Appendix A: Supplemental Information

A-1: Historical Aerial Photos
A-2: Historical Mapping
A-3: 2022 SI Habitat Mapping

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Appendix A-1: Historical Aerial Photos

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NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

EXEMPTION 3. (5 USC 552(b)(3))

Information exempted by other statutes

10 USC Section 130(e) Treatment of Certain Critical Infrastructure Security Information

Pages *5 - 100*

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Appendix A-2: Historical Mapping

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NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

EXEMPTION 3. (5 USC 552(b)(3))

Information exempted by other statutes

10 USC Section 130(e) Treatment of Certain Critical Infrastructure Security Information

Pages *103* - *124*

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Appendix A-3: 2022 SI Habitat Mapping

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NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

EXEMPTION 3. (5 USC 552(b)(3))

Information exempted by other statutes

10 USC Section 130(e) Treatment of Certain Critical Infrastructure Security Information

Pages *127* - *146*

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Appendix B: Field Forms and Photographic Log

B-1: Photographic Logs
B-2: Visitors Log
B-3: Daily MEC Activity Logs
B-4: Daily Safety Logs
B-5: Daily Safety Sign In
B-6: Daily QC Report
B-7: Chain-of-Custodies
B-8: Soil Sample Log
B-9: MC Field Logbook

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Appendix B-1: Photographic Logs

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NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 2 (SITE CC)

Date:	**Photographer:**
06/28/2022	Sjon Higgins

UXO 02, shipping container parts

Date:	**Photographer:**
06/28/2022	Sjon Higgins

UXO 02, shipping container parts

Date:	**Photographer:**
06/28/2022	Sjon Higgins

UXO 02, shipping container parts

Date:	**Photographer:**
06/28/2022	Sjon Higgins

UXO 02, shipping container parts

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts (Empty)

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 2 (SITE CC)


06/28/2022

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts (Empty)


06/28/2022

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts (Empty)


06/28/2022

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts


06/28/2022

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 2 (SITE CC)

06/28/2022

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts

08/06/2022

Date: 08/06/2022	**Photographer:** Nick Lyons

UXO 2 Shipping container pile
All shipping containers have been inspected and marked with “EMPTY” on containers.

08/06/2022

Date: 08/06/2022	**Photographer:** Nick Lyons

UXO 2 Shipping container pile – demil containers

08/06/2022

Date: 08/06/2022	**Photographer:** Tony Aguirre

UXO 2 MDAS: 40-mm Cartridge Cases Placing in MDAS Drums
Photo taken at Laydown Yard

Date: 06/28/2022	**Photographer:** Sjon Higgins

UXO 02, shipping container parts

Date: 08/06/2022	**Photographer:** Tony Aguirre

UXO 2 MDAS: 40-mm Cartridge Cases
Photo taken at Laydown Yard

Date: 08/06/2022	**Photographer:** Tony Aguirre

UXO 2 MDAS: 40-mm Cartridge Cases
Photo taken at Laydown Yard

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 3 (SITE D)

Date:
04/11/2022

Photographer:
Charlie Escola, Navy NTR

MDAS: UXO03-01, Munitions Debris, AN-M46, 100lb Photoflash Bomb

Date:
04/11/2022

Photographer:
Charlie Escola, Navy NTR

MDAS: UXO03-02, Munitions Debris, AN-M46, 100lb Photoflash Bomb

Date:
04/11/2022

Photographer:
Charlie Escola, Navy NTR

MDAS: UXO03-03, Munitions Debris, AN-M46, 100lb Photoflash Bomb

Date:
04/11/2022

Photographer:
Charlie Escola, Navy NTR

MDAS: UXO03-04, Munitions Debris, AN-M46, 100lb Photoflash Bomb

Date:
04/12/2022

Photographer:
Tony Aguirre

Total MDAS in secure barrel
Item ID: UXO03-05 to UXO03-11

Date:
04/18/2022

Photographer:
Anthony Aguirre

MDAS: AN-M46, 100lb Photoflash Bomb recovered at UXO 3, Item ID: UXO03-14 and UXO03-15
Photo taken at Laydown Yard

Date:
04/20/2022

Photographer:
Anthony Aguirre

MDAS: AN-M46, 100lb Photoflash Bomb recovered at UXO 3, Item ID: UXO03-16 to UXO03-18
Photo taken at Laydown Yard

Date:
04/21/2022

Photographer:
Anthony Aguirre

MDAS: AN-M46, 100lb Photoflash Bomb recovered at UXO 3, Item ID: UXO03-19 and UXO03-20
Photo taken at Laydown Yard

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 3 (SITE D)

Date:	**Photographer:**
04/26/2022	Anthony Aguirre

MDAS: AN-M46, 100lb Photoflash Bombs (5) recovered at UXO 3, Item ID: UXO03-21 to UXO03-25
Photo taken at Laydown Yard

Date:	**Photographer:**
04/27/2022	Anthony Aguirre

MDAS: AN-M46, 100lb Photoflash Bombs (2) recovered at UXO 3, Item ID: UXO03-26 and UXO03-27
Photo taken at Laydown Yard

Date:	**Photographer:**
05/01/2022	Anthony Aguirre

MDAS from UXO 03, AN-M46 Bomb Fragments (6), Item ID: UXO03-28 to UXO03-33
Photo taken at laydown yard

Date:	**Photographer:**
05/09/2022	Anthony Aguirre

UXO03 MDAS: MD, Bomb, Photoflash, AN-M46 (14), Item ID: UXO03-39 to UXO03-52
Photo taken at laydown yard

Date: 05/15/2022	**Photographer:** Anthony Aguirre

UXO 3 MDAS: AN-M46 Photoflash Bomb Fragments (8), Item ID: UXO03-73 to UXO03-80

Date: 05/16/2022	**Photographer:** Scott Elkind, Navy NTR

MEC, UXO 03: AN M46 photoflash Bomb
Item ID: 0301

Date: 05/16/2022	**Photographer:** Scott Elkind, Navy NTR

MEC, UXO 03: AN M46 photoflash Bomb
Item ID: 0301

Date: 05/16/2022	**Photographer:** Scott Elkind, Navy NTR

MEC, UXO 03: AN M46 photoflash Bomb
Item ID: 0301

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 3 (SITE D)

Date: 05/16/2022	**Photographer:** Anthony Aguirre

UXO 3 MDAS: AN-M46 Photoflash Bomb Fragments (6), Item ID: UXO03-81 to UXO03-86
Photo taken at Laydown Yard

Date: 05/17/2022	**Photographer:** Anthony Aguirre

Zoom in of UXO 3 MEC: AN-M46 Photoflash Bomb, Booster
Item ID: 0302

Date: 05/17/2022	**Photographer:** Anthony Aguirre

Bottom Angle Zoom in of UXO 3 MEC: AN-M46 Photoflash Bomb, Booster
Item ID: 0302

Date: 05/17/2022	**Photographer:** Anthony Aguirre

UXO 3 MEC: AN-M46 Photoflash Bomb, Booster
Item ID: 0302

Date: 05/18/2022	**Photographer:** Anthony Aguirre

UXO 3 MDAS: AN-M46 Photoflash Bomb Fragments (2), Item ID: UXO03-100 and UXO03-101
Photo taken at the Laydown Yard

Date: 05/18/2022	**Photographer:** Anthony Aguirre

UXO 3 MEC: AN-M46 Photoflash Bomb, Boosters (2)
Items ID: 0303 and 0304

Date: 05/18/2022	**Photographer:** Anthony Aguirre

Bottom Angle Zoom in of UXO 3 MEC: AN-M46 Photoflash Bomb, Boosters
Items ID: 0303 and 0304

Date: 06/01/2022	**Photographer:** Anthony Aguirre

UXO 3 MDAS from AN-M46 Photoflash Bombs (49), Item ID: UXO03-108 to UXO03-157
Photo taken at the Laydown Yard

Date: 06/01/2022	**Photographer:** Anthony Aguirre

UXO 3 MEC: AN-M46 Photo flash bomb, Booster
Item ID: 0305

Date: 06/01/2022	**Photographer:** Scott Elkind

UXO 03 MEC: AN-M46 Photo flash bomb
Item ID: 0306

Date: 06/01/2022	**Photographer:** Anthony Aguirre

UXO 3 MEC: AN-M46 Photo flash bomb, Booster
Item ID: 0307

Date: 06/06/2022	**Photographer:** Anthony Aguirre

UXO 3 MEC: Mk 19 Base Detonating Fuze (1)
Item ID: 0308

Date: 06/13/2022

Photographer: Anthony Aguirre

MEC Item: AN-M46 Photo flash bomb, Booster
Item ID: 0309

Date: 06/27/2022

Photographer: Sjon Higgins

UXO 3 MEC: AN-M46 Photo flash bomb, Booster
Item ID: 0310

Date: 06/28/2022

Photographer: Sjon Higgins

UXO 3 MEC: AN-M46 Photo flash bomb, Booster
Item ID: 0311

Date: 07/07/2022

Photographer: Anthony Aguirre

UXO 3 MDAS: AN-M46 Photoflash Bomb, Munitions Debris (6), Item ID: UXO03-197 to UXO03-202

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 3 (SITE D)

Date: 07/07/2022	**Photographer:** Anthony Aguirre

UXO 3 MDAS: AN-M46 Photoflash Bomb, Munitions Debris Zoom-in of white board, Item ID: UXO03-197 to UXO03-202

Date: 07/11/2022	**Photographer:** Nick Lyons

UXO 03 MDAS: AN-M46 Photoflash Bomb, MD (1), Item ID: UXO03-203

Date: 07/12/2011	**Photographer:** Nick Lyons

UXO 3 MDAS: AN-M46 Photoflash Bomb MD (38) and Projectile Unknown (1), Item ID: UXO03-204 to UXO03-242

Date: 07/13/2011	**Photographer:** Nick Lyons

UXO 03 MDAS: AN-M6 Photoflash Bomb Munitions Debris (82), Item ID: UXO03-243 to UXO03-325

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 3 (SITE D)

Date:
07/19/2022

Photographer:
Nick Lyons

UXO 03 MDAS: MD, Bomb, Unknown Model (13), Item ID: UXO03-328 to UXO03-340

Date:
07/19/2022

Photographer:
Nick Lyons

UXO 3 MEC: Booster, Bomb, Photoflash, AN-46 (1)
Item ID: 0312

Date:
07/25/2022

Photographer:
Nick Lyons

UXO 3 MEC: AN-M46 Photoflash Bomb Booster (1)
Item ID: 0313

Date:
08/16/2022

Photographer:
Nick Lyons

UXO 3 MEC: AN-M46 Photoflash Bomb (1)
Item ID: 0314

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 4 (SITE 9)

Date: 05/08/2022	**Photographer:** Anthony Aguirre

Surface Disposal Area
UXO04_SDA_02

Date: 05/08/2022	**Photographer:** Anthony Aguirre

Surface Disposal Area
UXO04_SDA_02

Date: 05/08/2022	**Photographer:** Anthony Aguirre

UXO04 MDAS: Fin Assembly, AN-M109A1 (2), Fin Assembly, AN-M103A1 (15), and MD, Fuze/Fuze adapter, Unknown (2); Item ID: UXO04-01 to UXO04-04

Date: 05/08/2022	**Photographer:** Anthony Aguirre

Surface Disposal Area
UXO04_SDA_01

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 4 (SITE 9)

Date: 05/08/2022	**Photographer:** Anthony Aguirre

Surface Disposal Area
UXO04_SDA_01

Date: 06/05/2022	**Photographer:** Scott Elkind

UXO 4 MDAS: M25 40 mm Dummy Cartridge (1) (Item Needs Demiled)
Item ID: UXO04-05

Date: 06/12/2022	**Photographer:** Anthony Aguirre

UXO 4 Bomb fin/shipping container demil
Pre-painting

Date: 06/12/2022	**Photographer:** Anthony Aguirre

UXO 4 Bomb fin/shipping container demil
Painted without stencil

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 4 (SITE 9)

Date: 06/12/2022	**Photographer:** Anthony Aguirre

UXO 4 Bomb fin/shipping container demil
OP5 required painted with "Empty" stencil placed on shipping container

Date: 06/12/2022	**Photographer:** Anthony Aguirre

UXO 4 MDAS: AN-M103A1 Fin Assembly (3), AN-M109A1/AN-M103A1 Fin Assembly (34), and MD Unknown Fuze/Fuze Adapter (4); Item ID: UXO04-46 to UXO04-53, Photo taken at Laydown Yard

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 6 (SITE 22)

Date: 10/10/2022	**Photographer:** Nick Lyons

UXO 6 MEC: Mk 2 Mod 1 Primer (1)
Item ID: 0606

Date: 10/10/2022	**Photographer:** Nick Lyons

UXO 06 MDAS: MD, Unknown (Various Signal Flare parts and pieces) (10)
Item ID: UXO06-01

Date: 10/10/2022	**Photographer:** Nick Lyons

UXO 6 MEC: Mk 22 Percussion Primer (5)
Item ID: 0601, 0602, 0603, 0604, and 0605

Date: 10/24/2022	**Date:** Nick Lyons

Range Related Debris and MDAS on UXO 06 Slope with Ropes for access

Date: 10/24/2022	**Photographer:** Nick Lyons

Barrels located on UXO 06 Slope Northern Area

Date: 10/24/2022	**Photographer:** Nick Lyons

Barrels located on UXO 06 Slope mixed with MDAS and Range Related Debris

Date: 10/24/2022	**Photographer:** Nick Lyons

Range Related Debris and MDAS on UXO 06 Slope with Ropes for access

Date: 10/24/2022	**Photographer:** Nick Lyons

Range Related Debris on UXO 06 Slope

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 6 (SITE 22)

Date: 10/24/2022	**Photographer:** Nick Lyons

Range Related Debris and MDAS on UXO 06 Slope

Date: 10/24/2022	**Photographer:** Nick Lyons

Barrels located on UXO 06 Slope mixed with MDAS and Range Related Debris

Date: 10/24/2022	**Photographer:** Nick Lyons

Barrels located on UXO 06 Slope mixed with MDAS and Range Related Debris

Date: 10/24/2022	**Photographer:** Nick Lyons

Cartridge Casing on UXO 06 Slope

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 6 (SITE 22)

Date: 10/24/2022	**Photographer:** Nick Lyons

Range Related Debris and MDAS on UXO 06 Slope

Date: 10/24/2022	**Photographer:** Nick Lyons

MEC and MDAS on UXO 06 Slope

Date: 10/24/2022	**Photographer:** Nick Lyons

MEC and MDAS on UXO 06 Slope

Date: 10/24/2022	**Photographer:** Nick Lyons

Range Related Debris and MDAS on UXO 06 Slope


10/24/22

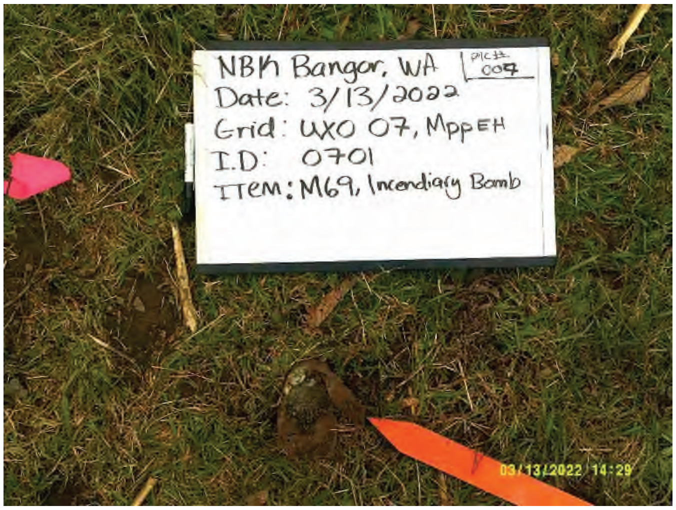
Date: 10/24/2022	**Photographer:** Nick Lyons

Range Related Debris and MDAS on UXO 06 Slope

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 07 (SITE 23)

Date:	**Photographer:**
03/13/2022	Tony Aguirre

Non-Munitions Related Debris (NMRD); trash pile, with drum and automobile pieces and parts



Date:	**Photographer:**
03/13/2022	Tony Aguirre

MEC Item (M69 incomplete incendiary bomb with residue); Item ID: 0701

Date:	**Photographer:**
03/13/2022	Tony Aguirre

M69 incomplete incendiary bomb with residue
Item ID: 0701

Date:	**Photographer:**
03/13/2022	Tony Aguirre

NMRD within the grid of UXO 07

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 7B (OU 1 SITE A)

Date:
07/07/2022

Photographer:
Nick Lyons

UXO 07B MDAS: Unknown Item MD (6), Fuze Unknown MD (1), Mk2 Cartridge Case (1), and Mk 376 Tail Fuze MD (1); Item ID: UXO07B-01 to UXO07B-09

Date:
07/07/2022

Photographer:
Nick Lyons

Munitions Debris with writing scribed on it: “Bangor NBK EOD”

Date:
07/10/2022

Photographer:
Anthony Aguirre

UXO 07B MDAS: Unknown Item MD (11), M48 Series Fuze MD (1), 75 mm Unknown Model Cartridge MD (1), and (1) Mk 19 Mod 1 Exploder Mechanism MD; Item ID: UXO07B-10 to UXO07B-23

Date:
07/17/2022

Photographer:
Nick Lyons

UXO 07B MEC: 40mm HE HE-I Mk 2 Projectile
Item ID: 07B02

Date:	**Photographer:**
07/17/2022	Nick Lyons

UXO 07B MEC: 40mm Unknown Model Projectile
Item ID: 07B01

Date:	**Photographer:**
07/18/2022	Anthony Aguirre

UXO 07B MDAS: MD, Bomb, Unknown Model (1)
Item ID: UXO07B-24

Date:	**Photographer:**
07/20/2022	Nick Lyons

UXO 07B MEC: Marker, Location, Marine,
Mk 25 Mod 1-3
Item ID: 07B03

Date:	**Photographer:**
07/20/2022	Nick Lyons

UXO 7B MDAS: MD, Marker, Location, Marine, Mk 25 Mod 1-3 (1) and MD, Unknown Item (2); Item ID: UXO07B-25 to UXO07B-27

Date: 07/21/2022

Photographer: Nick Lyons

UXO 07B MDAS: MD, Projectile, 75mm, Unknown model (1) and MD, Unknown Item (12); Item ID: UXO07B-28 to UXO07B-38

Date: 07/24/2022

Photographer: Nick L yons

UXO 7B MDAS: MD, Projectile, 37mm, APC-T, M51 (1) and MD, Unknown item (2)
Item ID: UXO07B-39 to UXO07B-41

Date: 07/24/2022

Photographer: Nick Lyons

UXO 07B MEC: Projectile, 75mm, HE, Unknown model
Item ID: 07B04

Date: 07/24/2022

Photographer: Nick Lyons

UXO 07B MEC: Closer angle of Item 07B04

Date: 09/21/2022	**Photographer:** Nick Lyons

UXO 07B, shipping end caps, pre UXO sweep team

Date: 09/21/2022	**Photographer:** Nick Lyons

UXO 07B shipping end caps

Date: 09/21/2022	**Photographer:** Nick Lyons

UXO 7B MDAS in Step out Western portion: Case, Cartridge, Model Unknown (2)
Item IDs: UXO7B-42 and UXO7B-43

Date: 09/21/2022	**Photographer:** Nick Lyons

UXO 07B, after UXO sweeps – Shipping end caps

Date: 08/15/2022	**Photographer:** Nick Lyons

UXO 9 MEC: M18 Smoke Hand Grenade (Yellow) (1)
Item ID: 0901

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 11 (SITE 14)

Date: 05/23/2022	**Photographer:** Scott Elkind

Deteriorated drums located in UXO 11

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 11B (SITE 8)

Date: 05/23/2022	**Photographer:** Scott Elkind

UXO 11B, ammunition cans taken out of Root cellar entrance

Date: 05/23/2022	**Photographer:** Scott Elkind

UXO 11B, inside photo of root cellar

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 17 (SITE 2)

Date:	**Photographer:**
05/09/2022	Anthony Aguirre

UXO 17 MDAS: Case, Cartridge, Mk 2 (1) and Case, Cartridge, Mk 3 (1)
Item ID: UXO17-01 and UXO 17-02

Date:	**Photographer:**
05/10/2022	Anthony Aguirre

UXO 17 MEC: MK 38 mod 3 5” projectile APHE - Break in diameter, Item ID: 1701

Date:	**Photographer:**
05/10/2022	Anthony Aguirre

UXO 17 MEC: MK 38 mod 3 5” projectile APHE - Ballistic windshield, Item ID: 1701

Date:	**Photographer:**
05/10/2022	Anthony Aguirre

UXO 17 MEC: MK 38 mod 3 5” projectile APHE - Projectile base, tracer and bd fuze rings, Item ID: 1701

NBK BANGOR - SITE PHOTOGRAPHIC LOG
UXO 17 (SITE 2)

Date: 05/10/2022	**Photographer:** Anthony Aguirre

UXO 17 MEC: MK 38 mod 3 5” projectile APHE - Full Projectile, Item ID: 1701

Date: 05/10/2022	**Photographer:** Anthony Aguirre

UXO 17 MEC: MK 38 mod 3 5” projectile APHE - Tail, unscored rotating band, MK 38 mod 3 “ comm on rotating band, Item ID: 1701

Date: 05/10/2022	**Photographer:** Anthony Aguirre

UXO 17 MEC: MK 38 mod 3 5” projectile APHE -
Unscored rotating band and strait boat tail
Item ID: 1701

Date: 06/13/2022	**Photographer:** Anthony Aguirre

UXO 17 MEC: Mk 46 Mod 2 5 in Special Common Projectile (1)
Item ID: 1705

Date:
06/13/2022

Photographer:
Anthony Aguirre

UXO 17 MEC: Mk 6 Unknown Mod 5 in. Warhead (1)
Item ID: 1702

Date:
06/13/2022

Photographer:
Anthony Aguirre

UXO 17 MEC: Mk 46 Mod 2 5 in Special Common Projectile (1)
Item ID: 1703

Date:
06/13/2022

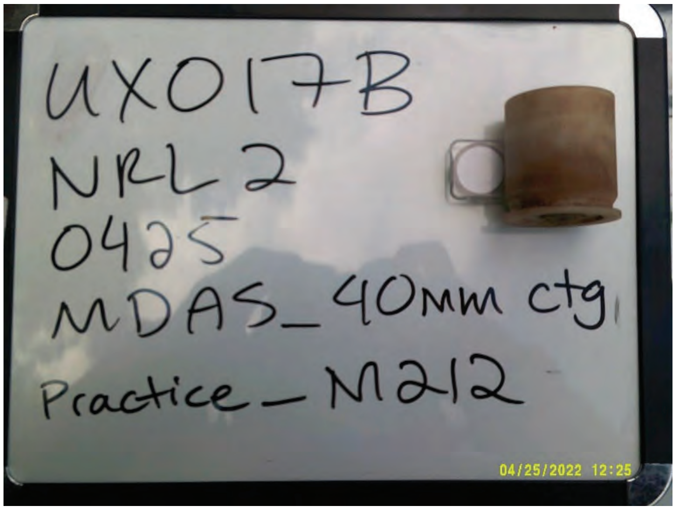
Photographer:
Anthony Aguirre

UXO 17 MEC: Mk 46 Mod 2 5 in Special Common Projectile (1)
Item ID: 1704

Date:
09/28/2022

Photographer:
Tony Aguirre

UXO 17 MDAS: Case, Cartridge, 3in, Mk 7 Mod 1 (1)
Item ID: UXO17-14



Date: 04/25/2022	**Photographer:** Anthony Aguirre

MDAS, UXO17B NRL2
M212, practice cartridge case, 40mm Case Only
Item ID: UXO017B-NR-01

NBK BANGOR - SITE PHOTOGRAPHIC LOG
GENERAL PROJECT PHOTOS

Date:
03/09/2022

Photographer:
Anthony Aguirre

ECA instrument verification strip

Date:
03/10/2022

Photographer:
Anthony Aguirre

Example of UXO 09 Wetlands SW recon in March 2022 showing wet conditions

Date:
03/21/2022

Photographer:
Anthony Aguirre

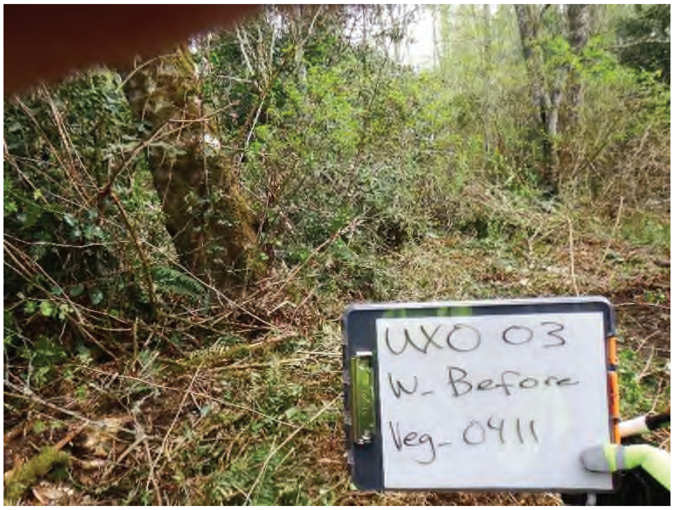
Example of UXO 17C Siding Before Vegetation Management (Siding 18)

Date:
03/23/2022

Photographer:
Anthony Aguirre

Example of UXO 17C Siding After Vegetation Management (Siding 18)

NBK BANGOR - SITE PHOTOGRAPHIC LOG
GENERAL PROJECT PHOTOS



Date: 04/11/2022	**Photographer:** Charlie Escola (Navy)

Example of UXO 3 Before Vegetation Management

Date: 04/11/2022	**Photographer:** Charlie Escola (Navy)

Example of UXO 3 After Vegetation Management

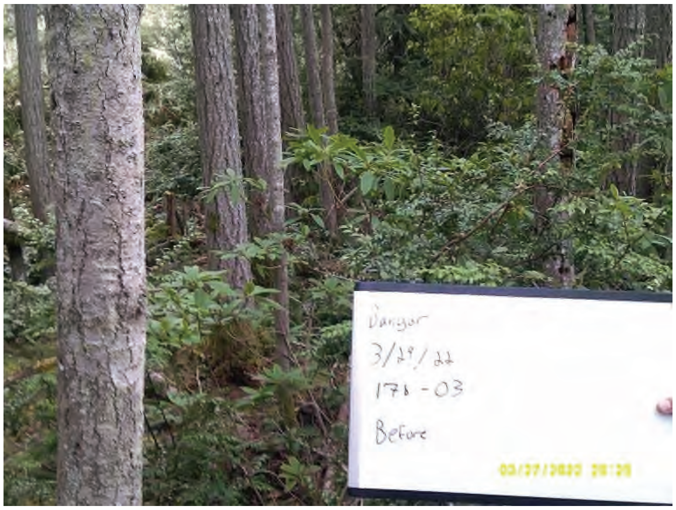
Date: 04/26/2022	**Photographer:** Scott Elkind (Navy)

Example of UXO 04 before vegetation management

Date: 04/26/2022	**Photographer:** Scott Elkind (Navy)

Example of UXO 04 after vegetation management

NBK BANGOR - SITE PHOTOGRAPHIC LOG
GENERAL PROJECT PHOTOS



Date:
03/29/2022

Photographer:
Anthony Aguirre

Example of UXO 17B Siding Before Vegetation Management (Siding 3)

Date:
04/28/2022

Photographer:
Anthony Aguirre

Example of UXO 17B Siding After Vegetation Management (Siding 3)

Date:
05/05/2022

Photographer:
Anthony Aguirre

Example of UXO 17 Before Vegetation Management

Date:
05/05/2022

Photographer:
Anthony Aguirre

Example of UXO 17 After Vegetation Management

NBK BANGOR - SITE PHOTOGRAPHIC LOG
GENERAL PROJECT PHOTOS

Date:
05/04/2022

Photographer:
Anthony Aguirre

UXO 17 Crane Operating Area

Date:
05/04/2022

Photographer:
Anthony Aguirre

Kaiser S12 Excavator

Date:
05/04/2022

Photographer:
Anthony Aguirre

Example of UXO 17 After Vegetation Management

Date:
05/19/2022

Photographer:
Anthony Aguirre

UXO 11 Southern Slope

NBK BANGOR - SITE PHOTOGRAPHIC LOG
GENERAL PROJECT PHOTOS

Date: 05/23/2022	**Photographer:** Scott Elkind (Navy)

UXO 7B After Vegetation Management

Date: 06/13/2022	**Photographer:** Anthony Aguirre

Laydown Yard and Conex Box

Date: 06/13/2022	**Photographer:** Anthony Aguirre

Laydown Yard and ITS

Date: 06/13/2022	**Photographer:** Anthony Aguirre

MDAS drums and Tetra Tech Entrance to Laydown

Date: 06/22/2022

Photographer: Sjon Higgins

UXO 02 pre-vegetation management

Date: 06/23/2022

Photographer: Sjon Higgins

UXO 02 vegetation management
Vegetation progress photo

Date: 03/11/2022

Photographer: Tony Aguirre

North to South, Cleared SI Area with Mounds

Date: 03/11/2022

Photographer: Tony Aguirre

Southwest Corner, SI Area Following Vegetation Management

Date: 09/22/2022	**Photographer:** Nick Lyons

UXO 6, Looking down into sloped area

Date: 09/22/2022	**Photographer:** Nick Lyons

UXO 6, Looking down into sloped area

Date: 10/07/2022	**Photographer:** Nick Lyons

UXO 06 Step-out, Vegetation Management plus 15’ safety line

Date: 05/23/2022	**Photographer:** Scott Elkind

UXO 11B after vegetation management, progression photo

Date: 07/17/2022	**Photographer:** Nick Lyons

UXO 12 Pre-vegetation management

Date: 07/30/2022	**Photographer:** Nick Lyons

UXO 12 After Vegetation Management

Date: 06/20/2022	**Photographer:** Sjon Higgins

UXO 13 pre-vegetation management
West Side

Date: 06/21/2022	**Photographer:** Sjon Higgins

UXO 13 vegetation management
Vegetation Progress Photo

Date: 09/24/2022	**Photographer:** Nick Lyons

Hydraulic spill on ground, contaminated soil has been removed

Date: 09/24/2022	**Photographer:** Nick Lyons

Hydraulic spill on ground

Date: 09/24/2022	**Photographer:** Nick Lyons

Hydraulic spill, being double bagged and excavated

Date: 09/24/2022	**Photographer:** Nick Lyons

Hydraulic spill after, contaminated soil has been removed

NBK BANGOR - SITE PHOTOGRAPHIC LOG
MEC MANAGEMENT & DETONATIONS

Date:
03/15/2022

Photographer:
Anthony Aguirre

Example of Placards on MEC transportation truck

Date:
03/13/2022

Photographer:
Anthony Aguirre

Example of full construction of consolidation point for MEC items

Date:
03/15/2022

Photographer:
Anthony Aguirre

Example of MEC transportation set up, bed of truck

Date:
03/15/2022

Photographer:
Anthony Aguirre

Example of MEC transportation ops, back of truck

NBK BANGOR - SITE PHOTOGRAPHIC LOG
MEC MANAGEMENT & DETONATIONS

10/11/22

Date: 10/11/2022	**Photographer:** Nick Lyons

Keyport Annex Magazine, MEC items for Demo Prep

10/11/22

Date: 10/11/2022	**Photographer:** Nick Lyons

Keyport Annex Magazine, MEC items for Demo Prep

10/11/22

Date: 10/11/2022	**Photographer:** Nick Lyons

Keyport Annex Magazine, MEC items for Demo Prep

10/31/22

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition shot hole marking

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition shot hole marking

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition Prep, Supersack filled with soil

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition Prep

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition Prep

NBK BANGOR - SITE PHOTOGRAPHIC LOG
MEC MANAGEMENT & DETONATIONS

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition Prep, hole digging for BEM

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition Prep, Supersacks

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition Prep, Shot holes covered with Plywood and marked “HOLE”

Date: 10/31/2022	**Photographer:** Nick Lyons

Demolition Prep, Supersacks and plywood staged at perspective shot holes

NBK BANGOR - SITE PHOTOGRAPHIC LOG
MEC MANAGEMENT & DETONATIONS

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot work up

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot work up

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot work up

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot work up with detonation cord

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot work up with detonation cord

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot work up

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot work up with Super Sacks/tamped BEM

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot after hole explosive use

NBK BANGOR - SITE PHOTOGRAPHIC LOG
MEC MANAGEMENT & DETONATIONS


11/02/22

Date: 11/02/2022	**Photographer:** Nick Lyons

Demo Shot hole after explosive use


11/02/22

Date: 11/02/2022	**Photographer:** Nick Lyons

Clearing Demo shot with Metal Detector


11/02/22

Date: 11/02/2022	**Photographer:** Nick Lyons

MDAS collection after demo shots


11/02/22

Date: 11/02/2022	**Photographer:** Nick Lyons

MC Sampling after demo shot 3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 03/09/2022

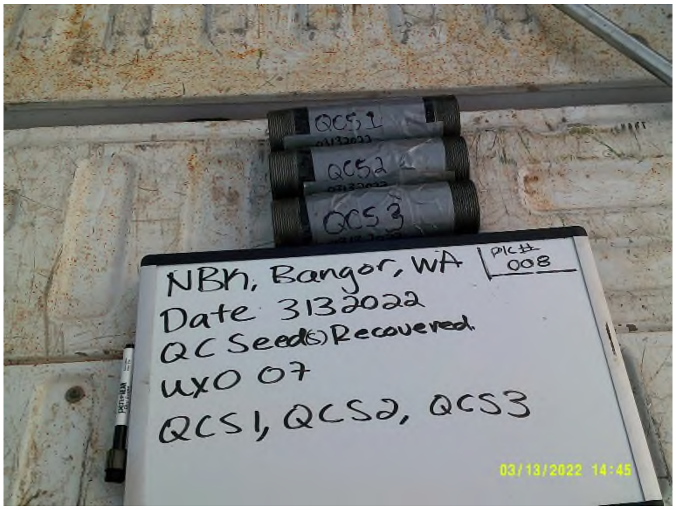
Photographer: Tony Aguirre

Surface QC seed, medium ISO

Date: 03/09/2022

Photographer: Tony Aguirre

Surface QC seed, medium ISO, Trimble Screen Shot, QCS2 030922



Date: 03/13/2022

Photographer: Tony Aguirre

Recovered QC seeds from team surface sweep

Date: 03/15/2022

Photographer: Tony Aguirre

QC seed surface medium ISO, QCS203152022

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:
03/15/2022

Photographer:
Tony Aguirre

QC seed surface medium ISO, QCS303152022

Date:
03/15/2022

Photographer:
Tony Aguirre

QC seed surface medium ISO, QCS103152022

Date:
03/15/2022

Photographer:
Tony Aguirre

QC seed surface medium ISO, QCS403152022

Date:
03/17/2022

Photographer:
Tony Aguirre

QC Surface seed, Medium ISO,
QCS1UXO17C 03172022

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 03/17/2022	**Photographer:** Tony Aguirre

QC seed surface medium ISO, QCS1uxo17c03172022

Date: 03/17/2022	**Photographer:** Tony Aguirre

QC seed surface medium ISO, QCS2uxo17c03172022

Date: 03/17/2022	**Photographer:** Tony Aguirre

QC seed surface medium ISO, QCS3uxo17c03172022

Date: 03/17/2022	**Photographer:** Tony Aguirre

QC Surface seed, Medium ISO
QCS2UXO17C 03172022

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:	**Photographer:**
03/17/2022	Tony Aguirre

QC Surface seed, Medium ISO
QCS3UXO17C 03172022

Date:	**Photographer:**
03/17/2022	Tony Aguirre

QC Surface seed, Medium ISO
QCS4UXO17C 03172022

Date:	**Photographer:**
03/23/22	Tony Aguirre

QC Seed Medium ISO, Siding 19
QCS1 UXO17C 032322

Date:	**Photographer:**
03/23/22	Tony Aguirre

QC Seed Medium ISO, Siding 18
QCS2 UXO17C 032322

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:	**Photographer:**
03/23/22	Tony Aguirre

QC Seed Medium ISO, Siding 17
QCS3 UXO17C 032322

Date:	**Photographer:**
03/28/2022	Tony Aguirre

QC Seed Northern rail line, Small ISO
QCS1 UXO17C 0328

Date:	**Photographer:**
03/28/2022	Tony Aguirre

QC Seed Northern rail line, Small ISO
QCS2 UXO17C 0328

Date:	**Photographer:**
03/28/2022	Tony Aguirre

QC Seed Northern rail line, Small ISO
QCS3 UXO17C 0328

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 03/29/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B
QCS1 UXO17B 0329

Date: 03/29/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B
QCS3 UXO17B 0329

Date: 03/29/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B
QCS2 UXO17B 0329

Date: 03/30/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #14
QCS3 UXO17B 0330

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:
03/30/2022

Photographer:
Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #12
QCS1 UXO17B 0330

Date:
03/30/2022

Photographer:
Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #12
QCS2 UXO17B 0330

Date:
04/03/2022

Photographer:
Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #8
QCS1 UXO17C 0403

Date:
04/03/2022

Photographer:
Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #8
QCS2 UXO17C 0403

Date: 04/04/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #7
QCS1 UXO17B 0404 Sid07

Date: 04/04/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #7
QCS2 UXO17B 0404 Sid 07

Date: 04/05/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #20
QCS1 UXO17B 0405 S20

Date: 04/05/2022	**Photographer:** Tony Aguirre

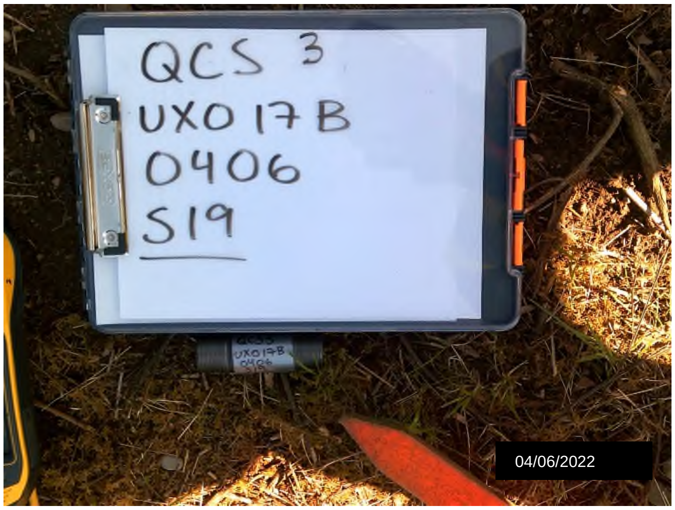
QC Seed small ISO, UXO 17B, Siding #20
QCS2 UXO17B 0405 S20

Date:	Photographer:
04/06/2022	Anthony Aguirre

QC Seed small ISO, UXO 17B, Siding #19
QC1 UXO 17B 0406 S19

Date:	Photographer:
04/06/2022	Anthony Aguirre

QC Seed small ISO, UXO 17B, Siding #19
QC2 UXO 17B, 0406 S19



Date:	Photographer:
04/06/2022	Anthony Aguirre

QC Seed small ISO, UXO 17B, Siding #19
QC3 UXO 17B 0406 S19

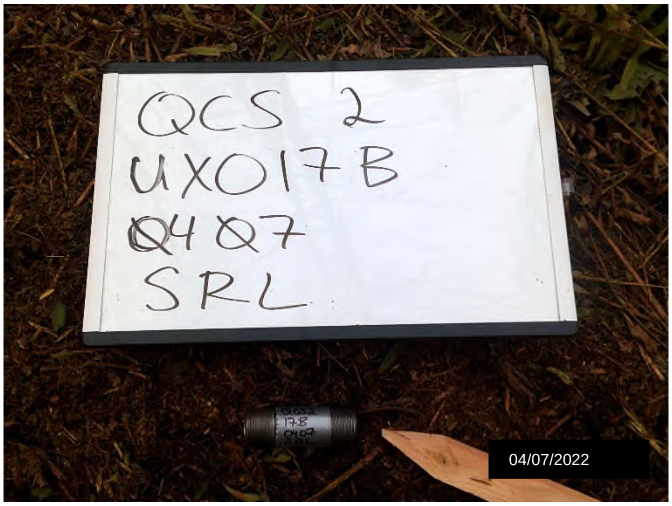
Date:	Photographer:
04/06/2022	Anthony Aguirre

QC Seed small ISO, UXO 17B, Siding #19
QC4 UXO 17B 0406 S19

Date:
04/07/2022

Photographer:
Tony Aguirre

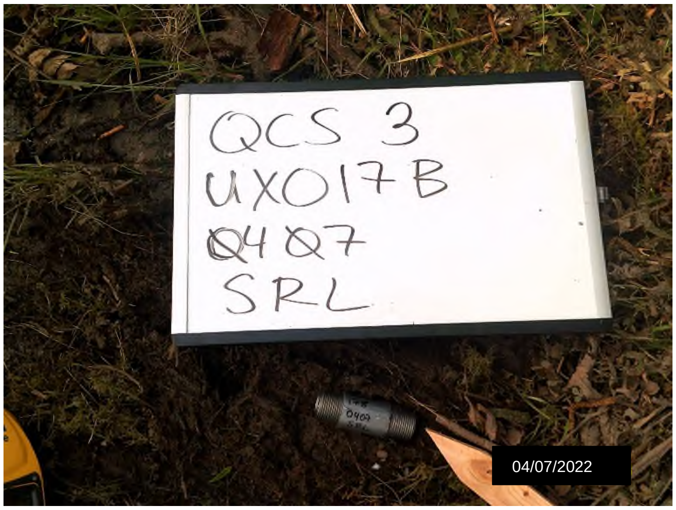
QC Seed small ISO, UXO 17B, Southern Rail Line
QCS1 UXO17B 0407 SRL



Date:
04/07/2022

Photographer:
Tony Aguirre

QC Seed small ISO, UXO 17B, Southern Rail Line
QCS2 UXO17B 0407 SRL



Date:
04/07/2022

Photographer:
Tony Aguirre

QC Seed small ISO, UXO 17B, Southern Rail Line
QCS3 UXO17B 0407 SRL

Date:
04/10/2022

Photographer:
Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #16
QCS3 UXO17B 0410 S16

Date: 04/10/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #17
QCS1 UXO17B 0410 S17

Date: 04/10/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #17
QCS2 UXO17B 0410 S17

Date: 04/11/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #15
QCS2 UXO17B 0411 S15

Date: 04/11/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #1
QCS3 UXO17B 0411 S01

TETRA TECH

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 04/11/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #15
QCS1 UXO17B 0411 S15

Date: 04/12/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #4
QCS2 UXO17B 0412 S04

Date: 04/12/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #4
QCS3 UXO17B 0412 S04

Date: 04/12/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17B, Siding #6
QCS1 UXO17B 0412 S06

Date: 04/13/2022

Photographer: Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #1
QCS1 UXO17C 0413 S01

Date: 04/13/2022

Photographer: Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #1
QCS2 UXO17C 0413 S01

Date: 04/13/2022

Photographer: Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #2
QCS3 UXO17C 0413 S02

Date: 04/13/2022

Photographer: Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #2
QCS3 UXO17C 0413 S02

Date: 04/14/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #3
QC1 Seed small ISO, UXO 17C, S03

Date: 04/14/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #3
QC2 Seed small ISO, UXO 17C, S03

Date: 04/14/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #5
QC3 Seed small ISO, UXO 17C, S05

Date: 04/14/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #5
QC4 Seed small ISO, UXO 17C, S05

Date:	Photographer:
04/14/2022	Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #7
QC1 Seed small ISO, UXO 17C, S07

Date:	Photographer:
04/14/2022	Tony Aguirre

QC Seed small ISO, UXO 17C, Siding #7
QC2 Seed small ISO, UXO 17C, S07

Date:	Photographer:
04/18/2022	Anthony Aguirre

QC Seed small ISO, UXO 17C, Siding #9
QC1 UXO 17C 0418 S09

Date:	Photographer:
04/18/2022	Anthony Aguirre

QC Seed small ISO, UXO 17C, Siding #9
QC2 UXO 17C 0418 S09

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 04/18/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 17C, Siding #18
QC3 UXO 17C 0418 S10

Date: 04/18/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 17C, Siding #10
QC4 UXO 17C 0418 S10

Date: 04/20/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 17C, Southern Rail Line
QCS1 UXO 17C 0420 SRL

Date: 04/20/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 17C, Southern Rail Line
QCS2 UXO 17C 0420 SRL

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:
04/20/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 17C, Southern Rail Line
QCS3 UXO 17C 0420 SRL

Date:
04/21/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 03 Siding #13
QCS1 UXO 17B 0421 S13

Date:
04/21/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 03 Siding #18
QCS2 UXO 17B 0421 S18

Date:
04/24/2022

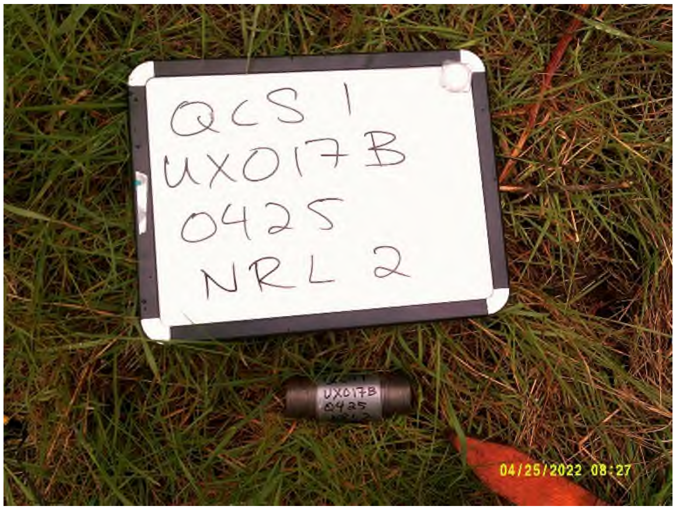
Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 17B Northern Rail Line Section 1
QCS1 UXO 17B 0424 NRL1

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 04/24/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Northern Rail Line
Section 1
QCS2 UXO 17B 0424 NRL1

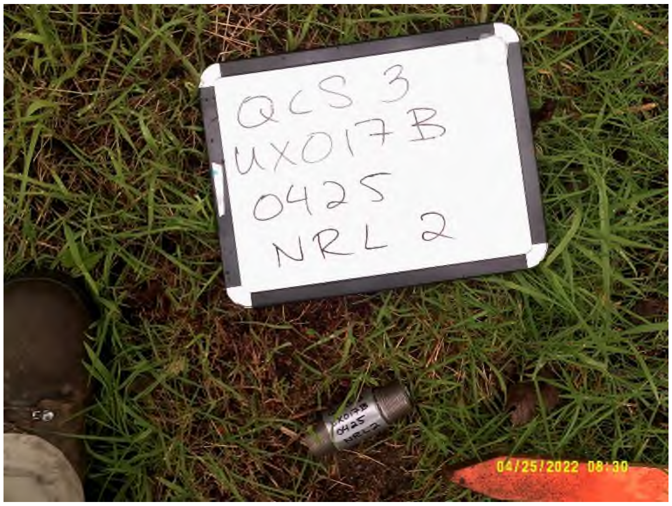


Date: 04/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Northern Rail Line
Section 2
QCS1 UXO 17B 0425 NRL2

Date: 04/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Northern Rail Line
Section 2
QCS2 UXO 17B 0425 NRL2



Date: 04/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Northern Rail Line
Section 2
QCS3 UXO 17B 0425 NRL2

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 04/26/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Northern Rail Line Section 3
QCS3 UXO 17B 0426 NRL3

Date: 04/26/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Siding #11
QCS1 UXO 17B 0426 S11

Date: 04/26/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Northern Rail Line Section 3
QCS2 UXO 17B 0426 NRL3

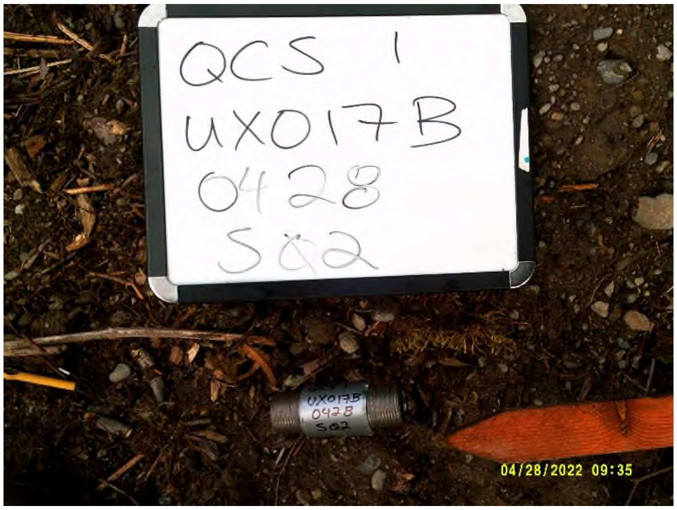
Date: 04/28/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Siding #3
QCS3 UXO 17B 0428 S03

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 04/28/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Siding #3
QCS2 UXO 17B 0428 S03



Date: 04/28/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17B Siding #2
QCS1 UXO 17B 0428 S02

Date: 05/03/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid M4
QCS3 UXO 17 0503 M4

Date: 05/03/2022	**Photographer:** Anthony Aguirre

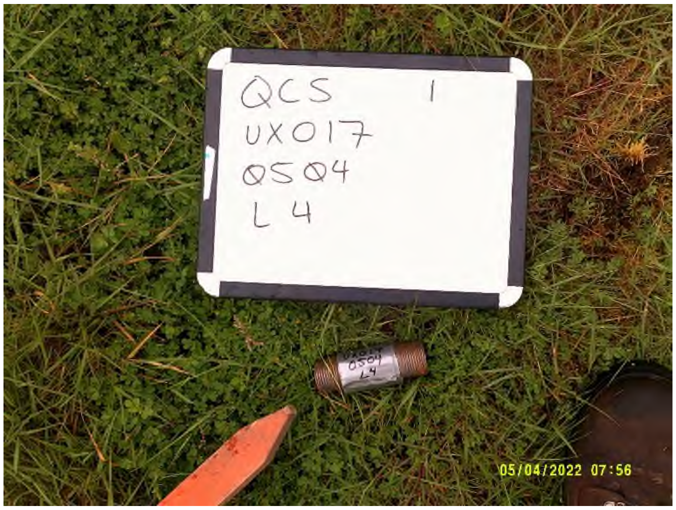
QC Seed small ISO, UXO 17 Grid M3
QCS2 UXO 17 0503 M3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 05/03/2022

Photographer: Anthony Aguirre

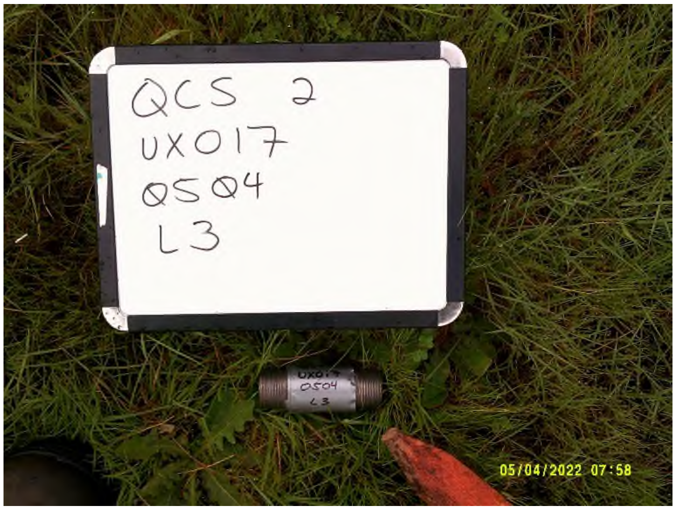
QC Seed small ISO, UXO 17 Grid M2
QCS1 UXO 17 0503 M2



Date: 05/04/2022

Photographer: Tony Aguirre

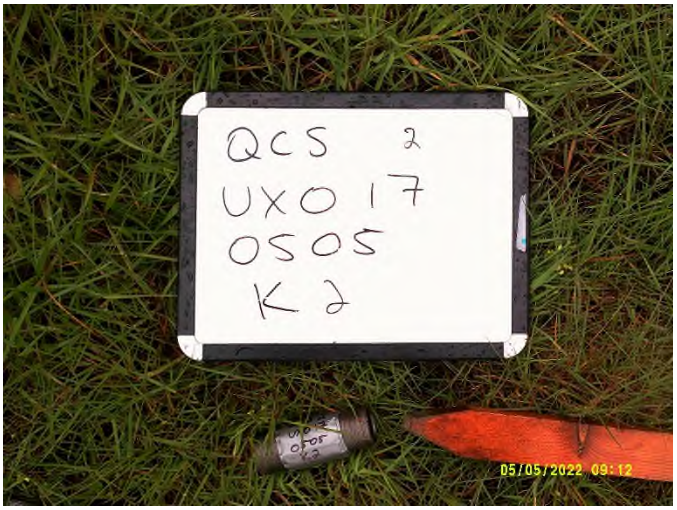
QC Seed small ISO, UXO 17 Grid L4
QCS1 UXO 17 0504 L4



Date: 05/04/2022

Photographer: Tony Aguirre

QC Seed small ISO, UXO 17 Grid L3
QCS2 UXO 17 0504 L3



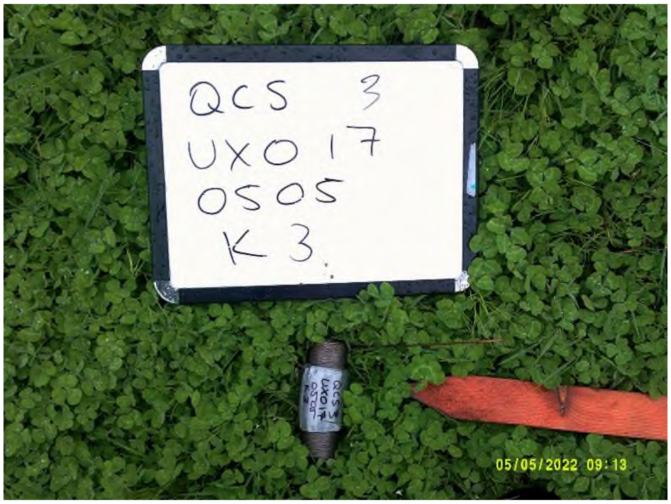
Date: 05/05/2022

Photographer: Tony Aguirre

QC Seed small ISO, UXO 17 Grid K2
QCS2 UXO17 0505 K2

Date: 05/05/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17 Grid K1
QCS1 UXO17 0505 K1



Date: 05/05/2022	**Photographer:** Tony Aguirre

QC Seed small ISO, UXO 17 Grid K3
QCS2 UXO17 0505 K2

Date: 05/08/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid J3
QCS1 UXO17 0508 J3

Date: 05/08/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid J3
QCS2 UXO17 0508 J3

Date: 05/08/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid J4
QCS3 UXO17 0508 J4

Date: 05/17/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid c6
QCS3 UXO03 0517 c6

Date: 05/17/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid c5
QCS2 UXO03 0517 c5

Date: 05/17/2022	**Photographer:** Anthony Aguirre

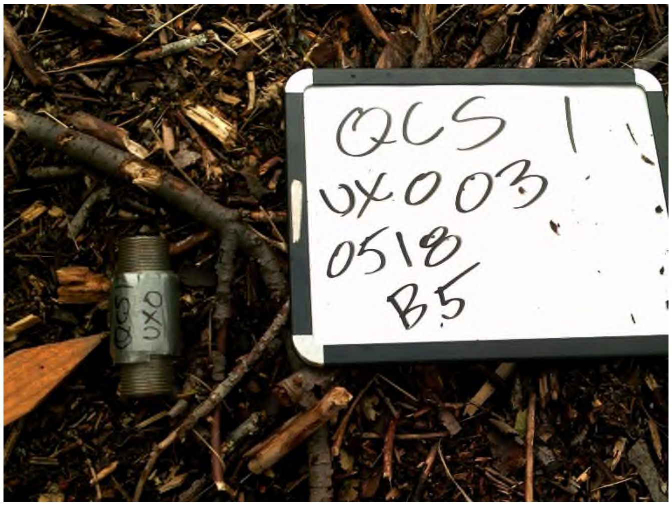
QC Seed small ISO, UXO 03 Grid b5
QCS3 UXO03 0517 b5

Date: 05/17/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid c6
QCS4 UXO03 0517 c6

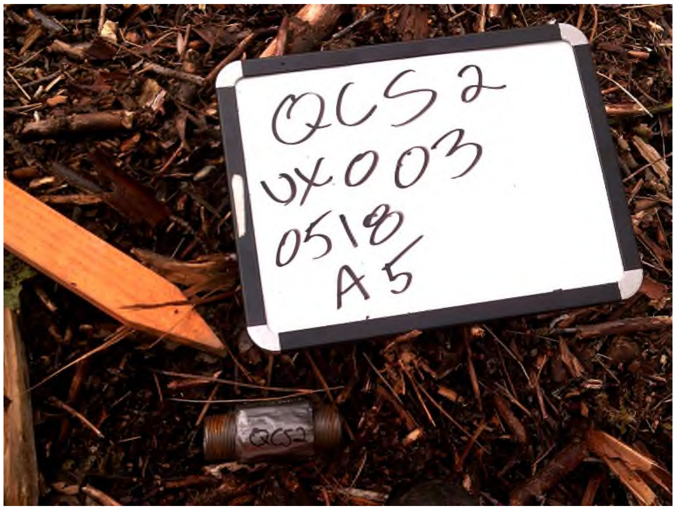
Date: 05/17/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid c5
QCS1 UXO03 0517 c5



Date: 05/18/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid b5
QCS1 UXO03 0518 b5



Date: 05/18/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid a5
QCS2 UXO03 0518 a5

TETRA TECH

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 05/18/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid a5
QCS3 UXO03 0518 a5

Date: 05/22/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid b3
QCS2 UXO03 0522 b3

Date: 05/22/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid a3
QCS3 UXO03 0522 a3

Date: 05/22/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid a4
QCS4 UXO03 0522 a4

Date:
05/22/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 03 Grid b3
QCS1 UXO03 0522 b3

Date:
05/22/2022

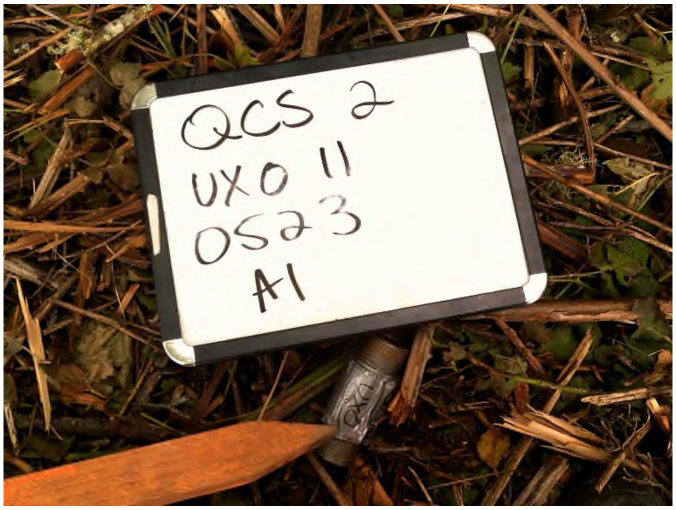
Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 03 Grid b4
QCS5 UXO03 0522 b4

Date:
05/23/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 11 Grid a1
QCS1 UXO11 0523 a1



Date:
05/23/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 11 Grid a1
QCS2 UXO11 0523 a1

Date: 05/24/2022	**Photographer:** Anthony Aguirre

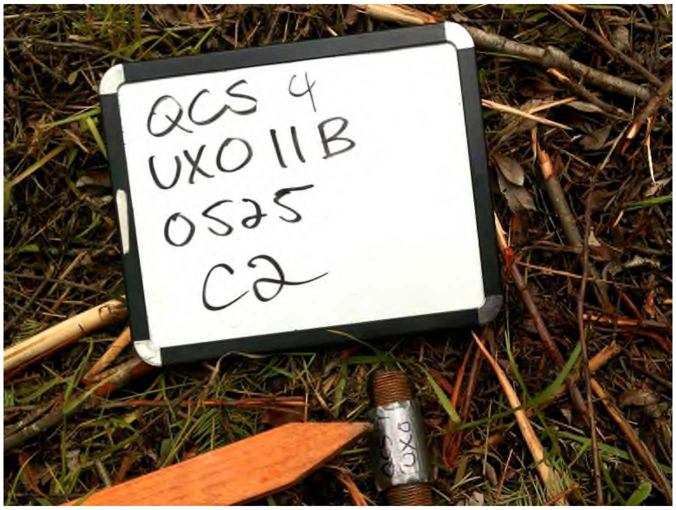
QC Seed small ISO, UXO 11 Grid b1
QCS1 UXO11 0524 b1

Date: 05/24/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11 Grid b1
QCS2 UXO11 0524 b1

Date: 05/24/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11 Grid b2
QCS3 UXO11 0524 b2

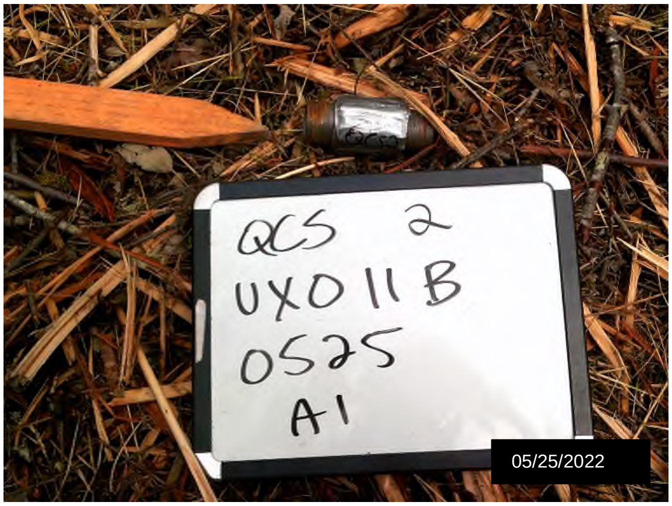


Date: 05/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11B Grid c2
QCS4 UXO11B 0525 c2

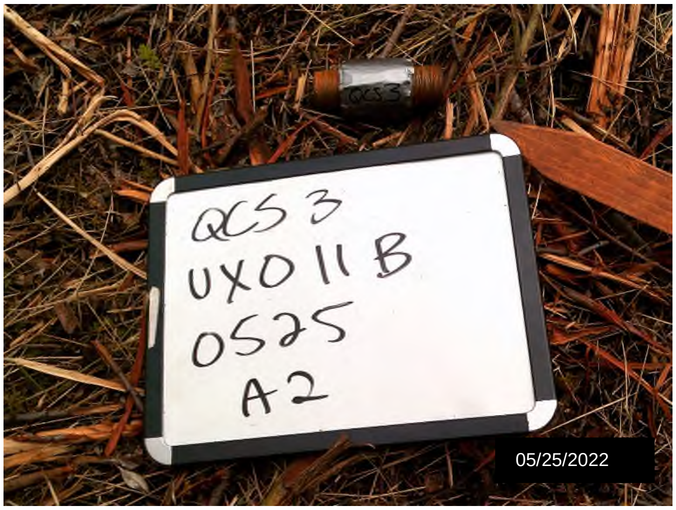
Date: 05/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11B Grid a1
QCS1 UXO11B 0525 a1



Date: 05/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11B Grid a1
QCS2 UXO11B 0525 a1



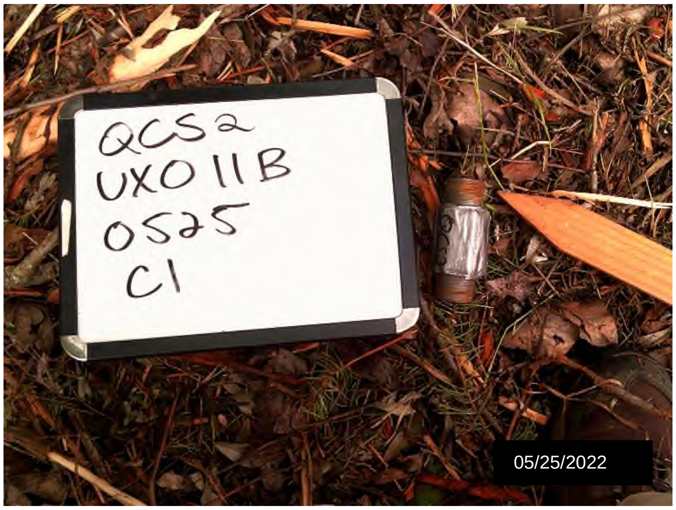
Date: 05/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11B Grid a2
QCS3 UXO11B 0525 a2

Date: 05/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11B Grid c1
QCS1 UXO11B 0525 c1

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

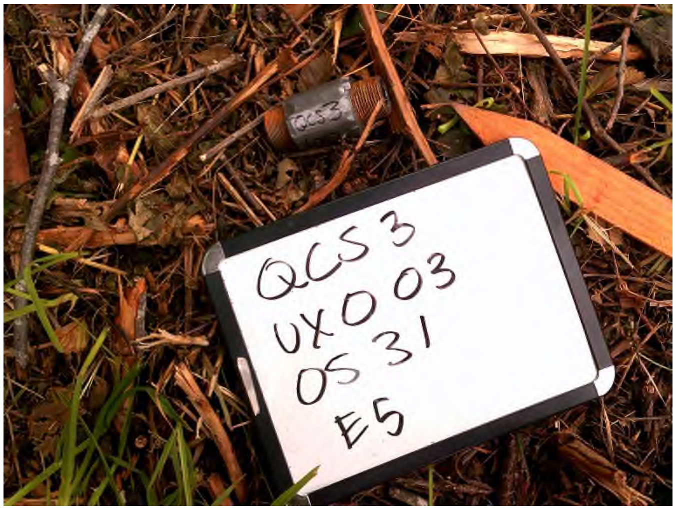


Date: 05/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11B Grid c1
QCS2 UXO11B 0525 c1

Date: 05/25/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 11B Grid c2
QCS3 UXO11B 0525 c2



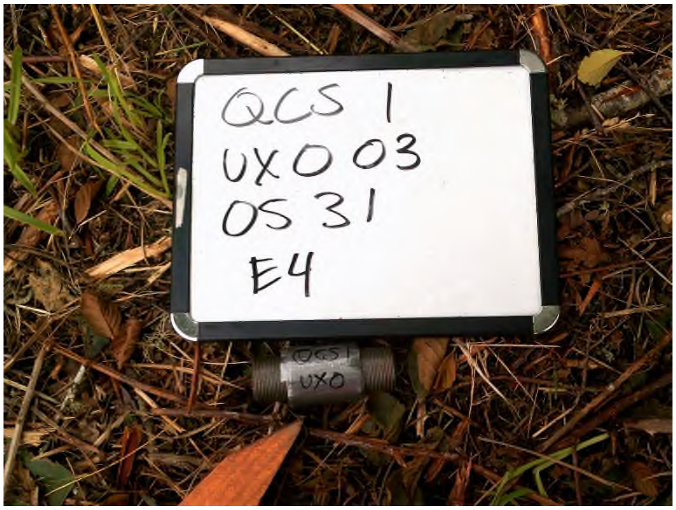
Date: 05/31/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid e5
QCS3 UXO03 0531 e5

Date: 05/31/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid e5
QCS4 UXO03 0531 e5

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS



Date: 05/31/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid e4
QCS1 UXO03 0531 e4

Date: 05/31/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid e4
QCS2 UXO03 0531 e4

Date: 06/01/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid g6
QCS1 UXO03 0601 g6

Date: 06/01/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid g6
QCS2 UXO03 0601 g6

Date: 06/01/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid g5
QCS3 UXO03 0601 g5

Date: 06/01/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid g5
QCS4 UXO03 0601 g5

Date: 06/02/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 03 Grid i6
QCS3 UXO03 0602 i6

Date: 06/02/2022	**Photographer:** Anthony Aguirre

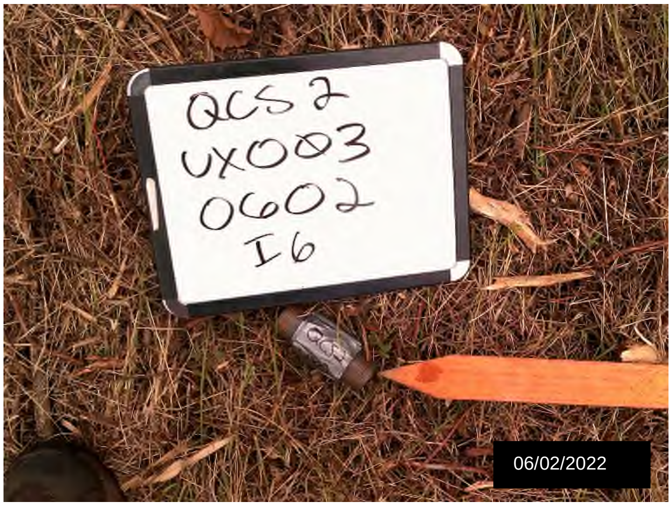
QC Seed small ISO, UXO 03 Grid i6
QCS4 UXO03 0602 i6

06/02/2022

Date: 06/02/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 03 Grid i7
QCS1 UXO03 0602 i7



06/02/2022

Date: 06/02/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 03 Grid i6
QCS2 UXO03 0602 i6

06/05/2022 07:52

Date: 06/05/2022

Photographer: Anthony Aguirre

QC Seed medium ISO, UXO 04 Grid F2
QCS5 UXO04 0605 F2

06/05/2022 07:55

Date: 06/05/2022

Photographer: Anthony Aguirre

QC Seed medium ISO, UXO 04 Grid F2
QCS6 UXO04 0605 F2

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 06/05/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 04 Grid D1
QCS1 UXO04 0508 D1

Date: 06/05/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 04 Grid D2
QCS2 UXO04 0508 D2

Date: 06/05/2022

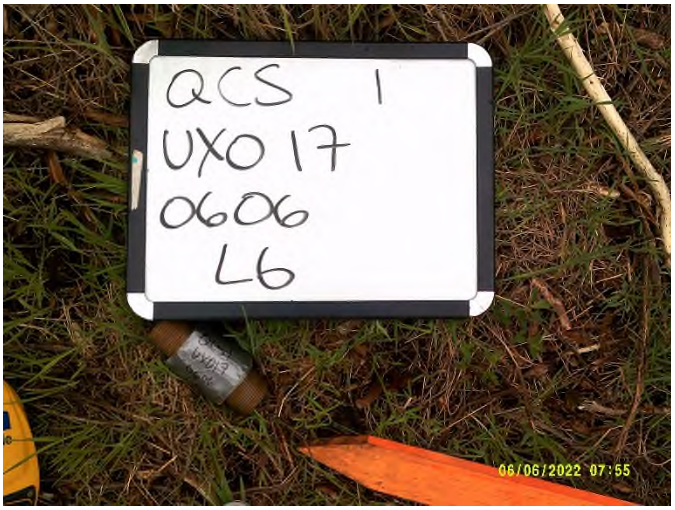
Photographer: Anthony Aguirre

QC Seed medium ISO, UXO 04 Grid F2
QCS3 UXO04 0605 F2

Date: 06/05/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 04 Grid E2
QCS4 UXO04 0605 E2



Date: 06/06/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid L6
QCS1 UXO17 0606 L6

Date: 06/06/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid j5
QCS2 UXO17 0606 j5

Date: 06/06/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid j5
QCS3 UXO17 0606 j5

Date: 06/06/2022	**Photographer:** Anthony Aguirre

QC Seed medium ISO, UXO 17 Grid i4
QCS4 UXO17 0606 i4

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 06/06/2022	**Photographer:** Anthony Aguirre

QC Seed medium ISO, UXO 17 Grid i4
QCS5 UXO17 0606 i4

Date: 06/07/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid i5
QCS1 UXO17 0607 i5

Date: 06/07/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid h5
QCS2 UXO17 0607 h5

Date: 06/07/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid h4
QCS3 UXO17 0607 h4

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 06/07/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid h3
QCS4 UXO17 0607 h3

Date: 06/07/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid i3
QCS5 UXO17 0607 i3

Date: 06/08/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid f4
QCS5 UXO17 0608 f4

Date: 06/08/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid f3
QCS4 UXO17 0608 f3

TETRA TECH

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 06/08/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid g4
QCS1 UXO17 0608 g4

Date: 06/08/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid g3
QCS3 UXO17 0608 g3

Date: 06/09/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid j2
QCS5 UXO17 0609 j2

Date: 06/09/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid i1
QCS4 UXO17 0609 i1

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:
06/09/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 17 Grid i2
QCS1 UXO17 0609 i2

Date:
06/09/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 17 Grid i2
QCS2 UXO17 0609 i2

Date:
06/09/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 17 Grid i1
QCS3 UXO17 0609 i1

[redacted]

Date:
06/12/2022

Photographer:
Anthony Aguirre

QC Seed medium ISO, UXO 04 Grid f3
QCS5 UXO04 0612 f3

Date: 06/12/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 04 Grid h3
QCS1 UXO04 0612 h3

Date: 06/12/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 04 Grid g3
QCS2 UXO04 0612 g3

Date: 06/12/2022	**Photographer:** Anthony Aguirre

QC Seed medium ISO, UXO 04 Grid g3
QCS3 UXO04 0612 g3

Date: 06/12/2022	**Photographer:** Anthony Aguirre

QC Seed medium ISO, UXO 04 Grid f3
QCS4 UXO04 0612 f3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

[redacted]

Date:
06/12/2022

Photographer:
Anthony Aguirre

QC Seed medium ISO, UXO 04 Grid f3
QCS5 UXO04 0612 f3

Date:
06/13/2022

Photographer:
Anthony Aguirre

QC Seed medium ISO, UXO 17 Grid A3
QCS3 UXO17 0613 A3

Date:
06/13/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 17 Grid A3
QCS1 UXO17 0613 A3

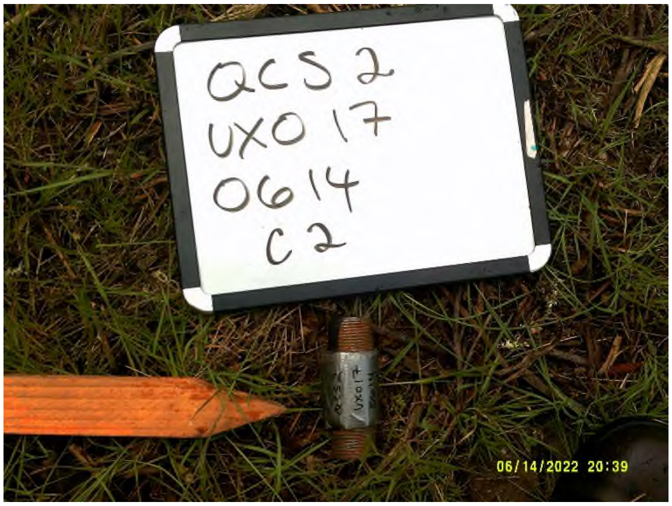
Date:
06/13/2022

Photographer:
Anthony Aguirre

QC Seed small ISO, UXO 17 Grid A3
QCS2 UXO17 0613 A3

Date: 06/13/2022	**Photographer:** Anthony Aguirre

QC Seed medium ISO, UXO 17 Grid A4
QCS4 UXO17 0613 A4



Date: 06/14/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid C2
QCS2 UXO17 0614 C2

Date: 06/14/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid C3
QCS3 UXO17 0614 C3

Date: 06/14/2022	**Photographer:** Anthony Aguirre

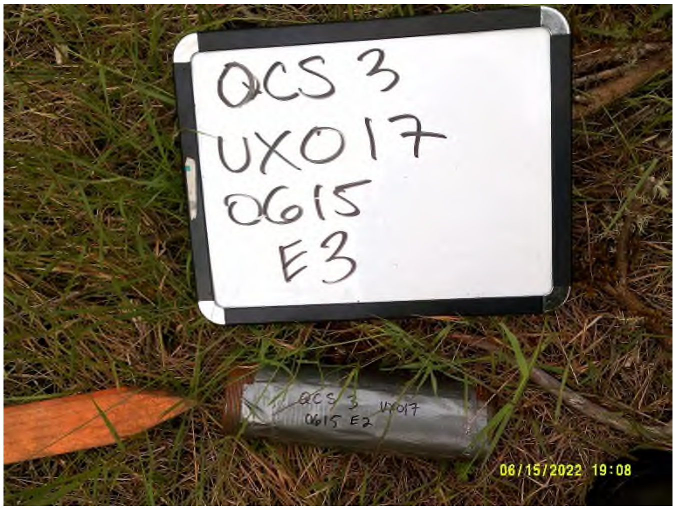
QC Seed small ISO, UXO 17 Grid B2
QCS1 UXO17 0614 B2

Date: 06/15/2022	**Photographer:** Anthony Aguirre

QC Seed small ISO, UXO 17 Grid D1
QCS1 UXO17 0615 D1

Date: 06/15/2022	**Photographer:** Anthony Aguirre

QC Seed medium ISO, UXO 17 Grid D2
QCS2 UXO17 0615 D2



Date: 06/15/2022	**Photographer:** Anthony Aguirre

QC Seed medium ISO, UXO 17 Grid E3
QCS3 UXO17 0615 E3

Date: 06/15/2022	**Photographer:** Anthony Aguirre

QC Seed medium ISO, UXO 17 Grid E3
QCS4 UXO17 0615 E3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 06/16/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 17 Grid f1
QCS1 UXO17 0616 f1

Date: 06/16/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 17 Grid f2
QCS2 UXO17 0616 f2

Date: 06/16/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 17 Grid g1
QCS3 UXO17 0616 g1

Date: 06/16/2022

Photographer: Anthony Aguirre

QC Seed small ISO, UXO 17 Grid g2
QCS4 UXO17 0616 g2

Date:
06/20/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 03 Grid L5
QCS1 UXO03 0620 L5

Date:
06/20/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 03 Grid L3
QCS2 UXO03 0620 L3

Date:
06/20/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 03 Grid m5
QCS3 UXO03 0620 m5

Date:
06/21/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 03 Grid k2
QCS1 UXO03 0621 k2

Date:	**Photographer:**
06/21/2022	Sjon Higgins

QC Seed small ISO, UXO 03 Grid k5
QCS4 UXO03 0621 k5

Date:	**Photographer:**
06/21/2022	Sjon Higgins

QC Seed small ISO, UXO 03 Grid k4
QCS3 UXO03 0621 k4

Date:	**Photographer:**
06/21/2022	Sjon Higgins

QC Seed small ISO, UXO 03 Grid k3
QCS2 UXO03 0621 k3

Date:	**Photographer:**
06/22/2022	Sjon Higgins

QC Seed small ISO, UXO 03 Grid j5
QCS4 UXO03 0622 j5

Date:
06/22/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 03 Grid j2
QCS1 UXO03 0622 j2

Date:
06/22/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 03 Grid j3
QCS2 UXO03 0622 j3

Date:
06/22/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 03 Grid j4
QCS3 UXO03 0622 j4

Date:
06/26/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 03 Grid k1
QCS4 UXO03 0626 k1

Date: 06/26/2022

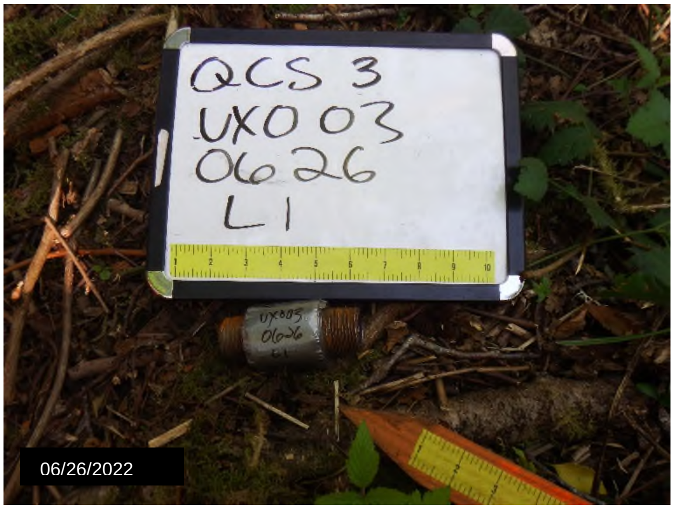
Photographer: Sjon Higgins

QC Seed small ISO, UXO 03 Grid L2
QCS1 UXO03 0626 L2

Date: 06/26/2022

Photographer: Sjon Higgins

QC Seed medium ISO, UXO 03 Grid L2
QCS2 UXO03 0626 L2



Date: 06/26/2022

Photographer: Sjon Higgins

QC Seed small ISO, UXO 03 Grid L1
QCS3 UXO03 0626 L1

Date: 06/27/2022

Photographer: Sjon Higgins

QC Seed small ISO, UXO 03 Grid i5
QCS4 UXO03 0627 i5

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 06/27/2022	**Photographer:** Sjon Higgins

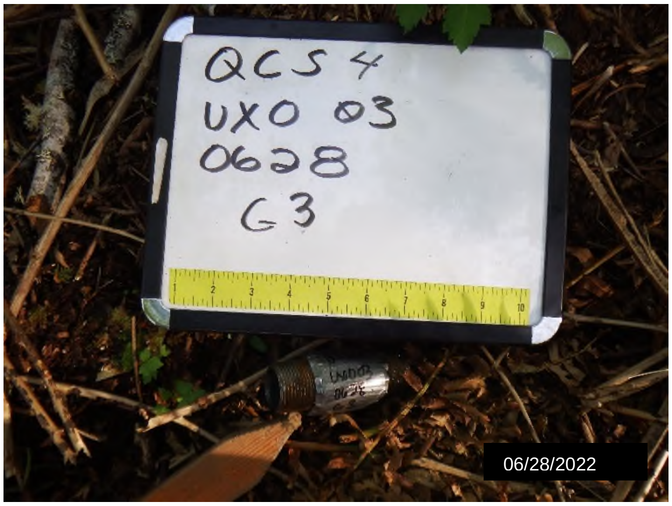
QC Seed small ISO, UXO 03 Grid i4
QCS3 UXO03 0627 i4

Date: 06/27/2022	**Photographer:** Sjon Higgins

QC Seed medium ISO, UXO 03 Grid h4
QCS1 UXO03 0627 h4

Date: 06/27/2022	**Photographer:** Sjon Higgins

QC Seed medium ISO, UXO 03 Grid h4
QCS2 UXO03 0627 h5



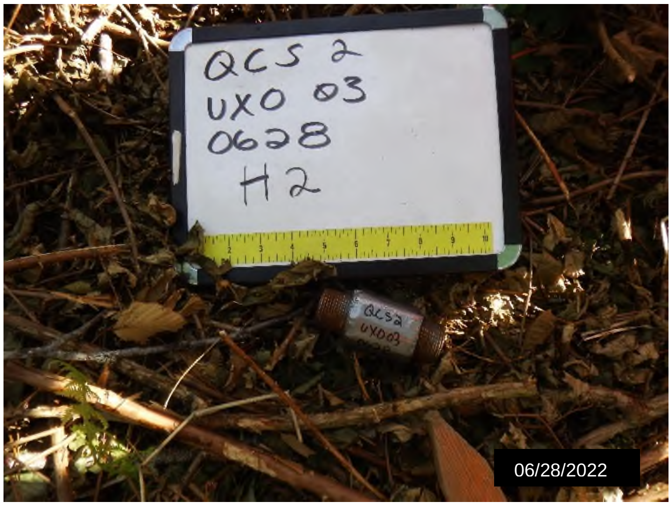
Date: 06/28/2022	**Photographer:** Sjon Higgins

QC Seed small ISO, UXO 03 Grid g3
QCS4 UXO03 0628 g3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:	**Photographer:**
06/28/2022	Sjon Higgins

QC Seed small ISO, UXO 03 Grid i3
QCS1 UXO03 0628 i3



Date:	**Photographer:**
06/28/2022	Sjon Higgins

QC Seed small ISO, UXO 03 Grid h2
QCS2 UXO03 0628 h2

Date:	**Photographer:**
06/28/2022	Sjon Higgins

QC Seed medium ISO, UXO 03 Grid h3
QCS3 UXO03 0628 h3

Date:	**Photographer:**
06/29/2022	Sjon Higgins

QC Seed small ISO, UXO 07B Grid g6
QCS3 UXO07B 0629 g6

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:
06/29/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 07B Grid g5
QCS1 UXO07B 0629 g5

Date:
06/29/2022

Photographer:
Sjon Higgins

QC Seed small ISO, UXO 07B Grid g5
QCS2 UXO07B 0629 g5

Date:
07/05/2022

Photographer:
Nick Lyons

QC Seed small ISO, UXO 07B Grid f5
QCS3 UXO07B 0705 f6

Date:
07/05/2022

Photographer:
Nick Lyons

QC Seed small ISO, UXO 07B Grid g4
QCS4 UXO07B 0705 g4

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/05/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid f4
QCS1 UXO07B 0705 f4

Date: 07/05/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid f5
QCS2 UXO07B 0705 f5

Date: 07/06/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid f7
QCS5 UXO07B 0706 f7

Date: 07/06/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid e7
QCS4 UXO07B 0706 e7

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/06/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid e4
QCS1 UXO07B 0706 e4

Date: 07/06/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid e5
QCS2 UXO07B 0706 e5

Date: 07/06/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid e6
QCS3 UXO07B 0706 e6

Date: 07/07/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid i1
QCS6 UXO03 0707 i1

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/07/2022	**Photographer:** Nick Lyons

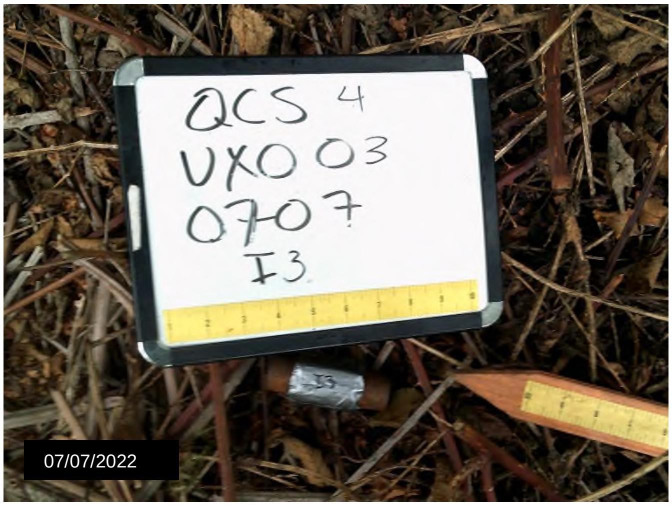
QC Seed small ISO, UXO 03 Grid j3
QCS1 UXO03 0707 j3

Date: 07/07/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 03 Grid i3
QCS2 UXO03 0707 j3

Date: 07/07/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 03 Grid i3
QCS3 UXO03 0707 i3



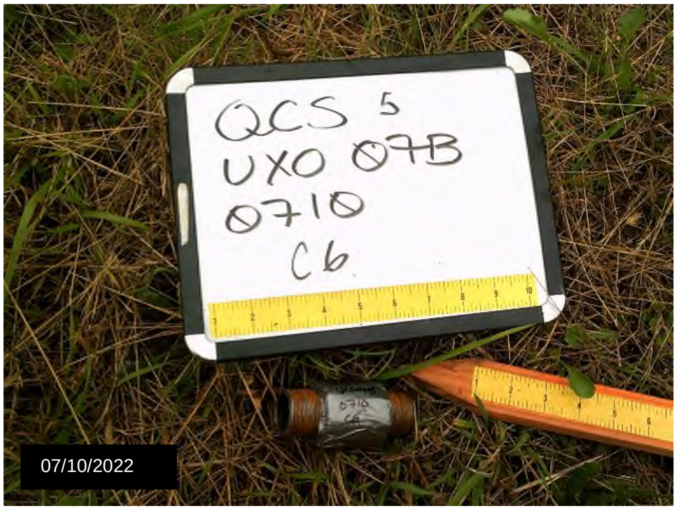
Date: 07/07/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 03 Grid i3
QCS4 UXO03 0707 i3

Date: 07/07/2022

Photographer: Nick Lyons

QC Seed medium ISO, UXO 03 Grid i2
QCS5 UXO03 0707 i2



Date: 07/10/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid c6
QCS5 UXO03 0710 c6

Date: 07/10/2022

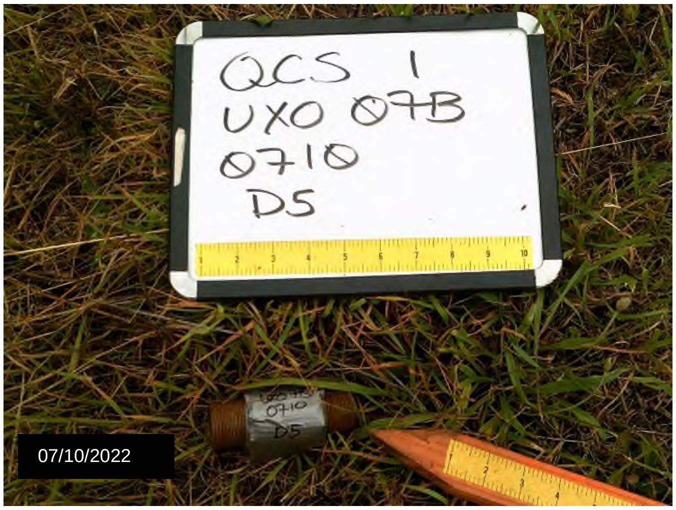
Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid d7
QCS3 UXO03 0710 d7

Date: 07/10/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid c7
QCS4 UXO03 0710 c7



Date: 07/10/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid d5
QCS1 UXO03 0710 d5

Date: 07/10/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid d6
QCS2 UXO03 0710 d6

Date: 07/11/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid h1
QCS5 UXO03 0711 h1

Date: 07/11/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 03 Grid h2
QCS4 UXO03 0711 h2

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:	Photographer:
07/11/2022	Nick Lyons

QC Seed small ISO, UXO 03 Grid g2
QCS1 UXO03 0711 g2

Date:	Photographer:
07/11/2022	Nick Lyons

QC Seed medium ISO, UXO 03 Grid g2
QCS2 UXO03 0711 g2

Date:	Photographer:
07/11/2022	Nick Lyons

QC Seed small ISO, UXO 03 Grid h2
QCS3 UXO03 0711 h2

Date:	Photographer:
07/12/2011	Nick Lyons

QC Seed medium ISO, UXO 03 Grid f3
QCS5 UXO03 0712 f3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:
07/12/2011

Photographer:
Nick Lyons

QC Seed small ISO, UXO 03 Grid e3
QCS1 UXO03 0712 e3

Date:
07/12/2011

Photographer:
Nick Lyons

QC Seed small ISO, UXO 03 Grid e3
QCS2 UXO03 0712 e3

Date:
07/12/2011

Photographer:
Nick Lyons

QC Seed medium ISO, UXO 03 Grid e2
QCS3 UXO03 0712 e2

Date:
07/12/2011

Photographer:
Nick Lyons

QC Seed medium ISO, UXO 03 Grid f2
QCS4 UXO03 0712 f2

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/13/2011

Photographer: Nick Lyons

QC Seed small ISO, UXO 03 Grid c4
QCS1 UXO03 0713 c4

Date: 07/13/2011

Photographer: Nick Lyons

QC Seed medium ISO, UXO 03 Grid c4
QCS2 UXO03 0713 c4

Date: 07/13/2011

Photographer: Nick Lyons

QC Seed small ISO, UXO 03 Grid d4
QCS3 UXO03 0713 d4

Date: 07/13/2011

Photographer: Nick Lyons

QC Seed medium ISO, UXO 03 Grid d3
QCS4 UXO03 0713 d3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/13/2011	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid d2
QCS5 UXO03 0713 d2

Date: 07/14/2011	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 03 Grid d1
QCS5 UXO03 0714 d1

Date: 07/14/2011	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid f1
QCS3 UXO03 0714 f1

Date: 07/14/2011	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid e1
QCS4 UXO03 0714 e1

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:
07/14/2011

Photographer:
Nick Lyons

QC Seed medium ISO, UXO 03 Grid g1
QCS1 UXO03 0714 g1

Date:
07/14/2011

Photographer:
Nick Lyons

QC Seed small ISO, UXO 03 Grid g1
QCS2 UXO03 0714 g1

Date:
07/17/2022

Photographer:
Nick Lyons

QC Seed small ISO, UXO 07B Grid b6
QCS5 UXO07B 0717 b6

Date:
07/17/2022

Photographer:
Nick Lyons

QC Seed small ISO, UXO 07B Grid b5
QCS4 UXO07B 0717 b5

Date: 07/17/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid b4
QCS3 UXO07B 0717 b4

Date: 07/17/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid c5
QCS2 UXO07B 0717 c5

Date: 07/17/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid c4
QCS1 UXO07B 0717 c4

Date: 07/18/2022

Photographer: Nick Lyons

QC Seed small ISO, UXO 07B Grid a7
QCS4 UXO07B 0718 a7

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

07/18/2022

Date: 07/18/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid a4
QCS1 UXO07B 0718 a4

07/18/2022

Date: 07/18/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid a5
QCS2 UXO07B 0718 a5

07/18/2022

Date: 07/18/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid a6
QCS3 UXO07B 0718 a6

07/19/2022

Date: 07/19/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid a3
QCS3 UXO03 0719 a3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/19/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid a3
QCS1 UXO03 0719 a3

Date: 07/19/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid a3
QCS2 UXO03 0719 a3

Date: 07/20/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid b3
QCS3 UXO07B 0720 b3

Date: 07/20/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid b2
QCS4 UXO07B 0720 b2

Date: 07/20/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid a2
QCS1 UXO07B 0720 a2

Date: 07/20/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid a3
QCS2 UXO07B 0720 a3

Date: 07/21/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid c1
QCS3 UXO07B 0721 c1

Date: 07/21/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid c1
QCS2 UXO07B 0721 c1

Date: 07/21/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid c1
QCS1 UXO07B 0721 c1

Date: 07/24/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid b3
QCS1 UXO07B 0724 b3

Date: 07/24/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid g3
QCS4 UXO07B 0724 g3

Date: 07/24/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid f3
QCS3 UXO07B 0724 f3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/24/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Grid f3
QCS2 UXO07B 0724 f3

Date: 07/25/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid c2/c3
QCS2 UXO03 0725 c2/c3

Date: 07/25/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid c2
QCS3 UXO03 0725 c2

Date: 07/25/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid c1
QCS4 UXO03 0725 c1

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

07/25/2022

Date:	**Photographer:**
07/25/2022	Nick Lyons

QC Seed small ISO, UXO 03 Grid c3
QCS1 UXO03 0725 c3

07/26/2022

Date:	**Photographer:**
07/26/2022	Nick Lyons

QC Seed medium ISO, UXO 03 Grid b2
QCS2 UXO03 0726 b2

07/26/2022

Date:	**Photographer:**
07/26/2022	Nick Lyons

QC Seed medium ISO, UXO 03 Grid b2
QCS3 UXO03 0726 b2

07/26/2022

Date:	**Photographer:**
07/26/2022	Nick Lyons

QC Seed medium ISO, UXO 03 Grid b3
QCS4 UXO03 0726 b3

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/26/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 03 Grid b1
QCS1 UXO03 0726 b1

Date: 07/27/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid a1
QCS3 UXO03 0727 a1

Date: 07/27/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid a1
QCS4 UXO03 0727 a1

Date: 07/27/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 03 Grid a2
QCS2 UXO03 0727 a2

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 07/30/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 02 NEQ
QCS1 UXO02 0730 NEQ

Date: 07/30/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 02 NEQ
QCS2 UXO02 0730 NEQ

Date: 07/30/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 02 NEQ
QCS4 UXO02 0730 NEQ

Date: 07/30/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 02 NEQ
QCS4 UXO02 0730 NEQ

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date:	**Photographer:**
07/31/2022	Nick Lyons

QC Seed small ISO, UXO 02 SEQ
QCS1 UXO02 0731 SEQ

Date:	**Photographer:**
07/31/2022	Nick Lyons

QC Seed small ISO, UXO 02 SEQ
QCS2 UXO02 0731 SEQ

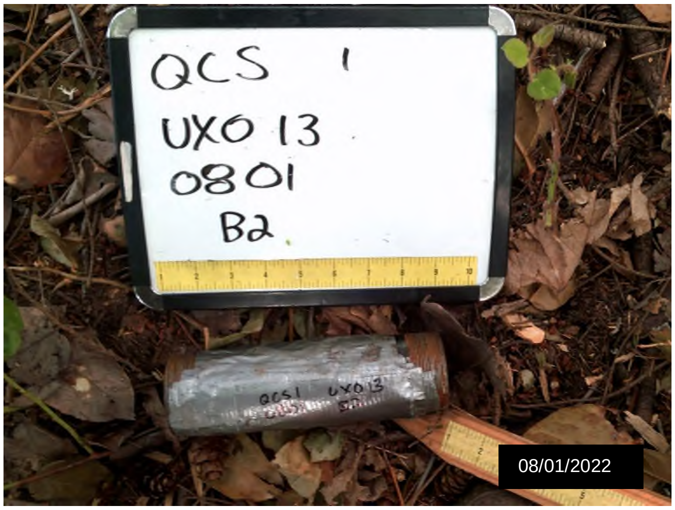
Date:	**Photographer:**
07/31/2022	Nick Lyons

QC Seed small ISO, UXO 02 SEQ
QCS3 UXO02 0731 SEQ

Date:	**Photographer:**
07/31/2022	Nick Lyons

QC Seed small ISO, UXO 02 SEQ
QCS4 UXO02 0731 SEQ

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS



Date: 08/01/2022

Photographer: Nick Lyons

QC Seed medium ISO, UXO 13 Grid b2
QCS1 UXO13 0801 b2

Date: 08/01/2022

Photographer: Nick Lyons

QC Seed medium ISO, UXO 13 Grid b2
QCS2 UXO13 0801 b2

Date: 08/01/2022

Photographer: Nick Lyons

QC Seed medium ISO, UXO 13 Grid b1
QCS3 UXO13 0801 b1

Date: 08/01/2022

Photographer: Nick Lyons

QC Seed medium ISO, UXO 13 Grid b1
QCS4 UXO13 0801 b1

Date: 08/03/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 13 Grid e1
QCS1 UXO13 0803 e1

Date: 08/03/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 13 Grid e1
QCS2 UXO13 0803 e1

Date: 08/03/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 13 Grid e1
QCS3 UXO13 0803 e1

Date: 08/06/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 02 SWQ
QCS4 UXO02 0806 SWQ

Date:
08/06/2022

Photographer:
Nick Lyons

QC Seed small ISO, UXO 02 SWQ
QCS1 UXO02 0806 SWQ

Date:
08/06/2022

Photographer:
Nick Lyons

QC Seed small ISO, UXO 02 SWQ
QCS2 UXO02 0806 SWQ

Date:
08/06/2022

Photographer:
Nick Lyons

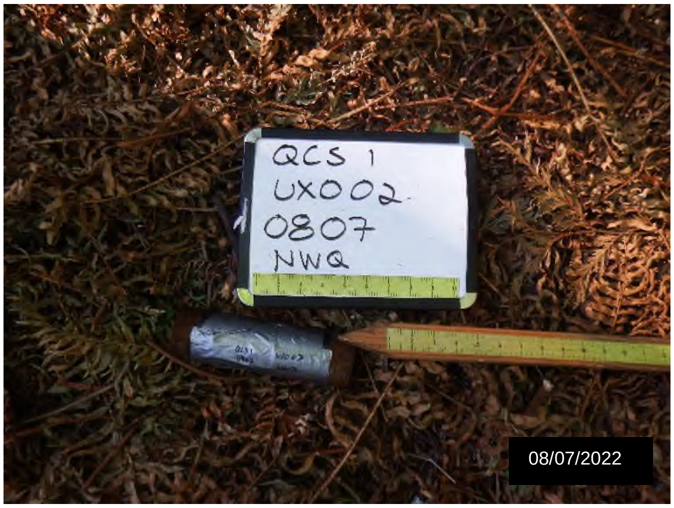
QC Seed medium ISO, UXO 02 SWQ
QCS3 UXO02 0806 SWQ

Date:
08/07/2022

Photographer:
Nick Lyons

QC Seed small ISO, UXO 02 NWQ
QCS4 UXO02 0807 NWQ

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS



Date: 08/07/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 02 NWQ
QCS1 UXO02 0807 NWQ

Date: 08/07/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 02 NWQ
QCS2 UXO02 0807 NWQ

Date: 08/07/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 02 NWQ
QCS3 UXO02 0807 NWQ

Date: 08/08/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 14 Siding
QCS3 UXO14 0808 Siding

NBK BANGOR - SITE PHOTOGRAPHIC LOG
QC SEEDS

Date: 08/08/2022
Photographer: Nick Lyons

QC Seed small ISO, UXO 14 Siding
QCS1 UXO14 0808 Siding

Date: 08/08/2022
Photographer: Nick Lyons

QC Seed small ISO, UXO 14 Siding
QCS2 UXO14 0808 Siding

Date: 08/09/2022
Photographer: Nick Lyons

QC Seed small ISO, UXO 12 Siding
QCS3 UXO12 0809 Siding

Date: 08/09/2022
Photographer: Nick Lyons

QC Seed small ISO, UXO 12 Siding
QCS2 UXO12 0809 Siding

Date: 08/09/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 12 Siding
QCS1 UXO12 0809 Siding

Date: 09/21/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Step Out West
QCS1 UXO07B 0921 SOW

Date: 09/21/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Step Out West
QCS2 UXO07B 0921 SOW

Date: 09/22/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Step Out East
QCS2 UXO07B 0922 SOE

Date: 09/22/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 07B Step Out East
QCS1 UXO07B 0922 SOE

Date: 10/08/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 02 Step Out East
QCS1 UXO02so 1008 SOE

Date: 10/08/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 02 Step Out East
QCS2 UXO02so 1008 SOE

Date: 10/09/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 02 Step Out West
QCS1 UXO02so 1009 SOW

Date:	**Photographer:**
10/09/2022	Nick Lyons

QC Seed medium ISO, UXO 02 Step Out West
QCS2 UXO02so 1009 SOW

Date:	**Photographer:**
10/10/2022	Nick Lyons

QC Seed small ISO, UXO 06 TP1 (Top Portion 1)
QCS1 UXO06 1010 TP1

Date:	**Photographer:**
10/10/2022	Nick Lyons

QC Seed medium ISO, UXO 06 TP1 (Top Portion 1)
QCS2 UXO06 1010 TP1

Date:	**Photographer:**
10/11/2022	Nick Lyons

QC Seed medium ISO, UXO 06 TP2 (Top Portion 2)
QCS2 UXO06 1011 TP2

Date: 10/11/2022	**Photographer:** Nick Lyons

QC Seed small ISO, UXO 06 TP2 (Top Portion 2)
QCS1 UXO06 1011 TP2

Date: 10/13/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 11 Step Out 1
QCS1 UXO11so 1013 SO1

Date: 10/13/2022	**Photographer:** Nick Lyons

QC Seed medium ISO, UXO 11 Step Out 1
QCS2 UXO11so 1013 SO1

Appendix B-2: Visitors Log

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NAVFAC
Naval Facilities Engineering Command

NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

FOIA Exemption 6 (5 USC 552(b)(6))

Personal information affecting an individual's privacy

Pages 901 - 914

TO REQUEST A COPY OF THE DOCUMENT
PLEASE CONTACT

Department of the Navy
Freedom of Information Act Office

http://www.secnav.navy.mil/foia/Pages/default.aspx

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Appendix B-3: Daily MEC Activity Logs

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NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

FOIA Exemption 6 (5 USC 552(b)(6))

Personal information affecting an individual's privacy

Pages 917 - 1398

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PLEASE CONTACT

Department of the Navy
Freedom of Information Act Office

http://www.secnav.navy.mil/foia/Pages/default.aspx

Appendix B-4: Daily Safety Logs

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NAVFAC
Naval Facilities Engineering Command

NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

FOIA Exemption 6 (5 USC 552(b)(6))

Personal information affecting an individual's privacy

Pages 1401 - 1588

TO REQUEST A COPY OF THE DOCUMENT
PLEASE CONTACT

Department of the Navy
Freedom of Information Act Office

http://www.secnav.navy.mil/foia/Pages/default.aspx

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Appendix B-5: Daily Safety Sign In

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NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

FOIA Exemption 6 (5 USC 552(b)(6))

Personal information affecting an individual's privacy

Pages 1591 - 2036

**TO REQUEST A COPY OF THE DOCUMENT
PLEASE CONTACT**

**Department of the Navy
Freedom of Information Act Office**

http://www.secnav.navy.mil/foia/Pages/default.aspx

Appendix B-6: Daily QC Reports

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NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

FOIA Exemption 6 (5 USC 552(b)(6))

Personal information affecting an individual's privacy

Pages 2039 - 2316

TO REQUEST A COPY OF THE DOCUMENT
PLEASE CONTACT

Department of the Navy
Freedom of Information Act Office

http://www.secnav.navy.mil/foia/Pages/default.aspx

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Appendix B-7: Chain-of-Custodies

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Original
Revised 11-7-22
Mitch Baron

Eurofins Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Phone (303) 431-7171

Chain of Custody Record

eurofins | Environment Testing America

Client Information

Client Contact: Mitch Baron
Company: Tetra Tech, Inc.
Address: 19803 North Creek Parkway
City: Bothell
State, Zip: WA, 98011
Phone: [redacted]
Email: [redacted]
Project Name: NB Kitsap Bangor CTO NW194112, WA
Site:

Sampler: Mitch Baron
[redacted]
PWSID:
Due Date Requested:
TAT Requested (days): Standard
Compliance Project: Δ Yes Δ No
PO #: Purchase Order Requested
WO #:
Project #: 28023939
SSOW#:

Lab PM: Turner, Shelby R
E-Mail: Shelby.Turner@et.eurofinsus.com
Carrier Tracking No(s):
State of Origin:
COC No: 2063500
Page: 1 of 2
Job #:

Analysis Requested

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8330B_DOD5 - Explosives, Client list with 3,5-DNA, Picric & Diamino (No ISM)	8321B_NGu - Nitroguanidine	8270E_DOD5 - 2,4-Dinitrophenol, Diphenylamine, N-Nitrosodiphenylamine, Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N		
X3-SS-C01-0006	11-1-2022	1235	C	S			X	X	X	3	
FD-11012201	11-1-2022	1245	C	S			X	X	X	3	
X3-SS-C02-0006	11-1-2022	1350	C	S			X	X	X	3	
~~X3-SS-C03-0006~~	~~11-1-2022~~	~~1430~~	~~C~~	~~S~~			~~X~~	~~X~~	~~X~~	3	Discard sample as per agreement w/ PM 11-4-22 M.B. 11-7-22
X3-SS-C04-0006	11-1-2022	1525	C	S			X	X	X	3	
RB-11012201	11-1-2022	1545	G	W			X	X	X	4	
X3-SS-C05-0006	11-2-2022	0920	C	S			X	X	X	3	
FD-11022201	11-2-2022	0930	C	S			X	X	X	3	
X3-SS-C06-0006	11-2-2022	1015	C	S		X	X	X	X	3	Run MS/MSD
X7-SS-C01-0006	11-2-2022	1115	C	S			X	X	X	3	
X7B-SS-C01-0006	11-2-2022	1150	C	S			X	X	X	3	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: Date: Time: Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Mitch Baron [redacted] Sealed in cooler	11-3-2022 1445	Tetra Tech			

Custody S tact: Δ Yes o
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Eurofi nver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Phone (303) 431-7171

Chain of Custody Record

Original

eurofins | Environment Testing America

Client Information	Sampler: Mitch Baron	Lab PM: Turner, Shelby R	Carrier Tracking No(s):	COC No: 2063500
Client Contact: Mitch Baron	Phone: [redacted]	E-Mail: Shelby.Turner@et.eurofinsus.com	State of Origin:	Page: 2 of 2
Company: Tetra Tech, Inc.	PWSID:			Job #:

Address: 19803 North Creek Parkway
City: Bothell
State, Zip: WA, 98011
Phone: [redacted]
Email: [redacted]
Project Name: NB Kitsap Bangor CTO NW194112, WA
Site:

Due Date Requested:
TAT Requested (days): Standard
Compliance Project: Δ Yes Δ No
PO #: Purchase Order Requested
WO #:
Project #: 28023939
SSOW#:

Analysis Requested

Preservation Codes:

- A - HCL
- B - NaOH
- C - Zn Acetate
- D - Nitric Acid
- E - NaHSO4
- F - MeOH
- G - Amchlor
- H - Ascorbic Acid
- I - Ice
- J - DI Water
- K - EDTA
- L - EDA
- M - Hexane
- N - None
- O - AsNaO2
- P - Na2O4S
- Q - Na2SO3
- R - Na2S2O3
- S - H2SO4
- T - TSP Dodecahydrate
- U - Acetone
- V - MCAA
- W - pH 4-5
- Y - Trizma
- Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8330B_DOD5 - Explosives, Client list with 3,5-DNA, Picric & Diamino (No ISM)	8321B_NGu - Nitroguanidine	8270E_DOD5 - 2,4-Dinitrophenol, Diphenylamine, N-Nitrosodiphenylamine, Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N		
X7-TP-C01-5460	11-2-2022	1420	C	S			X	X	X	3	
X7-TP-C02-3648	11-2-2022	1535	C	S			X	X	X	3	
X7-TP-C03-4248	11-2-2022	1640	C	S			X	X	X	3	
X7-TP-C04-4248	11-3-2022	0920	C	S			X	X	X	3	
X3-SS-C07-0006	11-3-2022	1015	C	S			X	X	X	3	
X3-SS-C08-0006	11-3-2022	1045	C	S			X	X	X	3	

M Baron 11-3-2022

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Mitch Baron [redacted] Sealed in cooler	11-3-2022 1445	Tetra Tech			

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Original
Revised 11-7-22
Mitch Baron
R2 11-14-2022
Both pages. M.B.

Eurofins Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Phone (303) 431-7171

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: Mitch Baron	Lab PM: Turner, Shelby R	Carrier Tracking No(s):	COC No: 2063500
Client Contact: Mitch Baron	Phone: [redacted]	E-Mail: Shelby.Turner@et.eurofinsus.com	State of Origin:	Page: 1 of 2
Company: Tetra Tech, Inc.	PWSID:	**Analysis Requested**		Job #:
Address: 19803 North Creek Parkway	Due Date Requested:			
City: Bothell	TAT Requested (days): Standard			
State, Zip: WA, 98011	Compliance Project: Δ Yes Δ No			
Phone: [redacted]	PO #: Purchase Order Requested			
Email: [redacted]	WO #:			
Project Name: NB Kitsap Bangor CTO NW194112, WA	Project #: 28023939			
Site:	SSOW#:			

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8330B_DOD5 - Explosives, Client list with 3,5-DNA, Picric & Diamino (No ISM)	8321B_NGu - Nitroguanidine	8270E_DOD5 - 2,4-Dinitrophenol, Diphenylamine, N-Nitrosodiphenylamine, Moisture	353.2 MOD Nitrocellulose	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
X3-SS-C01-0006	11-1-2022	1235	C	S			X	X	X	X	3	
FD-11012201	11-1-2022	1245	C	S			X	X	X	X	3	
X3-SS-C02-0006	11-1-2022	1350	C	S			X	X	X	X	3	
~~X3-SS-C03-0006~~	~~11-1-2022~~	~~1430~~	~~C~~	~~S~~			~~X~~	~~X~~	~~X~~		~~3~~	Discard sample as per agreement w/ PM 11-4-22 M.B. 11-7-
X3-SS-C04-0006	11-1-2022	1525	C	S			X	X	X	X	3	
RB-11012201	11-1-2022	1545	G	W			X	X	X		4	
X3-SS-C05-0006	11-2-2022	0920	C	S			X	X	X	X	3	
FD-11022201	11-2-2022	0930	C	S			X	X	X	X	3	
X3-SS-C06-0006	11-2-2022	1015	C	S		X	X	X	X	X	3	Run MS/MSD
X7-SS-C01-0006	11-2-2022	1115	C	S			X	X	X	X	3	
X7B-SS-C01-0006	11-2-2022	1150	C	S			X	X	X	X	3	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by: Mitch Baron [redacted] Sealed in cooler	Date/Time: 11-3-2022 1445	Company Tetra Tech	Received by: [redacted]	Date/Time: 11/4/22 1035	Company ETA DEN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody S tact: Δ Yes .o	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3.5, 0.2, 2.7 IR#12 CF-0.0

V.. 01/16/2019

Eurofi nver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Phone (303) 431-7171

Chain of Custody Record

Original

eurofins | Environment Testing America

Client Information	Sampler: Mitch Baron	Lab PM: Turner, Shelby R	Carrier Tracking No(s):	COC No: 263500
Client Contact: Mitch Baron	Phone: [redacted]	E-Mail: Shelby.Turner@et.eurofinsus.com	State of Origin:	Page: 2 of 2
Company: Tetra Tech, Inc.	PWSID:	**Analysis Requested**		Job #:

Address: 19803 North Creek Parkway	Due Date Requested:
City: Bothell	TAT Requested (days): Standard
State, Zip: WA, 98011	Compliance Project: Δ Yes Δ No
Phone: [redacted]	PO #: Purchase Order Requested
Email: [redacted]	WO #:
Project Name: NB Kitsap Bangor CTO NW194112, WA	Project #: 28023939
Site:	SSOW#:

Preservation Codes:
- A - HCL
- B - NaOH
- C - Zn Acetate
- D - Nitric Acid
- E - NaHSO4
- F - MeOH
- G - Amchlor
- H - Ascorbic Acid
- I - Ice
- J - DI Water
- K - EDTA
- L - EDA
- M - Hexane
- N - None
- O - AsNaO2
- P - Na2O4S
- Q - Na2SO3
- R - Na2S2O3
- S - H2SO4
- T - TSP Dodecahydrate
- U - Acetone
- V - MCAA
- W - pH 4-5
- Y - Trizma
- Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8330B_DOD5 - Explosives, Client list with 3,5-DNA, Picric & Diamino (No ISM)	8321B_NGu - Nitroguanidine	8270E_DOD5 - 2,4-Dinitrophenol, Diphenylamine, N-Nitrosodiphenylamine, Moisture	353.2 MOD Nitrocellulose	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N	N		
X7-TP-C01-5460	11-2-2022	1420	C	S			X	X	X	X	3	
X7-TP-C02-3648	11-2-2022	1535	C	S			X	X	X	X	3	
X7-TP-C03-4248	11-2-2022	1640	C	S			X	X	X	X	3	
X7-TP-C04-4248	11-3-2022	0920	C	S			X	X	X	X	3	
X3-SS-C07-0006	11-3-2022	1015	C	S			X	X	X	X	3	
X3-SS-C08-0006	11-3-2022	1045	C	S			X	X	X	X	3	

M Baron 11-3-2022

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Mitch Baron [redacted] Sealed in cooler	11-3-2022 1445	Tetra Tech	[redacted]	11/4/22 1035	ETA DEN

Custody Seals Intact: Δ Yes Δ No

Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 01/16/2019

Appendix B-8: Soil Sample Logs

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SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X3-SS-C01-0006
Sampled By: Mitch Baron
Sample Location: UX03, MEC sites 301, 305, 306, 307, +
Sample Date: 11-1-2022
QA/QC Duplicate ID: FD-11012201 304
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment

☒ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X3-SS-C01-0006	1235	0-6 inch		
FD-11012201	1245			Duplicate

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B		1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E		1	8 oz	~~8oz~~ Jar	
Diphenylamine						
N-Nitrosodiphenylamine	↓					
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X3-SS-C02-0006
Sample Location: UX03, MEC sites 310,311,312
QA/QC Duplicate ID:

Sampled By: Mitch Baron
Sample Date: 11-1-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment

☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X3-SS-C02-0006	1350	0-6 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E		1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓		↓	↓	↓	
N-Nitrosodiphenylamine						
moisture	D2216					

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X3-SS-C04-0006	**Sampled By:** Mitch Baron
Sample Location: UX03, MEC site 313	**Sample Date:** 11-1-2022
QA/QC Duplicate ID:	**MS/MSD Collected:** YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X3-SS-C04-0006	1525	0-6 inch		
RB-11012201	1545			Decon Rinse Blank

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E		1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓		↓	↓	↓	
N-Nitrosodiphenylamine						
moisture	D2216					

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW20411b

Sample ID No.: X3-SS-C05-0006
Sample Location: UX03, ~~MEC sites 305 + 309~~
↑ Incinerator
QA/QC Duplicate ID: FD-11022201
Sampled By: Mitch Baron
Sample Date: 11-2-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment
☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

Time:	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X3-SS-C05-0006	0920	0-6 inch		
FD-11022201	0930			Duplicate

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-Nitrosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW20411b

Sample ID No.: X3-SS-C06-0006
Sample Location: VX03 ~~Incinerator~~ Mound
QA/QC Duplicate ID:

Sampled By: Mitch Baron
Sample Date: 11-2-2022
MS/MSD Collected: [✓ YES] NO

MATRIX / CONCENTRATION:

- ☒ Surface Soil
- [ ] Subsurface Soil
- [ ] Sediment

- [ ] Low Concentration
- [ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X3-SS-C06-0006	1015	0-6 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-Nitrosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X3-SS-C07-0006
Sample Location: UX03 - MEC sites 304+309
QA/QC Duplicate ID:

Sampled By: Mitch Baron
Sample Date: 11-3-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment

☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

Time:
Method:
Monitor Reading (ppm):

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X3-SS-C07-0006	1015	0-6 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-Nitrosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X3-SS-C08-0006
Sample Location: UX03 MEC site 308
QA/QC Duplicate ID:

Sampled By: Mitch Baron
Sample Date: 11-3-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment

☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X3-SS-C08-0006	1045	0-6 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-Nitrosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Banyor
Project No.: 112G08005-NW204116

Sample ID No.: X7-SS-C01-0006
Sample Location: UX07, mec site 701
QA/QC Duplicate ID:
Sampled By: Mitch Baron
Sample Date: 11-2-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment
☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X7-SS-C01-0006	1115	0-6 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-N,trosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X7B-SS-C01-0006
Sample Location: UXO 7B, MEC site 7B03
QA/QC Duplicate ID:

Sampled By: Mitch Baron
Sample Date: 11-2-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment

☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X7B-SS-C01-0006	1150	0-6 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-Nitrosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X7-TP-C01-~~00~~ 5460
Sample Location: VX07, Demo Pit #1
QA/QC Duplicate ID:
Sampled By: Mitch Baron
Sample Date: 11-2-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment

☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

Time:
Method:
Monitor Reading (ppm):

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X7-TP-C01-5460	1420	54-60 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-Nitrosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW20411b

Sample ID No.: X7-TP-C02-3648
Sample Location: UX07, Demo Pit #2
QA/QC Duplicate ID:

Sampled By: Mitch Baron
Sample Date: 11-2-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X7-TP-C02-3648	1535	36-48 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E		1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓		↓	↓	↓	
N-Nitrosodiphenylamine						
moisture	D2216					

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X7-TP-C03-4248
Sample Location: UX07, Demo Pit #3
QA/QC Duplicate ID:

Sampled By: Mitch Baron
Sample Date: 11-2-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
[ ] Subsurface Soil
[ ] Sediment

[ ] Low Concentration
[ ] High Concentration

GRAB SAMPLE DATA:

Time:
Method:
Monitor Reading (ppm):

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X7-TP-C03-4248	1640	42-48 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-Nitrosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event: MC Sampling
Project Site Name: NBK Bangor
Project No.: 112G08005-NW204116

Sample ID No.: X7-TP-C04-4248
Sample Location: UX07, Demo Pit #4
QA/QC Duplicate ID:

Sampled By: Mitch Baron
Sample Date: 11-3-2022
MS/MSD Collected: YES [✓ NO]

MATRIX / CONCENTRATION:

☒ Surface Soil
☐ Subsurface Soil
☐ Sediment

☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Time:			
Method:			
Monitor Reading (ppm):			

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:
PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
X7-TP-C04-4248	0920	42-48 inch		

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected
Explosives	8330B	None	1	8 oz	~~8oz~~ Jar	
Nitroguanidine	8321B	↓	1	4 oz	~~4oz~~ Jar	
2-4-Dinitrophenol	8270E	↓	1	8 oz	~~8oz~~ Jar	
Diphenylamine	↓	↓	↓	↓	↓	
N-Nitrosodiphenylamine	↓	↓	↓	↓	↓	
moisture	D2216	↓	↓	↓	↓	

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

Appendix B-9: MC Field Logbook

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11-1-2022 Tuesday Bangor SI

1100 Mitch Baron on site at Bangor laydown yard. Meet w/ UXOSO for safety brief.

1130 On site at UXO3. Meet w/ UXO Tech to provide avoidance. Discuss sampling process and plan.

1145 Note UXO Tech has placed pin flags at MEC planned sample locations in prep for sample activity.

1150 Begin collecting aliquots for first sample (DIP locations 0301/0305/0306/0307/0314). First aliquot at ~ 3ft SE of 0314.

1200 Second aliquot collected at 0301. Due to DIP, a ~ 5 ft dia. pit filled w/ water at 0301. Collect aliquot at S side of pit outside of water.

1210 Collect third aliquot at 2 ft SE of 0305.

1220 Collect fourth aliquot at 1 ft N of 0306

M. Baron

11-1-2022 Cont.

1225 Collect fifth aliquot at 0307.

1235 Complete collection of composite sample:
X3-SS-C01-0006

1245 Collect duplicate of above sample:
FD-11012201

1300 Begin collecting aliquots for second sample. First aliquot located ~ 1 ft E of 0312. Second aliquot at ~ 1 ft N of 0312.
Note burnt wood observed on ground surface at 0312

1320 Third aliquot at ~1 ft E of 0311. Fourth aliquot at ~1 ft N of 0311

1340 Fifth aliquot at 1ft W of 0310

1350 Complete collection of composite sample from locations 0310, 0311, and 0312:
X3-SS-C02-0006

M. Baron

11-1-2022 Continued

1420 At location 0308. Collect aliquots at center 0308 at 5 ft from center to N, E, S, and W locations.

*1430 Complete collection of composite sample at location 0308:
X3-SS-C03-0006

See 11-3-22 @ 1020 Re. this Sample *

1515 At location 0313. Collect aliquots at center and 5 ft from center at NE, NW, SE, and SW locations.

1525 Complete collection of composite sample at 0313 as X3-SS-C04-0006

1530 Secure sample operations while escort needed at other project activities.

1540 Complete decon of bowl/spoon and auger.

1545 Collect Rinse Blank sample RB-11012201.

M.Baron

11-2-2022 Wednesday

0700 Mitch Baron at Bangor laydown yard for Daily safety brief.

0745 At Jackson Park site to collect additional sample jars.

0830 At site UXO 3 to resume sample collection.
Note weather: calm, 40°F, cloudy

0900 At Small Arms Incinerator Collect aliquots at 40 ft W of center of incinerator. Center pt downstream of incinerator opening and at 5 ft NE, NW, SE, and SW.

0915 While mixing soil aliquots, ~ 8 "caps" were noted and removed from soil bowl prior to sample collection.

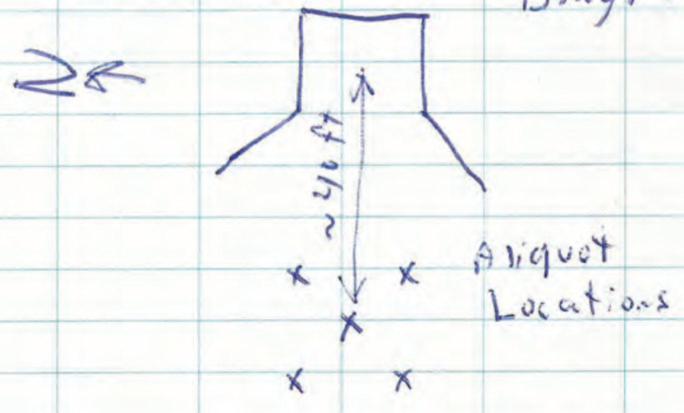
0920 Collect small arms incinerator sample; m.b.
X3-SS-~~C4~~ C05-0006

0930 Collect duplicate sample FD-11022201

M.Baron

11-2-2022 Cont.

Small Arms Incinerator Diagram



MBaron

11-2-2022

0945 Inspect site for presence of "mounds" located NW of Incinerator. No obvious mounds observed. A low mound or rather a flat area w/ elevation drop to NW, W, and SW may be location of former "mound". A old Navy Survey stake noted on W side. Survey Witness Post NWE-12.

1010 Complete collection of aliquots w/ center and at 5 ft NE, NW, SE, and SW.

1015 Complete collection of sample X3-SS-06-0006 which will be provided w/ MS/MSD request.

1045 On site at UXO 7.

1105 UXO Tech located MEC Location 0701.

1110 Collect aliquots at center at at 5 ft NE, NW, SE, and SW locations

M.Baron

11-2-2022 Wednesday Cont.

1115 Collect composite sample X7-SS-C01-0006.

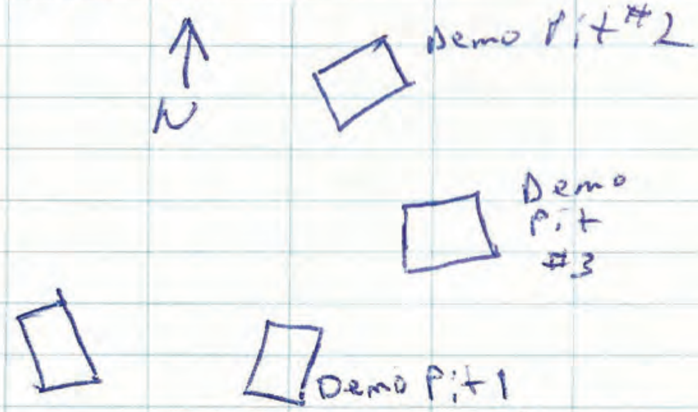
1140 At UXO 7B location 07B03. UXO Tech survey and clear locations at center and at 5 ft NE, NW, SE, and SW.

1150 Complete sample collection at X7B-SS-C01-0006.

1200 Secure sample operation while UXO teams prepare for demo operations.

1345 ~~Complete~~ UXO Team completed demo shots at site UXO 7

1400 At site UXO 7. Begin collection of aliquots at Demo Pit #1



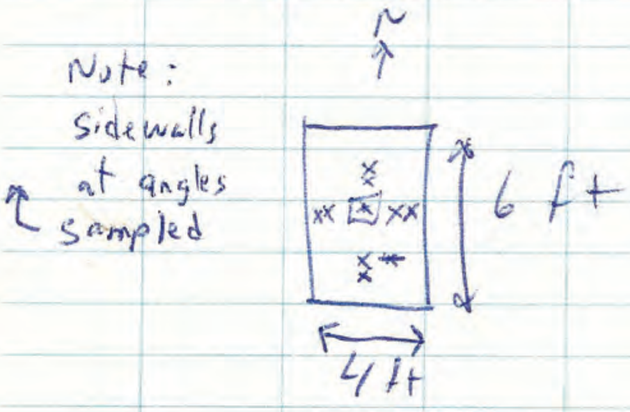
Mitch Baron

11-2-2022 Cont.

Collection of aliquots at Demo Pit #1 at location center 4 1/2 to 5 ft depth. and each side wall each at about 4 1/2 ft depth.

1420 Complete collection of sample: X7-TP-C01-5460

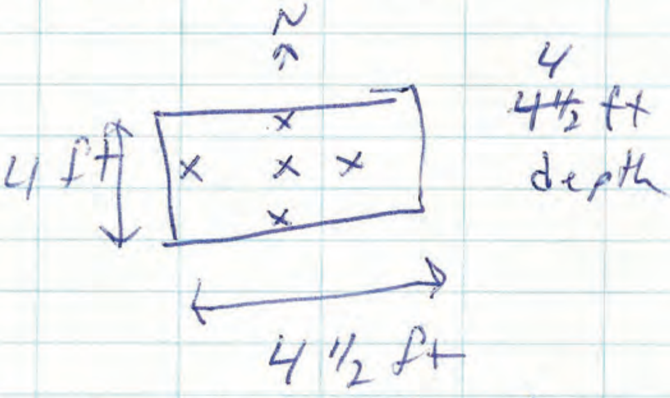
Demo Pit #1



MBaron

11-2-2022 Cont.

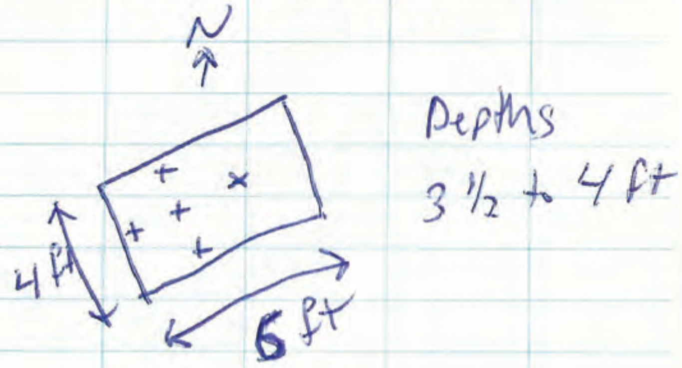
1515 Complete Demo Shot #2 at Demo Pit #2



1530 Complete collection of aliquots at 3 to 4 ft depths

1535 Complete collection of sample X7-TP-C02-~~36-48~~ 3648

1600 Complete Demo shot #3 at Demo Pit #3



mBaron

11-2-2022 Cont.

1630 Complete collection of aliquots at 3½ to 4 ft depths

1640 Complete collection of sample X7-TP-C03-4248 at Demo Pit #3

1700 Final Demo Shot completed at Demo Pit #4

1710 UXO Team securing site, delay sample collection to next day.

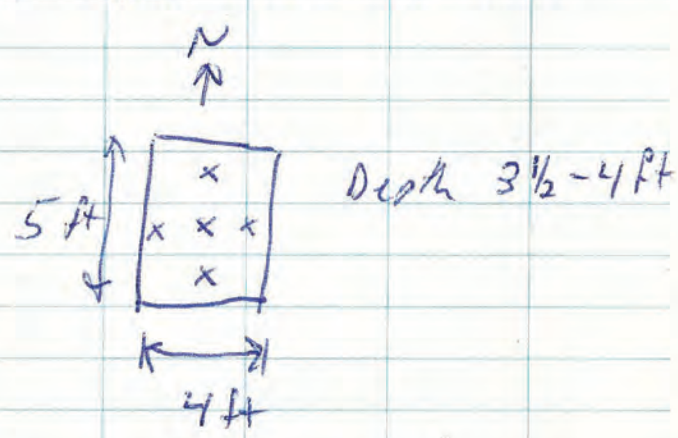
mBaron

11-3-2022 Thursday

0800 Mitch Baron on site at laydown yard for safety brief. Note weather, Calm, 38°F, Cloudy.

0835 On site at UXO 7.

0905 At Demo Shot #4 Pit.



0915 Complete collection of aliquots at Demo Pit #4 from 3½ to 4 ft depths

0920 Complete collection of sample X7-TP-C04-4248

0945 On site at UXO3

0955 Collect aliquot at 0304 and second aliquot 5 ft W of 0304

1000 Collect third aliquot at 0309

M.Baron

11-3-2022 Cont.

1005 Collect fourth aliquot at ~20 ft SW of 0309
Collect fifth aliquot at ~30 ft NE of 0309

1015 Complete sample collection of X3-SS-C07-0006

1020 Noted previous UXO3 0308 location was a MDAS location. Located 0308 MEC location.

1035 Collected aliquots at 0308 and at NE, S, SW, and ~~S~~ NW locations. SE not clear for sample

1045 Complete collection of sample:
X3-SS-C08-0006

M.Baron

11-3-2022

1300 M. Baron at Jackson Park field office packaging samples for shipment to laboratory.

1500 ~~Dor~~ Drop 3 each coolers w/ samples for shipment to Eurofins Denver laboratory.

FedEx tracking #'s
770398466523
770398465972
770398461440

M Baron

Appendix C: Field Change Requests

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Tetra Tetra
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST LOG

Task Order: N4425519F4112	**Project Manager:**	**Linda Klink**	**NTR / RPM:**	**Ray Kobeski/ Janice Horton**
DOCUMENT	**FCR No.**	**DESCRIPTION OF CHANGE**	**DATE INITIATED**	**STATUS**
SSHP/APP	1	Revision to APP/SSHP. Current COVID-19 procedures and requirements need to be followed for field work to address control/mitigation procedures in respond to the COVID 19 pandemic. FCR-NW194112-01 provides APP replacement pages 10-1 and 10-2 (back on back) and new Attachment XI.	6/29/20	Ray Kobeski signed 6/30/20
SSHP/APP	2	Revision to APP/SSHP. The clinic noted has closed and so a replacement locale for non-emergency care is needed. FCR-NW194112-02 provides APP replacement pages: cover w/ cumulative FCR date changes, pages 9-11 and 9-12 (back on back) and Attachment VII Figure 9-1 (unchanged flip side Figure 9-2). [Pen&ink change to SSHP/APP by field team on 08/14/2020]	10/14/20	Ray Kobeski signed 10/22/20
SSHP/APP	3	Revision to APP/SSHP. UXO 6 has a steep slope and rope access requirements are needed to ensure safety of field personnel. The scope is authorized as per the concurrence letter signed by the Navy on 6/1/20. FCR-NW194112-03 provides APP replacement pages: -Cover w/ cumulative FCR date changes (FCR-01 thru FCR-03) -Table of Contents Attachment List, page x (and unchanged flip side ix) -Page 2-2 (and unchanged flip side 2-1) -Page 4-4 (and unchanged flip side 4-3) -Page 4-9 (and unchanged flip side 4-10) -Page 5-5 (and unchanged flip side 5-6) -Pages 6-1 and 6-2 (back on back) -Page 9-24 (and unchanged flip side 9-23) -Page 9-42 (and unchanged flip side 9-41) -Page 10-2 (and unchanged flip side 10-1) -Attachment I UXO 6 Figure 2-22 addition (and unchanged flip side Figure 2-21) and associated revised flysheet -Attachment II UXO 6 AHA additions and associated revised flysheet -New Attachment XII (subcontractor Gravitec Work Plan) with new flysheet	10/14/20	Ray Kobeski signed 10/22/20
SSHP/APP	4	Revisions to APP/SSHP. -Personnel changes (see attachment for summary) -Personnel and Medical Center changes (see revised Figure 9-1 Emergency Contacts attachment)	2/28/22	Janice Horton signed 3/3/2022
MEC QAPP/ MC QAPP/ ESS	1	Revisions to MEC QAPP/MC QAPP/ESS -Personnel changes (see attachment for summary)	2/28/22	Janice Horton signed 3/3/2022
MEC QAPP/ ESS	2	Revisions to MEC QAPP/ESS -Vegetation management changes (see attachment for summary)	3/21/22	Charlie Escola (NTR) signed 3/21/2022 as emailed by Janice Horton on 3/22/2022
MEC QAPP	3	Revision to MEC QAPP -SUXOS change Syd Rodgers to Forrest Malone	4/12/22	Janice Horton signed 4/13/2022
MEC QAPP	4	Revisions to MEC QAPP -Project Geophysicist change Jeff Gamey to Matt Barner -QC Geophysicist change Matt Barner to Jessie Powers -Site Geophysicist change TBD to Brett Yarborough -Section 17.10 MEC/MPPEH Management (DFW 9), 3rd bullet: For greater flexibility, in addition to the EOD Range, disposition of MEC via controlled detonation at the end of the project may also be conducted at UXO 3 and/or UXO 7 at the direction of the Navy.	7/8/22	Steven Skeehan (NTR) signed 7/21/2022 as emailed by Janice Horton that same day. Of note, previous Janice verbal approval on 7/19/2022.
MEC QAPP	5	Revisions to MEC QAPP -Change in geophysics EM61-HP battery voltage levels to meet daily production goals and maintain schedule efficiency. The manufacturer Geonics was consulted and concurred with the change. Impacts Worksheet #22 MQO, and SOPs 4 and 5.	7/26/22	Steven Skeehan (NTR) signed 07/27/2022

FIELD CHANGE REQUEST LOG

Task Order: N4425519F4112		**Project Manager:**	**Linda Klink**	**NTR / RPM:**	**Ray Kobeski/ Janice Horton**
DOCUMENT	**FCR No.**	**DESCRIPTION OF CHANGE**		**DATE INITIATED**	**STATUS**
MEC QAPP	6	Revisions to MEC QAPP Key changes include elimination of full coverage GPR surveys from MRP sites as well as conducting focused GPR profile surveys across anomaly footprints of interest instead of blanket GPR transect surveys at a pre-planned uniform spacing. The revised agreed-upon scope with the PDT for the GPR work is as follows: - Site UXO4: 12 profiles - Site UXO7: 7 profiles - Site UXO17: 9 profiles - Site UXO17B: 10 profiles Attachments provided with this FCR include a summary table of the MRP geophysical sites, presenting original GPR scope and current scope, changes to relevant text and tables in the MEC QAPP and figures depicting the GPR profile locations. MEC QAPP changes impact: -Worksheet #11, Section 11.5, Decision Rule #6 -Worksheet #12, Table 12-1, Measurements #3 and #12 -Worksheet #17, Section 17.1, 2nd and 3rd paragraphs and Tables 17-1 & 17-2		11/9/22	Charlie Escola (NTR) signed 2/7/2023 as emailed by Janice Horton on 2/8/2023
MC QAPP (also see MEC QAPP/ MC QAPP/ ESS FCR 1 above)	1	Change of laboratory for analysis of Nitrocellulose, one of the analytes on the explosives list. Includes all worksheet sections affected by this change. Laboratory for analysis of Nitrocellulose, change from Eurofins TestAmerica Sacramento to Agriculture & Priority Pollutants Laboratory, Inc. (APPL). To address this change, the following Worksheets are affected with revised worksheet sections included in this FCR. (note that additions/changes are shown in bold, red font): -Worksheets #3 through 7, 14, 26, 30, 31, & 33 (worksheets which notate laboratory identification). Worksheets revised to include APPL. -Worksheet #15 Worksheet Limits and Evaluation Tables revised with APPL reference limits for Nitrocellulose. -Worksheet #19 Analytical SOP Requirements Table revised with APPL requirements. -Worksheet #23 Analytical SOP Reference Table revised with addition of APPL SOP. -Worksheet #24 Analytical Instrument Calibration Table revised with addition of APPL Nitrocellulose analyzer instrument. -Worksheet #25 Analytical Instrument and Equipment Maintenance, Testing, and Inspection revised with addition of APPL instrument for Nitrocellulose analysis. -Worksheet #28 Laboratory QC Samples Table revised with addition of APPL QC for Nitrocellulose. -Appendix D Laboratory Accreditations, addition of APPL DoD ELAP accreditation.		11/9/22	Dana Stonelake (Navy Chemist) signed FCR-01 Revision 1 01/06/2023
HISTORICAL AND CULTURAL RESOURCES SURVEY REPORT	1	Revisions to Historical and Cultural Resources Survey Report (Appendix F Cultural Work Plan) -Personnel changes (see attachment for summary)		2/28/22	Janice Horton signed 3/3/2022

CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-NW194112-01 DATE 6/29/2020
LOCATION: Naval Base Kitsap Bangor, Silverdale WA Contracting/COR Kimberly Gillette/Ray Kobeski

1. Document to be changed. Identify revision, date, section, drawing, etc.

Final Accident Prevention Plan/Site Safety and Health Plan (Site Inspection for Munitions and Explosives of Concern, Munitions Constituents, Historical and Cultural Resources Survey, and Habitat/ Endangered Species Survey) dated May 2020
APP, Section 10 and new APP Attachment XI COVID-19 APP Supplement

2. Description of existing requirement and proposed change (Attach sheet if necessary)

It is necessary to address new requirement for field projects to address control/mitigation procedures in response to the COVID 19 pandemic. Section 10 is revised to reference new Attachment XI. Attachment XI provides this FCR and related attachments as a package addressing COVID-19 guidance and requirements. COVID-19 requirements change regularly and so the FCR is best issued just prior to field work initiation to ensure most recent guidance and requirements are employed.

The revised Section 10 and new Attachment XI are presented in redline on the following pages.

The affected work plan pages 10-1 and 10-2 may be directly replaced with the following 2 pages of this FCR (back on back).
New Attachment XI should be inserted after Attachment X.

ATTACHMENT XI

COVID-19 APP SUPPLEMENT AND ATTACHMENTS

A Tetra Tech COVID-19 Field Task Modification Form
B CDC Face Mask Covering Guidelines
C DOD Face Covering Policy
D Tetra Tech COVID-19 Supplement AHA Mobilization/Demobilization
E Tetra Tech COVID-19 Vehicle Inspection Checklist
F Tetra Tech Essential Services Authorization State of Washington
G Washington Coronavirus Hazard Considerations for Employers, May 22, 2020

3. Reason for Change (Attach sheet if necessary)

It is necessary to address new requirement for field projects to address control/mitigation procedures in response to the COVID 19 pandemic. Section 10 reference to new Attachment XI provides the field team with the necessary protective measures associated with COVID-19.

4. Originator: (print name and sign) Linda Klink Linda Klink	**Title**	**Date** 6/29/2020
Reviewed by: (print name and sign) **See Attachment A Tt CLEAN H&S Manager signature, Stan Liang (Tt developed standard Field Task Modification Form)**	**Title**	**Date**

Site Superintendent (Print name and sign) NA	**Date**	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 6/29/2020
Tt Program QC Manager (Print Name and Sign) N/A	**Date**	**Navy Acknowledgement (Print name and sign)**	**Date**

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10.0 Activity Hazard Analysis

Work conducted in support of this project will be performed using the Activity Hazard Analysis (AHA) process to guide and direct field crews on a task by task basis.

Project work shall not begin until the APP/SSHP, including AHAs and assigned Risk Assessment Codes (RACs), have been accepted by the GDA designated (as well as designated government on site representatives) for this project and discussed with all project field personnel (e.g., Tetra Tech personnel, Tetra Tech subcontractor personnel) as discussed below.

The FOL/SSHO will sign each AHA indicating acceptance of initial RACs prior to initiating each task. If the hazard controls specified in an AHA are not available (or are insufficient based on site-specific considerations and changing conditions) the FOL/SSHO shall notify the CHSM immediately. After acceptance of AHAs by the FOL/SSHO, he/she will review the AHAs with the task participants as part of pre-task tailgate briefing sessions.

Daily safety meetings will be conducted during site work and the task-specific AHA(s) will be reviewed prior to initiating any field activities. This effort will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Use of the AHA will provide the line of communication for reviewing task-specific hazards and protective measures associated with each operation. The AHA will be used as the primary reference for designating hazard control measures.

The FOL/SSHO is responsible for making the parties aware of the contents and requirements of the AHA. Any problems encountered with the protective measures required will be documented and brought to the attention of the FOL/SSHO.

As an ongoing quality assurance effort, the FOL/SSHO will review operations to ensure that AHAs adequately address job steps, potential hazards, and appropriate controls for the tasks being conducted. Where deficient, they will be corrected and that information shared with the field personnel. Correction will occur by initiating the process to revise applicable sections of the APP/SSHP.

Modifications to the APP/SSHP are initiated by submitting the Field Task Health and Safety Plan Modification Request Form (Attachment III) to CHSM. The CHSM, in consultation with the FOL/SSHO, modifies the APP/SSHP (including AHAs as needed).

See Attachment XI for COVID-19 APP Supplement.

If any revisions to the APP/SSHP result in revision to an AHA which increases a RAC classification or a change in personnel assigned to key project roles (e.g., Competent Person), the CHSM, through the Tetra Tech PM, will submit the revised APP/SSHP to the GDA designated (as well as designated government on site representatives) for this project for review and approval.

Once the review and approval process is completed, the Tetra Tech PM ensures that the revised APP/SSHP is provided to field personnel and any changes communicated to affected site personnel.

The following AHAs listed as DFOW in Section 2.5 of the APP are provided in Attachment II:

- Mobilization/Demobilization (see Attachment XI for COVID-19 APP Supplement)
- Vegetation Management
- Land Surveying
- QC Seeding, IVS Establishment, UXO Detector Aided Surface Survey
- DGM, GPS, and GPR Field Surveys
- MEC/MPPEH Management
- Munitions Constituents Sampling and Utility Clearance
- Historical and Cultural Resources Survey
- Habitat/Endangered Species Work Survey
- Decontamination

All completed AHAs shall be retained in the project files for a time period specified in the contract. Since AHAs are considered exposure data the final disposition is determined by the CHSM.

New Page as per FCR-NW194112-01

ATTACHMENT XI

COVID-19 APP SUPPLEMENT
AND ATTACHMENTS

ATTACHMENTS

A Tetra Tech COVID-19 Field Task Modification Form
B CDC Face Mask Covering Guidelines
C DOD Face Covering Policy
D Tetra Tech COVID-19 Supplement AHA Mobilization/Demobilization
E Tetra Tech COVID-19 Vehicle Inspection Checklist
F Tetra Tech Essential Services Authorization State of Washington
G Washington Coronavirus Hazard Considerations for Employers, 05/22/20

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TETRA TECH
Safety Excellence

Tetra Tech Inc.
FIELD TASK/HEALTH & SAFETY PLAN MODIFICATION REQUEST FORM

Project/Installation Name: Site Inspection Basewide Munitions Response Sites/ Naval Base Kitsap Bangor	**CTO & Project Number:** **N4425519F4112** **112G08005-NW194112**	**Task Modification Number:** FCR-NW194112-01
Modification to Final Accident Prevention Plan/Site Safety and Health Plan (Site Inspection for Munitions and Explosives of Concern, Munitions Constituents, Historical and Cultural Resources Survey, and Habitat/ Endangered Species Survey) dated May 2020	**Site Location** Silverdale, Washington	**Date of Request** 06/29/2020

Activity Description: N/A

Reason for Change/Modification: Addendum to plans which are being implemented in field projects to address control/mitigation procedures in response to the COVID 19 pandemic.

This is Rev 2 to this FTMR which addresses the following revisions:

- **New COVID 19 Mobilization/Demobilization AHA for Tetra Tech contractors.**
- **New AHA (Sampling of Private Drinking Water Wells (COVID 19 Supplement)) providing guidance for obtaining PFAS samples at a residence**
- **New link to state specific COVID 19 information provided by the National Governor's Association in the Tetra Tech (non contractor) Mobilization/Demobilization AHA**

Person Requesting Change/Modification:

Linda Klink, P.E. PMP	Project Manager
Name	**Position**

Tetra Tech Inc.
FIELD TASK/HEALTH & SAFETY PLAN
MODIFICATION REQUEST FORM

Recommended Disposition: This plan addresses control and mitigation procedures for field operations during the COVID 19 pandemic. This plan is based on the guidance provided by the following authoritative information resources:

- United States Centers for Disease Control (CDC) - https://www.cdc.gov/coronavirus/2019-ncov/
- World Health Organization (WHO) https://www.who.int/emergencies/diseases/novel-coronavirus-2019
- Tetra Tech Safe Work Practice Infectious Disease Guidance (SWP – 55) – available at https://tetratechinc.sharepoint.com/sites/Home

The risk posed by COVID 19 is unique in that this risk is a highly infectious disease. COVID-19 is thought to spread mainly from person-to-person, between people who are in close contact with one another (within about 6 feet) and through respiratory droplets produced when an infected person coughs or sneezes. The virus may survive on surfaces for 7 days or longer. Also, persons who are asymptomatic or pre-symptomatic can be a source of infection.

Due to the unique nature of this risk to Tetra Tech and contractor personnel performing work on field projects, controls such as hygiene practices, social distancing, isolation, and quarantine (where mandated by health professionals or local, state, or federal agencies) are the primary control measures. The potential for asymptomatic and pre-symptomatic transmission underscores the importance of the control measures (i.e. hygiene practices and social distancing) in the attached FTMR.

The attached Activity Hazard Analysis forms will be used in conjunction with the pre existing Mobilization/Demobilization AHA currently included in existing plans.

Unanticipated supply chain and logistical disruptions can be expected (e.g. shortages, restrictions in travel and business activities by government agencies). Therefore, this FTMR and attached AHAs are intended to be as flexible as possible to adapt control/mitigation measures to conditions present at a given job site.

Project personnel tasked with implementation of guidance in this FTMR and the attached AHAs are responsible for coordination of COVID 19 response and mitigation procedures with their respective clients.

The current status of the pandemic in geographical regions where field work will take place is evolving on an ongoing basis (e.g. changes in recommendations or mandates from CDC, WHO, local, state, and federal agencies, etc.). Therefore, this FTMR and attached AHAs will be updated as needed to address any such changes.

Any revisions to this FTMR/AHA, including client specific requirements, shall be submitted to the Navy CLEAN HSM (or designee) for review and approval.

Users of this guidance are encouraged to contact the CLEAN HSM or Matt Soltis to obtain the necessary clarification or guidance in implementation of this FTMR and AHA.

Linda Klink

Project/Task Order Manager (Signature)

06/29/2020

Date (Resolution Required By)

TETRA TECH
Safety Excellence

Tetra Tech Inc.
FIELD TASK/HEALTH & SAFETY PLAN
MODIFICATION REQUEST FORM

Modifications to the HASP required based on this change? ☒ Yes ☐ No ☐ NA
NOTE: Append this FTMR to all field copies of the APP/SSHP

If modification to the HASP is required please identify the content and identified revision number: ____________________

Health Safety Manager (Signature) **Date**: 6/29/2020

Linda Klink
Accepted by Requestor for Change/Modification (Signature) **Date** 06/29/2020

NA
Accepted By Contractor/Subcontractor Representative (Signature) **Date**

Distribution: **Other: Ray Kobeski, NAVFAC NW**
Program/Project File **112G08005-NW194112**

Use of Cloth Face Coverings to Help Slow the Spread of COVID-19

Attachment XI
(Attachment B)

How to Wear Cloth Face Coverings

Cloth face coverings should—

- fit snugly but comfortably against the side of the face
- be secured with ties or ear loops
- include multiple layers of fabric
- allow for breathing without restriction
- be able to be laundered and machine dried without damage or change to shape

CDC on Homemade Cloth Face Coverings

CDC recommends wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain (e.g., grocery stores and pharmacies), **especially** in areas of significant community-based transmission.

CDC also advises the use of simple cloth face coverings to slow the spread of the virus and help people who may have the virus and do not know it from transmitting it to others. Cloth face coverings fashioned from household items or made at home from common materials at low cost can be used as an additional, voluntary public health measure.

Cloth face coverings should not be placed on young children under age 2, anyone who has trouble breathing, or is unconscious, incapacitated or otherwise unable to remove the cloth face covering without assistance.

The cloth face coverings recommended are not surgical masks or N-95 respirators. Those are critical supplies that must continue to be reserved for healthcare workers and other medical first responders, as recommended by current CDC guidance.

Should cloth face coverings be washed or otherwise cleaned regularly? How regularly?

Yes. They should be routinely washed depending on the frequency of use.

How does one safely sterilize/clean a cloth face covering?

A washing machine should suffice in properly washing a cloth face covering.

How does one safely remove a used cloth face covering?

Individuals should be careful not to touch their eyes, nose, and mouth when removing their cloth face covering and wash hands immediately after removing.

cdc.gov/coronavirus

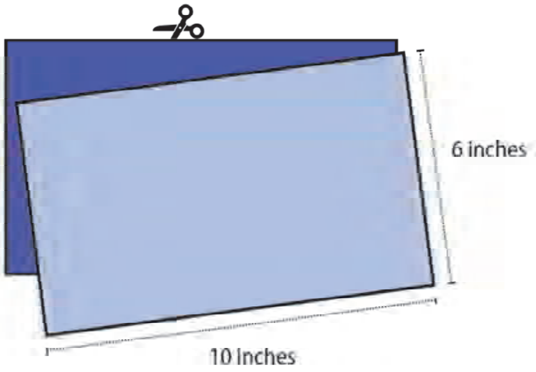
Sewn Cloth Face Covering

Materials

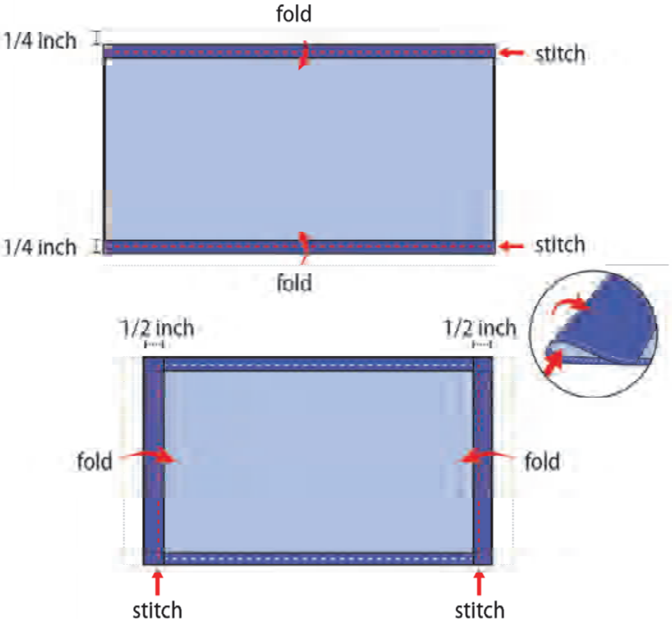
- Two 10"x6" rectangles of cotton fabric
- Two 6" pieces of elastic (or rubber bands, string, cloth strips, or hair ties)
- Needle and thread (or bobby pin)
- Scissors
- Sewing machine

Tutorial

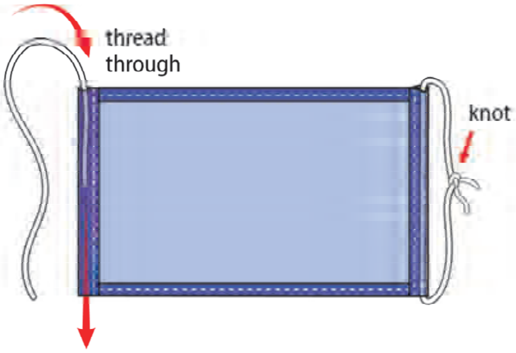
1. Cut out two 10-by-6-inch rectangles of cotton fabric. Use tightly woven cotton, such as quilting fabric or cotton sheets. T-shirt fabric will work in a pinch. Stack the two rectangles; you will sew the cloth face covering as if it was a single piece of fabric.



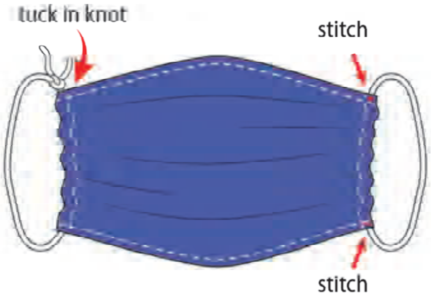
2. Fold over the long sides ¼ inch and hem. Then fold the double layer of fabric over ½ inch along the short sides and stitch down.



3. Run a 6-inch length of 1/8-inch wide elastic through the wider hem on each side of the cloth face covering. These will be the ear loops. Use a large needle or a bobby pin to thread it through. Tie the ends tight.
Don't have elastic? Use hair ties or elastic head bands. If you only have string, you can make the ties longer and tie the cloth face covering behind your head.



4. Gently pull on the elastic so that the knots are tucked inside the hem.
Gather the sides of the cloth face covering on the elastic and adjust so the cloth face covering fits your face. Then securely stitch the elastic in place to keep it from slipping.



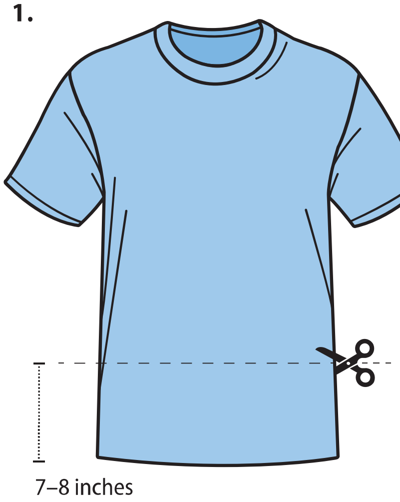
Quick Cut T-shirt Cloth Face Covering (no sew method)

Materials

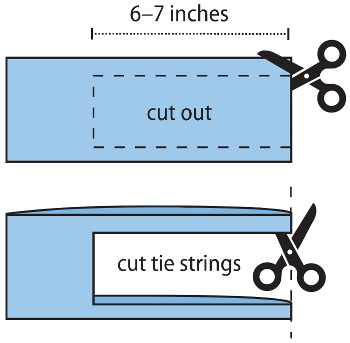
- T-shirt
- Scissors

Tutorial

1.



2.



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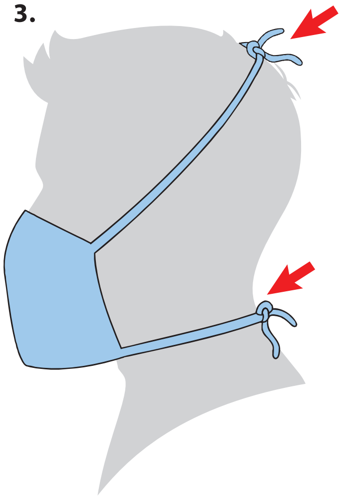


Tie strings around neck, then over top of head.

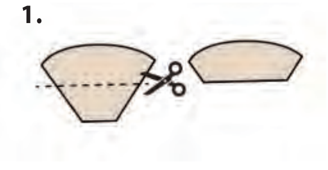
Bandana Cloth Face Covering (no sew method)

Materials

- Bandana (or square cotton cloth approximately 20″x20″)
- Coffee filter
- Rubber bands (or hair ties)
- Scissors (if you are cutting your own cloth)

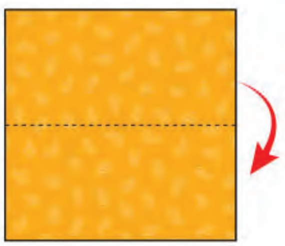
Tutorial

1.



cut coffee filter

2.



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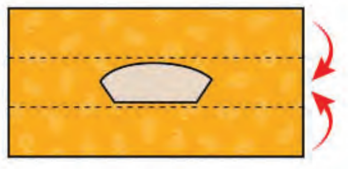
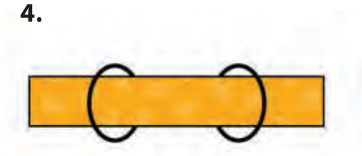


Fold filter in center of folded bandana.

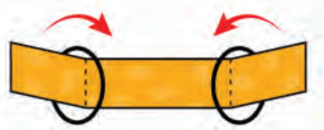
Fold top down. Fold bottom up.

4.



Place rubber bands or hair ties about 6 inches apart.

5.



Fold side to the middle and tuck.

6.

7.

SECRETARY OF DEFENSE
1000 DEFENSE PENTAGON
WASHINGTON, DC 20301-1000

Attachment XI
(Attachment C)

APR 0 5 2020

MEMORANDUM FOR CHIEF MANAGEMENT OFFICER OF THE DEPARTMENT OF DEFENSE
SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFF
UNDER SECRETARIES OF DEFENSE
CHIEF OF THE NATIONAL GUARD BUREAU
GENERAL COUNSEL OF THE DEPARTMENT OF DEFENSE
DIRECTOR OF COST ASSESSMENT AND PROGRAM EVALUATION
INSPECTOR GENERAL OF THE DEPARTMENT OF DEFENSE
DIRECTOR OF OPERATIONAL TEST AND EVALUATION
CHIEF INFORMATION OFFICER OF THE DEPARTMENT OF DEFENSE
ASSISTANT SECRETARY OF DEFENSE FOR LEGISLATIVE AFFAIRS
ASSISTANT TO THE SECRETARY OF DEFENSE FOR PUBLIC AFFAIRS
DIRECTOR OF NET ASSESSMENT
DIRECTORS OF DEFENSE AGENCIES
DIRECTORS OF DOD FIELD ACTIVITIES

SUBJECT: Department of Defense Guidance on the Use of Cloth Face Coverings

The Department of Defense (DoD) is committed to taking every precaution to ensure the health and wellbeing of our Service members, DoD civilian employees, families, and the Nation in response to the Coronavirus Disease 2019 (COVID-19) pandemic. DoD supports, and will continue to implement, all measures necessary to mitigate risks to the spread of the disease, consistent with the Department's priorities to protect our people, safeguard our national security capabilities, and support the government's whole-of-nation response.

The Centers for Disease Control and Prevention (CDC) recommends wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain, especially in areas of significant community-based transmission. Military personnel, DoD civilian employees, their family members, and DoD contractors are strongly encouraged to follow CDC guidelines on the use of cloth face coverings in public settings or where other social distancing measures are difficult to maintain.

Effective immediately, to the extent practical, all individuals on DoD property, installations, and facilities will wear cloth face coverings when they cannot maintain six feet of social distance in public areas or work centers (this does not include in a Service member's or Service family member's personal residence on a military installation). This includes all:

- Military Personnel

- DoD Civilian Employees
- Family Members
- DoD Contractors
- All other individuals on DoD property, installations, and facilities

Exceptions to this requirement may be approved by local commanders or supervisors, and then submitted up the chain of command for situational awareness. Security checkpoints may require the lowering of face covers to verify identification.

The Under Secretary of Defense for Personnel and Readiness will issue updated force health protection guidance on DoD implementation. The Military Departments will issue guidance on wear for Service members. As an interim measure, all individuals are encouraged to fashion face coverings from household items or common materials, such as clean T-shirts or other clean cloths that can cover the nose and mouth area. Medical personal protective equipment such as N95 respirators or surgical masks will not be issued for this purpose as these will be reserved for the appropriate personnel.

The Department will continue to implement force protective measures to mitigate the spread of COVID-19 to our total force and their families, and the American people. The latest DoD policies can be found at https://www.defense.gov/Explore/Spotlight/Coronavirus.

Mark T. Esper

Attachment XI
(Attachment D)

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Mobilization/Demobilization (COVID 19 Supplement) For Tetra Tech Personnel – Rev. 2

Overall Risk Assessment Code (RAC) (Use highest code) **M**

Project Location: CMAGR MRP Site 1, Imperial and Riverside Counties, California

Contract Task Order Number: N6247317F4188

Date Prepared: 06/01/2020

Prepared by: S. Liang, CIH, CSP

Reviewed by: M. Soltis, CIH, CSP

Notes: (Field Notes, Review Comments, etc.)
This AHA applies to Tetra Tech personnel only. A separate AHA is applicable to project contractor personnel.

Accepted by SSHO: Yes, see Field Change Request FCR06 for signature

Risk Assessment Code (RAC) Matrix

Severity	**Probability**				
	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	**E**	**E**	**H**	**H**	**M**
Critical	**E**	**H**	**H**	**M**	**L**
Marginal	**H**	**M**	**M**	**L**	**L**
Negligible	**M**	**L**	**L**	**L**	**L**

Step 1: Review each **"Hazard"** with identified safety "Controls" and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and Identified as: Frequent, Likely, Occasional, Seldom, or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart
- **E= Extremely High Risk**
- **H= High Risk**
- **M= Moderate Risk**
- **L= Low Risk**

The SSHO at the Initial Site Briefing shall review the AHA steps, hazards, and controls. In addition, the SSHO shall determine whether noted controls are implemented and available. If yes, then the initial RAC noted below shall be accepted via signature of the SSHO. If no, the SSHO shall advise the HSM of the deficiency immediately.

JOB STEPS	**HAZARDS**	**CONTROLS**	**RAC**
Transportation from home, from primary office, or from airport to site and vehicle operations during site activities. Return vehicle travel from site upon work completion.	1. Vehicle accident using a motor vehicle in an unsafe operating condition	1. Perform vehicle maintenance (see section 9.3 of the Tetra Tech Vehicle Safety Program). This program is available at https://tetratechinc.sharepoint.com/sites/Home. 2. Perform a walk-around inspection of the vehicle using the Vehicle Inspection Checklist (attached to this AHA).	**L**
	2. Vehicle accident from unsafe operating practices	1. Ensure the driver is "authorized" per the Tetra Tech Vehicle Safety Program. Every person operating a motor vehicle shall possess, at all times while operating such vehicle, a license/permit valid for the equipment being operated. 2. Operators must comply with state and local vehicle and traffic regulations. 3. Follow safe driving practices during motor vehicle operation: a. Observe the "Driver Rules of Conduct" specified in Tetra Tech Vehicle Safety Program	**L**

JOB STEPS	HAZARDS	CONTROLS	RAC
		b. Preset radio stations c. Secure wires for electronic devices (e.g. cell phone, GPS) or similar devices so this is not attempted while driving. d. The driver will not use a cell phone while the vehicle is in motion. e. Set address for GPS or similar devices so this does not have to occur while driving. f. Do not eat, play with the radio or engage in any activities that would distract you from your primary task of driving. g. If a call is received, let it go to voice mail or pull over and answer it h. Practice defensive driving whenever traveling in a vehicle. i. Permit adequate room between you and the driver in front of your vehicle. Use the 4-second rule j. Follow posted road signs k. Exercise extra caution when moving through school, residential, and work zones	
	3. Vehicle accident due to operator fatigue	1. Comply with the Tetra Tech Driver Rules of Conduct and Vehicle Use Policy. a. Be rested for 12 hours or more prior to conducting an 8-hour journey b. Do not drive more than 10 hours in a single day. c. When driving for 4 hours take mandatory 20-minute breaks every 2 hours d. When driving 5 hours or more, take one mandatory break of 45 minutes.	L
	4. Fire hazard during refueling of motor vehicle	1. Always turn off the vehicle engine while refueling. 2. Stay near the vehicle refueling point near the process. 3. Do not smoke or use a cell phone when pumping gas or near a someone pumping gas. 4. Use only the hold-open latch provided on the gasoline nozzle. Never jam or force the hold-open latch open by using some other object, such as the gas cap. 5. To avoid gasoline spills, do not overfill or top off your tank. The fuel dispenser will shut off automatically when the tank is full. 6. Be aware of static electricity from getting in and out of car, especially during cold weather. Discharge static electricity before pumping gas: a. DO NOT get back into the vehicle while refueling. b. If you must re enter the vehicle, discharge static electricity build up when you get out by touching the outside metal portion of your vehicle away from the filling point, before attempting to remove the nozzle.	L
	5. Involvement in a motor vehicle accident	1. If possible, move the vehicle off the road and out of active traffic. 2. Avoid exiting the vehicle unless absolutely necessary. Don a high visibility vest before exiting the vehicle.	L

JOB STEPS	HAZARDS	CONTROLS	RAC
	and struck by hazard from other motor vehicles	3. If outside your motor vehicle, avoid areas, such as shoulder areas or medians, directly adjacent to active motor vehicle traffic (unless protected by a permanent motor vehicle barrier, guard rail, jersey barrier, or equivalent) 4. Contact the rental agency roadside assistance for rental vehicles to determine if the vehicle is road safe. If necessary, request assistance. 5. Contact your personal insurance provider for personal vehicles. 6. Provide Tetra Tech personnel with first aid as needed. 7. For serious injuries, treat for shock, call 911, and await emergency response personnel. A Tetra Tech representative shall accompany injured team member to the hospital.	
	6. Exposure to or spread of infectious disease (COVID 19)	1. Before initiating travel, approval **MUST** be obtained as follows: a. Steve Ruffing (or Operations Manager for travel by automobile for distances not more than 50 miles from the person's office AND travel will not cross county or State boundaries) must approve the travel as "business essential". b. Matt Soltis (or person in the Health and Safety Group designated by Matt Soltis if unavailable) must perform a health and safety review and approval. 2. If an individual is feeling ill, **DO NOT TRAVEL**! Contact the Tetra Tech PM immediately to report your health condition if you are feeling the following symptoms (identified by the WHO) as potentially related to COVID 19 or are feeling unwell and have reason to believe signs and symptoms are COVID 19 related: a. Fever (person feels warm to the touch or has a measured temperature of 100.4°F) b. Tiredness c. Dry cough d. Headache e. Shortness of breath f. Repeated shaking with chills g. Aches and pains h. Nasal congestion i. Runny nose j. Sore throat k. Diarrhea. l. Loss of sense of smell and taste 3. Emergency warnings signs (according to the CDC) requiring immediate medical attention include: a. Trouble breathing b. Persistent pain or pressure in the chest c. New confusion or inability to arouse d. Bluish lips or face	M

JOB STEPS	HAZARDS	CONTROLS	RAC
		NOTE: Consult with your health care provider or CORE Occupation Medicine for any other symptoms that are severe or concerning 4. If the following scenarios occur while on business travel, Tetra Tech employees are required to follow the direction below: a. If an individual is experiencing the mentioned symptoms above while at work, contact CORE Occupational Medicine Injury Management at 855-683-9006 immediately. Provide details of your symptoms to the Case Manager. DO NOT TRAVEL. Contact the Tetra Tech PM. b. If you are in close contact with someone symptomatic or a confirmed COVID-19 individual, contact CORE Occupational Medicine. Current CDC guidelines defining close contact are the following: i. Being within approximately 6 feet (2 meters) of a COVID-19 case for a prolonged period of time (approximately 10 minutes is the criteria adopted by most health departments and agencies); ii. Having direct contact with infectious secretions of a COVID-19 case (e.g., being coughed on). c. Contact CORE Occupational Medicine if you need guidance as to whether you have been in close contact with a COVID 19 case. d. If you are directed to a clinic by CORE Occupation Medicine for testing, DO NOT TRAVEL until results are received. 5. There shall be not more than one occupant per motor vehicle unless implementation of this policy is not feasible. Where this policy cannot be feasibly implemented, contact the H&S Group which will determine, in consultation with the Tetra Tech PM, alternate controls. 6. Maintain disinfectant wipes in the vehicle (see below under “Site mobilization” for alternate cleaning products if disinfectant wipes are not available). Wipe down all frequently touched surfaces regularly. These surfaces include steering wheel, exterior and interior door handles, gear shift, climate control buttons, radio buttons, rearview mirror, center console, key fob, and A/C vents. 7. Practice good hygiene during travel: wash hands regularly with soap and water, avoid touching your face, use respiratory etiquette. See below under “Site mobilization” for hand washing guidance. 8. When outside of DOD installations, masks or facial coverings should be worn (NOTE: this is not a respirator PPE requirement, only a facial covering requirement). Follow CDC guidance for obtaining and use of face coverings (attached to this AHA). 9. Follow current WHO guidance for face mask donning and removal. See below under “Site mobilization” for guidance.	

JOB STEPS	HAZARDS	CONTROLS	RAC
		10. Stay informed of local, state, and federal restrictions of movement (ROM) and heed the ROM orders. The following resources are available to identify these requirements on the EGS Sharepoint site: a. A listing of health department websites and phone numbers (https://tetratechinc.sharepoint.com/sites/NUS/COVID19%20Resources/Forms/AllItems.aspx). b. A summary of state health directives is available from the National Governor's Association (https://www.nga.org/coronavirus/#glance) 11. An employee authorization letter for relevant states you will be traveling through should be obtained and kept with you when traveling in the event you are challenged by law enforcement or other government enforcement agencies or regulatory bodies. A compilation of work authorization letters is available on the Tetra Tech EGS intranet site. 12. Upon arrival at an active Department of the Navy (DON) facility, comply with DON and facility specific requirements. COVID 19 screening procedures implemented at these facilities include but are not necessarily limited to: a. Temperature checks b. Completion of a screening questionnaire. c. Follow Department of Defense (DOD) policy for use of face coverings (see DOD memorandum attached to this AHA).	
Site mobilization (including tailgate session, equipment inspection and staging, etc.)	1. Spread of infectious disease (COVID 19)	1. Maintain social distancing of at least 6 feet. Where not feasible, work at closer proximity should be kept as brief as possible. 2. If in person meetings are necessary, the following mitigation procedures are followed: a. No more than 10 people are allowed in a meeting (may be lower in geographical regions where stricter social distancing policies may be enforced – check for local restrictions and adjust maximum meeting size accordingly). b. Meetings in indoor or enclosed spaces are avoided unless absolutely necessary. Before holding such meetings in indoor locations, virtual options, such as Skype and phone conferences, are investigated for feasibility. c. If a meeting in an indoor location is absolutely necessary, only meeting areas permitting social distancing are permitted to be used. When meeting in indoor areas, steps to improve ventilation (e.g., opening windows, improve air changes provided by HVAC system) are taken as feasible. Use disinfectant wipes or disinfectant solutions (described below) to clean common high touch surfaces in meeting rooms before and after meetings. d. Personnel meeting the criteria (see criteria in "Transportation from home, from primary office, or from airport to site and vehicle operations during site activities") for a potential or confirmed positive case of COVID 19 shall not be permitted to attend meetings in person under any	M

JOB STEPS	HAZARDS	CONTROLS	RAC
		circumstances. The FOL/SSHO shall screen ALL meeting attendees (Tetra Tech, Tetra Tech subcontractors, client representative) etc. to determine whether they meet COVID 19 evaluation criteria. 3. Practice good hygiene: Wash hands regularly with soap and water. Hand washing procedures is as follows in accordance with CDC recommendations: a. Wet your hands with clean running water (warm or cold), turn off the tap, and apply soap. b. Lather your hands by rubbing them together with the soap. Be sure to lather the back of your hands, between your fingers, and under your nails. c. Scrub your hands for at least 20 seconds. d. Rinse hands well under clean, running water, dry hands using a clean towel or air dry them. 4. Use hand sanitizer (at least 60% alcohol-based) if hand washing is not readily available. 5. Wear disposable nitrile (or equivalent non latex material) surgical gloves between hand washings. Due to the risk of allergic reactions, use of latex gloves is to be avoided. This will minimize contact with potentially contaminated surfaces, especially if access to hand washing facilities or hand sanitizer is limited. Gloves are not to be reused. When removing gloves, avoid contact with outer surfaces. Dispose of in designated site trash receptables. 6. When outside of DOD installations, masks or facial coverings should be worn. 7. Follow DOD policy if you are on a DOD installation (see DOD memorandum attached to this AHA). 8. Follow CDC guidance for obtaining and use of face coverings (attached to this AHA). 9. Follow current WHO guidance for face mask donning and removal: a. Place the mask carefully, ensuring it covers the mouth and nose, and tie it securely (or use straps and/or loops) to minimize any gaps between the face and the mask. b. Avoid touching the mask while wearing it. c. Remove the mask using the appropriate technique: do not touch the front of the mask but untie it from behind (or only touch loops or straps). d. After removal or whenever a used mask is inadvertently touched, clean hands using an alcohol-based hand rub or soap and water. e. Replace masks as soon as they become damp with a new clean, dry mask. f. **Do not re-use single-use masks**. g. Discard single-use masks after each use and dispose of them immediately upon removal. **NOTE 1: Incorrect procedures for removal and cleaning of face coverings can increase risk of contact with and exposure to the virus that causes COVID 19. For example, self contamination can occur by touching the face when donning or attempting to reuse disposable masks.**	🟨

JOB STEPS	HAZARDS	CONTROLS	RAC
		NOTE 2: Use of face masks is NOT a substitute for social distancing and hand hygiene. It used in conjunction with social distancing as described in the DOD memorandum attached to this AHA. **NOTE 3: This is not a respirator PPE requirement, only a facial covering requirement).** 10. Avoid touching your face, use cough and sneezing etiquette. 11. Use disinfectant wipes or disinfectant solutions to clean common high touch surfaces on the job site. 12. If supply disruptions make common disinfection products unavailable, consult the following for alternatives: a. If disinfectant wipes are not available, use bleach solution with disposable paper towels or disposable cloth for disinfecting surfaces. BE CAUTIOUS, use bleach solution solely on hard, non-porous surfaces (do not use on textiles or metal surfaces). b. Bleach solution should be made daily and no more than a 1:10 bleach to water solution. Read and follow manufacturer's label instructions and warnings. c. Cleaning products with at least 60% alcohol may be used (if compatible with project sampling methods – consult with the Tetra Tech FOL/SSHO). d. Other guidance on surface disinfectant products can be found on the following websites: *i. EPA - List N: Disinfectants for Use Against SARS CoV 2 (*https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2) *ii. Consumer Reports – "These Common Household Products Can Destroy the Novel Coronavirus" (https://www.consumerreports.org/cleaning/common-household-products-that-can-destroy-novel-coronavirus/)* 13. Ensure that disinfection products are used safely (e.g., prevent risks such as skin, eye, or respiratory irritation) as follows: a. Make sure there is adequate ventilation (e.g., open doors and windows in confined areas)._ b. Wear nitrile gloves and safety glasses when handling, using, and preparing bleach solutions. c. If the cleaning product gets on exposed skin surfaces, rinse with water as thoroughly as possible to prevent skin irritation and dermatitis. d. Review and comply with manufacturer recommendations and the product SDS. Incorporate the SDS into the site chemical inventory list and maintain on site in accordance with the Hazard Communication requirements in the approved health and safety plan for the project. **WARNING: Combining certain cleaning products such as ammonia and chlorine can result in the production of toxic gases. Read all manufacturer warning labels before using a product.**	🟨

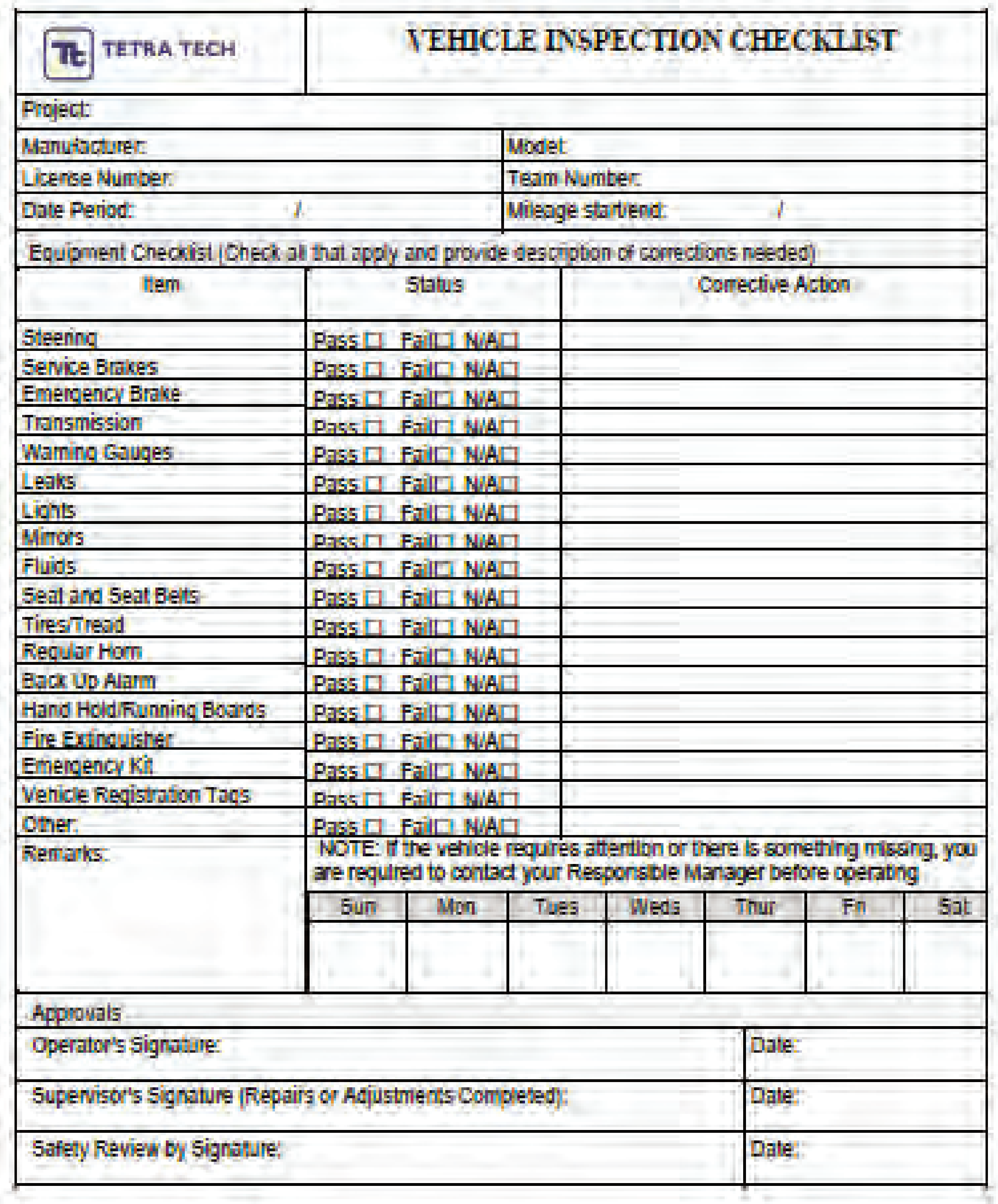
JOB STEPS	HAZARDS	CONTROLS	RAC
		14. Supplies of disposable tissues (or equivalent disposable paper product) are provided on site. 15. Avoid touching contents of trash receptables. Wear disposable gloves when handling trash. 16. Avoid using phones or equipment used by others unless disinfected following the procedures described above. 17. Disinfect all equipment prior to use including sampling equipment, cooler handles, sample collection containers, etc. If performing PFAS sampling, take care to use PFAS-free products when cleaning/disinfecting. 18. Potable drinking water or other beverages shall not be provided from common coolers or other containers. Only individual bottles of water or other beverages are provided. Beverages are not stored in common coolers used by multiple personnel. Disinfect surfaces of beverage containers (in accordance with the procedures described above) prior to use if they have been handled by more than one person. 19. Food shall not be distributed from common containers, plates, etc. **20. *O*nly if supply disruptions make products for implementing the above controls unavailable, are alternate hygiene practices considered. These must be determined and implemented in consultation with the Tetra Tech FOL/SSHO and Tetra Tech Navy CLEAN HSM.** ***21.*** **If site personnel meet criteria for signs and symptoms of COVID 19 exposure or close contact (see criteria in “Transportation from home, from primary office, or from airport to site, and vehicle operations during site activities”) contact CORE Occupational Medicine Injury Management, Tetra Tech PM, and Navy CLEAN HSM immediately. In the event site personnel test positive for COVID 19 or are presumed positive, the Tetra Tech FOL/SSHO, Tetra Tech PM, and CHSM will determine appropriate control/mitigation measures in con*sultation with CORE Occupational Medicine.*** 22. When staying in offsite lodging facilities: a. Observe social distancing (e.g., when getting meals or shopping for supplies). b. Wear face masks in public locations in accordance with the recommendations of public health authorities. Follow procedures for use of face masks described above. c. Do not permit anyone else into your room, except hotel maintenance staff. d. Wash hands frequently and before hand to mouth activities. e. Clean high touch surfaces in your room using the methods described above. f. Avoid touching the face. g. Practice cough etiquette.	

EQUIPMENT TO BE USED	**INSPECTION REQUIREMENTS**	**TRAINING REQUIREMENTS**
Disinfectant wipes, hand soap (liquid or bar form if liquid soap is not available), hand sanitizers with at least 60% alcohol, household bleach solution (10% to water), alternative surface disinfectant products described in the articles in the web links provided above, disposable tissues (or equivalent paper products)	Inspect motor vehicles to verify road safe condition. Complete Vehicle Inspection Checklist (attached to this AHA).	Review of AHA prior to mobilizing (pre travel briefing) and at a pre-task tailgate safety briefing with all intended task participants. Hazard Communication (see Section 9.14) Review SDS or manufacturer directions for cleaning products prior to use. Memorandum from the Secretary of Defense dated April 5, 2020 (attached to this AHA) Centers for Disease Control *"Use of Cloth Face Coverings to Help Slow the Spread of COVID 19"* (attached to this AHA)
Personal Protective Equipment: **Minimum**: High visibility vest. Face covering. **Optional items:** Disposable gloves (nitrile or non-latex equivalent) and safety glasses when using liquid cleaning products to sanitize surfaces and equipment. **HTRW**: None anticipated for this task.	Initial PPE inspection performed by FOL/SSHO. Ongoing (prior to each use) inspections responsibilities of PPE users.	PPE training in proper use, care, storage, and limitations

I have read and understand this AHA:

Name (Printed)	**Signature**	**Date**

Attachment XI
(Attachment E)



TETRA TECH

VEHICLE INSPECTION CHECKLIST

Project:

Manufacturer:

Model:

License Number:

Team Number:

Date Period: /

Mileage start/end: /

Equipment Checklist (Check all that apply and provide description of corrections needed)

Item	Status	Corrective Action
Steering	Pass ☐ Fail☐ N/A☐	
Service Brakes	Pass ☐ Fail☐ N/A☐	
Emergency Brake	Pass ☐ Fail☐ N/A☐	
Transmission	Pass ☐ Fail☐ N/A☐	
Warning Gauges	Pass ☐ Fail☐ N/A☐	
Leaks	Pass ☐ Fail☐ N/A☐	
Lights	Pass ☐ Fail☐ N/A☐	
Mirrors	Pass ☐ Fail☐ N/A☐	
Fluids	Pass ☐ Fail☐ N/A☐	
Seat and Seat Belts	Pass ☐ Fail☐ N/A☐	
Tires/Tread	Pass ☐ Fail☐ N/A☐	
Regular Horn	Pass ☐ Fail☐ N/A☐	
Back Up Alarm	Pass ☐ Fail☐ N/A☐	
Hand Hold/Running Boards	Pass ☐ Fail☐ N/A☐	
Fire Extinguisher	Pass ☐ Fail☐ N/A☐	
Emergency Kit	Pass ☐ Fail☐ N/A☐	
Vehicle Registration Tags	Pass ☐ Fail☐ N/A☐	
Other:	Pass ☐ Fail☐ N/A☐	

Remarks:

NOTE: If the vehicle requires attention or there is something missing, you are required to contact your Responsible Manager before operating

Sun	Mon	Tues	Weds	Thur	Fri	Sat

Approvals

Operator's Signature:

Date:

Supervisor's Signature (Repairs or Adjustments Completed):

Date:

Safety Review by Signature:

Date:

Attachment XI
(Attachment F)

TETRA TECH

Preston Hopson
Senior Vice President, General Counsel and Secretary

March 23, 2020

To whom it may concern:

The individual in possession of this letter is an employee of Tetra Tech, a global provider of consulting and engineering services in water, environment, infrastructure, resource management, energy, and international development. Tetra Tech provides essential services to federal, state and local governments and commercial clients.

Under the order issued by the State of Washington on March 23, 2020, Tetra Tech is a designated "Essential Business," and employees are authorized to continue working and providing these critical services. During the COVID-19 pandemic, Tetra Tech remains committed to doing important work in our local communities, including providing COVID-19 response services such as continuity planning, training, disinfection, and disaster purchasing support.

Please feel free to contact me with any questions at general.counsel@tetratech.com or (626) 351-4664.

Sincerely,

Preston Hopson
Senior Vice President, General Counsel and Secretary

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Tetra Tech
Tel 626.351.4664 Fax 626.351.5291 www.tetratech.com

Washington Coronavirus Hazard Considerations for Employers (except COVID-19 care in hospitals & clinics) Face Coverings, Masks, and Respirator Choices

Washington State Department of Labor & Industries

May 22, 2020

Attachment XI
(Attachment G)

Worksite Tasks	Negligible Transmission Risk	Low Transmission Risk	Medium Transmission Risk	High Transmission Risk	Extremely High Risk
Health status of the people around you	Healthy/Asymptomatic (no COVID-19 symptoms)	Healthy/Asymptomatic	Healthy/Asymptomatic	Healthy/Asymptomatic	Probable or known COVID-19 source or direct human mouth, nose, eye interactions.
Example of work conditions *, **	Employee working alone, or all outside, or 1-9 total persons inside building/structure with outside or HVAC air, where at least 6-foot distance is **always maintained**. Tools are not shared or are sanitized between different users.	Crews outside on large worksite where at least 6-foot distance is **easily maintained fulltime** and only broken intermittently, in passing, up to several times a day. Tools are not shared or are sanitized between different users.	Large crews outside where at least 6-foot distance is **mostly maintained,** but with job tasks that require several minutes of 6-foot distance broken several times a day. Tools are shared and sanitized between different users.	Work in close quarters, such as a multiple-occupancy permit-required confined space **or** inside a room with 10 or more people where at least 6-foot distance **is not maintained,** and includes job tasks **requiring sustained** close-together (less than 3 feet apart) work for more than 10 minutes in an hour multiple times a day.	Transporting/caring for **symptomatic patients with probable or active COVID-19** within 6 feet in vehicle; or non-hospital setting or a residence with no sanitization protocols in place.
	Worksite with controlled and low public interaction, where at least 6- foot distance is **always maintaine**d and only broken in passing once or twice a day.	Work inside a structure/office where number present allows for at least 6-foot distance to be **easily maintained fulltime** and only broken intermittently, in passing, up to several times a day.	Work inside a structure/office where at least 6-foot distance **is mostly maintained,** but with job tasks that **require sustained** several minutes of 6-foot distance broken several times a day without sneeze guards or other mitigations.	Work cleaning and sanitizing of surfaces and floor after confirmed active COVID-19 employee was present in the area. Also includes work that cannot be delayed, performing services in homes of quarantined confirmed COVID-19 clients. Examples include emergency plumbing repair or in-home pet euthanasia.	Healthcare work involving face-to-face close proximity or potential for coughing or sneezing while working with **healthy or asymptomatic people.** Potential for droplets of biological material or fluids to become airborne within the breathing zone of the employee. Examples include tonometry during eye exams, visual examination of the oral and nasal cavities, visual examination of the eyes, swab sampling in the mouth or nose.

Worksite Tasks	Negligible Transmission Risk	Low Transmission Risk	Medium Transmission Risk	High Transmission Risk	Extremely High Risk
		Non-healthcare work involving personal services (such as haircuts) where there are 1 or 2 workers inside room. All clients assumed to be wearing cloth face coverings or higher level of protection.	Non-healthcare work involving personal services (such as haircuts) where there are 3-6 workers inside a room where at least 6-foot distance is not maintained and job tasks require sustained close-together (less than 3 feet apart) work. All clients assumed to be wearing cloth face coverings or higher level of protection.	Healthcare work involving procedures in close proximity to healthy or asymptomatic people with potential for aerosols generated from saliva or mucous from the mouth or nose. Examples include dental work with an ultrasonic scaler, air/water syringe, or hand piece, administering medicines with a nebulizer, spirometry, deep or forced breathing exercises.	
Number of people and conditions in work vehicle **Note: Vehicles must be sanitized between different drivers and occupants.**	Vehicle operation: employees ride alone and vehicles are sanitized between different drivers.	Vehicle with more than one occupant but can maintain 6-foot distance that is only broken intermittently up to several times a day.	Vehicle with more than one occupant but **mostly maintain** 6-foot distance with job tasks that require several minutes of 6-foot distance broken several times a day.	Vehicle with more than one occupant where at least 6-foot distance **is not maintained,** and includes job tasks requiring close-together (less than 3 feet apart) work for more than 10 minutes in an hour more than once a day.	Vehicle with more than one occupant where at least 6-foot distance is **not maintained,** and includes job tasks requiring close-together (less than 3 feet apart) work for more than 10 minutes in an hour at least once a day.

Work Conditions	Negligible Transmission Risk	Low Transmission Risk	Medium Transmission Risk	High Transmission Risk	Extremely High Risk
Minimum required mask or respiratory protection for employees <u>without</u> additional engineering controls or PPE ***	Reusable cloth face covering that fully covers mouth and nose are required for employees covered by Governor Executive Order Industry agreements except when working alone in room, vehicle, or on jobsite.	Reusable cloth face covering that fully covers mouth and nose are required for employees covered by Governor Executive Order Industry agreements except when working alone in room, vehicle, or on jobsite.	Non-cloth disposables: dust mask, KN95 or other non-approved foreign-system NIOSH-style filtering facepiece respirators, or non-FDA approved procedure masks.	Elastomeric half- or full-face respirator with particulate filters **** --OR-- Powered-air purifying respirator (PAPR) with particulate filter. (Tight-fitting respirators must be fit-tested and the wearer must be clean-shaven. No fit-testing is required for loose fitting systems.) --OR— Industrial use N95, R95 or P95 or foreign-system non-NIOSH approved filtering facepiece respirator (or other particulate respirator****).	FDA-approved surgical mask or healthcare N95 filtering facepiece respirator**** or elastomeric respirator with particulate filters. Tight-fitting respirators must be fit-tested and the wearer must be clean-shaven. Powered-air purifying respirator (PAPR) with particulate filter may be used; no fit testing is required for loose-fitting models. When feasible, clients with COVID-19 should also wear an FDA-approved surgical N95 or surgical mask.
Strongly recommended worksite protections	Reusable cloth face covering that fully covers mouth and nose for all employees not working alone.	Use multiple engineering and administrative controls together to reduce frequency and risk of touch and airborne transmission between people. Ask workers for suggestions on further improvements to controls.	Use face shield combined with minimum face covering to lower risk category where work or job task allows.	Minimize number of workers present in high-risk work tasks. Consider all possible ways to accomplish the work without people in close proximity.	Add face shield to surgical masks or eye goggles to half- face disposable respirators and non-permeable disposable upper body coverings; use powered-air purifying respirator (PAPR) system, elastomeric full-face respirators with particulate filters or higher protection.

Work Conditions	Negligible Transmission Risk	Low Transmission Risk	Medium Transmission Risk	High Transmission Risk	Extremely High Risk
Comment	**Employees should be strongly encouraged not to carpool to and from work unless wearing facial covering or mask protection. This is suspected as a source of several national outbreaks.**				

*Social distancing is at least 6 feet apart between employee to employee, or employee to any other human.

**Other respirators or PPE may be required due to other hazards such as chemical exposures or projectile exposures. The PPE ensemble must protect the worker from all hazards that are not otherwise controlled.

*** Without additional engineering controls or PPE for employees like barriers or face shields or local ventilation.

**** Particulate-filtering respirators are rated by NIOSH for oil mist resistance (N, R, or P) and filtering efficiency (95, 99, and 100). An N-95 respirator is the least resistant to oil mists and lowest-filter efficiency. For protection from the COVID-19 virus, an N-95 rated respirator is sufficient and any other particulate respirator can be substituted. Foreign-certified respirators below may be used:

- Australia: AS/NZS 1716:2012
- Brazil: ABNT/NBR 13694:1996; ABNT/NBR 13697:1996; and ABNT/NBR 13698:2011
- People's Republic of China: GB 2626-2006; and GB 2626-2019
- European Union: EN 140-1999; EN 143-2000; and EN 149-2001
- Japan: JMHLW-2000
- Republic of Korea: KMOEL-2014-46; and KMOEL-2017-64
- Mexico: NOM-116-2009

CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-NW194112-02 DATE 10/14/2020

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Ray Kobeski

1. Document to be changed. Identify revision, date, section, drawing, etc.

Final Accident Prevention Plan/Site Safety and Health Plan (Site Inspection for Munitions and Explosives of Concern, Munitions Constituents, Historical and Cultural Resources Survey, and Habitat/ Endangered Species Survey) dated May 2020
APP, Section 9 and Attachment VII.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

It is necessary to address the change in the non-emergency care facility. Section 9.5.2 is revised to identify the replacement clinic information and Figure 9-1 repeats the appropriate information for the Emergency Contacts.

The revised Section 9 and Attachment VII is presented in redline on the following pages, along with revised cover page notating the FCR-02 change and date of change.

The affected APP pages 9-11 and 9-12 may be directly replaced with the following page of this FCR (back on back).
The affected Figure 9-1 Attachment VII may be directly replaced with the following page of this FCR. Figure 9-2 of the affected plan is not changed by this FCR and is included only for direct page replacement of Figure 9-1 (flip side).

Tt Program QC Manager (Print Name and Sign)

Reason for Change (Attach sheet if necessary)

The clinic noted in the plan has closed and so a replacement locale for non-emergency care is needed. Section 9 and Attachment VII provides the information on the replacement clinic.

4. Originator: (print name and sign) Linda Klink Linda Klink		**Title** Project Manager	**Date** 10/14/2020
Reviewed by: (print name and sign) Stan Liang, CIH, CSP		**Title** CLEAN Health and Safety Manager	**Date** 10/14/2020
Site Superintendent (Print name and sign) Syd Rodgers (SUXOS) Syd Rodgers	**Date** 10/14/20	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 10/14/2020
Tt Program QC Manager (Print Name and Sign) N/A	**Date**	**Navy Acknowledgement (Print name and sign)**	**Date**

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Naval Facilities Engineering Command Northwest
Silverdale, Washington

Site Inspection for Munitions and Explosives of Concern, Munitions Constituents, Historical and Cultural Resources Survey, and Habitat/ Endangered Species Survey

Final

Accident Prevention Plan/Site Safety and Health Plan

Naval Base Kitsap Bangor
Silverdale, Washington

May 2020

June 2020: FCR-NW194112-01 COVID-19 Procedures and Requirements
October 2020: FCR-NW194112-02 Non-Emergency Clinic Change

- The location of each first aid kit shall be clearly marked, and kits shall be protected from the weather and maintained in a clean condition.
- The kit must contain all the items listed in Figure 9-2 (see Attachment VII) Requirements for Basic Unit Packages (from Section 3 of the EM 385-1-1) and include one pocket mouthpiece or CPR barrier and latex gloves.
- The kit will be **inspected monthly** and items shall be replaced as they are used or expire.

Type IV kits are selected since kits that conform to this ANSI standard meet performance criteria for corrosion, impact, and moisture resistance anticipated for field conditions.

Bottles of disposable eyewash solution are maintained during sampling activities due to the small quantities of corrosive preservatives:

- These units are acceptable due to the extremely small quantity of the corrosives.
- These will be used as adjunct support to treatment obtained from the medical provider designated in this plan
- These units will be maintained in a clean location and **inspected each week**.

9.5.2 Route Maps and Phone Numbers for Emergency Responders

For emergency care, the hospital below will be used:

Harrison Medical Center - Silverdale
1800 Northwest Myhre Road
Silverdale, WA 98383
Telephone: (888) 825-3227 (general number)

The address and route to the hospital is to be posted on site and is located in Figure 9-3 (Attachment VII).

Before beginning work, the FOL/SSHO will confirm the route to the nearest hospital. Any revised directions will be posted by the FOL/SSHO (or placed in the binder in the FOL/SSHO's site vehicle).

For non emergency care, ~~Occupational Medicine Associates of Kitsap~~ The Doctors Clinic (a CORE designated clinic) can be used.

~~Occupational Medicine Associates of Kitsap~~The Doctors Clinic (TDC)
~~10513 Silverdale Way NW~~ 9621 Ridgetop Blvd NW
Suite 106
Silverdale, WA 98383
Telephone: (360) ~~692-1848~~782-3660

9.5.3 Criteria for Alerting Local Community Responders

In the event of an emergency situation, the FOL/SSHO will enact emergency notification procedures to secure additional assistance in the following manner:

- Call pertinent emergency contact as listed in Figure 9-1 (see Attachment VII), and report the incident.
- Give the emergency operator the:
  - Location of the emergency
  - Type of emergency
  - Number of injured
  - A brief description of the incident.
- Stay on the phone and follow the instructions given by the operator.

The operator will then notify and dispatch the proper emergency response agencies.

If emergency medical assistance is not required, Tetra Tech personnel may contact CORE Occupational Medicine (occupational medicine provider) as detailed in the APP/SSHP (see Section 9.5.5).

9.5.4 Medical Data Sheet

Each field team member, including visitors and subcontractors, entering the Exclusion Zone(s) shall be requested to complete and submit a copy of the Medical Data Sheet (see Attachment III). This shall be provided to the FOL/SSHO, prior to participating in site activities. The purpose of this document is to provide site personnel and emergency responders with additional information that may be necessary in order to administer medical attention. Any pertinent information regarding allergies to medications or other special conditions should be documented. If an exposure to hazardous materials has occurred, provide information on the chemical, physical, and toxicological properties of the subject chemical(s) to medical service personnel.

AGENCY	TELEPHONE
EMERGENCY (Navy Region Northwest Fire and Emergency Services)	**(360) 396-4444**
Primary Hospital – Harrison Medical Center – Silverdale	(888) 825-3227 (non emergency)
Non emergency medical care - ~~Occupational Medicine Associates of Kitsap~~The Doctors Clinic (TDC)	(360) ~~692-1848~~782-3660
US Navy COR/POC, Raymond Kobeski	(360) 396-0070 (office) (360) 265-1071
Poison Control	(800) 222-1222
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
CORE Occupational Medicine	(855) 683-9006
UXOSO/FOL/SSHO Karl Goehring	(307) 256-0424 (cell)
Project Manager, Linda Klink	(412) 720-1421 (cell)
CLEAN Health and Safety Manager Stan Liang	(412) 559-8415 (cell)

NOTE: Subcontractor information to be provided by SSHO upon selection and prior to the start of work.

Figure 9-1: Emergency Contacts

Unit first aid item	Minimum Size or Volume (metric)	Minimum Size or Volume (US)	Item quantity per unit package	Unit package size
Absorbent Compress	206 cm^2	32 in^2	1	1
Adhesive Bandage	2.5 x 7.5 cm	1 x 3 in.	16	1
Adhesive Tape	2.3 m	2.5 yd. (total)	1 or 2	1 or 2
* Combat style Tourniquet with Windlass	95.3 X 3.8	37.5 X 1.5 in. Width	1	1
Antiseptic Wipe	2.5 x 2.5 cm	1 x 1 in.	10	1
Aspirin, Individually Wrapped	325 mg	-	2	2
Bandage Compress (2 in.-4 in).	5 x 91 cm	2 x 36 in.	4	1
Hand Sanitizer	0.9 g	1/32 oz.	6	
Burn Dressing	10 x 10 cm	4 x 4 in.	1	1-2
Burn Treatment	0.9	1/32 fl. oz.	6	1
CPR Breathing Barrier	-	-	1	1
Cold Pack	10 x 12.5 cm	4 x 5 in	1	1-2
Eye Covering, with means of attachment	19 cm2	2.9 in2	2	1
Eye/Skin Wash	118 ml (total)	4 fl. Oz. total	1	2
First Aid Guide	-	-	1	1
Gloves, latex free	XL	XL	2 pair	1
Occlusive Dressing	10.2 X 10.2	4 X 4	1	2
Roller Bandage (4 in.).	10 x 366 cm	4 in. x 4 yd.	1	1
Roller Bandage (2 in.)	5 x 366 cm	2 in. x 4 yd.	2	1
Sterile pad	7.5 x 7.5 cm	3 x 3 in.	4	1
Triangular Bandage	101 x 101 x 142 cm	40 x 40 x 56 in.	1	1

* Required when power tools in use.

Figure 9-2: Requirements For Basic First Aid Unit Package

CLEAN

CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-NW194112-03 DATE 10/14/2020

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Ray Kobeski

1. Document to be changed. Identify revision, date, section, drawing, etc.

Final Accident Prevention Plan/Site Safety and Health Plan (Site Inspection for Munitions and Explosives of Concern, Munitions Constituents, Historical and Cultural Resources Survey, and Habitat/ Endangered Species Survey) dated May 2020
APP, changes throughout Sections 2, 4, 5, 6, 9, 10, and Attachment I (added UXO 6 figure), Attachment II (added AHAs specific to UXO 6), and new Attachment XII (Rope Access Plan by subcontractor Gravitec).

2. Description of existing requirement and proposed change (Attach sheet if necessary)

It is necessary to address new requirement for field work at UXO 6, which has a steep slope and rope access requirements are needed to ensure safety of field personnel. There is no existing requirement and is not included in the final SSHP/APP because the scope was not authorized until the concurrence letter was signed by the Navy on 6/1/20. Changes are needed throughout the APP to address safety procedures in response to Rope Access requirements for UXO 6. Section 2 references UXO 6 as a site for inclusion, Section 4 cites the new rope access plan responsibilites and lines of authority, Section 5 describes associated specialty training requirements, Section 6 addresses associated responsibilities of individuals, Section 9 references the Rope Access Plan, Section 10 identifies the listing of new Activity Hazard Analysis (AHAs) specific to UXO 6, addition to Attachment I is the UXO 6 figure, additions to Attachment II provide new AHAs specific to UXO 6, and new Attachment XII is the subcontractor (Gravitec) Rope Access Plan by Gravitec, who is providing the Competent Person for training and field oversight of the field team for UXO 6.

The revised APP, Cover, table of contents Attachment listing, Sections 2, 4, 5, 6, 9, 10, Attachment I (added UXO 6 figure), Attachment II (added AHAs specific to UXO 6) and new APP Attachment XII (Rope Access Plan by subcontractor Gravitec) are presented in redline/strikeout on the following pages and affected APP pages may be directly replaced with the following pages of this FCR:
-Cover w/ cumulative FCR date changes (FCR-01 thru FCR-03)
-Table of Contents Attachment List, page x (and unchanged flip side ix)
-Page 2-2 (and unchanged flip side 2-1)
-Page 4-4 (and unchanged flip side 4-3)
-Page 4-9 (and unchanged flip side 4-10)
-Page 5-5 (and unchanged flip side 5-6)
-Pages 6-1 and 6-2 (back on back)
-Page 9-24 (and unchanged flip side 9-23)
-Page 9-42 (and unchanged flip side 9-41)
-Page 10-2 (and unchanged flip side 10-1)
-Attachment I UXO 6 Figure 2-22 addition (and unchanged flip side Figure 2-1) and associated flysheet revision
-Attachment II additions (UXO 6 specific AHAs) and associated revised flysheet revision
-New Attachment XII (subcontractor Gravitec Work Plan) with flysheet

Attachment II AHA additions should be placed at the end of Attachment II. New Attachment XII should be inserted after Attachment XI (FCR-NW194112-01, COVID-19).

3. Reason for Change (Attach sheet if necessary)

It is necessary to address new requirement for field projects to address UXO 6, which has a steep slope and rope access requirements are needed in response to ensure safety of field personnel. The scope is authorized as per the concurrence letter signed by the Navy on 6/1/20. APP, changes throughout Sections 2, 4, 5, 6, 9, 10, Attachment I (added UXO 6 figure), Attachment II (added AHAs specific to UXO 6) and new APP Attachment XII (Rope Access Plan by subcontractor Gravitec) provides the field team with the necessary safety measures associated with Rope Access at UXO 6.

4. Originator: (print name and sign)		**Title**	**Date**
Linda Klink Linda Klink		Project Manager	10/14/2020
Reviewed by: (print name and sign)		**Title**	**Date**
Stan Liang, CIH, CSP		CLEAN Health and Safety Manager	10/14/2020
Site Superintendent (Print name and sign)	**Date**	**Task Order Manager (Print name and sign)**	**Date**

Syd Rodgers (SUXOS) Syd Rodgers	10/14/20	Linda Klink, PE, PMP Linda Klink	10/14/2020
Tt Program QC Manager (Print Name and Sign) N/A	**Date**	**Navy Acknowledgement (Print name and sign)**	**Date**

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Naval Facilities Engineering Command Northwest
Silverdale, Washington

Site Inspection for Munitions and Explosives of Concern, Munitions Constituents, Historical and Cultural Resources Survey, and Habitat/ Endangered Species Survey

Final

Accident Prevention Plan/Site Safety and Health Plan

Naval Base Kitsap Bangor
Silverdale, Washington

May 2020

June 2020: FCR-NW194112-01 COVID-19 Procedures and Requirements
October 2020: FCR-NW194112-02 Non-Emergency Clinic Change
October 2020: FCR-NW194112-03 UXO 6 Rope Access Provisions

2-15 Site Layout Map (UXO 14)

2-16 Site Layout Map (UXO 15)

2-17 Site Layout Map (UXO 16)

2-18 Site Layout Map (UXO 17)

2-19 Site Layout Map (UXO 17B)

2-20 Site Layout Map (UXO 17C)

2-21 Site Layout Map (UXO 17D)

4-1 Organization Chart Field Activiites

8-1 Tetra Tech Incident Reporting Forms

9-1 Emergency Contacts

9-2 Requirements for Basic Unit First Aid Packages

9-3 Directions and Map to Hospital

List of Tables

9-1 Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

List of Attachments

I Site Figures (Site Location, Figure 2-1, and Site Layout Maps, Figures 2-1 to 2-21)

II Activity Hazard Analysis for Activities Listed in Section 10.0

III Field Forms and Personnel Qualifications (FOL/SSHO/Competent Person Training/Qualifications/Medical Clearance, Employee Training/Qualifications/ Medical Clearance, Field Task Health and Safety Plan Modification Request Form, Tailgate Safety Meeting Form, HST-4; Site-Specific Training Documentation Form,; Site Safety Inspection Checklist, Deficiency Tracking Log; Chemical Inventory List; Medical Data Sheet)

IV Site Health and Safety Awareness Information (Heat Stress, Cold Stress, Natural Hazards Awareness, Fire Extinguisher Use, Hearing Protection)

V Equipment Inspection Forms

VI Incident Reporting Forms, Figure 8-1 (Form IR, Form IR-A, Form IR-B, Form IR-C, Form IR-D, NAVFAC Initial Contractor Mishap Notification Report)

VII Emergency Info (Emergency Contacts, Figure 9-1; Requirements for Basic Unit First Aid Packages, Figure 9-2; Directions and Map to Hospital, Figure 9-3)

VIII Night Operations Lighting Equipment

IX Utility Locating and Excavation Clearance Standard Operating Procedure

X OSHA Poster

XI COVID-19 APP Supplement and Attachments

XII Rope Access Plan

2.0 Background Information

2.1 Contractor

Tetra Tech will conduct the field activities identified in the Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP).

2.2 Contract Number

Naval Facilities Engineering Command, Northwest,Contract No. N6247016D9008, Contract Task Order N4425519F4112.

2.3 Project Name

Site Inspection for Munitions and Explosives of Concern, Munitions Constituents, Historical and Cultural Resources Survey, and Habitat/ Endangered Species Survey at Naval Base Kitsap (NBK) Bangor in Silverdale, Washington.

2.4 Project Description

The project work activities will be performed in accordance with the following Tetra Tech documents:

- *Quality Assurance Project Plan for Munitions and Explosive of Concern Site Inspection at Naval Base Kitsap Bangor*
- *Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Munitions Constituents Site Inspection at Naval Base Kitsap Bangor*
- *Habitat/Endangered Species Survey Work Plan for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor*
- *Historical and Cultural Resources Survey Work Plan for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor, Washington*

2.4.1 Location

NBK Bangor occupies approximately 6,130 acres and is located roughly 5 miles northwest of the town of Silverdale in Kitsap County, Washington. The installation is situated on the eastern bank of Hood Canal, a long fjord-like body of marine water and an arm of the Puget Sound. Hood Canal adjacent to NBK Bangor averages approximately 1.5 miles wide and is bordered on the west by a Navy-owned buffer zone (approximately 770 acres) on the Toandos Peninsula, in Jefferson County, Washington.

A site location map is included as Figure 2-1 (Attachment I).

2.4.2 General Site Description

The current primary missions of NBK Bangor are to maintain and support a Trident submarine group and other vessels home ported or moored at the installation and to operate administrative and personnel support facilities. The installation contains an Intermediate Maintenance Facility (IMF) adjacent to Hood Canal. Strategic Weapons Facility Pacific (SWFPAC) occupies the majority of the interior installation. The mission of SWFPAC is to service the Trident missiles carried by Trident submarines. Naval Undersea Warfare Center (NUWC) Keyport maintains an ordnance annex (NUWC Ordnance Annex, otherwise known as Keyport Annex) in the eastern portion of NBK Bangor. Additional information on the history of NBK Bangor is provided in the *Quality Assurance Project Plan*.

The Quality Assurance Project Plan for Munitions and Explosive of Concern Site Inspection at Naval Base Kitsap Bangor indicates that project activities and locations described in this document will occur at the following areas of NBK Bangor (formal site name (alias).

- UXO 000002 [redacted] (Site CC)
- UXO 000003 [redacted] (Site D)
- UXO 000004 [redacted] (Site 9)
- UXO 000006 [redacted] (Site 22)
- UXO 000007 [redacted] (Site 23)
- UXO 00007B [redacted] (OU1 Site A)
- UXO 000008 [redacted] (Site NN)
- UXO 000009 [redacted] (Site OO)
- UXO 000010 [redacted] (Site 12)
- UXO 000011 [redacted] (Site 14)
- UXO 000011B [redacted] (Site 8)
- UXO 000012 [redacted] (Site HH)
- UXO 000013 [redacted] (Site 4 [redacted])
- UXO 000014 [redacted] (Site JJ)
- UXO 000015 [redacted] (Site KK)

subcontractor management, and environmental data evaluation and reporting, field treatability tests, remedial design, decision documents, and UXO construction support.

4.1.2.2 CLEAN Health and Safety Manager– Stanford T. Liang, CIH, CSP

The CHSM is responsible for the development and administration of the health and safety policies and procedures under the Navy CLEAN contract. The CHSM will act in an advisory capacity to PM and site personnel for project-specific health and safety issues. The Tetra Tech PM will establish a liaison between the Navy Technical Representative and the CHSM on matters relating to health and safety. In the fulfillment of the duties of this position, the CHSM will enlist the support of safety and occupational health professionals, as appropriate. The CHSM is responsible for the following actions:

- Developing, maintaining, and overseeing implementation of this APP/SSHP
- Visiting project sites as needed to audit the effectiveness of the APP/SSHP
- Remaining available to respond to project related incidents and/or emergencies
- Developing modifications to the APP/SSHP, as needed
- Evaluating occupational exposure monitoring/air sampling data and adjusting APP/SSHP as necessary
- Serving as a Quality Control staff member
- Approving the APP/SSHP by signature

Mr. Liang is a Certified Industrial Hygienist and Certified Safety Professional with over thirty years of occupational safety and health experience.

He has prepared or approved numerous project-specific APPs and SSHPs to assure compliance with OSHA requirements and EM 385 1-1 (US Army Corps of Engineers Safety and Health Requirement Manual) and to control worker exposure to chemical, biological, and other hazards.

Project hazardous waste site experience includes detailed remedial investigations and assessments to evaluate risks and implement solutions due to subsurface vapor intrusion, groundwater and soil contamination; munitions and explosives; and waste disposal areas. Activities performed as part of these projects included monitoring well installation, excavation of test pits, inspection of confined spaces, and obtaining water and soil samples. Mr. Liang also has experience with various remediation projects including installation of slurry walls, remediation of soils (in situ or removal and off site disposal), and treatment of ground water.

Health and safety support activities for hazardous waste remediation projects include acting as a site health and safety officer as well as providing health and safety plan implementation support (e.g. audits and training).

His training experience includes:

- Certified Industrial Hygienist from the American Board of Industrial Hygiene
- Certified Safety Professional from the Board of Certified Safety Professionals
- OSHA 40-Hr HAZWOPER General Site Worker Training, May 1991
- OSHA 8-Hr HAZWOPER Supervisor Training, December 1991
- OSHA 500 Trainer Course in Occupational Safety and Health Standards for the Construction Industry, February 1997

4.1.2.3 Field Operations Leader/Site Safety and Health Officer (FOL/SSHO) – Karl Goehring

The FOL/SSHO is responsible for implementation of the project work plans in accordance with this APP/SSHP. The FOL/SSHO has experience commensurate to the Competent Person level. Therefore, the FOL/SSHO will be the Competent Person for this project with exception of implementation of the Rope Access Plan required for accessing step terrain areas of UXO 6. Gravitec Systems, Inc. will provide the Competent Person specifically responsible for implementation of the Rope Access Plan. For further information see Section 9.43 of the APP.

The FOL/SSHO manages field activities, executes the sampling and analysis, or remedial action plan, and enforces safety procedures as applicable to the identified scope of work. No work by the contractor is authorized unless the FOL/SSHO is onsite.

Specific FOL/SSHO duties include:

- Ensuring that the proper notifications are made prior to beginning work.
- Verifying training and medical clearance of onsite personnel status (using Attachment ~~III~~IV) to document onsite records.
- Establishing work zones and control points (see Section A10.0 of the SSHP).
- Possessing valid First Aid and Cardiopulmonary Resuscitation (CPR) training
- Coordinate emergency services availability to support site in case of an emergency event (see Section 9.5 of the APP).
- Providing site-specific training for onsite personnel including review of AHAs listed in Section 10.0 of the APP and included in Attachment II.
- Selecting, applying, inspecting, and maintaining personal protective equipment (PPE) listed in Section A5.0 of the SSHP.

activities in accordance with this APP/SSHP. Subcontractor on-site field personnel will attend the Tetra Tech daily health and safety meetings.

4.1.3.1 Identification

The subcontractors for the following DFOWs/activities are not known at this time but additional information will be submitted to the APP for acceptance prior to the start of any activities listed:

- Land surveying
- Vegetation clearance
- Rope access support and Competent Person oversight by Gravitec Systems, Inc.

4.1.3.2 Safety Responsibilities of Subcontractors and Suppliers

Subcontractor personnel who will work inside controlled access zones (Exclusion Zone and Contamination Reduction Zone) must comply with the applicable 29 CFR §1910.120 training and medical surveillance requirements. Subcontractors are responsible for providing PPE to their personnel as specified in this APP/SSHP.

Subcontractors who have not met OSHA training, medical surveillance, and PPE requirements will not be permitted to enter areas where exposure to hazardous materials may be possible.

This APP/SSHP shall be rigorously enforced during this field effort. Tetra Tech and Subcontractor personnel who violate the APP/SSHP will be verbally notified upon first violation and the violation will be noted by the FOL/SSHO in a field logbook. Upon second violation, the violator will be notified in writing, and the Tetra Tech PM and the violator's supervisors will be notified. A third violation will result in a written notification and the violator's eviction from the site. The written notification will be sent to the Tetra Tech persons Supervisor, where applicable; Subcontractor, Tetra Tech Contracts Department, and the CHSM.

Any single subcontractor with three workers disciplined for safety infractions shall be reviewed and possibly replaced unless acceptable efforts are being implemented to prevent further infractions.

Enforcement of violations of the APP/SSHP and AHAs is conducted by the FOL/SSHO during remedial actions. Tetra Tech will monitor the work practices of its subcontractor workers onsite, and unequivocally enforce all aspects specified in the APP/SSHP and/or the AHAs. Subcontractors are responsible for enforcing all health and safety policies applicable to site activities on this project. Disciplinary action will be enforced against the subcontractor project manager and personnel for noncompliance violations.

NOTE: Any violations that are deemed to be serious, intentional, or otherwise egregious will be subject to immediate corrective action, up to and including removal from the site.

4.1.4 Client Project Level Personnel

The Navy representative primarily responsible for this project is:

- Mr. Raymond Kobeski will serve as the Navy Contracting Officer Representative (COR) / Lead Remedial Project Manager (RPM).

5.4.6 Rope Access

Specific work activities in UXO 6 will require implementation of a Rope Access Plan to control hazards presented by steep, irregular terrain. Personnel using the rope access system must be trained in accordance with this plan and use this system under the supervision of a Competent Person from Gravitec Systems, Inc. See Section 9.43 for additional information on the Rope Access Plan.

5.5 Training Documentation

Attachment III (Site Specific Training Documentation) will be used to document the provision and content of the project-specific training. Site personnel will be required to sign this form prior to commencement of site activities. This training documentation identifies personnel who, through record review and attendance of the site-specific training, are cleared for participation in site activities. This document shall be maintained at the site to identify and maintain an active list of trained and cleared site personnel.

5.6 UXO Training

The UXO Technician III, II, and I will meet the qualifications stated in Department of Defense Explosive Safety Board (DDESB) TP 18 and be under the direct supervision of the SUXOS or UXO PM in his/her absence.

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6.0 Safety and Health Inspections

The work site will be subject to potential audits by parties identified within this APP/SSHP.

6.1 Individuals Responsible For Conducting Safety Inspections

The Tetra Tech FOL/SSHO will conduct safety and health field self-assessment inspections during this field effort to ensure safe work areas and compliance with the APP/SSHP using the Site Safety Inspection Checklist (see Attachment III) and applicable equipment specific checklists (see Attachment V).

6.1.1 Proof of Inspector’s Training/Qualifications

The FOL/SSHO has experience commensurate to the Competent Person level. Therefore, the FOL/SSHO will be the Competent Person for this project with the exception of implementation of the Rope Access Plan.

Tasks performed at UXO 6 will require implementation of a Rope Access Plan to control hazards presented by steep, irregular terrain. Implementation of this plan will be the responsibility of the Competent Person provided by Gravitec Systems, Inc. See Section 9.43 (Rope Access Plan) for additional information.

6.1.2 Inspection Frequency

Daily inspections are performed by the FOL/SSHO or the Gravitec Systems, Inc. Competent Person (for implementation of the Rope Access Plan). See Section 9.43 (Rope Access Plan) for additional information.

6.1.3 Inspection Forms

The SSHO shall record any deficiencies identified during inspections (using the Site Safety Inspection Checklist in Attachment III and applicable equipment inspection checklists in Attachment V) on the Deficiency Tracking Log in Attachment III. The FOL/ SSHO will establish corrective measures and schedule to track any identified deficiency to correction.

6.1.4 Deficiency Tracking System and Follow-up Procedures

The items noted during field audits will be communicated to the PM and CHSM who maintains a corrective/preventive action database. Responsibility for resolving each item noted during these audits is assigned and tracked through resolution.

Results from field audits are also regularly communicated throughout Tetra Tech as a method of continuous program improvement. The PM and the CHSM shall follow up with the FOL/ SSHO to ensure deficiencies identified are resolved.

6.1.5 Competent and Qualified Persons

The competent and qualified persons for this project are documented in the Activity Hazard Analysis in Section 10 and Attachment II of this APP/SSHP.

A competent person, as identified in this APP/SHPP, is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate or control these hazards and conditions.

The FOL/SSHO has field supervision experience in environmental sampling, and safety and meets the applicable requirements EM 385-1-1 for hazardous, toxic, radioactive waste (HTRW) activities and 29 CFR 1910.120 for knowledge of and experience in environmental sampling.

The qualifications of the Gravitec Systems, Inc. Competent Person for rope access will be attached to relevant AHAs (see Attachment II). The Gravitec Competent Person must be on site when the rope access system is in use.

6.1.6 External Inspections/Certifications

The CHSM or a designated representative may conduct an unannounced inspection during this project.

9.13.2.2 Intrusive Hazards

Intrusive activities and utility hazards are addressed in Section 9.33.1 of the APP and the AHAs in Attachment II.

9.13.2.3 Hand and Power Tools

Hand and power tools shall comply with OSHA Standard, Subpart I. Hand and power tools shall only be used for intended purposes. Any tools found to be defective will be taken out service. Tools shall be stored properly and maintained as specified by the manufacturer. Keep any machine guards in place, and all moving parts shall be avoided. Secure loose clothing, jewelry, or long hair prior to use of equipment.

Equipment and project specific information on hazards and controls are provided in Attachment II.

9.13.2.4 Slips, Trips, and Falls

Planned activities associated with hazardous waste remedial investigation operations will bring field personnel into areas where there are potential slip, trip, and fall hazards. These hazards may include the following:

- Uneven terrain
- Spilled materials
- Work place clutter (e.g., tangled hoses)
- Accessing equipment in and out of pick-up trucks

Hazards of this nature and the potential consequences of injury from a slip, trip or fall are magnified when personnel are maneuvering and carrying equipment on these work sites.

Examples of control measures to be implemented include the following:

- Ensure appropriate footwear is worn.
- Focus on what is being done and where you are going.
- Clean up spills immediately.
- Identify and report all tripping hazards.
- Selecting the best approach routes to work areas and locations, keeping in mind that these may not be the shortest routes.
- Maintaining good housekeeping practices.

The FOL/SSHO will evaluate all walking/working surfaces to ensure that hazards are controlled and comply with the applicable regulations including but not necessarily limited to:

- 29 CFR 1926.25 - Housekeeping
- 29 CFR 1926.250 – General Requirements for Storage

Work at UXO 000006 –Debris Area 2 (Site 22) locations, due to the steepness of terrain, present a fall hazard. This must be controlled using a Rope Access Program as provided in Section 9.43 of the APP. Project specific controls implemented by the FOL/SSHO are provided in the AHAs in Attachment II.

9.13.2.5 Head and Back Injuries

Hard hats will be worn when overhead hazards are present. This will prevent minor injuries caused by bumping one's head while working around and under equipment and vegetation, as well as protecting personnel from falling objects.

Hazards which can result in back injury are addressed below (Heavy or Awkward Lifting)

Project specific controls implemented by the FOL/SSHO are described in the AHAs in Attachment II.

9.13.2.6 Falling Objects

Not applicable.

9.13.2.7 Heavy or Awkward Lifting

The FOL/SSHO implements controls resulting from manual lifting and handling tasks.

Personnel are instructed in proper lifting techniques and will not lift heavy items without assistance. Each worker will not lift more than 50 pounds. Objects heavier than 50 pounds, and those with uneven weight distribution, may require assistance from another person. Supervisors will use mechanical lifting equipment whenever possible to minimize worker exposure to lifting hazards.

By evaluating applicable contributing factors, planning lifts, and incorporating feasible control measures, the potential for injury associated with lifting can be minimized.

Tetra Tech personnel should notify supervisors or designated safety representatives of pre-existing medical conditions that may be aggravated or re-injured by lifting activities, This action may avert re-occurrence.

9.33.2 Overhead Utilities

Not applicable.

9.34 Standard Pre-Lift Plan – Load Handling Equipment

Not applicable.

9.35 Critical Lift Plan

Not applicable.

9.36 Naval Architectural Analysis

Not applicable.

9.37 Contingency Plan For Severe Weather

Not applicable.

9.38 Man Overboard/Abandon Ship Procedures

Not applicable.

9.39 Float Plan for Launches, Motorboats, and Skiffs (Floating Plants, Boats, Marine Activities)

Not applicable.

9.40 Fall Protection Plan

Not applicable.

9.41 Demolition/Renovation Plan

Not applicable.

9.42 Emergency Plan For Marine Activities

Not applicable.

9.43 Rope Access Program

~~Not applicable.~~ A rope access program will be required for locations at UXO 000006 – Debris Area 2 (Site 22). Gravitec Systems, Inc, (Gravitec) has been retained to develop and assist Tetra Tech in the implementation of this plan, which is provided as Attachment XII. Use of the system defined in the rope access program is only used for tasks where permitted in the applicable AHA (Attachment II).

9.44 Excavation/Trenching Plan

Not applicable.

9.45 Underground Construction Fire Prevention and Protection Plan

Not applicable.

9.46 Compressed Air Plan

Not applicable.

9.47 Formwork and Shoring Erection and Removal Plan

Not applicable.

9.48 Precast Concrete Plan

Not applicable.

10.0 Activity Hazard Analysis

Work conducted in support of this project will be performed using the Activity Hazard Analysis (AHA) process to guide and direct field crews on a task by task basis.

Project work shall not begin until the APP/SSHP, including AHAs and assigned Risk Assessment Codes (RACs), have been accepted by the GDA designated (as well as designated government on site representatives) for this project and discussed with all project field personnel (e.g., Tetra Tech personnel, Tetra Tech subcontractor personnel) as discussed below.

The FOL/SSHO will sign each AHA indicating acceptance of initial RACs prior to initiating each task. If the hazard controls specified in an AHA are not available (or are insufficient based on site-specific considerations and changing conditions) the FOL/ SSHO shall notify the CHSM immediately. After acceptance of AHAs by the FOL/SSHO, he/she will review the AHAs with the task participants as part of pre-task tailgate briefing sessions.

Daily safety meetings will be conducted during site work and the task-specific AHA(s) will be reviewed prior to initiating any field activities. This effort will ensure that site-specific considerations and changing conditions are incorporated into the planning effort. Use of the AHA will provide the line of communication for reviewing task-specific hazards and protective measures associated with each operation. The AHA will be used as the primary reference for designating hazard control measures.

The FOL/SSHO is responsible for making the parties aware of the contents and requirements of the AHA. Any problems encountered with the protective measures required will be documented and brought to the attention of the FOL/SSHO.

As an ongoing quality assurance effort, the FOL/SSHO will review operations to ensure that AHAs adequately address job steps, potential hazards, and appropriate controls for the tasks being conducted. Where deficient, they will be corrected and that information shared with the field personnel. Correction will occur by initiating the process to revise applicable sections of the APP/SSHP.

Modifications to the APP/SSHP are initiated by submitting the Field Task Health and Safety Plan Modification Request Form (Attachment III) to CHSM. The CHSM, in consultation with the FOL/SSHO, modifies the APP/SSHP (including AHAs as needed).

See Attachment XI for COVID-19 APP Supplement.

If any revisions to the APP/SSHP result in revision to an AHA which increases a RAC classification or a change in personnel assigned to key project roles (e.g., Competent Person), the CHSM, through the Tetra Tech PM, will submit the revised APP/SSHP to the GDA designated (as well as designated government on site representatives) for this project for review and approval.

Once the review and approval process is completed, the Tetra Tech PM ensures that the revised APP/SSHP is provided to field personnel and any changes communicated to affected site personnel.

The following AHAs listed as DFOW in Section 2.5 of the APP are provided in Attachment II:

- Mobilization/Demobilization (see Attachment XI for COVID-19 APP Supplement)
- Vegetation Management
- Land Surveying
- QC Seeding, IVS Establishment, UXO Detector Aided Surface Survey
- DGM, GPS, and GPR Field Surveys
- MEC/MPPEH Management
- Munitions Constituents Sampling and Utility Clearance
- Historical and Cultural Resources Survey
- Habitat/Endangered Species Work Survey
- Decontamination

For the following DFOWs listed above, there will be a separate AHA in Attachment II as, due to the hazards presented by steep, irregular terrain, the Rope Access Plan will be implemented to control fall hazards for work at UXO 6:

- QC Seeding, IVS Establishment, UXO Detector Aided Surface Survey (UXO 6)
- MEC/MPPEH Management (UXO 6)
- Munitions Constituents Sampling and Utility Clearance (UXO 6)

All completed AHAs shall be retained in the project files for a time period specified in the contract. Since AHAs are considered exposure data the final disposition is determined by the CHSM.

ATTACHMENT I

SITE FIGURES

SITE LOCATION MAP, FIGURE 2-1
SITE LAYOUT MAPS, FIGURES 2-2 TO 2-21
AND FIGURE 2-22 (UXO 6 ADDITION)

Figure 2-21: Site Layout Map (UXO 17D)

New Page as per FCR-NW194112-03

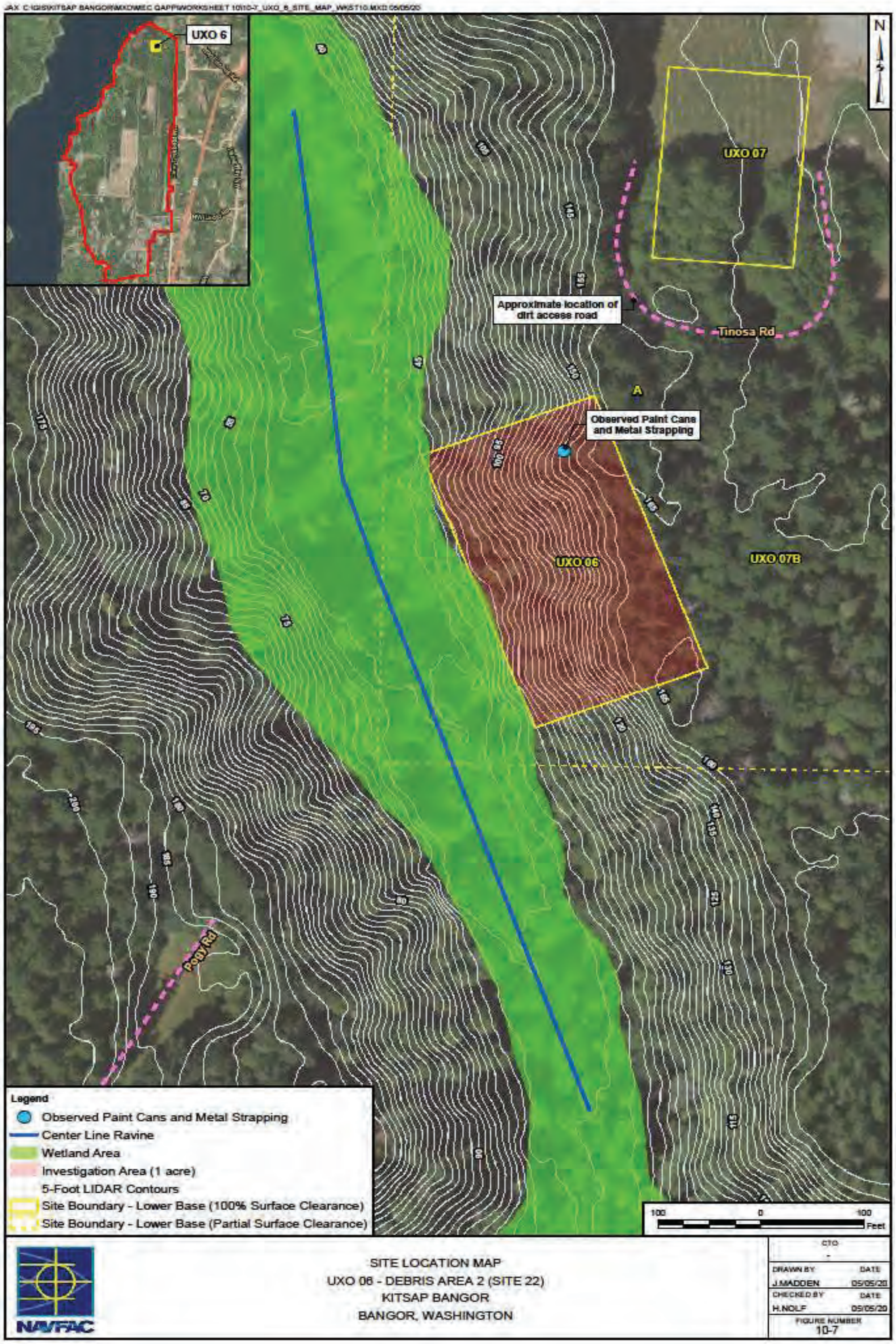


Figure 2-22: Site Layout Map (UXO 6)

ATTACHMENT II

ACTIVITY HAZARD ANALYSIS

1. Mobilization/Demobilization
2. Vegetation Management
3. Land Surveying
4. QC Seeding, IVS Establishment, UXO Detector Aided Surface Survey
5. DGM, GPS, and GPR Field Surveys
6. MEC/MPPEH Management
7. Munitions Constituents Sampling and Utility Clearance
8. Historical and Cultural Resources Survey
9. Habitat/Endangered Species Work Survey
10. Decontamination
11. QC Seeding, IVS Establishment, UXO Detector Aided Surface Survey (UXO 6)
12. MEC/MPPEH Management (UXO 6)
13. Munitions Constituents Sampling and Utility Clearance (UXO 6)

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Activity/Work Task	QC Seeding, IVS Establishment, UXO Detector Aided Surface Survey **(UXO 6)**
AHA Signature Log #	
Project Location	NBK Bangor
Contract Number	Contract No. N6247016D9008 CTO No. N 4425519F4112
Date Prepared	September 2020
SSHO Signature	
Superintendent Signature	
QC Manager Signature	
Subcontractor Foreman Name:	
Signature:	
ET/GDA Reviewed by (Name)	

Overall Risk Assessment Code (RAC) (Use highest code)	M

Risk Assessment Code (RAC) Matrix

	Probability				
Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	🟥	🟥	🟧	🟧	🟨
Critical	🟥	🟧	🟧	🟨	🟩
Marginal	🟧	🟨	🟨	🟩	🟩
Negligible	🟨	🟩	🟩	🟩	🟩

Notes: (Field Notes, Review Comments, etc.)

This AHA is specifically applicable to UXO 6 - Debris Area 2 (Site 22). This location has rope access requirements resulting from steep terrain unique to this location. Control measures in this AHA must be used in conjunction with the Rope Access Plan (Attachment XII)

As required by EM 385 1-1 Section 01.A.14, the qualifications of the SSHO/Competent Person and Qualified Person (responsible for plan preparation) attached to this AHA as proof of his/her qualifications

	RAC CHART
Step 1: Review each Hazard with identified safety "Controls". Determine RAC (see above).	
Probability: Likelihood the activity will cause a Mishap (Near Miss, Incident, or Accident). Identify as Frequent, Likely, Occasional, Seldom or Unlikely	**E = Extremely High Risk**
Identify as Catastrophic, Critical, Marginal, or Negligible	**H = High Risk**
Step 2: Identify the RAC (probability vs. severity) as **E, H,** M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of the AHA	M= Moderate Risk **L** = Low Risk

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
Detector aided survey / IVS inspection and re-installation - seed location excavation / IVS removal - seed excavation	1. Minor cuts, abrasions or contusions	1. Wear cut-resistant gloves when handling items with sharp or rough edges.	**L**
	2. Heavy lifting (muscle strains and pulls)	1. Ensure a clear path of travel, a good grasp on the object, and perform a "test lift" to gauge the ability to safely make the lift 2. Lift with legs, keep the back straight. Do not twist the body when lifting loads. 3. Each worker will not lift more than 50 pounds. 4. Obtain help to lift large, bulky, or heavy items.	**L**

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
		5. See if breaking larger loads into smaller ones and making more trips (or obtaining help to carry the additional loads) is feasible.	
	3. Slips, trips, falls (when not on steep terrain).	1. Watch for tree branches, roots, weeds, limbs and other ground hazards. 2. Wear appropriate foot protection to prevent slips and trips. 3. Use caution when working on uneven and wet ground surfaces.	L
	4. Fall hazards working on steep, irregular terrain	1. Comply with the Rope Access Plan (Attachment XII of the APP). 2. The authorized Competent Person designated in the Rope Access Plan must be present on site and oversee implementation at any location where the safe access procedures in this plan are required.	L
	5. Inclement weather	1. See Mobilization/Demobilization AHA for inclement weather procedures.	L
	6. Insect and animal bites.	1. Shake out boots before donning. 2. Use insect repellants (products containing 20% DEET, picardin, or IR 3535 should be applied to exposed skin, products containing Permethrin should be applied to clothing only). 3. Follow manufacturer's recommendations for application. 4. Tape up pants leg to work boot joints with duct tape. 5. Wear light-colored clothing to better see and remove any insects. 6. Avoid wooded and brushy areas and walk in the center of trails when possible. 7. If such areas cannot be avoided, vegetation clearance is used to reduce the risk of tick exposure (e.g. clear pathways to work areas). 8. Hazard controls for vegetation clearance is addressed separately in the Vegetation Management AHA. 9. Perform close body inspections at least daily upon leaving the site. Close body inspections include the following: • Check the body crevices. Note that ticks, once attached to your clothing, may move to these areas of the body. • Use a mirror for hard to see areas. 10. Any incident involving an embedded tick SHALL be reported to the SSHO and documented in field log book. 11. See Section 9.13 and Attachment IV of the APP for additional information on identification of hazards and exposure controls.	L

Job Steps (Work Sequences)	**Specific Anticipated Hazards**	**Controls**	**RAC**
	7. Poisonous plants.	1. Avoid contact with poisonous plants. See Section 9.13 and Attachment IV of the APP for additional information on identification of hazards and exposure controls. 2. Personnel who are knowingly hypersensitive or allergic to these plants may use the Medical Data Sheet to disclose this condition. In addition, precautionary measures should be taken.	**L**
	8. Chemical exposure to concentrations of COCs	1. Wear nitrile surgical type gloves under work gloves when handling potentially contaminated media, equipment or tools. 2. Wear Tyvek coveralls if soiling of clothing is possible. Avoid contact with potentially-contaminated equipment to the extent possible. 3. Practice good personal hygiene (hands and face washing) decontamination practices when exiting work area. 4. Dispose of nitrile gloves, work gloves, and Tyvek coveralls as soon as possible, when exiting the Exclusion Zone, if exposed to contaminated soil or ground water. 5. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.). 6. While not likely, if visible dust emissions are observed, water suppression will be used.	**L**
	9. MEC/MPPEH	1. The IVS will be installed in an area free of anomalies. IVS installation excavations will be performed using anomaly avoidance. 2. MEC/MPPEH survey and clearance will be conducted by trained UXO Technicians. 3. Non-UXO personnel will be escorted while in the area of concern. 4. Exclusion Zone distances will be defined based on those specified in the Work Plan. 5. Operations within the safe separation distance for team operations will immediately stop if MEC/MPPEH is discovered and UXO Technicians will secure the area. All non-UXO personnel will leave the area. 6. If MEC/MPPEH is observed, the UXO Technician making the observation will signal to stop operations and take the following precautions: • The UXO Technician will visually inspect the MEC/MPPEH to determine the type and condition if possible. This identification and the exact location will be recorded on MEC Daily Activity Log. Location information will be recorded with the site GPS.	**M**

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
		• If suspect MEC or MPPEH items not determined MDAS are identified, the local authorities will be notified as stated in the Work Plan. • Any suspect MEC/MPPEH item discovered during UXO Survey operations which has been determined to be safe to move may be moved to a designated holding area. Local authorities will be notified as stated in the Work Plan. • An inventory will be maintained by the SUXOS with locations and descriptions for suspect MEC/MPPEH discovered during this operation.	

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Equipment to be used	Training Requirements & Competent or Qualified Personnel Name(s)	Inspection Requirements
Hand tools (shovels etc.), Magnetometer, all metals detector, GPS equipment. **Safety Equipment:** Class IV First Aid Kit meeting requirements of OSHA/ANSI 308 and EM 385 1-1 and an emergency air horn nearby. Access equipment required by the Rope Access Plan (see Attachment XII of the APP) **Monitoring Instruments:** None.	Review of the AHA during a pre-task tailgate safety briefing with the intended task participants. The UXO Technician III, II, and I will meet the qualifications stated in DDESB TP 18 (DDESB, 2016). The UXO personnel for this project will be as follows: Adam Goforth (Level I) Brandon Humphries (Level II) Alvin Lee (Level III) Dane McCarthy (Level II) Miranda Mitchell (Level II) Daniel Odom (Level II) Jesse Prince (Level I) Ronald Stum (Level III) Tye Turner (Level III) Shaun Woods (Level II) Qualifications are provided in Attachment III Rope access training in accordance with the Rope Access Plan (see Attachment XII of the APP) Competent Person: Karl Goehring Competent Person (rope access): Collin Kupers (Gravitec Systems, Inc.) Qualified Person: Stanford T. Liang	Visual inspection prior to use by user, out-of box test, GPS monument checks Inspection of rope access equipment in accordance with the Rope Access Plan (see Attachment XII of the APP) and manufacturer recommendations. Monthly inspection of first aid kit

Personal Protective Equipment Minimum: Safety toe boots (composite toes compatible with UXO hazards), safety glasses, work gloves, nitrile gloves, disposable over boots, high visibility vest (minimum ANSI Type 2). Rope access equipment (see Attachment XII of the APP). **Optional items:** None. **HTRW:** MEC/MPPEH and related chemicals (e.g.2,4,6 TNT, nitroglycerin, etc.)	PPE training in proper use, care, storage, and limitations in accordance with this APP and the Rope Access Plan (see Attachment XII of the APP).	Initial PPE inspection performed by SSHO. Ongoing (prior to each use) inspections responsibilities of PPE users.
UFGS 013526 11/15 1.9 Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences; specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented. UFGS 013526 1.9.1 Review the AHA list periodically (at least monthly) at supervisory safety meetings, update when procedures, scheduling or hazards change. UFGS 013526 1.9.2 Each employee performing work...must review the AHA and sign a signature log for that AHA prior to starting work. The SSHO must maintain a signature log on site for every AHA		

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

QC Seeding, IVS Establishment, UXO Detector Aided Surface Survey **(UXO 6)** AHA Signature Log # ____________

Name (Printed)	Signature	Date

TETRA TECH

Stanford T. Liang, CIH, CSP

Senior Industrial Hygienist

EXPERIENCE SUMMARY

Mr. Liang is a Certified Industrial Hygienist and Certified Safety Professional with over thirty years of occupational safety and health experience. This experience spans a diverse range of workplaces including hazardous waste remediation sites, shipyards, wastewater treatment plants, hospitals, and various manufacturing plants and construction sites. As a consultant project manager, he has managed complex industrial hygiene and safety projects to cost-effectively address the needs of the client on time and under budget, such as noise surveys at underground mines at multiple geographical locations which required a project team of five industrial hygienists. Health and safety services provided by Mr. Liang have included the following:

- Industrial hygiene surveys, including air sampling and noise
- Training, such as HAZWOPER 10- and 30-hour OSHA Construction Safety, and the Society of Protective Coatings Competent Person Training for Deleading of Industrial Structures
- Development and implementation of health and safety compliance programs
- Safety and industrial hygiene compliance audits
- Indoor air quality surveys for mold and other contaminants
- Laboratory safety surveys
- Evaluation of HVAC and industrial local exhaust ventilation systems
- Evaluation and control of lead containing coatings on industrial structures
- Ambient air monitoring for total suspended particulates and PM-10

Mr. Liang has managed health and safety programs to successfully identify and control workplace hazards and meet regulatory and client requirements. As an Assistant Safety Officer stationed aboard the aircraft carrier USS Independence, he implemented a safety program during the course of a multi-year $800 million shipyard overhaul at the Philadelphia Naval Shipyard. Mr. Liang is a member of the American Industrial Hygiene Association and is past director of the local Pittsburgh chapter. He has also published peer reviewed articles in publications such as the Journal of Protective Coatings and Linings.

EDUCATION

Bachelor of Science, Safety, 1986, University of Southern California

AREA OF EXPERTISE

Industrial Hygiene and Safety

TRAINING/CERTIFICATIONS

Certified Industrial Hygienist (CIH), No. 7515 CP

Certified Safety Professional (CSP), No. 18630

OFFICE

Pittsburgh, Pennsylvania

YEARS OF EXPERIENCE

30

YEARS WITH TETRA TECH

2

AWARDS

2001 Journal of Protective Coatings and Linings Editor's Award

RELEVANT PROJECT EXPERIENCE

Industrial Hygienist; MAHLE Industries, Inc.; Various Locations; 2014 – 2016. Provided comprehensive industrial hygiene sampling program for air contaminants and noise at multiple chemical manufacturing facilities. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Health and Safety Officer; Confidential Industrial Client; West Virginia; 2018. Health and safety officer for a complex in-situ soil remediation project requiring treatment of 5,000 cubic yards of soil via alkaline hydrolysis and in-situ chemical oxidation with sodium persulfate. This process involved injecting and mixing chemicals into the soil using a crane with a large diameter auger attachment to depths of approximately 20 feet bgs. Chemicals of concern in soil that were treated include dinitrotoluene, benzene, and other organic compounds. The presence of elevated benzene levels in soil required the work to be performed in Level B respiratory protection. Oversaw health and safety program implementation for project remediation activities such as use of personal protective equipment, safe handling procedures for treatment chemicals (e.g. liquid caustic, sodium persulfate), and control of heat stress exposures. Other health and safety support services included training (e.g. benzene, daily tailgate meetings), perimeter and area air monitoring with real time monitoring instruments, and personal air sampling.

Industrial Hygienist: AB Kaelin, LLC; Delaware River Port Authority Betsy Ross Bridge Painting and Steel Repairs – Phase I; Philadelphia, PA; April 2018 – Present. Provides CIH and CSP support services for an industrial painting contractor that is a client of AB Kaelin, LLC. Support services include review of painting contractor safety plans and reports (e.g. industrial hygiene air sampling, results of blood lead analysis of painting contractor personnel) and site visits (e.g. attend meetings and audits).

Industrial Hygienist; Comprehensive Long-Term Environmental Action (CLEAN) Contract; Naval Facilities Engineering Command; Multiple Facilities; 2017 - present. Prepares or approves project-specific HASPs to assure compliance with OSHA requirements and EM 385-1-1 (US Army Corps of Engineers Safety and Health Requirement Manual) and to protect personnel, property, and the environment from chemical, biological, and other hazards. Projects include detailed remedial investigations and assessments to evaluate risks and implement solutions due to subsurface vapor intrusion, groundwater and soil contamination; munitions and explosives; and waste disposal areas. Activities performed as part of these projects included monitoring well installation, excavation of test pits, inspection of confined spaces, and obtaining water and soil samples. Site visits to conduct audits and provide health and safety plan implementation support (e.g. training).

Project Health and Safety Officer; U.S Army Corps of Engineers; Savanna Army Depot Facility, Savanna, Illinois; July 2017 – July 2018. Wrote Accident Prevention Plans and Site Safety and Health Plans for site remediation projects at Site 20, Site 73, Site 178 which are former landfills at this facility. The plan describes procedures for compliance with applicable requirements of OSHA and EM 385-1-1. Remediation activities consist of collection of multi-media environmental samples, installation of monitoring wells, excavation activities with heavy equipment for site restoration, stabilization of soil lead contaminants, debris removal, and transportation of contaminated soils to an offsite disposal facility, and vegetation clearance including tree removal with power saws and heavy equipment. Site visits to conduct audits and provide health and safety plan implementation support (e.g. training).

Project Industrial Hygienist; Georgia Environmental Protection Division; Martin Fireproofing Georgia, Inc.; Elberton, Georgia; October 2017 – June 2018. Wrote Health and Safety Plan and Air Monitoring Plan for

site remediation project. Remediation activities consist of removal of trees and other debris and excavation and removal (for disposal at an approved facility) of dioxin contaminated soil. Exposure controls addressed in the plan included engineering controls, work practices, and personal protective equipment (e.g. respiratory protection), based on an exposure assessment, to control dioxin exposure to workers engaged in site remediation activities. Assisted Health and Safety Manager in plan implementation.

Project Industrial Hygienist; NAVFAC; Marine Corps Recruit Depot; Parris Island, South Carolina; August 2017 – October 2017. Wrote project Accident Prevention Plan and coordinated subcontractor implementation of hurricane debris cleanup activities in compliance with applicable OSHA and EM 385-1-1 requirements. Remedial activities included vegetation and tree removal (including use of power saws and heavy equipment) and minor structural repairs to site infrastructure (e.g. wooden walkways). Subcontractor coordination included review of contractor submittals (e.g. safety plans and policies).

Project Industrial Hygienist; Washington Health Systems; Washington Hospital; Washington, Pennsylvania; September 2015 – May 2017. Performed various indoor air quality assessments (e.g. mold, formaldehyde, ventilation systems) in response to occupant complaints at a hospital facility.

Project Manager; Hartman and Hartman Constructors; Koppers, Inc. Follansbee Plant; Follansbee, West Virginia; February 2016 – May 2016. Assisted client in development and implementation of a hazardous waste site safety plan for excavation work. Oversaw industrial hygiene air monitoring services including field air sampling and report writing performed by an industrial hygiene technician

Project Manager; CONSOL Energy, Inc.; Various Locations; January 2016 – March 2016. Managed a team of four industrial hygienists responsible for comprehensive noise surveys consisting of personal noise dosimetry and area noise maps at multiple underground mines. Project management activities included proposal development, coordination of survey activities, budgeting, and invoicing. Performed review and interpretation of noise monitoring data. Comprehensive reports were developed and submitted which included findings relative to worker noise exposure levels, exposure controls, and compliance with MSHA regulations.

Project Manager; U.S. Minerals, Inc.; Various Locations; 2015 – 2016. Developed and implemented a site audit and industrial hygiene monitoring program for an abrasive blasting media manufacturer to comply with an OSHA settlement agreement. For each site audit, site audit reports which addressed survey findings relative to compliance with applicable OSHA requirements and control of identified worker exposures were presented to both the client and OSHA for review and approval.

Project Manager; Koppers, Inc.; Various Locations; 2014 – 2016. Directed implementation of a comprehensive industrial hygiene sampling program at multiple facilities manufacturing railroad ties and wood treating chemicals. The scope of the surveys encompassed various air contaminants, noise, ionizing radiation, industrial local exhaust ventilation, compliance with applicable OSHA regulations and corporate policies, and evaluation of relevant engineering, work practice controls, and personal protective equipment. Responsibilities included technical direction and oversight for a project team of five industrial hygienists, project budgeting, coordination of survey activities, and client relations. Performed quality assurance review of industrial hygiene data and interpretation of results. Reviewed and approved final comprehensive survey reports for each site visit with findings and recommendation for compliance and control of worker hazard exposure.

Project Manager; Nova Chemicals Corporation; Various Locations; 2014 – 2016. Supervised implementation of a comprehensive industrial hygiene sampling program for air contaminants and noise at

multiple chemical manufacturing facilities. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Project Manager; LANXESS Corporation; Various Locations; 2014 – 2016. Directed implementation of an industrial hygiene sampling program at multiple facilities manufacturing pigments. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Project Manager; Horsehead Holding Corporation; Various Locations; 2014 – 2016. Oversaw an industrial hygiene exposure monitoring program for air contaminants and noise at multiple facilities recovering and processing lead and zinc oxide from arc furnace dust and a battery recycling facility. Performed safety compliance audits.

Trainer; Michael Baker Jr.; Moon Township, Pennsylvania; May 2009 – August 2009. Developed and presented a comprehensive fall protection training program for Michael Baker, Jr. employees at various offices in Pennsylvania.

Project Manager; Enbridge Energy; Multiple Locations in the United States and Canada; 2005 – 2006. Managed a team of three industrial hygienists who conducted an industrial hygiene study. The objective of the study was to compare the worker exposure attributes of several different abrasive blast media at multiple pipeline repair locations. Developed, implemented, and presented the report of findings for the study protocol which included personal air sampling for various analytes (e.g. crystalline silica and several toxic metals).

Project Health and Safety Consultant; Damolos & Sons; Army Corps of Engineers Pike Island Locks and Dam; Wheeling, West Virginia; June 2003. Developed permit required confined space entry and rescue procedures associated with abrasive blasting and repainting of dam tainter gates. Presented training on entry and rescue procedures to contractor employees performing permit-required confined space entries.

Project Industrial Hygienist; Duquesne Energy; H. J. Heinz Energy Facility; Pittsburgh, Pennsylvania; May 2003. Industrial hygiene area and personal monitoring for carbon monoxide and nitrogen oxide at a power generation facility.

Project Industrial Hygienist; Community College of Allegheny County; Pittsburgh, Pennsylvania; 2002 – 2005. Conducted indoor air quality surveys at multiple classroom, laboratory, and office facilities.

Project Health and Safety Specialist; New York City Department of Transportation; New York, New York (Various Locations); 2001 – 2014. Performed environmental, waste management, health, and safety audits for various bridge painting projects for compliance with applicable project specifications and regulatory requirements. Supervised ambient air monitoring of lead emissions associated with removal of lead containing coatings. Reviewed contractor project submittals.

Project Industrial Hygienist; Allegheny County Sanitary Authority; Pittsburgh, Pennsylvania; 1998-Present. Conducts annual laboratory safety survey and lab hood ventilation evaluation. Provides other industrial hygiene and safety services as needed including personal protective equipment hazard evaluation, noise surveys, personal air sampling, and assessments for lead containing coatings.

Project Health and Safety Specialist and Trainer; Triborough Bridge and Tunnel Authority, New York, New York (Various Locations); 1998 – 2014. Conducted environmental, waste management, health, and safety audits for various bridge painting projects for compliance with applicable project specifications and regulatory requirements. Project included a five-year, $26 million project at the Verrazano Narrows Bridge. Reviewed contractor project submittals. Provided training, such as fall protection, firing range worker lead safety, and histoplasmosis control training to Triborough Bridge and Tunnel Authority personnel.

Project Industrial Hygienist; EBI Insurance Company; Various Locations; 1998 – 2002. Performed industrial hygiene surveys at various client facilities, such as a battery manufacturing plant, a specialty glass manufacturer, and a fabrication shops manufacturing and painting structural steel components. Surveys included respirable silica, sulfuric acid, work area illumination levels, and organic vapors.

Project Industrial Hygienist; Liberty Mutual Insurance Company; Various Locations; 1998 – 2002. Performed industrial hygiene surveys at various client facilities, such as a surface mine, specialty glass manufacturer, and a steel fabrication shop. Surveys included silica, oil mists, and noise.

Health and Safety Specialist; 3M; 3M Brownwood Plant Hazardous Waste Remediation Project; Brownwood, Texas; November 1992 – December 1992. Developed and supervised implementation of the site health and safety plan for hazardous waste site construction activities including slurry wall installation. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; Chevron Corporation; Richmond Refinery Hazardous Waste Remediation Project; Richmond, California; February 1992 – August 1992. Developed and supervised implementation of the site health and safety plan for hazardous waste site construction activities. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; AWD Technologies, Inc.; Lone Pine Corporation Superfund Project; Freehold Township, New Jersey; September 1991 – December 1991. Developed and supervised implementation of the site health and safety plan. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; Amoco Corporation; Whiting Refinery Hazardous Waste Remediation Project; Whiting, Indiana; April 1991 – September 1991. Observed site activities for compliance with the health and safety plan on a sludge stabilization remediation project. Performed personal air sampling and air monitoring with direct reading instruments.

CHRONOLOGICAL HISOTRY

2016 Golder Associates - Pittsburgh, PA - Senior Project Industrial Hygienist. Performed various industrial hygiene consulting services for local energy industry clients.

2014 – 2016 AM Health and Safety, Inc. - Pittsburgh, PA - Director - Industrial Hygiene and Safety Services. Project manager for industrial hygiene and safety consulting services for various industrial and construction industry clients. Supervise and provide direction to technical staff of five employees. Responsible for project execution from the proposal phase to final invoicing for projects that generated $650,000 in revenue in 2015.

Health and safety consulting services included industrial hygiene monitoring, safety program development, develop and implement health and safety plans for hazardous waste remediation projects, compliance audits, and training.

1998 – 2014 KTA –TATOR, INC. - Pittsburgh, PA. Corporate Director of Safety and Health. Developed and implemented the internal safety program for inspectors and professional level consultant staff on client sites such as manufacturing and petrochemical facilities for industrial coatings, concrete, and welding inspection projects. Responsible for conducting worker training, evaluating work site hazards, conducting accident investigations, and maintaining health and safety documentation (e.g. OSHA Form 300). Managed construction and industrial painting contractor health, safety, and environmental screening service audit and compliance programs such as ISNetworld. Responsible for project management of industrial hygiene and safety consulting services for various clients, including industrial, construction, industrial painting contractor, and Army Corps of Engineers.

1993 – 1997 CENTER FOR SAFETY & ENVIRONMENTAL MANAGEMENT - Vandergrift, Pennsylvania - Health and Safety Consultant. Developed safety programs for clients such as Weirton Steel and Allegheny Ludlum. Safety program development services included confined spaces, job safety analysis, lock out/tag out, hazard communication, and hazardous materials emergency response. Provided safety training for clients such as Allegheny Ludlum, General Electric, PPG, and Weirton Steel. Courses presented included OSHA 30-Hour Construction Safety, fall protection, confined space, hearing protection, forklift safety, lockout/tag out, hazardous waste site worker, and industrial hazardous material emergency response.

1991 – 1993 GEO-CON, INC. - Pittsburgh, Pennsylvania - Health and Safety Specialist. Acted as safety officer on hazardous waste site construction projects. Developed health and safety plans. Performed various types of industrial hygiene monitoring for airborne contaminants. Prepared and implemented corporate safety programs, including respiratory protection, confined spaces, and lock out/tag out.

1986 – 1990 UNITED STATES NAVY - Philadelphia Naval Shipyard/USS Independence - Assistant Safety Officer/3rd Division Officer. Developed and implemented safety programs. Coordinated industrial safety program implementation and workplace inspections with the civilian safety department during a two year shipyard overhaul. Conducted accident investigations and compiled safety statistics. Presented safety training (e.g. respiratory protection). Performed various supervisory duties as Third Division Officer, including leading shipboard firefighting and radiological and chemical warfare repair locker (e.g. response team).

SCIENTIFIC/TECHNICAL PUBLICATIONS

‘Protecting Workers Against Falls: Proper Use of Safety Gear,” Journal of Protective Coatings and Linings, Volume 18, Number 2, February 2001. (co-author)
“Respiratory Risks of Spray Painting and Ways to Control Them: An Overview,” Journal of Protective Coatings and Linings, Volume 17, No. 8, August 2000. Winner of JPCL 2001 Editors’ Award. (co author)

ADDITIONAL TRAINING

24 Hour Radiation Safety Officer Training Course, March 2015
Asbestos Building Inspector, November 2014
Indoor Air Quality and IH Air Sampling, April 2013
Comprehensive Industrial Ventilation, February 2010

Fall Prevention and Protection High Access Rescue Training, May 2008
Confined Space and Confined Space Rescue Training, April 2007
Fall Protection and Prevention Competent Person Training, August 2006
Air Barriers: Constructing Air Tight Buildings, December 2003
American Conference of Governmental Industrial Hygienists Mold, Spores, and Remediation Workshop, May 2002
Society of Protective Coatings Supervisor/Competent Person Training for Deleading of Industrial Structures, February 1999
Level 1 Coatings Inspection Training, March 1998
National Highway Institute Hazardous Bridge Coatings, March 1998
Environmental, Health and Safety Auditing, February 1996
National Environmental Training Association Designing and Delivering Effective Environmental Training Course, June 1995
29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8-Hour Supervisor Training, December 1991
29 CFR 1910.120 40-Hour Hazardous Waste Health and Safety Training, May 1991
Radiological Monitoring and Decontamination, May 1987

NUS
CORPORATION

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

STANFORD LIANG

has successfully completed a 40 hour course of instruction in
OSHA 29 CFR 1910.120

HAZARDOUS WASTE HEALTH AND SAFETY TRAINING

prepared and conducted by the
NUS Corporation,
Pittsburgh, Pennsylvania

MAY 13 - 17, 1991
Date of Award

Herold S. Hannah Jr.
Principal Instructor, Project Manager
Environmental Management Group

Richard C. Gerlach, Ph.D., C.I.H.
Manager, Health Sciences,
Environmental Management Group

014
CERTIFICATION NUMBER

GEO•CON INC.
GEOTECHNICAL CONTRACTING

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

S onl

has successfully completed 8 hours of health and safety supervisory training in accordance with 29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response

prepared and conducted by

GEO-CON INC
Pittsburgh, Pennsylvania

12-14-91
Date of Award

Kathleen S. Brady
KATHLEEN S. BRADY, CSP
Manager, Coporate Health & Safety

CHRISTOPHER R. RYAN
President/CEO

Activity Hazard Analysis (AHA) ***New Page as per FCR-NW194112-03***

ABIH®

american board of industrial hygiene®

organized to improve the practice of industrial hygiene
proclaims that

Stanford T. Liang

having met all requirements of
education, experience and examination, and
ongoing maintenance,
is hereby certified in the

COMPREHENSIVE PRACTICE
of
INDUSTRIAL HYGIENE

and has the right to use the designations

CERTIFIED INDUSTRIAL HYGIENIST

CIH

Certificate Number	7515 CP
Awarded:	November 12, 1997
Expiration Date:	June 1, 2023

Jeffrey M. Miller
Chair, ABIH

Chief Executive Officer, ABIH

BOARD OF CERTIFIED SAFETY PROFESSIONALS

affirms that

Stanford T Liang

Has applied for, met qualifications, and passed required examination(s) and is hereby authorized to use the designation

Certified Safety Professional®
in Comprehensive Practice

So long as this certificate is not suspended or revoked and the certificant renews this authorization annually and meets Continuance of Certification requirements.

Board of Examiners in witness whereof we have here unto
set our hands and affixed the Seal of the Board this
6th Day of July, 2005

Thomas F. Bresnahan **President**

Secretary

18630 **CSP No.**

West Virginia University

NATIONAL RESOURCE CENTER FOR OSHA TRAINING

This is to certify that

STAN LIANG

has met the attendance requirements
and successfully completed the course

OSHA 500
TRAINER COURSE IN
OCCUPATIONAL SAFETY AND HEALTH STANDARDS
FOR THE CONSTRUCTION INDUSTRY

COURSE DIRECTOR

NOVEMBER 17-20, 1997
DATE

Training Provider: Safety & Health Extension, West Virginia University, P.O. Box 6615, Morgantown, WV 26506-6615
Phone: 1-800-626-4748 or 304-293-3096

TETRA TECH

Karl Goehring

UXO Tech III/Safety/QC/SUXOS

EXPERIENCE SUMMARY

Mr. Goehring is a Master Badged Explosive Ordnance Disposal (EOD) Technician with more than 30 years of EOD/MMRP experience. He is a graduate of the U.S. Naval EOD School at Indian Head, MD and the EOD Assistant's Course, Redstone Arsenal, AL. His experience and training qualify him to perform the duties of Unexploded Ordnance (UXO) Technician III, UXO Safety Officer, UXO Quality Control Specialist, and Senior UXO Supervisor (SUXOS) for MMRP and Commercial Unexploded Ordnance (UXO) operations. He identifies, characterizes, and disposes of UXO and supervises and performs range clearance operations.

RELEVANT EXPERIENCE

CIVILIAN EXPERIENCE: (Additional Experience available upon request)

Various UXO Projects with Tetra Tech; Various Locations; 2018 – Present. Mr. Goehring has served in varying capacities on numerous UXO projects with Tetra Tech:

UXOSO/QCS, DGM Survey, target anomaly intrusive investigation, MEC/MPPEH Management, DR Horton, Cecil Field, Cameron Oaks, Jacksonville, FL, January - February 2020

UXOSO, Technology aided surface survey, UXO Support, USACE Europe, Kanji AB, Nigeria, July - August 2019

UXO Tech III Team Leader, Technology aided surface survey, target anomaly intrusive investigation, Abilene, TX, June -July 2018

UXO Technician and Supervisor; Various UXO Projects with Other Firms; Various Locations; 2002 – 2019. Mr. Goehring has served in varying capacities on several UXO projects with other firms:

FPM Remediations, UXO Tech III, team leader, directed field team during UXO clearance, Kirkland AFB, NM, August - October 2019

USA Environmental, UXOSO/QCS, responsible for site safety & quality control during dredging operations, Pearl Harbor, HI, April - May 2019

ERRG, UXOSO/QCS, responsible for health, safety & welfare 20 personnel during MEC surface clearance. Safety oversight during demolition operations, Kanahena Point, Maui, HI, March – May 2018

EDUCATION

Explosive Ordnance Disposal, Redstone Arsenal, and Indian Head, MD, 1979

REGISTRATIONS

Class A CDL, WY

TRAINING/CERTIFICATIONS

OSHA 40-Hour HAZWOPER, and annual refreshers

OSHA 8-Hour HAZWOPER Supervisor

OSHA 30/10-hr Construction Safety;

CQM for Contractors;

CPR and First Aid;

Current Medical/CDL clearance;

U.S. Passport

OFFICE

Cheyenne, WY

YEARS OF EXPERIENCE

38

YEARS WITH TETRA TECH

2

ERRG, UXOSO/QCS, responsible for health, safety & welfare 50 personnel during MEC surface clearance. Safety oversight during demolition operations. Whiskey Flat, Hawthorne, NV, March – November 2017

Koman, UXOSO/QCS, responsible for health, safety & welfare 14 personnel during MEC surface clearance. Safety oversight during demolition operations. Boardman Air Force Range, OR, January – February 2017

ERRG, UXOSO/QCS, responsible for health, safety & welfare of 12 personnel during removal and explosive venting of over 4,000 rockets. Responbile for quality control and safety overlight during demolition operations, Hawthorne Army Dept, NV, October 2015 – December 2016

HydroGeologic, SUXOS, directed field operations during removal action of areas surrounding former OD site. MEC disposal operations conducted daily, Kanas Army Ammunition Plant, KS July 2013 – June 2014

CH2M Hill, SUXOS, directed field operations and provided project oversight. Camp Lejuene, NC, March – June 2013.

URS Corp, SUXOS, directing field operations during removal actions surrounding former OD site for 38 personnel. Over 100 tons MDAS recovered, processed, and shipped to offsite recycler. Former Sioux Army Depot, NB. June 2012 – January 2013.

URS Corp, SUXOS, directed field operations to conduct surface removal actions at AL501 & OD508 ranges with 42 personnel. MEC disposal operations conducted daily, over 65 tons of MDAS inspected, processed, and shipped offsite to certified recycler. Hill AFB, UT. June 2010 – May 2012.

URS Corp, SUXOS, directed field operations to conduct surface removal of aircraft flares with 16 personnel. Supervised large geophysical data collection effort. Barry M. Goldwater Range, AZ. March 2010 – May 2010.

Additional projects available upon request.

MILITARY EOD ASSIGNMENTS:

March 1979 – August 1983 – Lackland AFB, TX

September 1983 – August 1985 – Hahn AFB, Germany

September 1985 – December 1992 – Beale AFB, California

January 1993 – April 1994 – Incirlik AFB, Turkey

May 1994 – March 1996 – Vandenberg AFB, California

The United States Air Force

CERTIFIES THAT

TSGT KARL J. GOEHRING

HAS SUCCESSFULLY COMPLETED THE

Hazardous Waste Operator Course (40 Hours)
29 CFR 1910.120

AND IS HEREWITH AWARDED THIS

Certificate of Training

JAMES J. BOUCHIE, Captain, USAF
Chief, Disaster Preparedness Division

21 October 1994
DATE

CERTIFICATE OF TRAINING

This certifies that the person named below completed training on
June 8, 2019 to satisfy the requirements of 29 CFR 1910.120(e)(8) for:

HAZWOPER ANNUAL REFRESHER (8 HRS)

KARL GOEHRING

The above person has received training appropriate for situations and investigations subject to the referenced federal regulation regarding Hazardous Waste Operations and Emergency Response, is familiar with Respiratory Protection and Levels of Protection A through D, and is hereby technically qualified to participate in activities pertinent to the specified training.

Thomas N. Smith

Certificate Number 190601

Thomas N. Smith, Instructor

Training conducted by Smith Environmental Consulting, 7315 Oswego, San Antonio, TX 78250

CERTIFICATE OF COMPLETION

This certifies that

Karl Goehring

completed the requirements for 29 CFR 1910.120

8 Hour
Hazardous Waste Operations & Emergency Response
Supervisor/Refresher

Achieving Level C competency on the 5th day of October, 2002

Kenneth T. Weber
Kenneth T. Weber

EHSC, Inc. 227 Johnson Drive Loveland, Colorado 80537

Certificate No.: 330-48-2868

O)SHA Occupational Safety and Health Administration

36-005940228

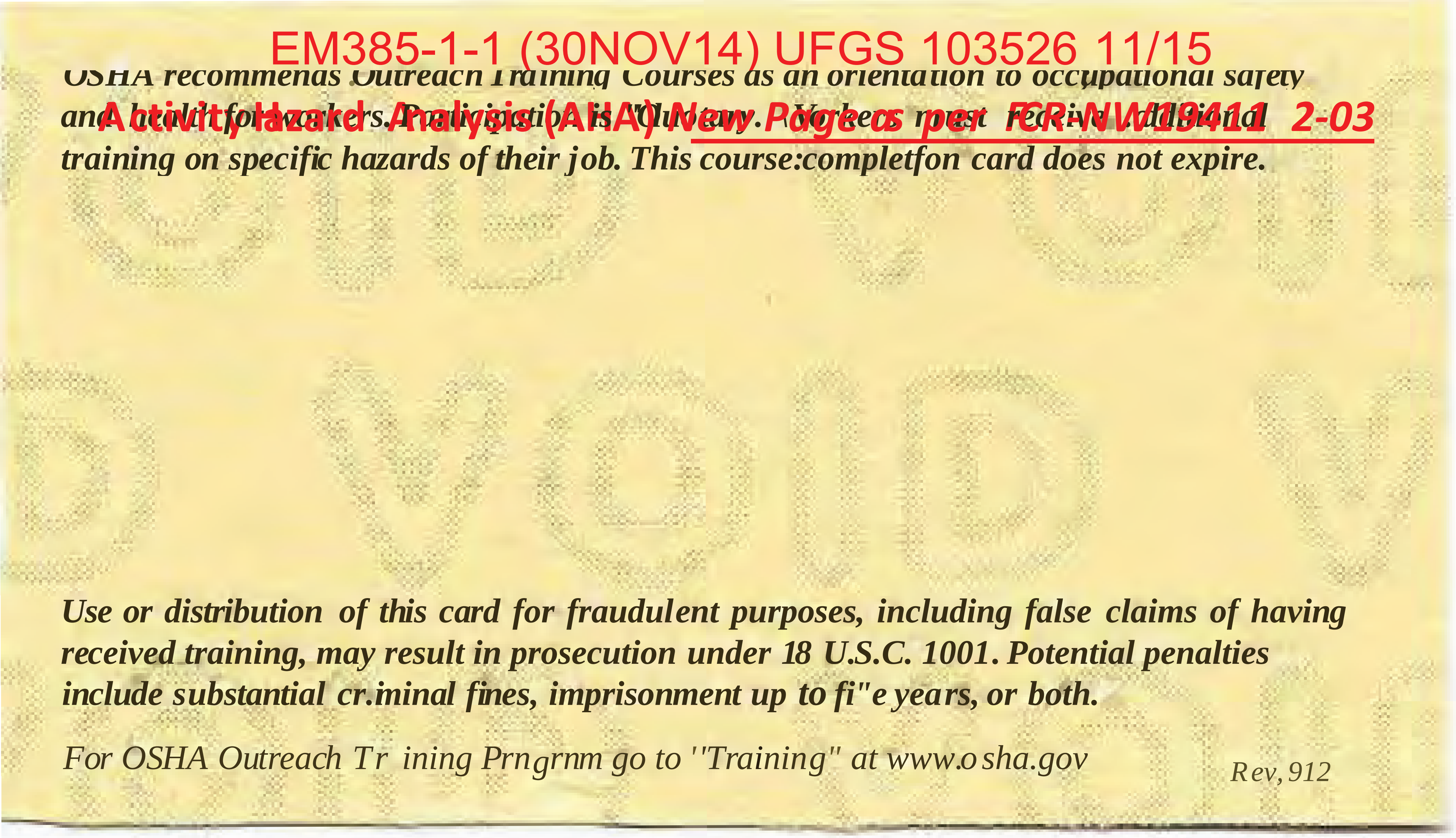
This card acknowledges that the recipient has successfully completed a 10-hour Occupational Safety and Health Training Course in

Construction Safety and Health

Karl Goehring

<Peter e97357 **4/17/2017**

(Trainer name - print or type) (Course end date)



OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is "Voluntary". Workers must receive additional training on specific hazards of their job. This course:completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to five years, or both.

For OSHA Outreach Training Program go to "Training" at www.osha.gov

Rev, 912

OSHA Occupational Safety and Health Administration

36-601441359

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in
Construction Safety and Health

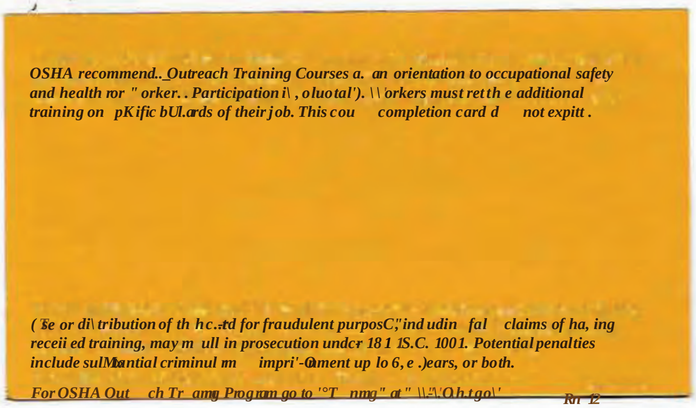
KARL GOEHRING

Matthew Luman (Trainer name – print or type)

6/26/2017 (Course end date)

EM385-1-1 (30NOV14) UFGS 103526 11/15

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*



OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

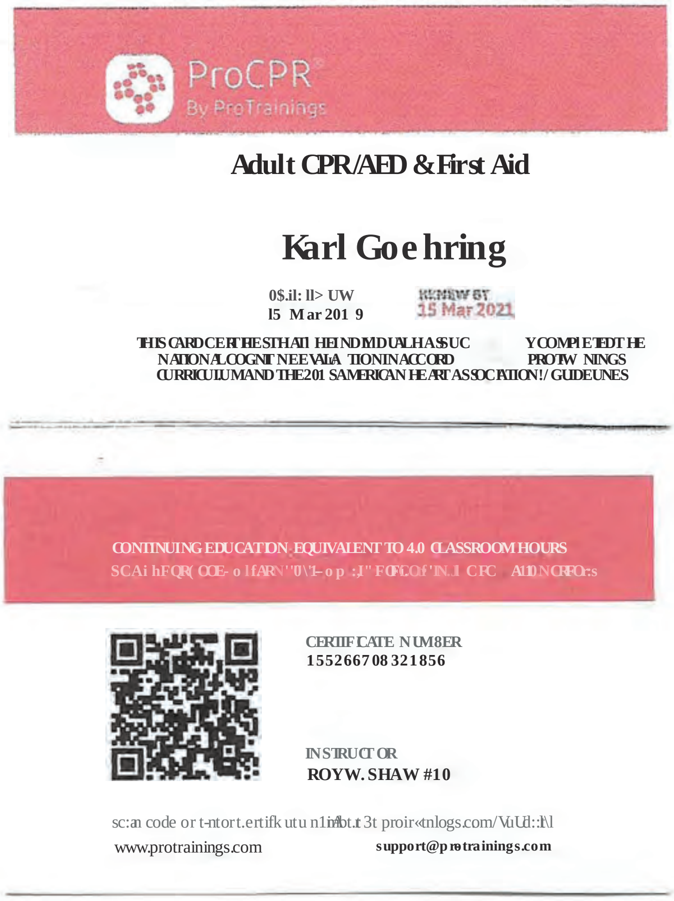
Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to 6 years, or both.

For OSHA Outreach Training Program go to "Training" at www.osha.gov

Rev 12

EM385-1-1 (30NOV14) UFGS 103526 11/15

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*



ProCPR
By ProTrainings

Adult CPR/AED & First Aid

Karl Goehring

ISSUED ON
15 Mar 2019

RENEW BY
15 Mar 2021

THIS CARD CERTIFIES THAT THE INDIVIDUAL HAS SUCCESSFULLY COMPLETED THE NATIONALLY RECOGNIZED EVALUATION IN ACCORDANCE WITH PROTRAININGS CURRICULUM AND THE 2015 AMERICAN HEART ASSOCIATION GUIDELINES

CONTINUING EDUCATION EQUIVALENT TO 4.0 CLASSROOM HOURS
[illegible]

CERTIFICATE NUMBER
1552667 08 321856

INSTRUCTOR
ROY W. SHAW #10

Scan code or enter certificate number at protrainings.com/[illegible]
www.protrainings.com
support@protrainings.com

MAKING HEALTH COUNT

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: USA Environmental - Baseline Exam
EXAM CLASSIFICATION: Baseline Examination

EMPLOYEE: Goehring, Karl J.
ID: 1038
DATE OF EXAM: 03/19/2019
EXPIRATION DATE: 03/19/2021

COMPANY: USA Environmental
POSITION: UXO Safety Officer
LOCATION: USA Environmental, Inc.
SITE:

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/ her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120 (Hazwoper)?	☐	1K]	☐
Has the employee any contraindication for work in accordance with 29 CFR §1910.95(9)1926.52 (Hearing Conservation)?	☐	1K]	☐
Has the employee any limitations in accordance with 29 CFR §1910.134 (Respirator)?	☐	1K]	☐

Status

IK] **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

D **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

☐ **NOT QUALIFIED**

D **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

Comments:

Qualified for biennial frequency.

Negative Drug Screen.

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 03/25/19

Signature: I 1

Naval School
Explosive Ordnance Disposal

This certifies that

A man Ka l J. Goe h ng, USAF

having successfully completed
the prescribed course of study for

EXPLOSIVE ORDNANCE DISPOSAL SPECIALIST - G5ABN46430

is awarded this
Certificate

this 2nd day of March A.D. 1979

J. T. KENNEDY, CDR, USN
COMMANDING OFFICER

NAVSCOLEOD FORM 1650/2

THE NATIONAL ENVIRONMENTAL TRAINERS

Ron Stum

has satisfactorily passed an exam and completed a 40-h01r training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPBR Regulations). This course has been awarded 5.0 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for 3.33 Continuance of Certification (COC) points from the Board of Certified Safety Professionals

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January 25, 2009

Course Number 1003, Awarded 40 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenyjronmentaltrajners.com

Signature of Instructor

Clay A. Bednarz, MS, RPIH

Naval School
Explosive Ordnance Disposal

This certifies that

Ronald L. Stam, Jr., Sergeant, USAF

having successfully completed the prescribed course of study for

EXPLOSIVE ORDNANCE DISPOSAL SPECIALIST

is awarded this Certificate

this *9th* **day of** *June* **A.D.** *1983*

James C. Blanton

JAMES C. BLANTON, CDR, USN

COMMANDING OFFICER

Certificate Of Completion

PRESENTED TO

[illegible]

In Recognition of Successful Completion of Requirements In

CPR/AED (Adult/Child/Infant)

Universal First Aid

02/ 26/ 2020

CERTIFICATION DATE

02/ 26/ 2022

EXPIRATION DATE

HOLDER'S SIGNATURE

Christopher Bayer

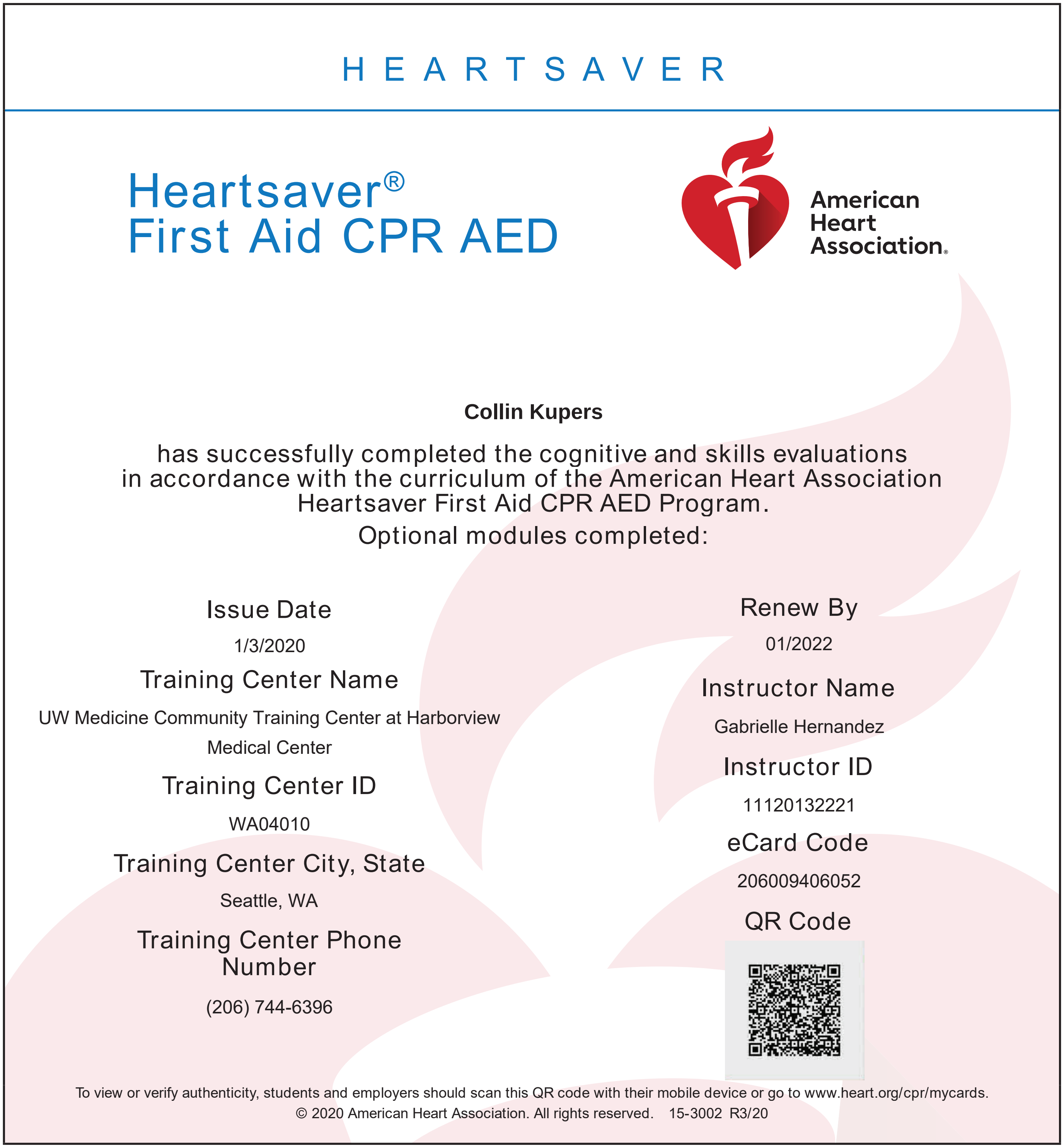
AUTHORIZED SIGNATURE

AMERICAN SAFETY TRAINING INSTITUTE

ASTI

www.AmericanSTI.org

This certifies participant listed above has successfully passed skills evaluation in accordance with national cognitive skills examination standards, and American Safety Training Institute certification terms and conditions. American Safety Training Institute courses follow national guidelines set by the American Heart Association (AHA), and the International Liaison Committee on Resuscitation (ILCOR). The American Safety Training Institute is not associated, affiliated with, sponsored, or endorsed by, American Safety and Health Institute (ASHI), American Heart Association (AHA), or American Red Cross (ARC), and unless otherwise specified no affiliation or endorsement is implied.



HEARTSAVER

Heartsaver®
First Aid CPR AED

American Heart Association.

Collin Kupers

has successfully completed the cognitive and skills evaluations in accordance with the curriculum of the American Heart Association Heartsaver First Aid CPR AED Program.

Optional modules completed:

Issue Date

1/3/2020

Training Center Name

UW Medicine Community Training Center at Harborview Medical Center

Training Center ID

WA04010

Training Center City, State

Seattle, WA

Training Center Phone Number

(206) 744-6396

Renew By

01/2022

Instructor Name

Gabrielle Hernandez

Instructor ID

11120132221

eCard Code

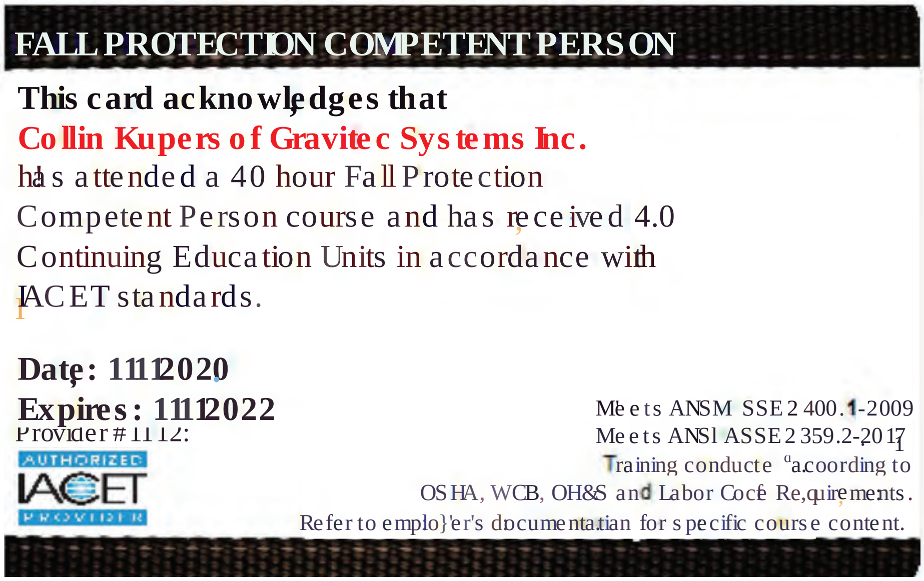
206009406052

QR Code

To view or verify authenticity, students and employers should scan this QR code with their mobile device or go to www.heart.org/cpr/mycards.

15-3002 R3/20

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*



FALL PROTECTION COMPETENT PERSON

This card acknowledges that

Collin Kupers of Gravitec Systems Inc.

has attended a 40 hour Fall Protection Competent Person course and has received 4.0 Continuing Education Units in accordance with IACET standards.

Date: 11112020

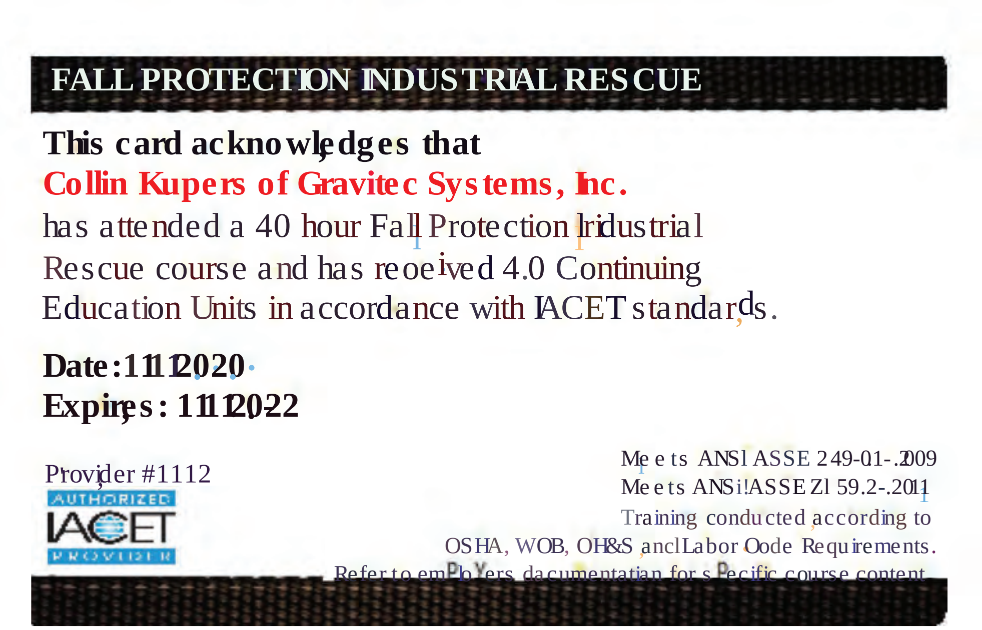
Expires: 11112022

Provider # 1112:

Meets ANSM SSE 2 400.1-2009
Meets ANSI ASSE 2 359.2-2017
Training conducted according to
OSHA, WCB, OH&S and Labor Code Requirements.
Refer to employer's documentation for specific course content.

EM385-1-1 (30NOV14) UFGS 103526 11/15

Activity Hazard Analysis (AHA) ***New Page as per FCR-NW194112-03***



FALL PROTECTION INDUSTRIAL RESCUE

This card acknowledges that

Collin Kupers of Gravitec Systems, Inc.

has attended a 40 hour Fall Protection Industrial Rescue course and has received 4.0 Continuing Education Units in accordance with IACET standards.

Date: 11112020

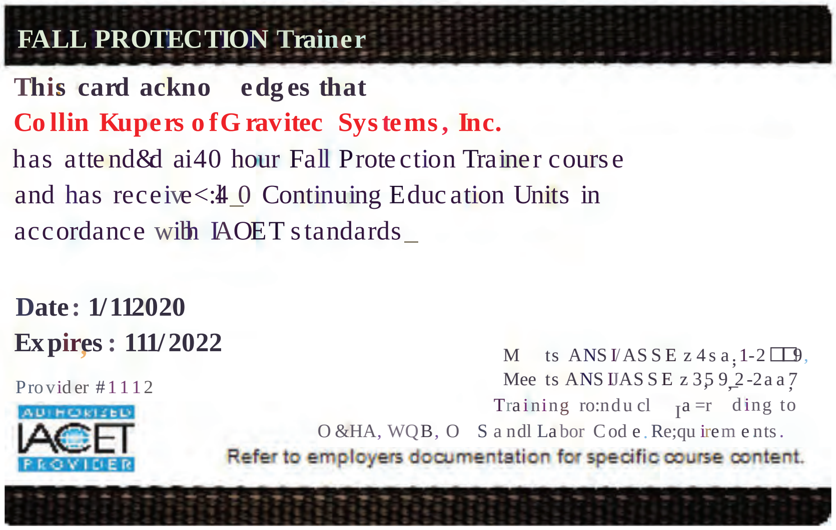
Expires: 11112022

Provider #1112

AUTHORIZED IACET PROVIDER

Meets ANSl ASSE 249-01-.2009
Meets ANSi!ASSE Zl 59.2-.2011
Training conducted according to
OSHA, WOB, OH&S and Labor Code Requirements.
Refer to employers documentation for specific course content.

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*



FALL PROTECTION Trainer

This card ackno edges that

Collin Kupers of Gravitec Systems, Inc.

has attend&d ai40 hour Fall Protection Trainer course and has receive<:4_0 Continuing Education Units in accordance wilh IAOET standards_

Date: 1/112020

Expires: 111/2022

Provider #1112

M ts ANSI/ASSE z4sa;1-2☐☐9,
Mee ts ANSIJASSE z3,59,2-2aa7,
Training ro:nducl Ia=r ding to
O&HA, WQB, O S andl Labor Code. Re;quirements.
Refer to employers documentation for specific course content.

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Activity/Work Task	MEC/MPPEH Management **(UXO 6)**
AHA Signature Log #	
Project Location	NBK Bangor
Contract Number	Contract No. N6247016D9008 CTO No. N 4425519F4112
Date Prepared	September 2020
SSHO Signature	
Superintendent Signature	
QC Manager Signature	
Subcontractor Foreman Name:	
Signature:	
ET/GDA Reviewed by (Name)	

Notes: (Field Notes, Review Comments, etc.)

This AHA is specifically applicable to UXO 6 - Debris Area 2 (Site 22). This location has rope access requirements resulting from steep terrain unique to this location. Control measures in this AHA must be used in conjunction with the Rope Access Plan (Attachment XII)

As required by EM 385 1-1 Section 01.A.14, the qualifications of the SSHO/Competent Person and Qualified Person (responsible for plan preparation) attached to this AHA as proof of his/her qualifications

Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Risk Assessment Code (RAC) Matrix

	Probability				
Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	🟥	🟥	🟧	🟧	🟨
Critical	🟥	🟧	🟧	🟨	🟩
Marginal	🟧	🟨	🟨	🟩	🟩
Negligible	🟨	🟩	🟩	🟩	🟩

Step 1: Review each Hazard with identified safety "Controls". Determine RAC (see above).	**RAC CHART**
Probability: Likelihood the activity will cause a Mishap (Near Miss, Incident, or Accident). Identify as Frequent, Likely, Occasional, Seldom or Unlikely	**E = Extremely High Risk**
Identify as Catastrophic, Critical, Marginal, or Negligible	**H = High Risk**
Step 2: Identify the RAC (probability vs. severity) as **E, H,** M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of the AHA	M= Moderate Risk
	L = Low Risk

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
Investigation of identified surface items	1. Heavy lifting (muscle strains and pulls)	1. Ensure a clear path of travel, a good grasp on the object, and perform a "test lift" to gauge the ability to safely make the lift 2. Lift with the legs, keep the back straight. Do not twist the body when lifting loads. 3. Each worker will not lift more than 50 pounds. 4. If shoveling, when possible, make more lifts with smaller loads rather than fewer lifts with heavier ones.	**L**

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
		5. Obtain help to lift large, bulky, or heavy items. 6. See if breaking larger loads into smaller ones and making more trips (or obtaining help to carry the additional loads) is feasible.	
	2. Slips, trips, falls (when not on steep, irregular terrain)	1. Watch for tree branches, roots, weeds, limbs and other ground hazards. 2. Wear appropriate foot protection to prevent slips and trips. 3. Use caution when working on uneven and wet ground surfaces.	**L**
	3. Fall hazards working on steep, irregular terrain	1. Comply with the Rope Access Plan (Attachment XII of the APP). 2. The authorized Competent Person designated in the Rope Access Plan must be present on site and oversee implementation at any location where the safe access procedures in this plan are required.	**L**
	4. Inclement weather	1. See Mobilization/Demobilization AHA for inclement weather procedures.	**L**
	5. Insect and animal bites.	1. Shake out boots before donning. 2. Use insect repellants (products containing 20% DEET, picardin, or IR 3535 should be applied to exposed skin, products containing Permethrin should be applied to clothing only). 3. Follow manufacturer's recommendations for application. 4. Tape up pants leg to work boot joints with duct tape. 5. Wear light-colored clothing to better see and remove any insects. 6. Avoid wooded and brushy areas and walk in the center of trails when possible. 7. If such areas cannot be avoided, vegetation clearance is used to reduce the risk of tick exposure (e.g. clear pathways to work areas). 8. Hazard controls for vegetation clearance is addressed separately in the Vegetation Management AHA. 9. Perform close body inspections at least daily upon leaving the site. Close body inspections include the following: • Check the body crevices. Note that ticks, once attached to your clothing, may move to these areas of the body. • Use a mirror for hard to see areas. 10. Any incident involving an embedded tick SHALL be reported to the SSHO and documented in the field log book. 11. See Section 9.13 and Attachment IV of the APP for additional information on identification of hazards and exposure controls.	**L**

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
	6. Poisonous plants.	1. Avoid contact with poisonous plants. See Section 9.13 and Attachment IV of the APP for additional information on identification of hazards and exposure controls. 2. Personnel who are knowingly allergic to these plants may use the Medical Data Sheet to disclose this condition. In addition, precautionary measures should be taken.	L
	7. Contacting underground utilities	1. Verify the minimum clearance distances of underground utility lines in accordance with Section 4.2 of Tetra Tech SOP SWP 5-35 (in Attachment IX). 2. Utility clearance requirements will be completed through Washington One-Call service and NBK Bangor Public Works Department (PWD)..	L
	8. Chemical exposure to concentrations of COCs	1. Wear nitrile surgical type gloves under work gloves when handling potentially contaminated equipment or tools. 2. Wear Tyvek coveralls if soiling of clothing is possible. Avoid contact with potentially-contaminated equipment to the extent possible. 3. Practice good personal hygiene (hands and face washing) decontamination practices when exiting work area. 4. Dispose of nitrile gloves, work gloves, and Tyvek coveralls as soon as possible, when exiting the Exclusion Zone, if exposed to contaminated soil or ground water. 5. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.). 6. While not likely, if visible dust emissions are observed, water suppression will be used.	L
	9. MEC/MPPEH	1. MEC/MPPEH survey and clearance will be conducted by trained UXO Technicians. 2. Non-UXO personnel will be escorted while in the area of concern. 3. Exclusion Zone distances will be defined based on those specified in the Work Plan. 4. Operations within the safe separation distance for team operations will immediately stop if MEC/MPPEH is discovered and UXO Technicians will secure the area. All non-UXO personnel will leave the area. 5. If MEC/MPPEH is observed, the UXO Technician making the observation will signal to stop operations and take the following precautions:	M

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
		• The UXO Technician will visually inspect the MEC/MPPEH to determine the type and condition if possible. This identification and the exact location will be recorded on MEC Daily Activity Log. Location information will be recorded with the site GPS. • If suspect MEC or MPPEH items not determined MDAS are identified, the item will be managed in accordance with the Work Plan. • Any suspect MEC or MPPEH items not determined MDAS are discovered during UXO survey/removal operations, which has been determined to be safe to move, may be moved to a designated holding area/Type II Storage Magazine. • An inventory will be maintained by the SUXOS with locations and descriptions for suspect MEC/MPPEH discovered during this operation. The UXO Manager will be provided an inventory update on a daily basis. 6. The SUXOS ensures that all MEC/MPPEH related tasks are performed in accordance with the approved ESS	

Equipment to be used	Training Requirements & Competent or Qualified Personnel Name(s)	Inspection Requirements
Hand tools (shovels etc) **Safety Equipment:** Class IV First Aid Kit meeting requirements of OSHA/ANSI 308 and EM 385 1-1 and an emergency air horn nearby. Access equipment required by the Rope Access Plan (see Attachment XII of the APP) **Monitoring Instruments:** None.	Review of the AHA during a pre-task tailgate safety briefing with the intended task participants. The SUXOS ensures that task participants review the DDESB-approved ESS and SWP 6-33 (UXO Precautions) prior to the start of this activity. The UXO Technician III, II, and I will meet the qualifications stated in DDESB TP 18 (DDESB, 2016). The UXO personnel for this project will be as follows: Adam Goforth (Level I) Brandon Humphries (Level II) Alvin Lee (Level III) Dane McCarthy (Level II) Miranda Mitchell (Level II)	Visual inspection prior to use by user. Inspection of rope access equipment in accordance with the Rope Access Plan (see Attachment XII of the APP) and manufacturer recommendations. Monthly inspection of first aid kit.

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Equipment to be used	Training Requirements & Competent or Qualified Personnel Name(s)	Inspection Requirements
	Daniel Odom (Level II) Jesse Prince (Level I) Ronald Stum (Level III) Tye Turner (Level III) Shaun Woods (Level II) Qualifications are provided in Attachment III Rope access training in accordance with the Rope Access Plan (see Attachment XII of the APP) Competent Person: Karl Goehring Competent Person (rope access): Collin Kupers (Gravitec Systems, Inc.) Qualified Person: Stanford T. Liang	
Personal Protective Equipment Minimum: Safety toe boots (composite toes compatible with UXO hazards), safety glasses, work gloves, nitrile gloves, high visibility vest (minimum ANSI Type 2). Rope access equipment (see Attachment XII of the APP). **Optional items:** Hardhat, Tyvek coveralls if there is a chance to soil clothing. **HTRW:** MEC/MPPEH and related chemicals (e.g.2,4,6 TNT, nitroglycerin, etc.)	PPE training in proper use, care, storage, and limitations in accordance with this APP and the Rope Access Plan (see Attachment XII of the APP).	Initial PPE inspection performed by SSHO. Ongoing (prior to each use) inspections responsibilities of PPE users.

UFGS 013526 11/15 1.9 Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences; specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

UFGS 013526 1.9.1 Review the AHA list periodically (at least monthly) at supervisory safety meetings, update when procedures, scheduling or hazards change.

UFGS 013526 1.9.2 Each employee performing work...must review the AHA and sign a signature log for that AHA prior to starting work. The SSHO must maintain a signature log on site for every AHA

Activity Hazard Analysis (AHA) ***New Page as per FCR-NW194112-03***

MEC/MPPEH Management **(UXO 6)** AHA Signature Log # ______________

Name (Printed)	Signature	Date

TETRA TECH

Stanford T. Liang, CIH, CSP

Senior Industrial Hygienist

EXPERIENCE SUMMARY

Mr. Liang is a Certified Industrial Hygienist and Certified Safety Professional with over thirty years of occupational safety and health experience. This experience spans a diverse range of workplaces including hazardous waste remediation sites, shipyards, wastewater treatment plants, hospitals, and various manufacturing plants and construction sites. As a consultant project manager, he has managed complex industrial hygiene and safety projects to cost-effectively address the needs of the client on time and under budget, such as noise surveys at underground mines at multiple geographical locations which required a project team of five industrial hygienists. Health and safety services provided by Mr. Liang have included the following:

- Industrial hygiene surveys, including air sampling and noise
- Training, such as HAZWOPER 10- and 30-hour OSHA Construction Safety, and the Society of Protective Coatings Competent Person Training for Deleading of Industrial Structures
- Development and implementation of health and safety compliance programs
- Safety and industrial hygiene compliance audits
- Indoor air quality surveys for mold and other contaminants
- Laboratory safety surveys
- Evaluation of HVAC and industrial local exhaust ventilation systems
- Evaluation and control of lead containing coatings on industrial structures
- Ambient air monitoring for total suspended particulates and PM-10

Mr. Liang has managed health and safety programs to successfully identify and control workplace hazards and meet regulatory and client requirements. As an Assistant Safety Officer stationed aboard the aircraft carrier USS Independence, he implemented a safety program during the course of a multi-year $800 million shipyard overhaul at the Philadelphia Naval Shipyard. Mr. Liang is a member of the American Industrial Hygiene Association and is past director of the local Pittsburgh chapter. He has also published peer reviewed articles in publications such as the Journal of Protective Coatings and Linings.

EDUCATION

Bachelor of Science, Safety, 1986, University of Southern California

AREA OF EXPERTISE

Industrial Hygiene and Safety

TRAINING/CERTIFICATIONS

Certified Industrial Hygienist (CIH), No. 7515 CP

Certified Safety Professional (CSP), No. 18630

OFFICE

Pittsburgh, Pennsylvania

YEARS OF EXPERIENCE

30

YEARS WITH TETRA TECH

2

AWARDS

2001 Journal of Protective Coatings and Linings Editor's Award

RELEVANT PROJECT EXPERIENCE

Industrial Hygienist; MAHLE Industries, Inc.; Various Locations; 2014 – 2016. Provided comprehensive industrial hygiene sampling program for air contaminants and noise at multiple chemical manufacturing facilities. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Health and Safety Officer; Confidential Industrial Client; West Virginia; 2018. Health and safety officer for a complex in-situ soil remediation project requiring treatment of 5,000 cubic yards of soil via alkaline hydrolysis and in-situ chemical oxidation with sodium persulfate. This process involved injecting and mixing chemicals into the soil using a crane with a large diameter auger attachment to depths of approximately 20 feet bgs. Chemicals of concern in soil that were treated include dinitrotoluene, benzene, and other organic compounds. The presence of elevated benzene levels in soil required the work to be performed in Level B respiratory protection. Oversaw health and safety program implementation for project remediation activities such as use of personal protective equipment, safe handling procedures for treatment chemicals (e.g. liquid caustic, sodium persulfate), and control of heat stress exposures. Other health and safety support services included training (e.g. benzene, daily tailgate meetings), perimeter and area air monitoring with real time monitoring instruments, and personal air sampling.

Industrial Hygienist: AB Kaelin, LLC; Delaware River Port Authority Betsy Ross Bridge Painting and Steel Repairs – Phase I; Philadelphia, PA; April 2018 – Present. Provides CIH and CSP support services for an industrial painting contractor that is a client of AB Kaelin, LLC. Support services include review of painting contractor safety plans and reports (e.g. industrial hygiene air sampling, results of blood lead analysis of painting contractor personnel) and site visits (e.g. attend meetings and audits).

Industrial Hygienist; Comprehensive Long-Term Environmental Action (CLEAN) Contract; Naval Facilities Engineering Command; Multiple Facilities; 2017 - present. Prepares or approves project-specific HASPs to assure compliance with OSHA requirements and EM 385-1-1 (US Army Corps of Engineers Safety and Health Requirement Manual) and to protect personnel, property, and the environment from chemical, biological, and other hazards. Projects include detailed remedial investigations and assessments to evaluate risks and implement solutions due to subsurface vapor intrusion, groundwater and soil contamination; munitions and explosives; and waste disposal areas. Activities performed as part of these projects included monitoring well installation, excavation of test pits, inspection of confined spaces, and obtaining water and soil samples. Site visits to conduct audits and provide health and safety plan implementation support (e.g. training).

Project Health and Safety Officer; U.S Army Corps of Engineers; Savanna Army Depot Facility, Savanna, Illinois; July 2017 – July 2018. Wrote Accident Prevention Plans and Site Safety and Health Plans for site remediation projects at Site 20, Site 73, Site 178 which are former landfills at this facility. The plan describes procedures for compliance with applicable requirements of OSHA and EM 385-1-1. Remediation activities consist of collection of multi-media environmental samples, installation of monitoring wells, excavation activities with heavy equipment for site restoration, stabilization of soil lead contaminants, debris removal, and transportation of contaminated soils to an offsite disposal facility, and vegetation clearance including tree removal with power saws and heavy equipment. Site visits to conduct audits and provide health and safety plan implementation support (e.g. training).

Project Industrial Hygienist; Georgia Environmental Protection Division; Martin Fireproofing Georgia, Inc.; Elberton, Georgia; October 2017 – June 2018. Wrote Health and Safety Plan and Air Monitoring Plan for

site remediation project. Remediation activities consist of removal of trees and other debris and excavation and removal (for disposal at an approved facility) of dioxin contaminated soil. Exposure controls addressed in the plan included engineering controls, work practices, and personal protective equipment (e.g. respiratory protection), based on an exposure assessment, to control dioxin exposure to workers engaged in site remediation activities. Assisted Health and Safety Manager in plan implementation.

Project Industrial Hygienist; NAVFAC; Marine Corps Recruit Depot; Parris Island, South Carolina; August 2017 – October 2017. Wrote project Accident Prevention Plan and coordinated subcontractor implementation of hurricane debris cleanup activities in compliance with applicable OSHA and EM 385-1-1 requirements. Remedial activities included vegetation and tree removal (including use of power saws and heavy equipment) and minor structural repairs to site infrastructure (e.g. wooden walkways). Subcontractor coordination included review of contractor submittals (e.g. safety plans and policies).

Project Industrial Hygienist; Washington Health Systems; Washington Hospital; Washington, Pennsylvania; September 2015 – May 2017. Performed various indoor air quality assessments (e.g. mold, formaldehyde, ventilation systems) in response to occupant complaints at a hospital facility.

Project Manager; Hartman and Hartman Constructors; Koppers, Inc. Follansbee Plant; Follansbee, West Virginia; February 2016 – May 2016. Assisted client in development and implementation of a hazardous waste site safety plan for excavation work. Oversaw industrial hygiene air monitoring services including field air sampling and report writing performed by an industrial hygiene technician

Project Manager; CONSOL Energy, Inc.; Various Locations; January 2016 – March 2016. Managed a team of four industrial hygienists responsible for comprehensive noise surveys consisting of personal noise dosimetry and area noise maps at multiple underground mines. Project management activities included proposal development, coordination of survey activities, budgeting, and invoicing. Performed review and interpretation of noise monitoring data. Comprehensive reports were developed and submitted which included findings relative to worker noise exposure levels, exposure controls, and compliance with MSHA regulations.

Project Manager; U.S. Minerals, Inc.; Various Locations; 2015 – 2016. Developed and implemented a site audit and industrial hygiene monitoring program for an abrasive blasting media manufacturer to comply with an OSHA settlement agreement. For each site audit, site audit reports which addressed survey findings relative to compliance with applicable OSHA requirements and control of identified worker exposures were presented to both the client and OSHA for review and approval.

Project Manager; Koppers, Inc.; Various Locations; 2014 – 2016. Directed implementation of a comprehensive industrial hygiene sampling program at multiple facilities manufacturing railroad ties and wood treating chemicals. The scope of the surveys encompassed various air contaminants, noise, ionizing radiation, industrial local exhaust ventilation, compliance with applicable OSHA regulations and corporate policies, and evaluation of relevant engineering, work practice controls, and personal protective equipment. Responsibilities included technical direction and oversight for a project team of five industrial hygienists, project budgeting, coordination of survey activities, and client relations. Performed quality assurance review of industrial hygiene data and interpretation of results. Reviewed and approved final comprehensive survey reports for each site visit with findings and recommendation for compliance and control of worker hazard exposure.

Project Manager; Nova Chemicals Corporation; Various Locations; 2014 – 2016. Supervised implementation of a comprehensive industrial hygiene sampling program for air contaminants and noise at

multiple chemical manufacturing facilities. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Project Manager; LANXESS Corporation; Various Locations; 2014 – 2016. Directed implementation of an industrial hygiene sampling program at multiple facilities manufacturing pigments. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Project Manager; Horsehead Holding Corporation; Various Locations; 2014 – 2016. Oversaw an industrial hygiene exposure monitoring program for air contaminants and noise at multiple facilities recovering and processing lead and zinc oxide from arc furnace dust and a battery recycling facility. Performed safety compliance audits.

Trainer; Michael Baker Jr.; Moon Township, Pennsylvania; May 2009 – August 2009. Developed and presented a comprehensive fall protection training program for Michael Baker, Jr. employees at various offices in Pennsylvania.

Project Manager; Enbridge Energy; Multiple Locations in the United States and Canada; 2005 – 2006. Managed a team of three industrial hygienists who conducted an industrial hygiene study. The objective of the study was to compare the worker exposure attributes of several different abrasive blast media at multiple pipeline repair locations. Developed, implemented, and presented the report of findings for the study protocol which included personal air sampling for various analytes (e.g. crystalline silica and several toxic metals).

Project Health and Safety Consultant; Damolos & Sons; Army Corps of Engineers Pike Island Locks and Dam; Wheeling, West Virginia; June 2003. Developed permit required confined space entry and rescue procedures associated with abrasive blasting and repainting of dam tainter gates. Presented training on entry and rescue procedures to contractor employees performing permit-required confined space entries.

Project Industrial Hygienist; Duquesne Energy; H. J. Heinz Energy Facility; Pittsburgh, Pennsylvania; May 2003. Industrial hygiene area and personal monitoring for carbon monoxide and nitrogen oxide at a power generation facility.

Project Industrial Hygienist; Community College of Allegheny County; Pittsburgh, Pennsylvania; 2002 – 2005. Conducted indoor air quality surveys at multiple classroom, laboratory, and office facilities.

Project Health and Safety Specialist; New York City Department of Transportation; New York, New York (Various Locations); 2001 – 2014. Performed environmental, waste management, health, and safety audits for various bridge painting projects for compliance with applicable project specifications and regulatory requirements. Supervised ambient air monitoring of lead emissions associated with removal of lead containing coatings. Reviewed contractor project submittals.

Project Industrial Hygienist; Allegheny County Sanitary Authority; Pittsburgh, Pennsylvania; 1998-Present. Conducts annual laboratory safety survey and lab hood ventilation evaluation. Provides other industrial hygiene and safety services as needed including personal protective equipment hazard evaluation, noise surveys, personal air sampling, and assessments for lead containing coatings.

Project Health and Safety Specialist and Trainer; Triborough Bridge and Tunnel Authority, New York, New York (Various Locations); 1998 – 2014. Conducted environmental, waste management, health, and safety audits for various bridge painting projects for compliance with applicable project specifications and regulatory requirements. Project included a five-year, $26 million project at the Verrazano Narrows Bridge. Reviewed contractor project submittals. Provided training, such as fall protection, firing range worker lead safety, and histoplasmosis control training to Triborough Bridge and Tunnel Authority personnel.

Project Industrial Hygienist; EBI Insurance Company; Various Locations; 1998 – 2002. Performed industrial hygiene surveys at various client facilities, such as a battery manufacturing plant, a specialty glass manufacturer, and a fabrication shops manufacturing and painting structural steel components. Surveys included respirable silica, sulfuric acid, work area illumination levels, and organic vapors.

Project Industrial Hygienist; Liberty Mutual Insurance Company; Various Locations; 1998 – 2002. Performed industrial hygiene surveys at various client facilities, such as a surface mine, specialty glass manufacturer, and a steel fabrication shop. Surveys included silica, oil mists, and noise.

Health and Safety Specialist; 3M; 3M Brownwood Plant Hazardous Waste Remediation Project; Brownwood, Texas; November 1992 – December 1992. Developed and supervised implementation of the site health and safety plan for hazardous waste site construction activities including slurry wall installation. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; Chevron Corporation; Richmond Refinery Hazardous Waste Remediation Project; Richmond, California; February 1992 – August 1992. Developed and supervised implementation of the site health and safety plan for hazardous waste site construction activities. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; AWD Technologies, Inc.; Lone Pine Corporation Superfund Project; Freehold Township, New Jersey; September 1991 – December 1991. Developed and supervised implementation of the site health and safety plan. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; Amoco Corporation; Whiting Refinery Hazardous Waste Remediation Project; Whiting, Indiana; April 1991 – September 1991. Observed site activities for compliance with the health and safety plan on a sludge stabilization remediation project. Performed personal air sampling and air monitoring with direct reading instruments.

CHRONOLOGICAL HISOTRY

2016 Golder Associates - Pittsburgh, PA - Senior Project Industrial Hygienist. Performed various industrial hygiene consulting services for local energy industry clients.

2014 – 2016 AM Health and Safety, Inc. - Pittsburgh, PA - Director - Industrial Hygiene and Safety Services. Project manager for industrial hygiene and safety consulting services for various industrial and construction industry clients. Supervise and provide direction to technical staff of five employees. Responsible for project execution from the proposal phase to final invoicing for projects that generated $650,000 in revenue in 2015.

Health and safety consulting services included industrial hygiene monitoring, safety program development, develop and implement health and safety plans for hazardous waste remediation projects, compliance audits, and training.

1998 – 2014 KTA –TATOR, INC. - Pittsburgh, PA. Corporate Director of Safety and Health. Developed and implemented the internal safety program for inspectors and professional level consultant staff on client sites such as manufacturing and petrochemical facilities for industrial coatings, concrete, and welding inspection projects. Responsible for conducting worker training, evaluating work site hazards, conducting accident investigations, and maintaining health and safety documentation (e.g. OSHA Form 300). Managed construction and industrial painting contractor health, safety, and environmental screening service audit and compliance programs such as ISNetworld. Responsible for project management of industrial hygiene and safety consulting services for various clients, including industrial, construction, industrial painting contractor, and Army Corps of Engineers.

1993 – 1997 CENTER FOR SAFETY & ENVIRONMENTAL MANAGEMENT - Vandergrift, Pennsylvania - Health and Safety Consultant. Developed safety programs for clients such as Weirton Steel and Allegheny Ludlum. Safety program development services included confined spaces, job safety analysis, lock out/tag out, hazard communication, and hazardous materials emergency response. Provided safety training for clients such as Allegheny Ludlum, General Electric, PPG, and Weirton Steel. Courses presented included OSHA 30-Hour Construction Safety, fall protection, confined space, hearing protection, forklift safety, lockout/tag out, hazardous waste site worker, and industrial hazardous material emergency response.

1991 – 1993 GEO-CON, INC. - Pittsburgh, Pennsylvania - Health and Safety Specialist. Acted as safety officer on hazardous waste site construction projects. Developed health and safety plans. Performed various types of industrial hygiene monitoring for airborne contaminants. Prepared and implemented corporate safety programs, including respiratory protection, confined spaces, and lock out/tag out.

1986 – 1990 UNITED STATES NAVY - Philadelphia Naval Shipyard/USS Independence - Assistant Safety Officer/3rd Division Officer. Developed and implemented safety programs. Coordinated industrial safety program implementation and workplace inspections with the civilian safety department during a two year shipyard overhaul. Conducted accident investigations and compiled safety statistics. Presented safety training (e.g. respiratory protection). Performed various supervisory duties as Third Division Officer, including leading shipboard firefighting and radiological and chemical warfare repair locker (e.g. response team).

SCIENTIFIC/TECHNICAL PUBLICATIONS

‘Protecting Workers Against Falls: Proper Use of Safety Gear,” Journal of Protective Coatings and Linings, Volume 18, Number 2, February 2001. (co-author)
“Respiratory Risks of Spray Painting and Ways to Control Them: An Overview,” Journal of Protective Coatings and Linings, Volume 17, No. 8, August 2000. Winner of JPCL 2001 Editors’ Award. (co author)

ADDITIONAL TRAINING

24 Hour Radiation Safety Officer Training Course, March 2015
Asbestos Building Inspector, November 2014
Indoor Air Quality and IH Air Sampling, April 2013
Comprehensive Industrial Ventilation, February 2010

Fall Prevention and Protection High Access Rescue Training, May 2008
Confined Space and Confined Space Rescue Training, April 2007
Fall Protection and Prevention Competent Person Training, August 2006
Air Barriers: Constructing Air Tight Buildings, December 2003
American Conference of Governmental Industrial Hygienists Mold, Spores, and Remediation Workshop, May 2002
Society of Protective Coatings Supervisor/Competent Person Training for Deleading of Industrial Structures, February 1999
Level 1 Coatings Inspection Training, March 1998
National Highway Institute Hazardous Bridge Coatings, March 1998
Environmental, Health and Safety Auditing, February 1996
National Environmental Training Association Designing and Delivering Effective Environmental Training Course, June 1995
29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8-Hour Supervisor Training, December 1991
29 CFR 1910.120 40-Hour Hazardous Waste Health and Safety Training, May 1991
Radiological Monitoring and Decontamination, May 1987

NUS
CORPORATION

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

STANFORD LIANG

has successfully completed a 40 hour course of instruction in
OSHA 29 CFR 1910.120

HAZARDOUS WASTE HEALTH AND SAFETY TRAINING

prepared and conducted by the
NUS Corporation,
Pittsburgh, Pennsylvania

MAY 13 - 17, 1991
Date of Award

Herold S. Hannah Jr.
Principal Instructor, Project Manager
Environmental Management Group

Richard C. Gerlach, Ph.D., C.I.H.
Manager, Health Sciences,
Environmental Management Group

GEO·CON® INC.
GEOTECHNICAL CONTRACTING

014
CERTIFICATION NUMBER

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

Stanford Liang

has successfully completed 8 hours of health and safety supervisory training in accordance with 29 CFR 1910.120 — Hazardous Waste Operations and Emergency Response

prepared and conducted by

GEO-CON INC
Pittsburgh, Pennsylvania

12-14-91
Date of Award

Kathleen S. Brady
KATHLEEN S. BRADY, CSP
Manager, Coporate Health & Safety

CHRISTOPHER R. RYAN
President/CEO

ABIH®

american board of industrial hygiene®

organized to improve the practice of industrial hygiene
proclaims that

Stanford T. Liang

having met all requirements of
education, experience and examination, and
ongoing maintenance,
is hereby certified in the

COMPREHENSIVE PRACTICE
of
INDUSTRIAL HYGIENE

and has the right to use the designations

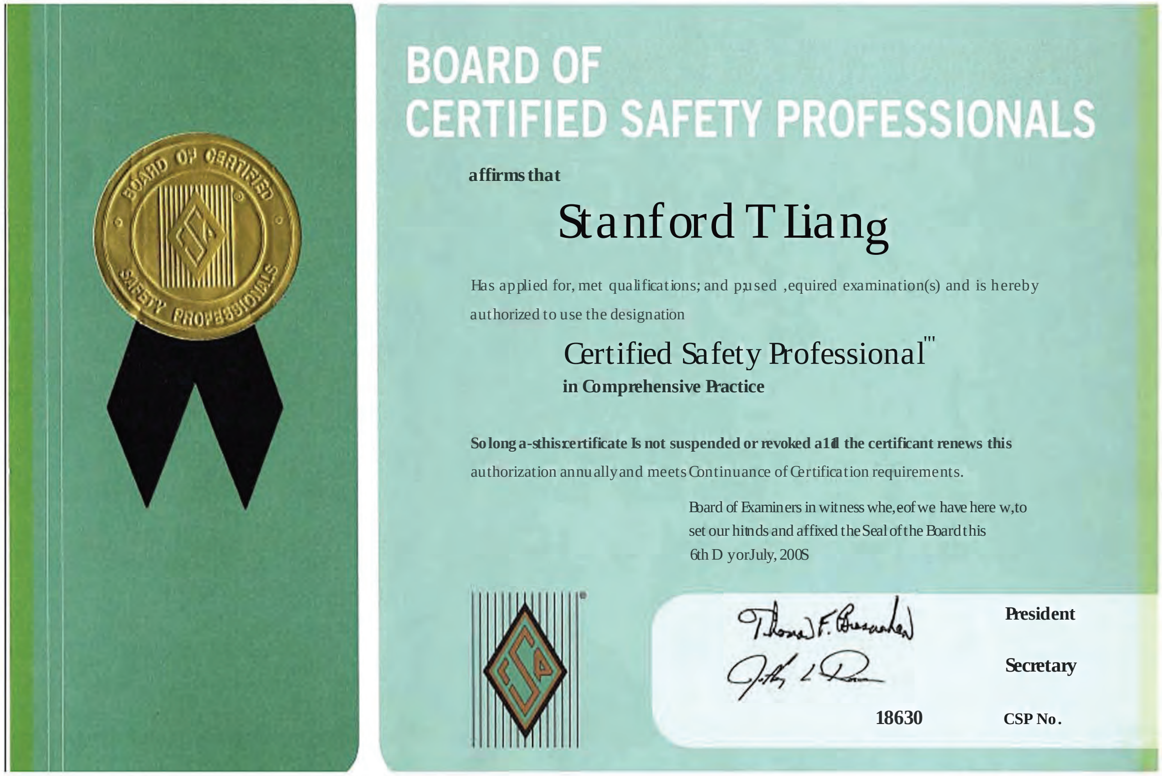
CERTIFIED INDUSTRIAL HYGIENIST

CIH

Certificate Number	7515 CP
Awarded:	November 12, 1997
Expiration Date:	June 1, 2023

Jeffrey M. Miller
Chair, ABIH

Chief Executive Officer, ABIH



BOARD OF
CERTIFIED SAFETY PROFESSIONALS

affirms that

Stanford T Liang

Has applied for, met qualifications; and p;used ,equired examination(s) and is hereby authorized to use the designation

Certified Safety Professional'''

in Comprehensive Practice

So long a-sthis:certificate Is not suspended or revoked a1d the certificant renews this authorization annually and meets Continuance of Certification requirements.

Board of Examiners in witness whe,eof we have here w,to
set our hitnds and affixed the Seal of the Board this
6th D yorJuly, 200S

President

Secretary

18630 **CSP No.**

West Virginia University

NATIONAL RESOURCE CENTER FOR OSHA TRAINING

This is to certify that

STAN LIANG

has met the attendance requirements
and successfully completed the course

OSHA 500
TRAINER COURSE IN
OCCUPATIONAL SAFETY AND HEALTH STANDARDS
FOR THE CONSTRUCTION INDUSTRY

Wayne J.
COURSE DIRECTOR

NOVEMBER 17-20, 1997
DATE

Training Provider: Safety & Health Extension, West Virginia University, P. O. Box 6615, Morgantown, WV 26506-6615
Phone: 1-800-626-4748 or 304-293-3096

TETRA TECH

Karl Goehring

UXO Tech III/Safety/QC/SUXOS

EXPERIENCE SUMMARY

Mr. Goehring is a Master Badged Explosive Ordnance Disposal (EOD) Technician with more than 30 years of EOD/MMRP experience. He is a graduate of the U.S. Naval EOD School at Indian Head, MD and the EOD Assistant's Course, Redstone Arsenal, AL. His experience and training qualify him to perform the duties of Unexploded Ordnance (UXO) Technician III, UXO Safety Officer, UXO Quality Control Specialist, and Senior UXO Supervisor (SUXOS) for MMRP and Commercial Unexploded Ordnance (UXO) operations. He identifies, characterizes, and disposes of UXO and supervises and performs range clearance operations.

RELEVANT EXPERIENCE

CIVILIAN EXPERIENCE: (Additional Experience available upon request)

Various UXO Projects with Tetra Tech; Various Locations; 2018 – Present. Mr. Goehring has served in varying capacities on numerous UXO projects with Tetra Tech:

UXOSO/QCS, DGM Survey, target anomaly intrusive investigation, MEC/MPPEH Management, DR Horton, Cecil Field, Cameron Oaks, Jacksonville, FL, January - February 2020

UXOSO, Technology aided surface survey, UXO Support, USACE Europe, Kanji AB, Nigeria, July - August 2019

UXO Tech III Team Leader, Technology aided surface survey, target anomaly intrusive investigation, Abilene, TX, June -July 2018

UXO Technician and Supervisor; Various UXO Projects with Other Firms; Various Locations; 2002 – 2019. Mr. Goehring has served in varying capacities on several UXO projects with other firms:

FPM Remediations, UXO Tech III, team leader, directed field team during UXO clearance, Kirkland AFB, NM, August - October 2019

USA Environmental, UXOSO/QCS, responsible for site safety & quality control during dredging operations, Pearl Harbor, HI, April - May 2019

ERRG, UXOSO/QCS, responsible for health, safety & welfare 20 personnel during MEC surface clearance. Safety oversight during demolition operations, Kanahena Point, Maui, HI, March – May 2018

EDUCATION

Explosive Ordnance Disposal, Redstone Arsenal, and Indian Head, MD, 1979

REGISTRATIONS

Class A CDL, WY

TRAINING/CERTIFICATIONS

OSHA 40-Hour HAZWOPER, and annual refreshers

OSHA 8-Hour HAZWOPER Supervisor

OSHA 30/10-hr Construction Safety;

CQM for Contractors;

CPR and First Aid;

Current Medical/CDL clearance;

U.S. Passport

OFFICE

Cheyenne, WY

YEARS OF EXPERIENCE

38

YEARS WITH TETRA TECH

2

ERRG, UXOSO/QCS, responsible for health, safety & welfare 50 personnel during MEC surface clearance. Safety oversight during demolition operations. Whiskey Flat, Hawthorne, NV, March – November 2017

Koman, UXOSO/QCS, responsible for health, safety & welfare 14 personnel during MEC surface clearance. Safety oversight during demolition operations. Boardman Air Force Range, OR, January – February 2017

ERRG, UXOSO/QCS, responsible for health, safety & welfare of 12 personnel during removal and explosive venting of over 4,000 rockets. Responbile for quality control and safety overlight during demolition operations, Hawthorne Army Dept, NV, October 2015 – December 2016

HydroGeologic, SUXOS, directed field operations during removal action of areas surrounding former OD site. MEC disposal operations conducted daily, Kanas Army Ammunition Plant, KS July 2013 – June 2014

CH2M Hill, SUXOS, directed field operations and provided project oversight. Camp Lejuene, NC, March – June 2013.

URS Corp, SUXOS, directing field operations during removal actions surrounding former OD site for 38 personnel. Over 100 tons MDAS recovered, processed, and shipped to offsite recycler. Former Sioux Army Depot, NB. June 2012 – January 2013.

URS Corp, SUXOS, directed field operations to conduct surface removal actions at AL501 & OD508 ranges with 42 personnel. MEC disposal operations conducted daily, over 65 tons of MDAS inspected, processed, and shipped offsite to certified recycler. Hill AFB, UT. June 2010 – May 2012.

URS Corp, SUXOS, directed field operations to conduct surface removal of aircraft flares with 16 personnel. Supervised large geophysical data collection effort. Barry M. Goldwater Range, AZ. March 2010 – May 2010.

Additional projects available upon request.

MILITARY EOD ASSIGNMENTS:

March 1979 – August 1983 – Lackland AFB, TX

September 1983 – August 1985 – Hahn AFB, Germany

September 1985 – December 1992 – Beale AFB, California

January 1993 – April 1994 – Incirlik AFB, Turkey

May 1994 – March 1996 – Vandenberg AFB, California

MCMXLVII

The United States Air Force

CERTIFIES THAT

TSGT KARL J. GOEHRING

HAS SUCCESSFULLY COMPLETED THE

Hazardous Waste Operator Course (40 Hours)
29 CFR 1910.120

AND IS HEREWITH AWARDED THIS

Certificate of Training

JAMES J. BOUCHIE, Captain, USAF
Chief, Disaster Preparedness Division

21 October 1994
DATE

CERTIFICATE OF TRAINING

This certifies that the person named below completed training on
June 8, 2019 to satisfy the requirements of 29 CFR 1910.120(e)(8) for:

HAZWOPER ANNUAL REFRESHER (8 HRS)

KARL GOEHRING

The above person has received training appropriate for situations and investigations subject to the referenced federal regulation regarding Hazardous Waste Operations and Emergency Response, is familiar with Respiratory Protection and Levels of Protection A through D, and is hereby technically qualified to participate in activities pertinent to the specified training.

Thomas N. Smith

Certificate Number 190601

Thomas N. Smith, Instructor

Training conducted by Smith Environmental Consulting, 7315 Oswego, San Antonio, TX 78250

CERTIFICATE OF COMPLETION

This certifies that

Karl Goehring

completed the requirements for 29 CFR 1910.120

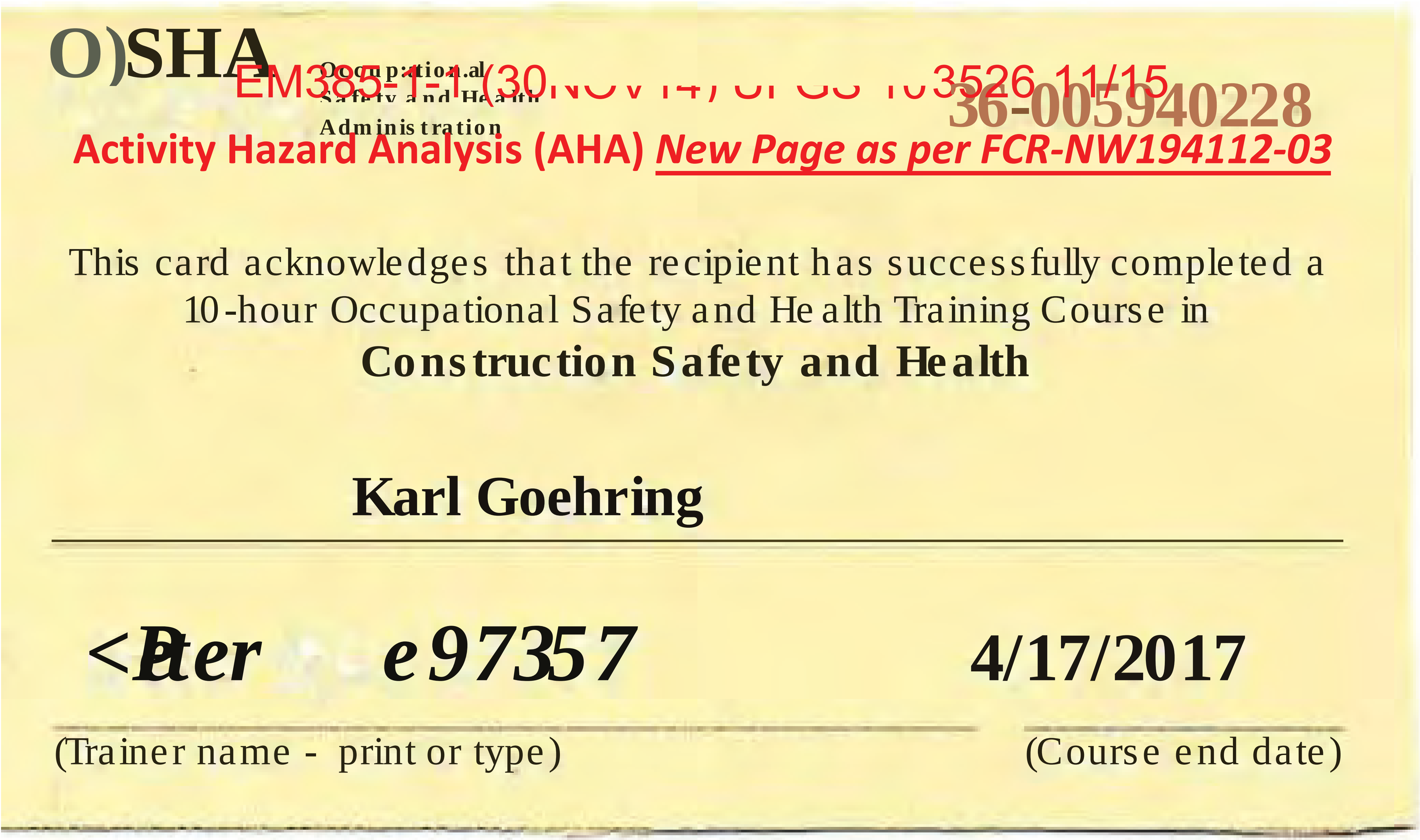
8 Hour
Hazardous Waste Operations & Emergency Response
Supervisor/Refresher

Achieving Level C competency on the 5th day of October, 2002

Kenneth T. Weber
Kenneth T. Weber

EHSC, Inc. 227 Johnson Drive Loveland, Colorado 80537

Certificate No.: 330-48-2868



O)SHA Occupational Safety and Health Administration

36-005940228

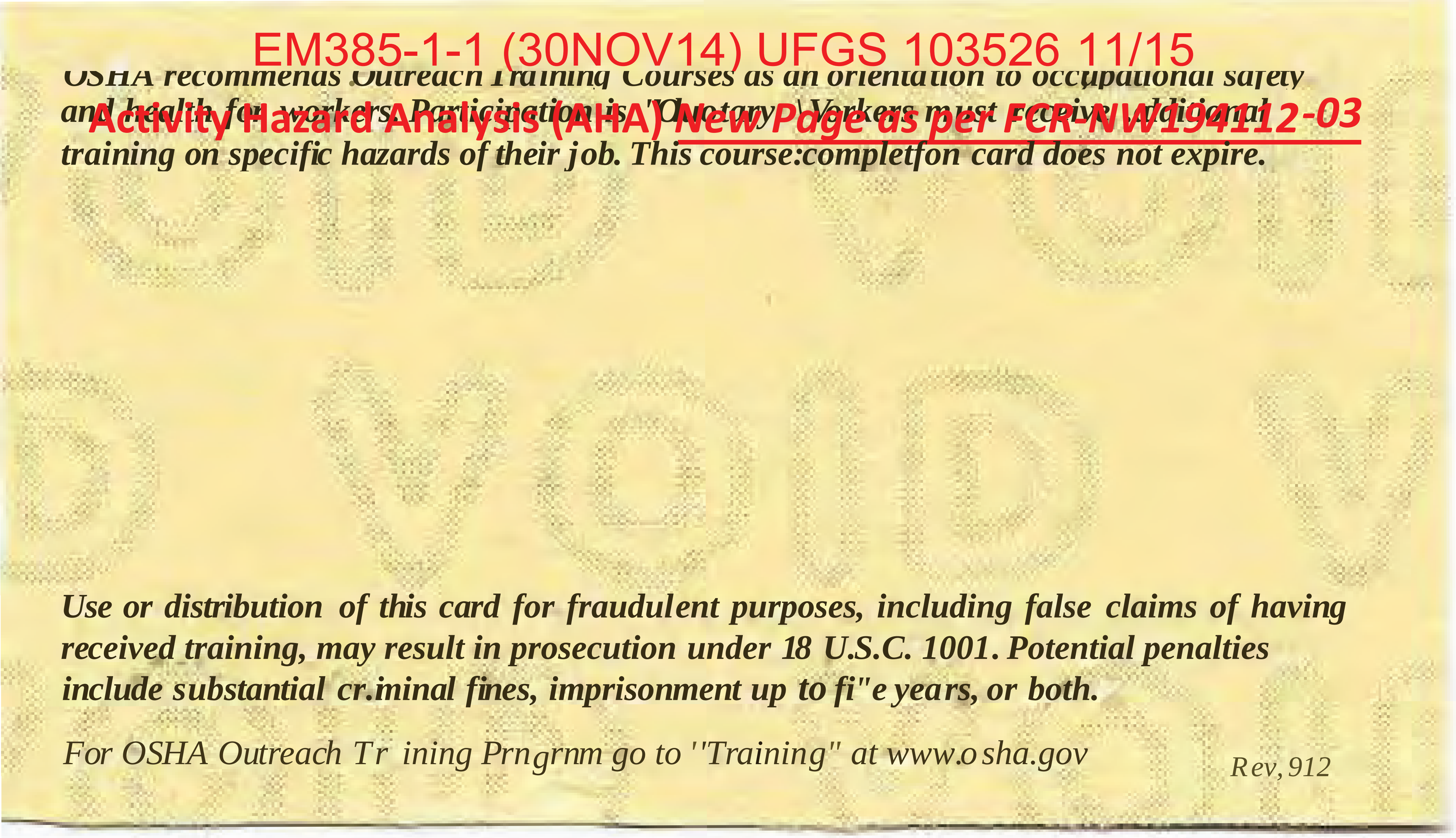
This card acknowledges that the recipient has successfully completed a 10-hour Occupational Safety and Health Training Course in

Construction Safety and Health

Karl Goehring

<Peter e97357 **4/17/2017**

(Trainer name - print or type) (Course end date)



OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is "Voluntary" Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to five years, or both.

For OSHA Outreach Training Program go to ''Training'' at www.osha.gov

Rev, 912

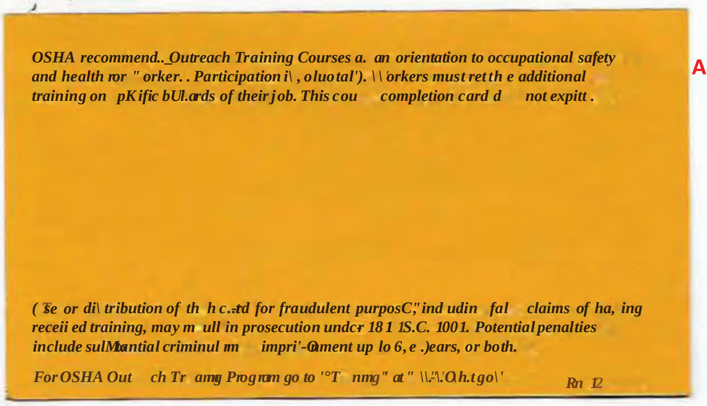
OSHA Occupational Safety and Health Administration

36-601441359

This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in **Construction Safety and Health**

KARL GOEHRING

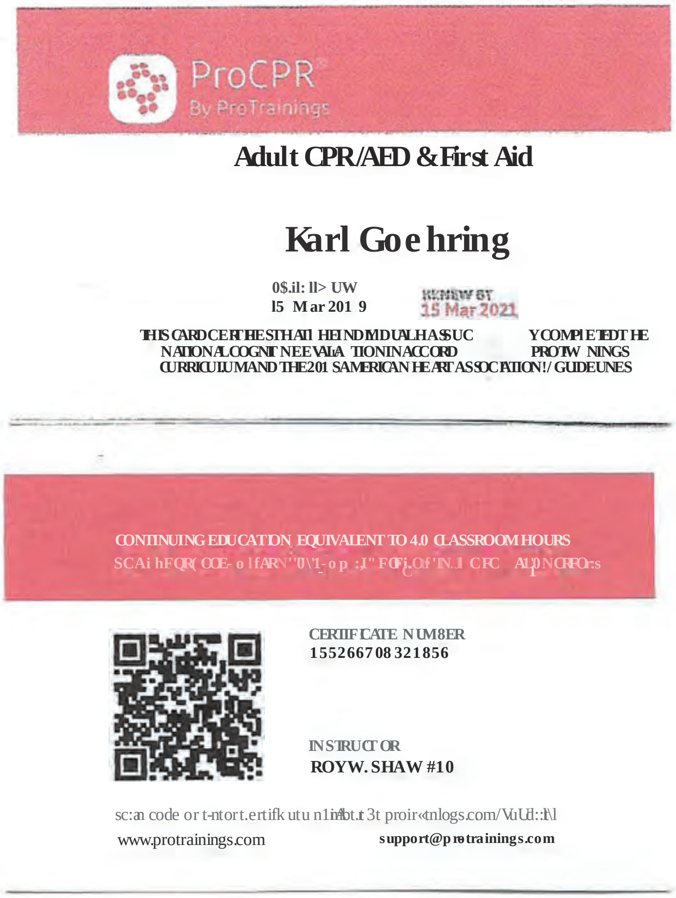
Matthew Luman	6/26/2017
(Trainer name – print or type)	(Course end date)



OSHA recommend.._Outreach Training Courses a. an orientation to occupational safety and health ror " orker. . Participation i\ , oluotal'). \ \ 'orkers must retth e additional training on pKific bUl.ards of their job. This cou completion card d not expitt .

(Tse or di\ tribution of th h c..:td for fraudulent purposC," ind udin fal claims of ha, ing receii ed training, may m ull in prosecution undcr 18 1 1S.C. 1001. Potential penalties include sulMbantial criminul rm impri'-Oment up lo 6, e .)ears, or both.

For OSHA Out ch Tr amg Program go to '°T nmg" at " \\.-'\.'O h.t go\' *Rn 12*



ProCPR®
By ProTrainings

Adult CPR/AED & First Aid

Karl Goehring

0$.il: ll> UW
15 Mar 2019

RENEW BY
15 Mar 2021

THIS CARD CERTIFIES THAT THE INDIVIDUAL HAS SUC Y COMPLETED THE
NATIONAL COGNIT NEE VALA TION IN ACCORD PROTW NINGS
CURRICULUM AND THE 2015 AMERICAN HEART ASSOCIATION!/ GUIDELINES

CONTINUING EDUCATION EQUIVALENT TO 4.0 CLASSROOM HOURS
SCAi hFQR(COE- o lfARN''0\'1- o p :,I" FOFi.Of 'IN.1 CFC A1'0NCRFOr:s

CERTIFICATE NUMBER
155266708321856

INSTRUCTOR
ROY W. SHAW #10

sc:an code or t-ntort.ertifk utu n1iAbt.r 3t proir«tnlogs.com/VuUd::1\l
www.protrainings.com
support@protrainings.com

WorkCare
MAKING HEALTH COUNT

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: USA Environmental - Baseline Exam
EXAM CLASSIFICATION: Baseline Examination

EMPLOYEE: Goehring, Karl J.
ID: 1038
DATE OF EXAM: 03/19/2019
EXPIRATION DATE: 03/19/2021

COMPANY: USA Environmental
POSITION: UXO Safety Officer
LOCATION: USA Environmental, Inc.
SITE:

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120 (Hazwoper)?	☐	☒	☐
Has the employee any contraindication for work in accordance with 29 CFR §1910.95(9)1926.52 (Hearing Conservation)?	☐	☒	☐
Has the employee any limitations in accordance with 29 CFR §1910.134 (Respirator)?	☐	☒	☐

Status

☒ **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

☐ **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

☐ **NOT QUALIFIED**

☐ **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

Comments:

Qualified for biennial frequency.

Negative Drug Screen.

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, **M.D.** Date: 03/25/19

Signature:

Nuuul @r;qool

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W4is rtrtifies t4at

A man Ka l J. Goe h ng, USAF

auiug surressfully rnmpltteb
t4t presrriheh ,nurse nf stuhy fnr

EXPLOSIVE ORVNANCE VISPOSAL SPECIALIST - G5ABN46430

is awarhth t4is
<ertifirate

this _ _zn_d hay nf March **A.D.** 1979

J. T. KENNEDY, CDR, USN
COMMANDING OFFICER

NAVSCOLEOD FORM 1650/2

THE NATIONAL ENVIRONMENTAL TRAINERS

Ron Stum

has satisfactorily passed an exam and completed a 40-hour training course entitled

Hazardous Waste Operations and Emergency Response

meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPBR Regulations). This course has been awarded 5.0 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for 3.33 Continuance of Certification (COC) points from the Board of Certified Safety Professionals

NATIONAL
ENVIRONMENTAL
TRAINERS, Inc.

January 25, 2009

Course Number 1003, Awarded 40 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

Clay A. Bednarz, MS, RPIH

.J}abal &cbool ploibt c9rbnanct ;Dtpo l

ORDNANCE EXPLOSIVE DISPOSAL
U.S. NAVAL SCHOOL
PER SCIENTIAM SERVITIA

This certifies that

· Sugean.t
Rondd L. Stam, Jk., , USAF

having successfully completed
the prescribed course of study for

EXPLOSIVE ORDNANCE DISPOSAL SPECIALIST

is awarded this
<1ertificate

this _ _9.th_ _ **day of** June **A.D.** 1983

James C. Blanton
JAMES C. BLANTON, CDR, USN
COMMANDING OFFICER

Certificate Of Completion

PRESENTED TO

[illegible]

In Recognition of Successful Completion of Requirements In

CPR/AED (Adult/Child/Infant)

Universal First Aid

02/ 26/ 2020
CERTIFICATION DATE

02/ 26/ 2022
EXPIRATION DATE

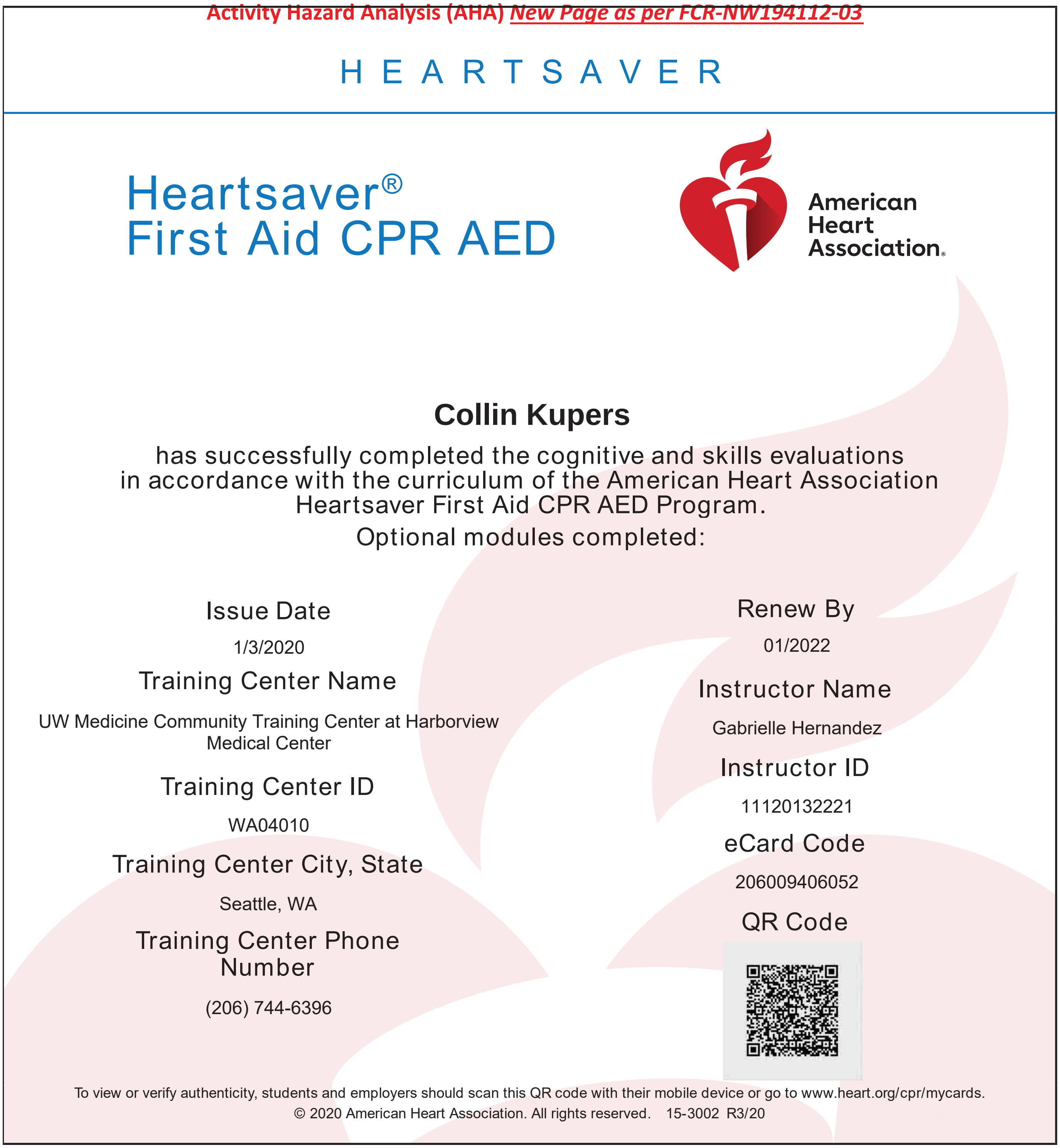
HOLDER'S SIGNATURE

Christopher Bayer
AUTHORIZED SIGNATURE

AMERICAN SAFETY ASTI TRAINING INSTITUTE

www.AmericanSTI.org

This certifies participant listed above has successfully passed skills evaluation in accordance with national cognitive skills examination standards, and American Safety Training Institute certification terms and conditions. American Safety Training Institute courses follow national guidelines set by the American Heart Association (AHA), and the International Liaison Committee on Resuscitation (ILCOR). The American Safety Training Institute is not associated, affiliated with, sponsored, or endorsed by, American Safety and Health Institute (ASHI), American Heart Association (AHA), or American Red Cross (ARC), and unless otherwise specified no affiliation or endorsement is implied.



HEARTSAVER

Heartsaver®
First Aid CPR AED

American
Heart
Association.

Collin Kupers

has successfully completed the cognitive and skills evaluations in accordance with the curriculum of the American Heart Association Heartsaver First Aid CPR AED Program.

Optional modules completed:

Issue Date
1/3/2020

Training Center Name
UW Medicine Community Training Center at Harborview Medical Center

Training Center ID
WA04010

Training Center City, State
Seattle, WA

Training Center Phone Number
(206) 744-6396

Renew By
01/2022

Instructor Name
Gabrielle Hernandez

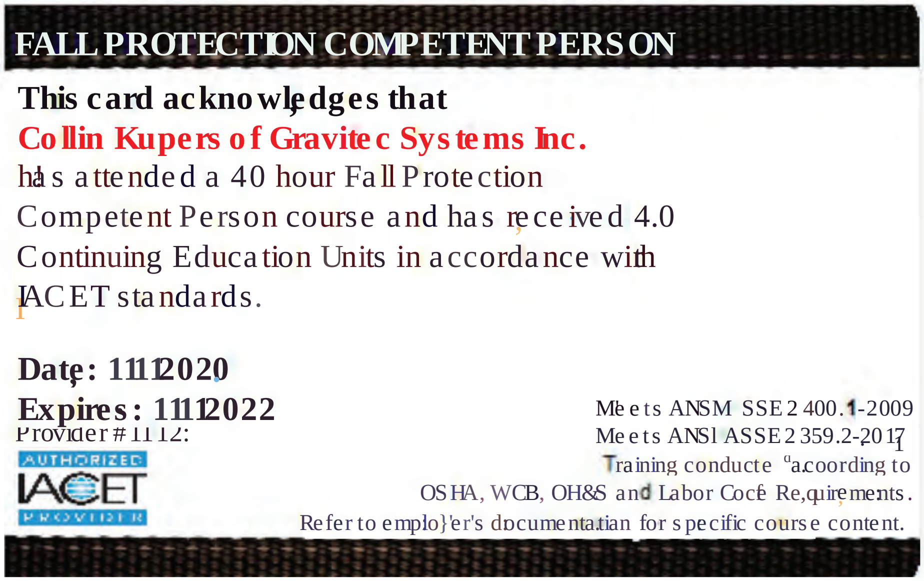
Instructor ID
11120132221

eCard Code
206009406052

QR Code

To view or verify authenticity, students and employers should scan this QR code with their mobile device or go to www.heart.org/cpr/mycards.

15-3002 R3/20



FALL PROTECTION COMPETENT PERSON

This card acknowledges that

Collin Kupers of Gravitec Systems Inc.

has attended a 40 hour Fall Protection Competent Person course and has received 4.0 Continuing Education Units in accordance with IACET standards.

Date: 11112020

Expires: 11112022

Provider #1112:

Meets ANSM SSE2 400.1-2009
Meets ANSI ASSE2 359.2-2017
Training conducted according to
OSHA, WCB, OH&S and Labor Code Requirements.
Refer to employer's documentation for specific course content.

Activity Hazard Analysis (AHA) ***<u>New Page as per FCR-NW194112-03</u>***

FALL PROTECTION INDUSTRIAL RESCUE

This card acknowledges that

Collin Kupers of Gravitec Systems, Inc.

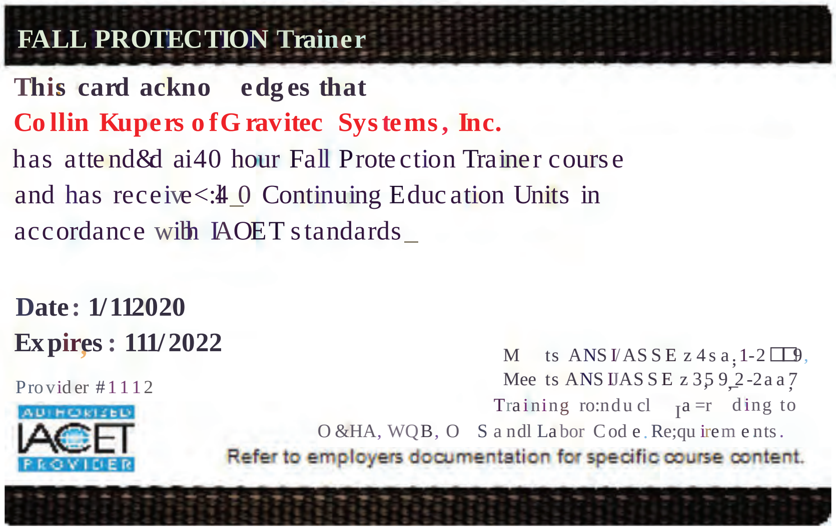
has attended a 40 hour Fall Protection Industrial Rescue course and has received 4.0 Continuing Education Units in accordance with IACET standards.

Date:1/1/2020
Expires: 1/1/2022

Provider #1112

AUTHORIZED IACET PROVIDER

Meets ANSI/ASSE Z490.1-2009
Meets ANSI/ASSE Z359.2-2017
Training conducted according to
OSHA, WCB, OH&S and Labor Code Requirements.
Refer to employers documentation for specific course content.



FALL PROTECTION Trainer

This card acknowledges that

Collin Kupers of Gravitec Systems, Inc.

has attend&d ai40 hour Fall Protection Trainer course and has receive<:4_0 Continuing Education Units in accordance with IAOET standards_

Date: 1/112020
Expires: 111/2022

Provider #1112

M ts ANSI/ASSE z4sa,1-2☐9,
Mee ts ANSI/ASSE z359,2-2aa7
Training ro:nducl Ia=r ding to
O&HA, WQB, O S andl Labor Code. Re;quirements.
Refer to employers documentation for specific course content.

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Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Activity/Work Task	Munitions Constituents Sampling and Utility Clearance **(UXO 6)**
AHA Signature Log #	
Project Location	NBK Bangor
Contract Number	Contract No. N6247016D9008 CTO No. N 4425519F4112
Date Prepared	September 2020
SSHO Signature	
Superintendent Signature	
QC Manager Signature	
Subcontractor Foreman Name:	
Signature:	
ET/GDA Reviewed by (Name)	

Overall Risk Assessment Code (RAC) (Use highest code)	**M**

Risk Assessment Code (RAC) Matrix

	Probability				
Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	🟥	🟥	🟧	🟧	🟨
Critical	🟥	🟧	🟧	🟨	🟩
Marginal	🟧	🟨	🟨	🟩	🟩
Negligible	🟨	🟩	🟩	🟩	🟩

Notes: (Field Notes, Review Comments, etc.)

This AHA is specifically applicable to UXO 6 - Debris Area 2 (Site 22). This location has rope access requirements resulting from steep terrain unique to this location. Control measures in this AHA must be used in conjunction with the Rope Access Plan (Attachment XII)

As required by EM 385 1-1 Section 01.A.14, the qualifications of the SSHO/Competent Person and Qualified Person (responsible for plan preparation) attached to this AHA as proof of his/her qualifications

Step 1: Review each Hazard with identified safety "Controls". Determine RAC (see above).

Probability: Likelihood the activity will cause a Mishap (Near Miss, Incident, or Accident). Identify as Frequent, Likely, Occasional, Seldom or Unlikely

Identify as Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (probability vs. severity) as **E, H,** M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of the AHA

RAC CHART

🟥 **E = Extremely High Risk**

🟧 **H = High Risk**

🟨 M= Moderate Risk

🟩 **L** = Low Risk

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
Surface soil sampling via hand augering or trowels	1. Contacting underground utilities	1. Verify the minimum clearance distances of underground utility lines in accordance with Section 4.2 of Tetra Tech SOP SWP 5-35 (in Attachment IX). 2. Utility clearance requirements will be completed through Washington One-Call service and NBK Bangor Public Works Department (PWD).	L
	2. Muscle strains, tendon or ligament sprains, back or other soft-tissue injuries	1. Operating a hand auger can be physically demanding depending on the conditions of the soil, the auger tools, and the physical capabilities of the operator.	L

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC
		2. Only personnel who are confident that they can physically perform this activity without injury should operate a hand auger.	
	2. Bruises, abrasions, cuts, foot or eye injuries	1. Ensure that the hand auger tool is properly maintained. 2. Avoid injury by stopping if strong resistance is encountered (such as if impassable rocky conditions are encountered). 3. Secure assistance when needed. 4. Wear appropriate PPE (work gloves, safety toe shoes, and safety impact eye protection)	L
	3. Fall hazards working on steep, irregular terrain	1. Comply with the Rope Access Plan (Attachment XII of the APP). 2. The authorized Competent Person designated in the Rope Access Plan must be present on site and oversee implementation at any location where the safe access procedures in this plan are required.	L
	4. UXO	1. UXO tech will perform a detector-aided surface survey in advance of the soil sampling activity. 2. In accordance with the Sampling and Analysis Plan, if a subsurface anomaly is identified by the UXO escort, the increment location near the anomaly will be moved to the nearest area clear of subsurface anomalies	M
	5. Chemical exposure to concentrations of COCs	1. Wear nitrile surgical type gloves under work gloves when handling potentially contaminated equipment or tools. 2. Wear Tyvek coveralls if soiling of clothing is possible. Avoid contact with potentially-contaminated equipment to the extent possible. 3. Practice good personal hygiene (hands and face washing) decontamination practices when exiting work area. 4. Dispose of nitrile gloves, work gloves, and Tyvek coveralls as soon as possible, upon exiting the Exclusion Zone, if exposed to contaminated soil or ground water. 5. Hand-to-mouth activities in the work area are prohibited (eating, drinking, smoking, etc.). 6. While not likely, if visible dust emissions are observed, water suppression will be used.	L

Equipment to be used	Training Requirements & Competent or Qualified Personnel Name(s)	Inspection Requirements
Hand tools (hand augers, disposable trowels, garden spades, sieves, etc.) **Safety Equipment:** Class IV First Aid Kit meeting requirements of OSHA/ANSI 308 and EM 385 1-1 and an emergency air horn nearby. Access equipment required by the Rope Access Plan (see Attachment XII of the APP) **Monitoring Instruments:** None	Review of the AHA during a pre-task tailgate safety briefing with all intended task participants. The UXO Technician III, II, and I will meet the qualifications stated in DDESB TP 18 (DDESB, 2016). The Escort/Technician personnel for this project will be as follows: Adam Goforth (Level I) Brandon Humphries (Level II) Alvin Lee (Level III) Dane McCarthy (Level II) Miranda Mitchell (Level II) Daniel Odom (Level II) Jesse Prince (Level I) Ronald Stum (Level III) Tye Turner (Level III) Shaun Woods (Level II) Qualifications are provided in Attachment III Rope access training in accordance with the Rope Access Plan (see Attachment XII of the APP) Competent Person: Karl Goehring Competent Person (rope access): Collin Kupers (Gravitec Systems, Inc.) Qualified Person: Stanford T. Liang	Visual inspection prior to use by user. Monthly inspection of first aid kit Inspection of rope access equipment in accordance with the Rope Access Plan (see Attachment XII of the APP) and manufacturer recommendations.

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Equipment to be used	Training Requirements & Competent or Qualified Personnel Name(s)	Inspection Requirements
Personal Protective Equipment: Minimum: Safety toe boots (composite toe compatible with UXO hazards), safety glasses, nitrile surgeon's style gloves, high visibility vest (minimum ANSI Type 2). Rope access equipment (see Attachment XII of the APP). **Optional items:** Tyvek coveralls if there is a chance to soil clothing. **HTRW**: MEC/MPPEH and related chemicals (e.g. 2,4,6 TNT, nitroglycerin, etc.)	PPE training in proper use, care, storage, and limitations in accordance with this APP and the Rope Access Plan (see Attachment XII of the APP).	Initial PPE inspection performed by SSHO. Ongoing (prior to each use) inspections responsibilities of PPE users.

UFGS 013526 11/15 1.9 Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences; specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

UFGS 013526 1.9.1 Review the AHA list periodically (at least monthly) at supervisory safety meetings, update when procedures, scheduling or hazards change.

UFGS 013526 1.9.2 Each employee performing work...must review the AHA and sign a signature log for that AHA prior to starting work. The SSHO must maintain a signature log on site for every AHA

EM385-1-1 (30NOV14) UFGS 103526 11/15

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Munitions Constituents Sampling and Utility Clearance **(UXO 6)** AHA Signature Log # ____________

Name (Printed)	Signature	Date

TETRA TECH

Stanford T. Liang, CIH, CSP

Senior Industrial Hygienist

EXPERIENCE SUMMARY

Mr. Liang is a Certified Industrial Hygienist and Certified Safety Professional with over thirty years of occupational safety and health experience. This experience spans a diverse range of workplaces including hazardous waste remediation sites, shipyards, wastewater treatment plants, hospitals, and various manufacturing plants and construction sites. As a consultant project manager, he has managed complex industrial hygiene and safety projects to cost-effectively address the needs of the client on time and under budget, such as noise surveys at underground mines at multiple geographical locations which required a project team of five industrial hygienists. Health and safety services provided by Mr. Liang have included the following:

- Industrial hygiene surveys, including air sampling and noise
- Training, such as HAZWOPER 10- and 30-hour OSHA Construction Safety, and the Society of Protective Coatings Competent Person Training for Deleading of Industrial Structures
- Development and implementation of health and safety compliance programs
- Safety and industrial hygiene compliance audits
- Indoor air quality surveys for mold and other contaminants
- Laboratory safety surveys
- Evaluation of HVAC and industrial local exhaust ventilation systems
- Evaluation and control of lead containing coatings on industrial structures
- Ambient air monitoring for total suspended particulates and PM-10

Mr. Liang has managed health and safety programs to successfully identify and control workplace hazards and meet regulatory and client requirements. As an Assistant Safety Officer stationed aboard the aircraft carrier USS Independence, he implemented a safety program during the course of a multi-year $800 million shipyard overhaul at the Philadelphia Naval Shipyard. Mr. Liang is a member of the American Industrial Hygiene Association and is past director of the local Pittsburgh chapter. He has also published peer reviewed articles in publications such as the Journal of Protective Coatings and Linings.

EDUCATION

Bachelor of Science, Safety, 1986, University of Southern California

AREA OF EXPERTISE

Industrial Hygiene and Safety

TRAINING/CERTIFICATIONS

Certified Industrial Hygienist (CIH), No. 7515 CP

Certified Safety Professional (CSP), No. 18630

OFFICE

Pittsburgh, Pennsylvania

YEARS OF EXPERIENCE

30

YEARS WITH TETRA TECH

2

AWARDS

2001 Journal of Protective Coatings and Linings Editor's Award

RELEVANT PROJECT EXPERIENCE

Industrial Hygienist; MAHLE Industries, Inc.; Various Locations; 2014 – 2016. Provided comprehensive industrial hygiene sampling program for air contaminants and noise at multiple chemical manufacturing facilities. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Health and Safety Officer; Confidential Industrial Client; West Virginia; 2018. Health and safety officer for a complex in-situ soil remediation project requiring treatment of 5,000 cubic yards of soil via alkaline hydrolysis and in-situ chemical oxidation with sodium persulfate. This process involved injecting and mixing chemicals into the soil using a crane with a large diameter auger attachment to depths of approximately 20 feet bgs. Chemicals of concern in soil that were treated include dinitrotoluene, benzene, and other organic compounds. The presence of elevated benzene levels in soil required the work to be performed in Level B respiratory protection. Oversaw health and safety program implementation for project remediation activities such as use of personal protective equipment, safe handling procedures for treatment chemicals (e.g. liquid caustic, sodium persulfate), and control of heat stress exposures. Other health and safety support services included training (e.g. benzene, daily tailgate meetings), perimeter and area air monitoring with real time monitoring instruments, and personal air sampling.

Industrial Hygienist: AB Kaelin, LLC; Delaware River Port Authority Betsy Ross Bridge Painting and Steel Repairs – Phase I; Philadelphia, PA; April 2018 – Present. Provides CIH and CSP support services for an industrial painting contractor that is a client of AB Kaelin, LLC. Support services include review of painting contractor safety plans and reports (e.g. industrial hygiene air sampling, results of blood lead analysis of painting contractor personnel) and site visits (e.g. attend meetings and audits).

Industrial Hygienist; Comprehensive Long-Term Environmental Action (CLEAN) Contract; Naval Facilities Engineering Command; Multiple Facilities; 2017 - present. Prepares or approves project-specific HASPs to assure compliance with OSHA requirements and EM 385-1-1 (US Army Corps of Engineers Safety and Health Requirement Manual) and to protect personnel, property, and the environment from chemical, biological, and other hazards. Projects include detailed remedial investigations and assessments to evaluate risks and implement solutions due to subsurface vapor intrusion, groundwater and soil contamination; munitions and explosives; and waste disposal areas. Activities performed as part of these projects included monitoring well installation, excavation of test pits, inspection of confined spaces, and obtaining water and soil samples. Site visits to conduct audits and provide health and safety plan implementation support (e.g. training).

Project Health and Safety Officer; U.S Army Corps of Engineers; Savanna Army Depot Facility, Savanna, Illinois; July 2017 – July 2018. Wrote Accident Prevention Plans and Site Safety and Health Plans for site remediation projects at Site 20, Site 73, Site 178 which are former landfills at this facility. The plan describes procedures for compliance with applicable requirements of OSHA and EM 385-1-1. Remediation activities consist of collection of multi-media environmental samples, installation of monitoring wells, excavation activities with heavy equipment for site restoration, stabilization of soil lead contaminants, debris removal, and transportation of contaminated soils to an offsite disposal facility, and vegetation clearance including tree removal with power saws and heavy equipment. Site visits to conduct audits and provide health and safety plan implementation support (e.g. training).

Project Industrial Hygienist; Georgia Environmental Protection Division; Martin Fireproofing Georgia, Inc.; Elberton, Georgia; October 2017 – June 2018. Wrote Health and Safety Plan and Air Monitoring Plan for

site remediation project. Remediation activities consist of removal of trees and other debris and excavation and removal (for disposal at an approved facility) of dioxin contaminated soil. Exposure controls addressed in the plan included engineering controls, work practices, and personal protective equipment (e.g. respiratory protection), based on an exposure assessment, to control dioxin exposure to workers engaged in site remediation activities. Assisted Health and Safety Manager in plan implementation.

Project Industrial Hygienist; NAVFAC; Marine Corps Recruit Depot; Parris Island, South Carolina; August 2017 – October 2017. Wrote project Accident Prevention Plan and coordinated subcontractor implementation of hurricane debris cleanup activities in compliance with applicable OSHA and EM 385-1-1 requirements. Remedial activities included vegetation and tree removal (including use of power saws and heavy equipment) and minor structural repairs to site infrastructure (e.g. wooden walkways). Subcontractor coordination included review of contractor submittals (e.g. safety plans and policies).

Project Industrial Hygienist; Washington Health Systems; Washington Hospital; Washington, Pennsylvania; September 2015 – May 2017. Performed various indoor air quality assessments (e.g. mold, formaldehyde, ventilation systems) in response to occupant complaints at a hospital facility.

Project Manager; Hartman and Hartman Constructors; Koppers, Inc. Follansbee Plant; Follansbee, West Virginia; February 2016 – May 2016. Assisted client in development and implementation of a hazardous waste site safety plan for excavation work. Oversaw industrial hygiene air monitoring services including field air sampling and report writing performed by an industrial hygiene technician

Project Manager; CONSOL Energy, Inc.; Various Locations; January 2016 – March 2016. Managed a team of four industrial hygienists responsible for comprehensive noise surveys consisting of personal noise dosimetry and area noise maps at multiple underground mines. Project management activities included proposal development, coordination of survey activities, budgeting, and invoicing. Performed review and interpretation of noise monitoring data. Comprehensive reports were developed and submitted which included findings relative to worker noise exposure levels, exposure controls, and compliance with MSHA regulations.

Project Manager; U.S. Minerals, Inc.; Various Locations; 2015 – 2016. Developed and implemented a site audit and industrial hygiene monitoring program for an abrasive blasting media manufacturer to comply with an OSHA settlement agreement. For each site audit, site audit reports which addressed survey findings relative to compliance with applicable OSHA requirements and control of identified worker exposures were presented to both the client and OSHA for review and approval.

Project Manager; Koppers, Inc.; Various Locations; 2014 – 2016. Directed implementation of a comprehensive industrial hygiene sampling program at multiple facilities manufacturing railroad ties and wood treating chemicals. The scope of the surveys encompassed various air contaminants, noise, ionizing radiation, industrial local exhaust ventilation, compliance with applicable OSHA regulations and corporate policies, and evaluation of relevant engineering, work practice controls, and personal protective equipment. Responsibilities included technical direction and oversight for a project team of five industrial hygienists, project budgeting, coordination of survey activities, and client relations. Performed quality assurance review of industrial hygiene data and interpretation of results. Reviewed and approved final comprehensive survey reports for each site visit with findings and recommendation for compliance and control of worker hazard exposure.

Project Manager; Nova Chemicals Corporation; Various Locations; 2014 – 2016. Supervised implementation of a comprehensive industrial hygiene sampling program for air contaminants and noise at

multiple chemical manufacturing facilities. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Project Manager; LANXESS Corporation; Various Locations; 2014 – 2016. Directed implementation of an industrial hygiene sampling program at multiple facilities manufacturing pigments. Responsibilities included technical direction and oversight of project industrial hygienists, sampling plan development, project budgeting, coordination of survey activities, and client relations.

Project Manager; Horsehead Holding Corporation; Various Locations; 2014 – 2016. Oversaw an industrial hygiene exposure monitoring program for air contaminants and noise at multiple facilities recovering and processing lead and zinc oxide from arc furnace dust and a battery recycling facility. Performed safety compliance audits.

Trainer; Michael Baker Jr.; Moon Township, Pennsylvania; May 2009 – August 2009. Developed and presented a comprehensive fall protection training program for Michael Baker, Jr. employees at various offices in Pennsylvania.

Project Manager; Enbridge Energy; Multiple Locations in the United States and Canada; 2005 – 2006. Managed a team of three industrial hygienists who conducted an industrial hygiene study. The objective of the study was to compare the worker exposure attributes of several different abrasive blast media at multiple pipeline repair locations. Developed, implemented, and presented the report of findings for the study protocol which included personal air sampling for various analytes (e.g. crystalline silica and several toxic metals).

Project Health and Safety Consultant; Damolos & Sons; Army Corps of Engineers Pike Island Locks and Dam; Wheeling, West Virginia; June 2003. Developed permit required confined space entry and rescue procedures associated with abrasive blasting and repainting of dam tainter gates. Presented training on entry and rescue procedures to contractor employees performing permit-required confined space entries.

Project Industrial Hygienist; Duquesne Energy; H. J. Heinz Energy Facility; Pittsburgh, Pennsylvania; May 2003. Industrial hygiene area and personal monitoring for carbon monoxide and nitrogen oxide at a power generation facility.

Project Industrial Hygienist; Community College of Allegheny County; Pittsburgh, Pennsylvania; 2002 – 2005. Conducted indoor air quality surveys at multiple classroom, laboratory, and office facilities.

Project Health and Safety Specialist; New York City Department of Transportation; New York, New York (Various Locations); 2001 – 2014. Performed environmental, waste management, health, and safety audits for various bridge painting projects for compliance with applicable project specifications and regulatory requirements. Supervised ambient air monitoring of lead emissions associated with removal of lead containing coatings. Reviewed contractor project submittals.

Project Industrial Hygienist; Allegheny County Sanitary Authority; Pittsburgh, Pennsylvania; 1998-Present. Conducts annual laboratory safety survey and lab hood ventilation evaluation. Provides other industrial hygiene and safety services as needed including personal protective equipment hazard evaluation, noise surveys, personal air sampling, and assessments for lead containing coatings.

Project Health and Safety Specialist and Trainer; Triborough Bridge and Tunnel Authority, New York, New York (Various Locations); 1998 – 2014. Conducted environmental, waste management, health, and safety audits for various bridge painting projects for compliance with applicable project specifications and regulatory requirements. Project included a five-year, $26 million project at the Verrazano Narrows Bridge. Reviewed contractor project submittals. Provided training, such as fall protection, firing range worker lead safety, and histoplasmosis control training to Triborough Bridge and Tunnel Authority personnel.

Project Industrial Hygienist; EBI Insurance Company; Various Locations; 1998 – 2002. Performed industrial hygiene surveys at various client facilities, such as a battery manufacturing plant, a specialty glass manufacturer, and a fabrication shops manufacturing and painting structural steel components. Surveys included respirable silica, sulfuric acid, work area illumination levels, and organic vapors.

Project Industrial Hygienist; Liberty Mutual Insurance Company; Various Locations; 1998 – 2002. Performed industrial hygiene surveys at various client facilities, such as a surface mine, specialty glass manufacturer, and a steel fabrication shop. Surveys included silica, oil mists, and noise.

Health and Safety Specialist; 3M; 3M Brownwood Plant Hazardous Waste Remediation Project; Brownwood, Texas; November 1992 – December 1992. Developed and supervised implementation of the site health and safety plan for hazardous waste site construction activities including slurry wall installation. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; Chevron Corporation; Richmond Refinery Hazardous Waste Remediation Project; Richmond, California; February 1992 – August 1992. Developed and supervised implementation of the site health and safety plan for hazardous waste site construction activities. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; AWD Technologies, Inc.; Lone Pine Corporation Superfund Project; Freehold Township, New Jersey; September 1991 – December 1991. Developed and supervised implementation of the site health and safety plan. Performed monitoring with direct reading instrumentation and collected personal air samples.

Health and Safety Specialist; Amoco Corporation; Whiting Refinery Hazardous Waste Remediation Project; Whiting, Indiana; April 1991 – September 1991. Observed site activities for compliance with the health and safety plan on a sludge stabilization remediation project. Performed personal air sampling and air monitoring with direct reading instruments.

CHRONOLOGICAL HISOTRY

2016 Golder Associates - Pittsburgh, PA - Senior Project Industrial Hygienist. Performed various industrial hygiene consulting services for local energy industry clients.

2014 – 2016 AM Health and Safety, Inc. - Pittsburgh, PA - Director - Industrial Hygiene and Safety Services. Project manager for industrial hygiene and safety consulting services for various industrial and construction industry clients. Supervise and provide direction to technical staff of five employees. Responsible for project execution from the proposal phase to final invoicing for projects that generated $650,000 in revenue in 2015.

Health and safety consulting services included industrial hygiene monitoring, safety program development, develop and implement health and safety plans for hazardous waste remediation projects, compliance audits, and training.

1998 – 2014 KTA –TATOR, INC. - Pittsburgh, PA. Corporate Director of Safety and Health. Developed and implemented the internal safety program for inspectors and professional level consultant staff on client sites such as manufacturing and petrochemical facilities for industrial coatings, concrete, and welding inspection projects. Responsible for conducting worker training, evaluating work site hazards, conducting accident investigations, and maintaining health and safety documentation (e.g. OSHA Form 300). Managed construction and industrial painting contractor health, safety, and environmental screening service audit and compliance programs such as ISNetworld. Responsible for project management of industrial hygiene and safety consulting services for various clients, including industrial, construction, industrial painting contractor, and Army Corps of Engineers.

1993 – 1997 CENTER FOR SAFETY & ENVIRONMENTAL MANAGEMENT - Vandergrift, Pennsylvania - Health and Safety Consultant. Developed safety programs for clients such as Weirton Steel and Allegheny Ludlum. Safety program development services included confined spaces, job safety analysis, lock out/tag out, hazard communication, and hazardous materials emergency response. Provided safety training for clients such as Allegheny Ludlum, General Electric, PPG, and Weirton Steel. Courses presented included OSHA 30-Hour Construction Safety, fall protection, confined space, hearing protection, forklift safety, lockout/tag out, hazardous waste site worker, and industrial hazardous material emergency response.

1991 – 1993 GEO-CON, INC. - Pittsburgh, Pennsylvania - Health and Safety Specialist. Acted as safety officer on hazardous waste site construction projects. Developed health and safety plans. Performed various types of industrial hygiene monitoring for airborne contaminants. Prepared and implemented corporate safety programs, including respiratory protection, confined spaces, and lock out/tag out.

1986 – 1990 UNITED STATES NAVY - Philadelphia Naval Shipyard/USS Independence - Assistant Safety Officer/3rd Division Officer. Developed and implemented safety programs. Coordinated industrial safety program implementation and workplace inspections with the civilian safety department during a two year shipyard overhaul. Conducted accident investigations and compiled safety statistics. Presented safety training (e.g. respiratory protection). Performed various supervisory duties as Third Division Officer, including leading shipboard firefighting and radiological and chemical warfare repair locker (e.g. response team).

SCIENTIFIC/TECHNICAL PUBLICATIONS

‘Protecting Workers Against Falls: Proper Use of Safety Gear,” Journal of Protective Coatings and Linings, Volume 18, Number 2, February 2001. (co-author)
“Respiratory Risks of Spray Painting and Ways to Control Them: An Overview,” Journal of Protective Coatings and Linings, Volume 17, No. 8, August 2000. Winner of JPCL 2001 Editors’ Award. (co author)

ADDITIONAL TRAINING

24 Hour Radiation Safety Officer Training Course, March 2015
Asbestos Building Inspector, November 2014
Indoor Air Quality and IH Air Sampling, April 2013
Comprehensive Industrial Ventilation, February 2010

Fall Prevention and Protection High Access Rescue Training, May 2008
Confined Space and Confined Space Rescue Training, April 2007
Fall Protection and Prevention Competent Person Training, August 2006
Air Barriers: Constructing Air Tight Buildings, December 2003
American Conference of Governmental Industrial Hygienists Mold, Spores, and Remediation Workshop, May 2002
Society of Protective Coatings Supervisor/Competent Person Training for Deleading of Industrial Structures, February 1999
Level 1 Coatings Inspection Training, March 1998
National Highway Institute Hazardous Bridge Coatings, March 1998
Environmental, Health and Safety Auditing, February 1996
National Environmental Training Association Designing and Delivering Effective Environmental Training Course, June 1995
29 CFR 1910.120 Hazardous Waste Operations and Emergency Response 8-Hour Supervisor Training, December 1991
29 CFR 1910.120 40-Hour Hazardous Waste Health and Safety Training, May 1991
Radiological Monitoring and Decontamination, May 1987

NUS
CORPORATION

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

STANFORD LIANG

has successfully completed a 40 hour course of instruction in
OSHA 29 CFR1910.120

HAZARDOUS WASTE HEALTH AND SAFETY TRAINING

prepared and conducted by the
NUS Corporation,
Pittsburgh, Pennsylvania

MAY 13 - 17, 1991
Date of Award

Herold S. Hannah Jr.
Principal Instructor, Project Manager
Environmental Management Group

Richard C. Gerlach, Ph.D., C.I.H.
Manager, Health Sciences,
Environmental Management Group

014
CERTIFICATION NUMBER

GEO•CON INC.

GEOTECHNICAL CONTRACTING

CERTIFICATE OF TRAINING

THIS CERTIFIES THAT

S onl

has successfully completed 8 hours of health and safety supervisory training in accordance with 29 CFR 1910.120 - Hazardous Waste Operations and Emergency Response

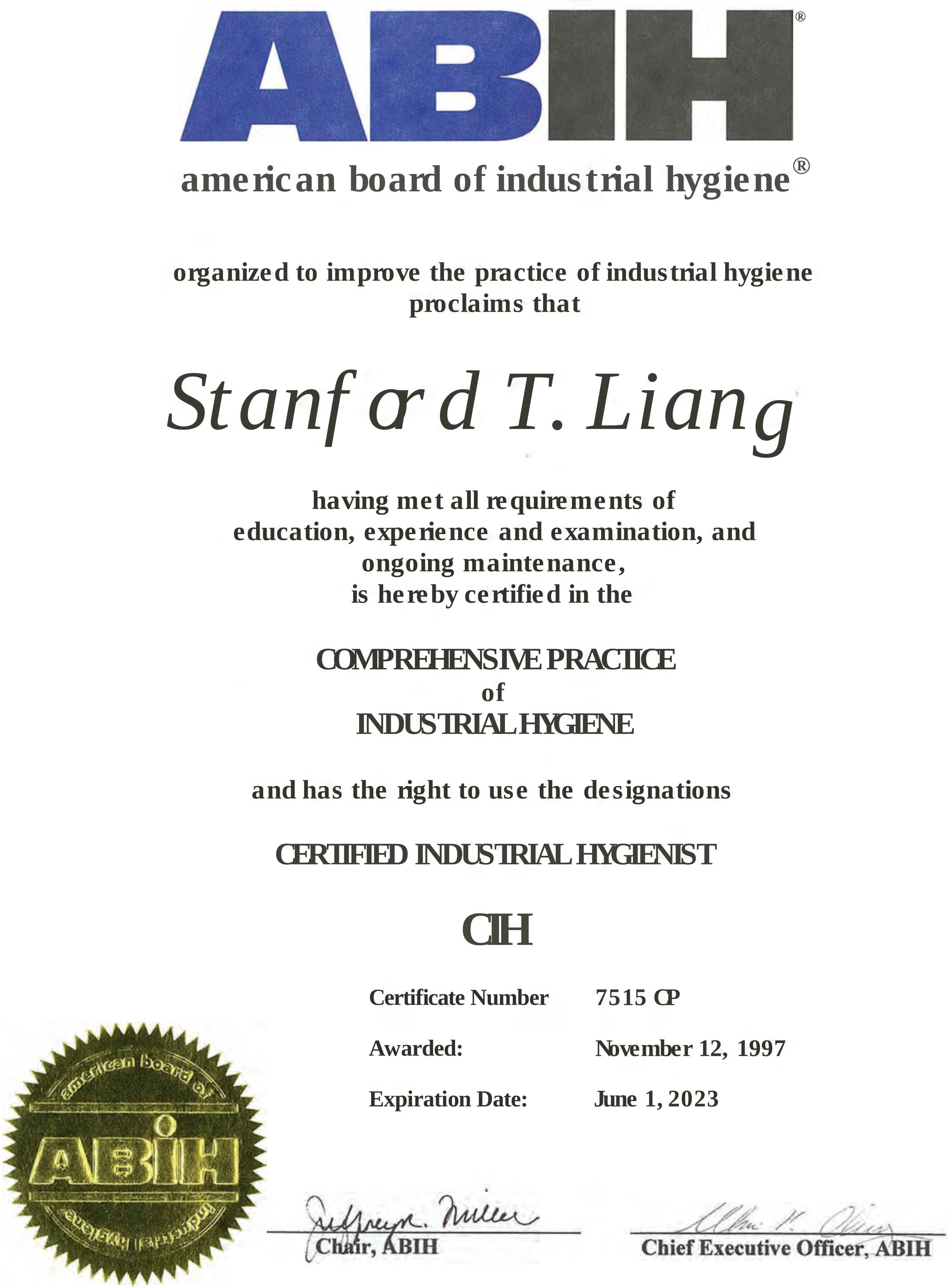
prepared and conducted by

GEO-CON INC
Pittsburgh, Pennsylvania

12-14-91
Date of Award

Kathleen S. Brady
KATHLEEN S. BRADY, CSP
Manager, Coporate Health & Safety

CHRISTOPHER R. RYAN
President/CEO



ABIH®

american board of industrial hygiene®

organized to improve the practice of industrial hygiene
proclaims that

Stanford T. Liang

having met all requirements of
education, experience and examination, and
ongoing maintenance,
is hereby certified in the

COMPREHENSIVE PRACTICE
of
INDUSTRIAL HYGIENE

and has the right to use the designations

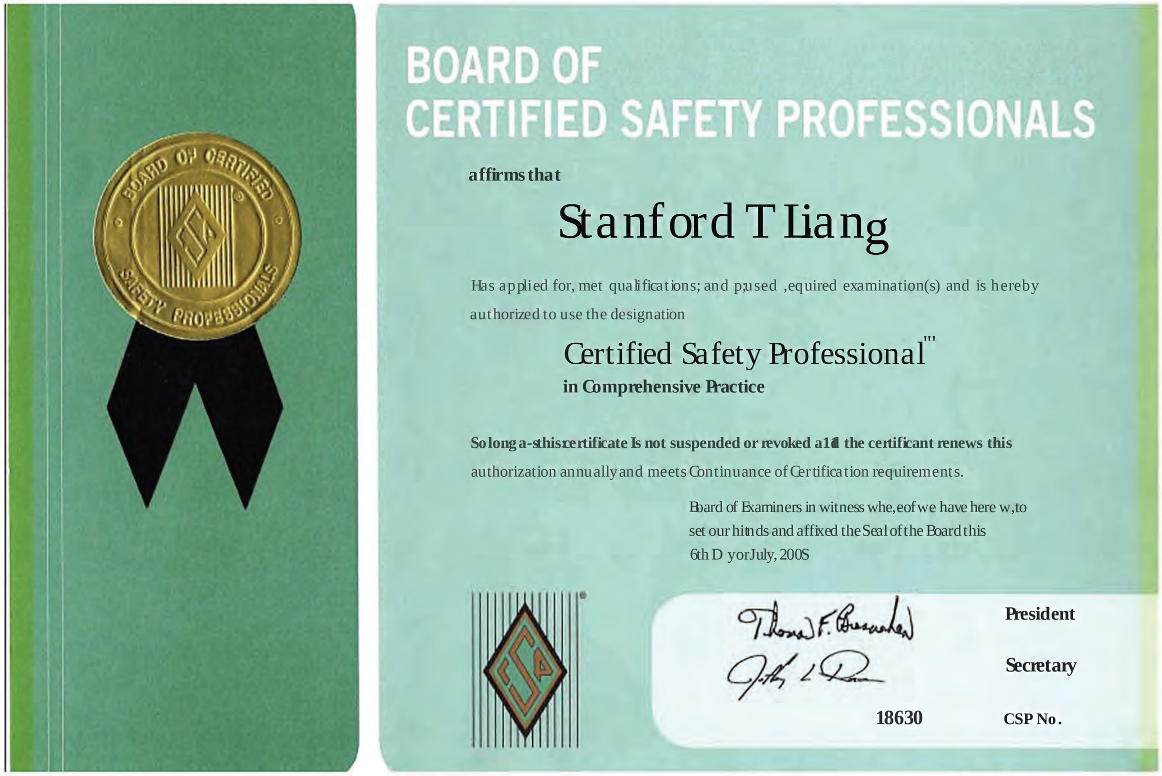
CERTIFIED INDUSTRIAL HYGIENIST

CIH

Certificate Number	7515 CP
Awarded:	November 12, 1997
Expiration Date:	June 1, 2023

Jeffrey M. Miller
Chair, ABIH

Chief Executive Officer, ABIH



BOARD OF
CERTIFIED SAFETY PROFESSIONALS

affirms that

Stanford T Liang

Has applied for, met qualifications; and p;used ,equired examination(s) and is hereby authorized to use the designation

Certified Safety Professional'''
in Comprehensive Practice

So long a-sthis:certificate Is not suspended or revoked a1d the certificant renews this authorization annually and meets Continuance of Certification requirements.

Board of Examiners in witness whe,eof we have here w,to
set our hitnds and affixed the Seal of the Board this
6th D yorJuly, 200S

Thomas F. Bresnahan **President**

Secretary

18630 **CSP No.**

West Virginia University

NATIONAL RESOURCE CENTER FOR OSHA TRAINING

This is to certify that

STAN LIANG

has met the attendance requirements
and successfully completed the course

OSHA 500
TRAINER COURSE IN
OCCUPATIONAL SAFETY AND HEALTH STANDARDS
FOR THE CONSTRUCTION INDUSTRY

COURSE DIRECTOR

NOVEMBER 17-20, 1997
DATE

Training Provider: Safety & Health Extension, West Virginia University, P. O. Box 6615, Morgantown, WV 26506-6615
Phone: 1-800-626-4748 or 304-293-3096

TETRA TECH

Karl Goehring

UXO Tech III/Safety/QC/SUXOS

EXPERIENCE SUMMARY

Mr. Goehring is a Master Badged Explosive Ordnance Disposal (EOD) Technician with more than 30 years of EOD/MMRP experience. He is a graduate of the U.S. Naval EOD School at Indian Head, MD and the EOD Assistant's Course, Redstone Arsenal, AL. His experience and training qualify him to perform the duties of Unexploded Ordnance (UXO) Technician III, UXO Safety Officer, UXO Quality Control Specialist, and Senior UXO Supervisor (SUXOS) for MMRP and Commercial Unexploded Ordnance (UXO) operations. He identifies, characterizes, and disposes of UXO and supervises and performs range clearance operations.

RELEVANT EXPERIENCE

CIVILIAN EXPERIENCE: (Additional Experience available upon request)

Various UXO Projects with Tetra Tech; Various Locations; 2018 – Present. Mr. Goehring has served in varying capacities on numerous UXO projects with Tetra Tech:

UXOSO/QCS, DGM Survey, target anomaly intrusive investigation, MEC/MPPEH Management, DR Horton, Cecil Field, Cameron Oaks, Jacksonville, FL, January - February 2020

UXOSO, Technology aided surface survey, UXO Support, USACE Europe, Kanji AB, Nigeria, July - August 2019

UXO Tech III Team Leader, Technology aided surface survey, target anomaly intrusive investigation, Abilene, TX, June -July 2018

UXO Technician and Supervisor; Various UXO Projects with Other Firms; Various Locations; 2002 – 2019. Mr. Goehring has served in varying capacities on several UXO projects with other firms:

FPM Remediations, UXO Tech III, team leader, directed field team during UXO clearance, Kirkland AFB, NM, August - October 2019

USA Environmental, UXOSO/QCS, responsible for site safety & quality control during dredging operations, Pearl Harbor, HI, April - May 2019

ERRG, UXOSO/QCS, responsible for health, safety & welfare 20 personnel during MEC surface clearance. Safety oversight during demolition operations, Kanahena Point, Maui, HI, March – May 2018

EDUCATION

Explosive Ordnance Disposal, Redstone Arsenal, and Indian Head, MD, 1979

REGISTRATIONS

Class A CDL, WY

TRAINING/CERTIFICATIONS

OSHA 40-Hour HAZWOPER, and annual refreshers

OSHA 8-Hour HAZWOPER Supervisor

OSHA 30/10-hr Construction Safety;

CQM for Contractors;

CPR and First Aid;

Current Medical/CDL clearance;

U.S. Passport

OFFICE

Cheyenne, WY

YEARS OF EXPERIENCE

38

YEARS WITH TETRA TECH

2

ERRG, UXOSO/QCS, responsible for health, safety & welfare 50 personnel during MEC surface clearance. Safety oversight during demolition operations. Whiskey Flat, Hawthorne, NV, March – November 2017

Koman, UXOSO/QCS, responsible for health, safety & welfare 14 personnel during MEC surface clearance. Safety oversight during demolition operations. Boardman Air Force Range, OR, January – February 2017

ERRG, UXOSO/QCS, responsible for health, safety & welfare of 12 personnel during removal and explosive venting of over 4,000 rockets. Responbile for quality control and safety overlight during demolition operations, Hawthorne Army Dept, NV, October 2015 – December 2016

HydroGeologic, SUXOS, directed field operations during removal action of areas surrounding former OD site. MEC disposal operations conducted daily, Kanas Army Ammunition Plant, KS July 2013 – June 2014

CH2M Hill, SUXOS, directed field operations and provided project oversight. Camp Lejuene, NC, March – June 2013.

URS Corp, SUXOS, directing field operations during removal actions surrounding former OD site for 38 personnel. Over 100 tons MDAS recovered, processed, and shipped to offsite recycler. Former Sioux Army Depot, NB. June 2012 – January 2013.

URS Corp, SUXOS, directed field operations to conduct surface removal actions at AL501 & OD508 ranges with 42 personnel. MEC disposal operations conducted daily, over 65 tons of MDAS inspected, processed, and shipped offsite to certified recycler. Hill AFB, UT. June 2010 – May 2012.

URS Corp, SUXOS, directed field operations to conduct surface removal of aircraft flares with 16 personnel. Supervised large geophysical data collection effort. Barry M. Goldwater Range, AZ. March 2010 – May 2010.

Additional projects available upon request.

MILITARY EOD ASSIGNMENTS:

March 1979 – August 1983 – Lackland AFB, TX

September 1983 – August 1985 – Hahn AFB, Germany

September 1985 – December 1992 – Beale AFB, California

January 1993 – April 1994 – Incirlik AFB, Turkey

May 1994 – March 1996 – Vandenberg AFB, California

MCMXLVII

The United States Air Force

CERTIFIES THAT

TSGT KARL J. GOEHRING

HAS SUCCESSFULLY COMPLETED THE

Hazardous Waste Operator Course (40 Hours)
29 CFR 1910.120

AND IS HEREWITH AWARDED THIS

Certificate of Training

JAMES J. BOUCHIE, Captain, USAF
Chief, Disaster Preparedness Division

21 October 1994
DATE

CERTIFICATE OF TRAINING

This certifies that the person named below completed training on
June 8, 2019 to satisfy the requirements of 29 CFR 1910.120(e)(8) for:

HAZWOPER ANNUAL REFRESHER (8 HRS)

KARL GOEHRING

The above person has received training appropriate for situations and investigations subject to the referenced federal regulation regarding Hazardous Waste Operations and Emergency Response, is familiar with Respiratory Protection and Levels of Protection A through D, and is hereby technically qualified to participate in activities pertinent to the specified training.

Thomas N. Smith

Certificate Number 190601

Thomas N. Smith, Instructor

Training conducted by Smith Environmental Consulting, 7315 Oswego, San Antonio, TX 78250

CERTIFICATE OF COMPLETION

This certifies that

Karl Goehring

completed the requirements for 29 CFR 1910.120

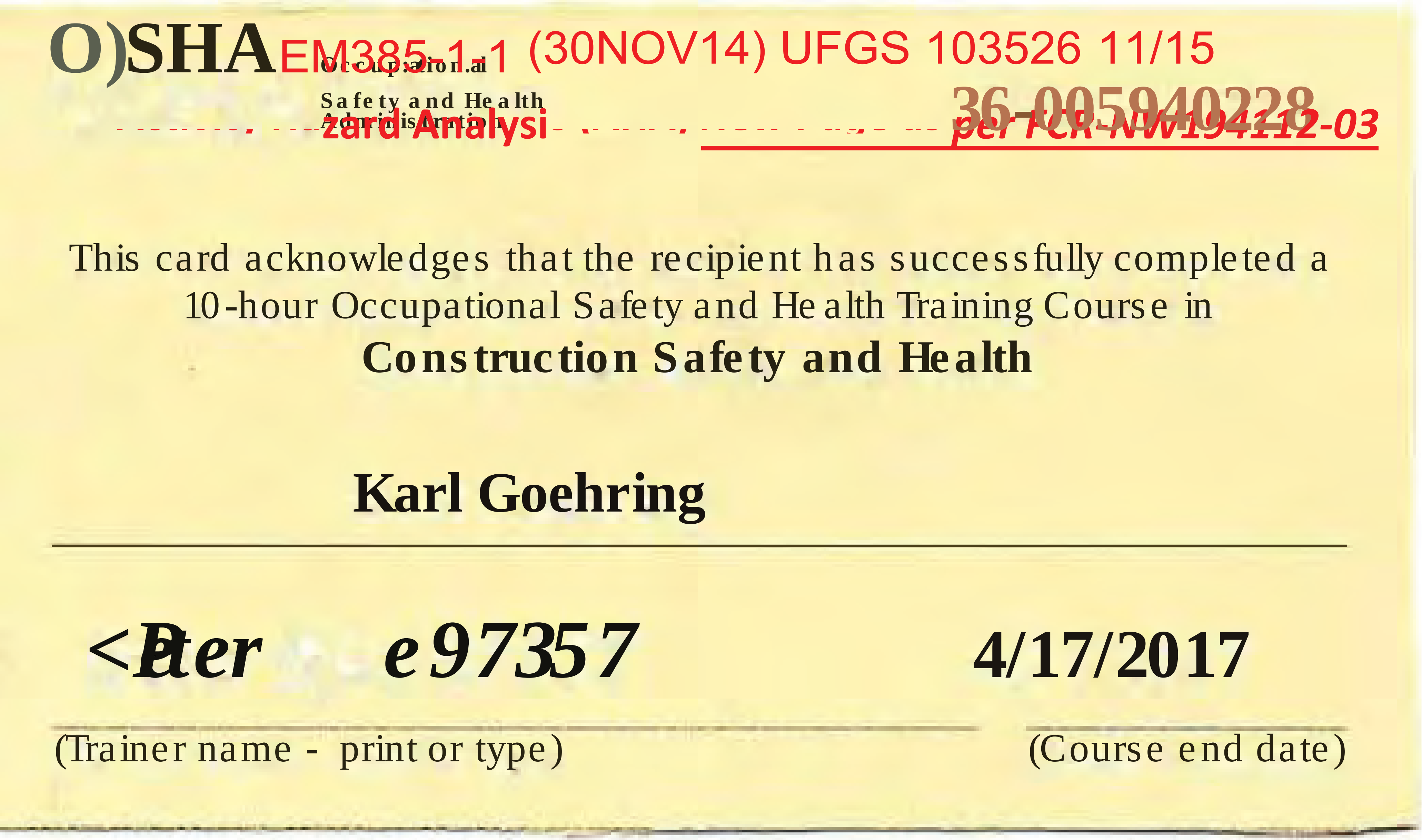
8 Hour
Hazardous Waste Operations & Emergency Response
Supervisor/Refresher

Achieving Level C competency on the 5th day of October, 2002

Kenneth T. Weber
Kenneth T. Weber

EHSC, Inc. 227 Johnson Drive Loveland, Colorado 80537

Certificate No.: 330-48-2868



O)SHA Occupational Safety and Health Administration

36-005940228

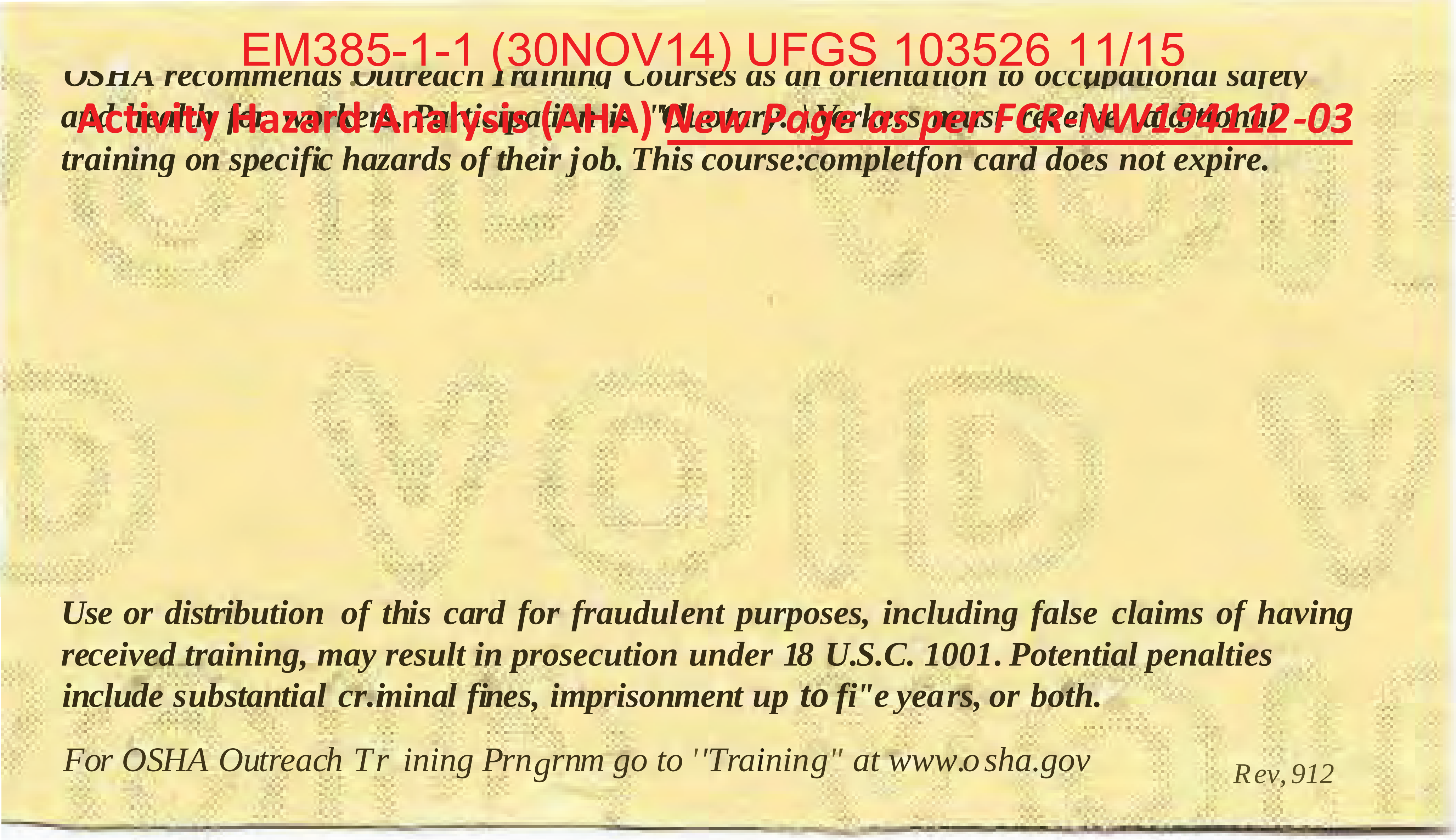
This card acknowledges that the recipient has successfully completed a 10-hour Occupational Safety and Health Training Course in

Construction Safety and Health

Karl Goehring

<Peter e97357 **4/17/2017**

(Trainer name - print or type) (Course end date)



OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is "Voluntary." Workers must receive additional training on specific hazards of their job. This course:completfon card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial cr.iminal fines, imprisonment up to fi"e years, or both.

For OSHA Outreach Tr ining Prngrnm go to ''Training" at www.osha.gov

Rev, 912

OSHA Occupational Safety and Health Administration

36-601441359

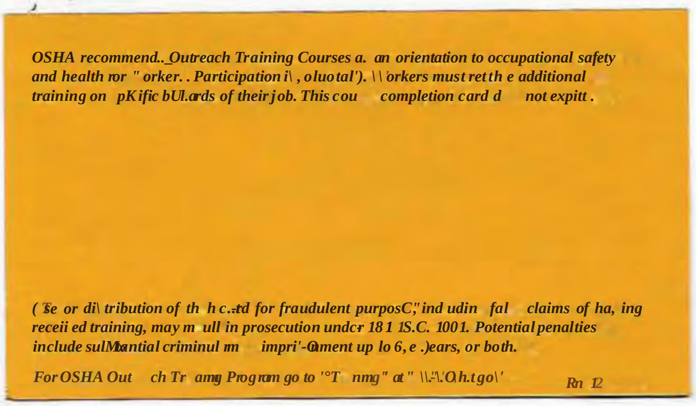
This card acknowledges that the recipient has successfully completed a 30-hour Occupational Safety and Health Training Course in

Construction Safety and Health

KARL GOEHRING

Matthew Luman
(Trainer name – print or type)

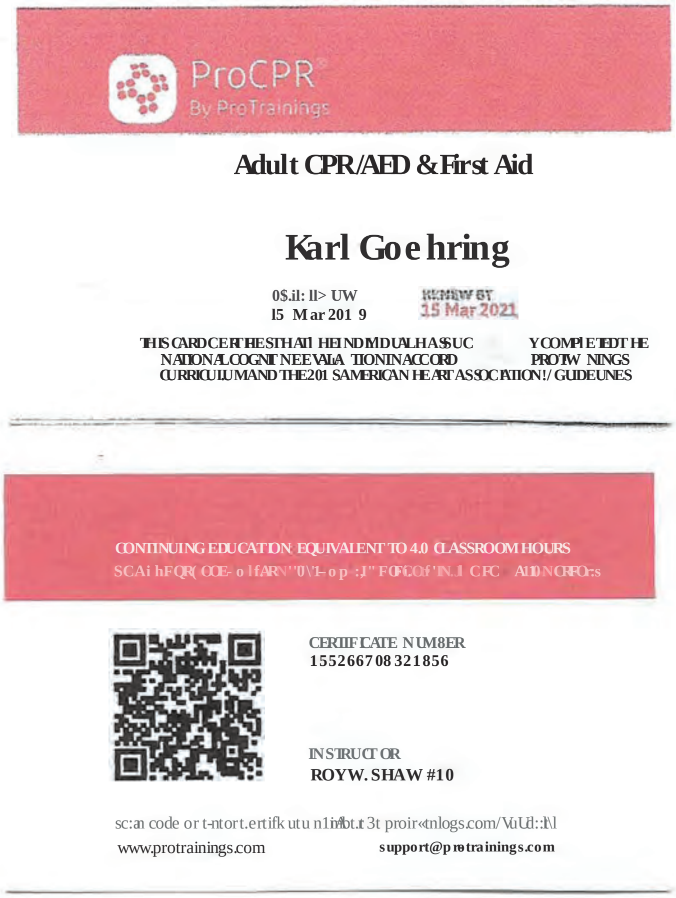
6/26/2017
(Course end date)



OSHA recommends Outreach Training Courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

Use or distribution of this card for fraudulent purposes, including false claims of having received training, may result in prosecution under 18 U.S.C. 1001. Potential penalties include substantial criminal fines, imprisonment up to 6 years, or both.

For OSHA Outreach Training Program go to "Training" at www.osha.gov *Rev 12*



ProCPR®
By ProTrainings

Adult CPR/AED & First Aid

Karl Goehring

0$.il: ll> UW
l5 Mar 2019

RENEW BY
15 Mar 2021

THIS CARD CERTHESTHAT1 HEINDMDUALHASSUC YCOMPIETEDTHE
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CONTINUING EDUCATION EQUIVALENT TO 4.0 CLASSROOM HOURS
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INSTRUCTOR
ROYW. SHAW #10

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www.protrainings.com **support@protrainings.com**

WorkCare·
MAKING HEALTH COUNT

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: USA Environmental - Baseline Exam
EXAM CLASSIFICATION: Baseline Examination

EMPLOYEE: Goehring, Karl J.
ID: 1038
DATE OF EXAM: 03/19/2019
EXPIRATION DATE: 03/19/2021

COMPANY: USA Environmental
POSITION: UXO Safety Officer
LOCATION: USA Environmental, Inc.
SITE:

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/ her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120 (Hazwoper)?	☐	1K]	☐
Has the employee any contraindication for work in accordance with 29 CFR §1910.95(9)1926.52 (Hearing Conservation)?	☐	1K]	☐
Has the employee any limitations in accordance with 29 CFR §1910.134 (Respirator)?	☐	1K]	☐

Status

IK] **QUALIFIED** The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

D **QUALIFIED - WITH LIMITATIONS** The examination indicates that a medical condition currently exists that limits work assignments on the following basis:

☐ **NOT QUALIFIED**

D **DEFERRED** The examination indicated that additional information is necessary. The employee has been given the following instructions.

Comments:

Qualified for biennial frequency.

Negative Drug Screen.

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Peter P. Greaney, M.D. Date: 03/25/19

Signature: I 1

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Whis rtrtifies t4at

A man Ka l J. Goe h ng, USAF

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EXPLOSI VE ORVNANCE VI SPOSAL SPECI ALI ST - G5ABN46430

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this _ _ *znd* hay nf March **A.D.** 1979

J. T. KENNEDY, CDR, USN
COMMANDING OFFICER

NAVSCOLEOD FORM 1650/2

THE NATIONAL ENVIRONMENTAL TRAINERS

Ron Stum

has satisfactorily passed an exam and completed a 40-hour training course entitled
Hazardous Waste Operations and Emergency Response
meeting the requirements identified in Title 29 CFR 1910.120 (OSHA HAZWOPER Regulations).
This course has been awarded 5.0 Industrial Hygiene CM Points by the American Board of Industrial Hygiene-Approval Number 13334. This course is also eligible for 3.33 Continuance of Certification (COC) points from the Board of Certified Safety Professionals

NATIONAL
ENVIRONMENTAL
TRAINERS, Inc.

January 25, 2009

Course Number 1003, Awarded 40 PDH's
Florida Board of Professional Engineers
CEU Provider Number 0004284

www.nationalenvironmentaltrainers.com

Signature of Instructor

Clay A. Bednarz, MS, RPIH

Naval School
Explosive Ordnance Disposal

This certifies that

Sergeant
Ronald L. Stum, Jr., [redacted], USAF

having successfully completed
the prescribed course of study for

EXPLOSIVE ORDNANCE DISPOSAL SPECIALIST

is awarded this
Certificate

this 9th day of June A.D. 1983

James C. Blanton
JAMES C. BLANTON, CDR, USN
COMMANDING OFFICER

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

Certificate Of Completion

PRESENTED TO

Ronald Stum

In Recognition of Successful Completion of Requirements In

CPR/AED (Adult/Child/Infant)

Universal First Aid

02/ 26/ 2020
CERTIFICATION DATE

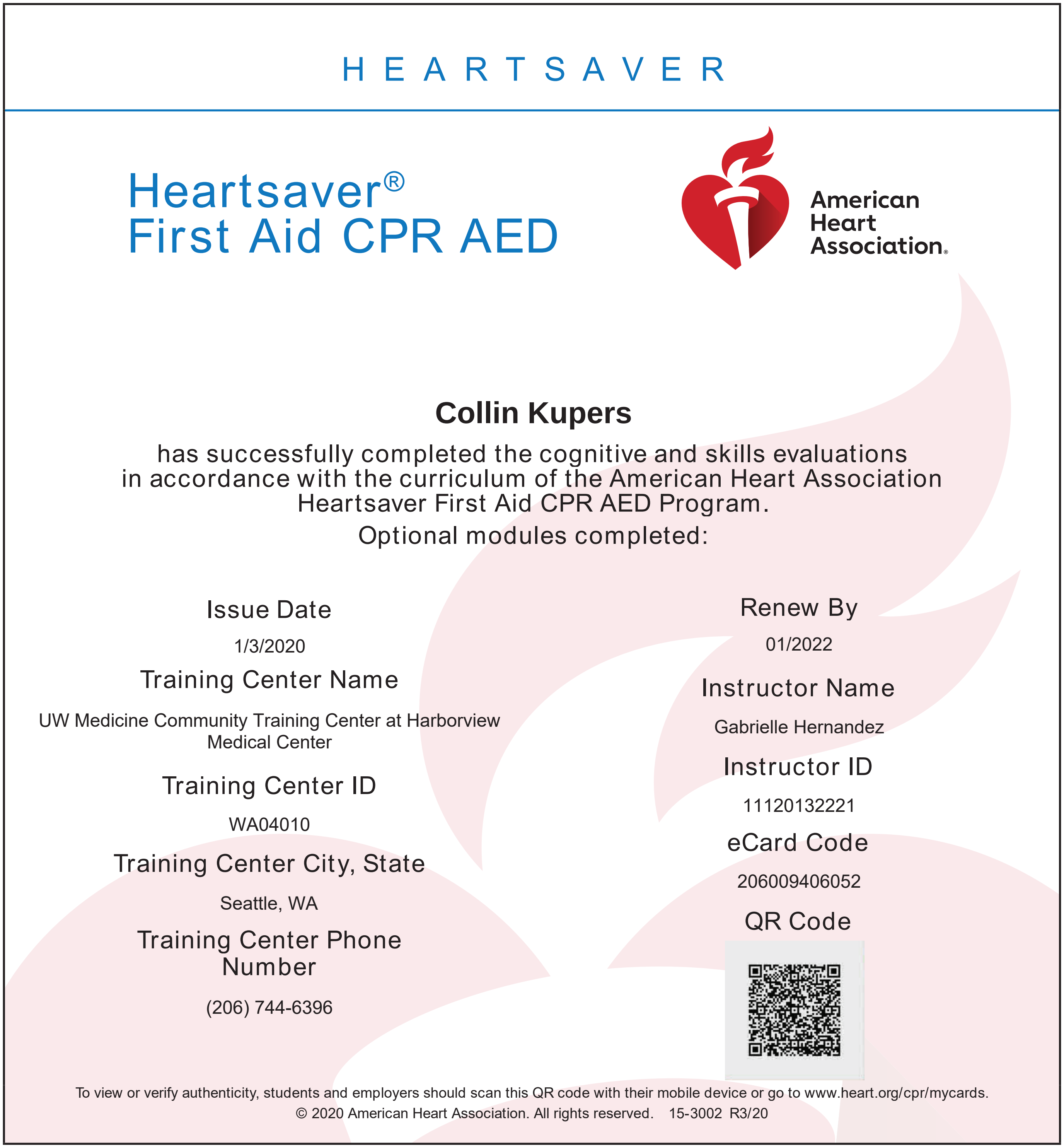
02/ 26/ 2022
EXPIRATION DATE

HOLDER'S SIGNATURE

Christopher Bayer
AUTHORIZED SIGNATURE

AMERICAN SAFETY TRAINING INSTITUTE
ASTI
www.AmericanSTI.org

This certifies participant listed above has successfully passed skills evaluation in accordance with national cognitive skills examination standards, and American Safety Training Institute certification terms and conditions. American Safety Training Institute courses follow national guidelines set by the American Heart Association (AHA), and the International Liaison Committee on Resuscitation (ILCOR). The American Safety Training Institute is not associated, affiliated with, sponsored, or endorsed by, American Safety and Health Institute (ASHI), American Heart Association (AHA), or American Red Cross (ARC), and unless otherwise specified no affiliation or endorsement is implied.



HEARTSAVER

Heartsaver®
First Aid CPR AED

American Heart Association.

Collin Kupers

has successfully completed the cognitive and skills evaluations in accordance with the curriculum of the American Heart Association Heartsaver First Aid CPR AED Program.

Optional modules completed:

Issue Date
1/3/2020

Training Center Name
UW Medicine Community Training Center at Harborview Medical Center

Training Center ID
WA04010

Training Center City, State
Seattle, WA

Training Center Phone Number
(206) 744-6396

Renew By
01/2022

Instructor Name
Gabrielle Hernandez

Instructor ID
11120132221

eCard Code
206009406052

QR Code

To view or verify authenticity, students and employers should scan this QR code with their mobile device or go to www.heart.org/cpr/mycards.

Activity Hazard Analysis (AHA) ***New Page as per FCR-NW194112-03***

FALL PROTECTION COMPETENT PERSON

This card acknowledges that

Collin Kupers of Gravitec Systems Inc.

has attended a 40 hour Fall Protection Competent Person course and has received 4.0 Continuing Education Units in accordance with IACET standards.

Date: 11112020

Expires: 11112022

Provider # 1112:

AUTHORIZED IACET PROVIDER

Meets ANSM SSE2 400.1-2009

Meets ANSI ASSE 2359.2-2017

Training conducted according to OSHA, WCB, OH&S and Labor Code Requirements.

Refer to employer's documentation for specific course content.

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*

FALL PROTECTION INDUSTRIAL RESCUE

This card acknowledges that

Collin Kupers of Gravitec Systems, Inc.

has attended a 40 hour Fall Protection Industrial Rescue course and has received 4.0 Continuing Education Units in accordance with IACET standards.

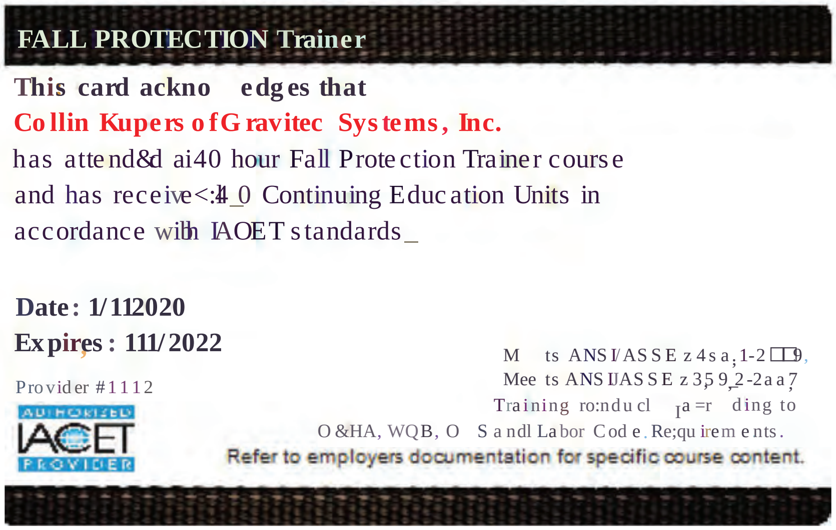
Date:1/1/2020
Expires: 1/1/2022

Provider #1112

AUTHORIZED IACET PROVIDER

Meets ANSI/ASSE Z490.1-2009
Meets ANSI/ASSE Z359.2-2017
Training conducted according to
OSHA, WCB, OH&S and Labor Code Requirements.
Refer to employers documentation for specific course content.

Activity Hazard Analysis (AHA) *New Page as per FCR-NW194112-03*



FALL PROTECTION Trainer

This card ackno edges that

Collin Kupers of Gravitec Systems, Inc.

has attend&d ai40 hour Fall Protection Trainer course
and has receive<:4_0 Continuing Education Units in
accordance wib IAOET standards_

Date: 1/112020
Expires: 111/2022

Provider #1112

M ts ANSI/ASSE z4sa;1-2☐☐9,
Mee ts ANSIJASSE z35,9_2-2aa7,
Training ro:nducl Ia =r ding to
O&HA, WQB, O S andl Labor Code. Re;quirements.
Refer to employers documentation for specific course content.

New Page and Associated Attachment as per FCR-NW194112-03

ATTACHMENT XII

ROPE ACCESS PLAN

Rope Access Procedure for Tetra Tech – Naval Base Bangor, UXO 6

1. **Scope:** This procedure's scope is limited to the use of rope access to survey and investigate natural slopes at Naval Base Bangor. This procedure is limited to the assembly and use of rope access equipment. It does not consider other aspects of safety dealing with the selection of staff, means and methods of surveying, hazard communication, or work planning. This procedure is intended to augment Tetra Tech's safety program.

2. **Purpose:** The purpose of this procedure is to describe the equipment, assembly, and procedure of the rope access ropes used on site. This document will be used to source and assemble equipment and communicate and train applicable people on the use of the equipment.

3. **Equipment:** The rope access equipment required for this work, per employee, is as follows:

3.1 All equipment listed is designed, tested, and intended for rope access work. All the equipment is labeled as meeting applicable ANSI Z359 fall protection standards or NFPA 1983 Life Safety Standards.

- Rope Access Harness (1)
- Static Kernmantle Life Safety Rope (2, different colors)
- Descent Control Device (1)
- Fall Arrestor with Energy Absorber (1)
- Auto-locking Carabiner (4, 2 in use, 2 extra)
- Anchorage Connectors (2)
- Rope Access Helmet (1)

**Additional PPE for the work is not listed, but may be required by Tetra Tech such as gloves, glasses, protective footwear, monitoring equipment, etc.*

**Rope Access Accessories may be used as needed during this work to include ascenders, foot loops, pulleys, and other compatible equipment.*

3.2 Depending on the degree of difficulty in navigating the slope, a one-rope or two-rope system will be used, assembled with the equipment listed in this procedure.

- ONE ROPE SYSTEM: The one-rope system is used for slopes and areas that can easily be navigated by foot and to prevent a person from sliding down the slope if their footing slips. These slopes are not very difficult and can be navigated by foot. The one-rope system is not intended to hold or support weight or assist in movement on the slope. It is present as a back-up to prevent a person from sliding down the slope if their footing should release (similar to a roofer's fall protection system on a house). A person wears a harness and is connected to the rope but does not rest or use the rope to support their weight. The rope is there as a protective feature, and all movement is conducted by foot.

- TWO ROPE SYSTEM: The two-rope system is used for areas that cannot be navigated by foot alone and require a rope to support the person's weight. The ropes are a different color to assist with identification; one rope supports the worker's weight and is used for movement while the other is a back-up if issues arise with the first. The primary rope is always under load, and the secondary rope is slack. The two-rope system is used on steep slopes or areas where a rope is required to assist navigation.

4. Personnel: The Competent Person for Rope Access will be Collin Kupers of Gravitec Systems, Inc. The scope of this work is use of descent control systems on low to mid-slope natural hillsides for which Mr. Kupers is qualified to conduct. Mr. Kupers will work in conjunction with other Tetra Tech staff for the work and will be the Competent Person, responsible for the rope access elements of the job. Mr. Kupers will:

a) Inspect all rope access equipment prior to use
b) Train Tetra Tech staff on rope access equipment use
c) Install rope access equipment on location
d) Supervise the use of rope access equipment
e) Participate in pre-work planning and AHA elements of the work
f) Communicate with Tetra Tech supervision during the work.

5. Training: all personnel on-rope will be trained on the use of the one and two-rope systems described in Section 3 – Equipment. Training will be conducted prior to the project at Gravitec Systems Inc. training facility to include lecture, demonstrations, observations of performance and field exercises using all applicable equipment and skills required of the work. Training will be conducted by a number of Gravitec personnel (resumes and qualifications submitted separately). Training will be three days (21-24 hours) and will include:

a) Introduction to rope access equipment
b) Before use inspections
c) Hierarchy of Fall Protection
d) Travel Restraint vs. Fall Arrest vs. Rope Descent
e) Proper Use and Limitations of:
  - Full body harness
  - Connectors
  - Fall Arrestor
  - Energy Absorbers
  - Rope
  - Descent Control Devices
  - Ascenders
f) Demonstrations and Field Exercises of:
  - One-rope System for travel restraint
  - Two-rope system for Positioning and Fall Arrest
  - Descending the rope
  - Adjusting and parking the Fall Arrestor
  - Ascending the rope
  - Connections into and out of the rope systems from the Safe Zone
  - Troubleshooting rope entanglements
  - Raising an incapacitated worker

6. Risk Assessment and Safety Analysis Report: Gravitec Systems has conducted a site visit to determine the appropriate rope access equipment to develop access methods used in this procedure. The written report was used to develop the Rope Access Work Plan. It is important to note that people conducting this work are not fully suspended but navigating natural slopes by foot. The Risk Assessment, conducted August 6, 2020, revealed two types of slopes: low-slope and mid-slope. Low-slope areas can be navigated by workers by foot without assistance and a one-rope system is there to prevent the worker sliding down the slope if a slip occurs. Mid-slope areas cannot be navigated by foot without assistance and a two-rope system is used. The working line is weighted and provide support for the worker to aid in navigation and the safety line is present to guard against any failure of the primary line. In response to the requirements of EM385.1-2014, 24.H.02(c) (1-4) a summary of the report findings are:

a) All suspended people will be trained and deemed proficient in the use of the equipment and skill sets described in Section 5 – Training prior to the work.

b) The suspended person will not be using any materials or tools that will cause any reaction to the ropes or fall protection equipment. No cutting, excavation, burning or chemical based tools will be used. The scope of the work is limited to visual inspections and the use of handheld analog magnetometer or all metals detector, and a GPS unit.

c) The work is being conducted on low and mid-range slopes and no personnel will be below the work. The slopes are generally covered with vegetation and are not loose rock or gravel. Any material loosened by the movements of the worker cannot freely fall as the work is on a slope and the movement of material should be minimal and limited to a local area around the feet of the worker.

d) The duration of time a worker is on-rope is planned to be less than 2 hours per person. The duration of time at specific locations will vary, but each worker should not be on-rope for more than two hours per inspection location. Workers on-rope are not fully suspended, and they are able to sit, stand, kneel, turn-around and find comfortable positions to work. No issues with being on-rope for extended durations are expected, even if the work extends beyond expected times per location.

e) Workers will always be connected to the one-rope or two-rope system. There is no need to disconnect from the rope during the rope, which makes rescue of a worker more efficient. If the need for rescue arises, the following rescue methods will be used according to the situation:

1. For minor injuries, a worker can navigate their way back up the slope to the Safe Zone.
2. If the worker cannot navigate the slope but are still mobile, workers at the top of the slope will create a haul system (using the working line and/or safety line) to raise the worker up the slope to the Safe Zone.
3. If the worker is immobile, a rescuer will establish a second set of ropes, descend to the rescue subject and assist them up the slope by placing them into a SKED (plastic sliding rescue litter) and having workers on the top use a haul system to reach the Safe Zone.
4. If the ropes in use are jeopardized in any manner, a second set of ropes are on-site and will be used to conduct any rescue.

7. Work Planning: Before performing the work, Gravitec Systems staff will participate in Tetra Tech's pre-work safety meetings and assist with planning the work regarding the use of the rope access equipment. Gravitec Systems will assemble the rope access equipment and assist Tetra Tech with the supervision of the work regarding the use of the rope access systems.

5. Installation Procedures: This procedure begins on-site at a staging area where no fall hazards exist. All people going on-rope will have been trained using the equipment listed in Section 3.

5.1 Each person going on rope will:
- remain in the safe zone until instructed otherwise.
- inspect their equipment for function and condition.
- put their harness on and conduct a buddy check to confirm fit and adjustment.

- don other applicable PPE and work equipment as needed.
- listen and participate in Gravitec Systems pre-work rope briefing regarding the specific rope systems installed.
- assist with other people on-rope in managing ropes, inspecting each other's equipment, raising and lowering each other, and assisting when needed.
- stay within the safe zone(s) when not conducting work.
- ask questions and raise any concerns regarding the ropes and work.

5.2 One-Rope System:

Gravitec Systems will work with Tetra Tech evaluating each work area and determine if a one or two-rope system is required. Gravitec Systems will assemble the one-rope system using the following procedure.

- Create a safe-zone where people can connect and disconnect from the system without exposure to the slope.
- Anchor the lifeline to an anchorage using one of the following anchorage methods.
  - engineered anchorage connector
  - tensionless anchor
  - anchor system using multiple anchorages
- Connect the lifeline to the anchorage connector
- Connect the fall arrestor to the lifeline
- Place the fall arrestor inside the safe zone

6. Use Procedures: After the systems (one-rope and/or two-rope system) are installed, people going on rope will follow the procedures listed below.

6.1 One-rope System:

- Inspect all PPE for function and condition.
- While inside the safe zone, connect the fall arrestor on the lifeline to the sternal (upper) D-ring of the harness.
- Check the fall arrestor for function and condition by sliding it up and down the lifeline.
- Test the fall arrestor locking function by pulling sharply down on the fall arrestor. Stop and do not use it if the fall arrestor does not lock.
- Test the parking feature on the fall arrestor by engaging the locking tab and pulling down on the device.

The unit should not move. Stop and do not use it if it does not function.

- Double-check PPE, clothing, equipment, communications, and slope before navigating into the hazard zone.
- Begin work by walking down the slope. The fall arrestor will follow you down the rope without any manipulation.
- When stopped, slide the fall arrestor up-rope as much as possible to minimize and fall distance.
- If staying in one place for any period of time, lock the fall arrestor in place by engaging the locking tab. Disengage the locking tab when movement is desired.
- During all movements, keep the fall arrestor up-slope, above you as much as possible.
- When work is completed, walk back up the slope, sliding the fall arrestor up the rope keeping it up-rope at all times.
- Reach the top of the slope and enter the safe zone.
- Disconnect the fall arrestor from the harness and store.

6.2 Two-rope System:
- Inspect all PPE for function and condition.
- While inside the safe zone, connect the fall arrestor on the lifeline to the sternal (upper) D-ring of the harness.
- Check the fall arrestor for function and condition by sliding it up and down the lifeline.
- Test the fall arrestor locking function by pulling sharply down on the fall arrestor. Stop and do not use it if the fall arrestor does not lock.
- Test the parking feature on the fall arrestor by engaging the locking tab and pulling down on the device.

The unit should not move. Stop and do not use it if it does not function.
- While inside the safe zone, connect the descent control device on the descent rope to the ventral (lower) D-ring of the harness.
- Check the descent device for function and condition by weighting it and moving down and up the descent rope.
- Test the descent device locking function by pulling sharply down on the operator’s handle. The unit should lock. Stop and do not use it if the descent device does not lock.
- Test the parking feature on the descent device by engaging the operators handle in the stop position. The unit should not move. Stop and do not use it if it does not function.
- Double-check PPE, clothing, equipment, communications, and slope before navigating into the hazard zone.
- Begin work by walking down the slope, weighted into the descent control device and descent rope. The fall arrestor will follow you down the rope without any manipulation.
- Continue to operate the descent control device to navigate down the slope.
- To stop, move the operator’s handle on the descent device to the stop position and slide the fall arrestor up-rope as much as possible to minimize and fall distance.
- If staying in one place for any period of time, lock the fall arrestor in place by engaging the locking tab. Disengage the locking tab when movement is desired.
- During all movements, keep the fall arrestor up-slope, above you as much as possible.
- To move up the slope, raise your weight (by pulling up on the descent rope or taking a step up-slope) on the primary rope and pull slack through the descent device. While resting your weight in the descent device, always slide the fall arrestor up the rope keeping it up-rope.
- Repeat the previous steps to move up-slope. Pull slack through the descent device and move the fall arrestor up-rope. Continue these steps until reaching the top of the slope and enter the safe zone.
- Disconnect the fall arrestor from the harness and store.
- Disconnect the descent device from the harness and store.

7. Dismantling Procedures: Upon completion of the work, no people will be on-rope. From the safe zone, the ropes will be pulled up the slope into the safe zone, inspected, cleaned, disconnected from the anchorage, and placed into the storage bags.
Upon moving to the next location, repeat this procedure, starting from Section 4.

8. Rescue Procedure: In the event a worker needs assistance while on rope, one of the following extraction methods will be used. The system used will depend on the specific circumstances and the degree of assistance needed.

8.1 Top-Haul System: using the existing rope, a haul system will be created, and the worker will be pulled up the slope to the safe zone.

8.2 Worker Assisted: a second set of ropes can be installed, and an additional worker can go down and assist the other worker to come up the slope.
8.3 SKED Drag: if a worker cannot navigate the slope, but the situation is not emergent, a second set of ropes can be installed, and the worker can be placed onto/into a SKED that can be slid up the slope to the safe area.
8.4 Professional Response: if a situation arises where significant injuries exist where a worker cannot or should not be moved, first responders will be called, and assistance will be given to get responders to the worker for immobilization and 8.1, 8.2 or 8.3 will be used to extricate the worker.

CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-NW194112-04 DATE 02/28/20022

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Janice Horton

1. Document to be changed. Identify revision, date, section, drawing, etc.

Final Accident Prevention Plan/Site Safety and Health Plan (Site Inspection for Munitions and Explosives of Concern, Munitions Constituents, Historical and Cultural Resources Survey, and Habitat/ Endangered Species Survey) dated May 2020 and including previous FCRs [June 2020: FCR-NW194112-01 COVID-19 Procedures and Requirements, October 2020: FCR-NW194112-02 Non-Emergency Clinic Change, October 2020: FCR-NW194112-03 UXO 6 Rope Access Provisions].

Change in Navy COR/RPM and Tetra Tech key field staff in planning documents.
Changes throughout SSHP/APP as identified in summary attachment.
Also, change in Medical Center information.
Changed emergency contact table (Figure 9-1) as per attached to address change in personnel and change in Medical Center information.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

Key personnel and Medical Center information has changed.
-Personnel changes throughout SSHP/APP as identified in summary attachment.
-Figure 9-1 revised emergency contact table attached includes changes in Tetra Tech key personnel and change in Medical Center information.

Tt Reason for Change (Attach sheet if necessary)

Due to changes in field work start date,

4. Originator: (print name and sign) Linda Klink Linda Klink		**Title** Project Manager	**Date** 2/28/2022
Reviewed by: (print name and sign) Matt Soltis, CIH, CSP Matthew M. Soltis Digitally signed by Matthew M. Soltis Date: 2022.03.01 12:45:56 -05'00'		**Title** CLEAN Health and Safety Manager	**Date** 1 MAR 2022
Site Superintendent (Print name and sign) Syd Rodgers (SUXOS) Syd Rodgers	**Date** 2/28/22	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 2/28/2022
Tt Program QC Manager (Print Name and Sign) N/A	**Date**	**Navy Acknowledgement (Print name and sign)** Janice Horton	**Date** 3/3/2022

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02/28/2022

PERSONNEL CHANGES, BANGOR

POC Name in Final Planning Document	Role in Final Planning Document	Revised POC Name	Revised POC email	Revised POC phone	Worksheets/Tables/Sections Impacted SSHP/ APP	Any notes/comments
Navy						
Raymond Kobeski	COR / Lead RPM	Janice Horton	janice.l.horton5.civ@us.navy.mil	(360) 556-0621	Section 4.1.4; Figure 4-1 (end of Section 4); Figure 9-1 Emergency Contacts	**Global Comment:** Ray Kobeski is listed on the signature page for the planning documents but will be left as is since he was the RPM at the time of document finalization.
Tetra Tech Key Field Staff in SSHP/APP						
Syd Rogers	SUXOS	No Change (For now Syd is the SUXOS, may change in future)			Section 4.1.2.5	--
Various UXO Techs	UXO Team	NA (listed as group)			Figure 4-1 lists all UXO Technicians; Ronald Stum listed in Section 5.4.1; Attachment II AHAs; Attachment III Personnel Quals	--
Stan Liang	HSM	Matt Soltis	Matt.Soltis@tetratech.com	(412) 921-8912	WS 1; Section 4.1.2.2; Figure 4-1; Attachment II AHAs; Attachment III Personnel Quals; Figure 9-1 Emergency Contacts	**Global Comment:** Stan Liang is listed on the signature page for the document but will be left as is since he was the HSM at the time of document finalization.
Karl Goehring	FOL/SSHO	Anthony Aguirre	tony.aguirre@tetratech.com	(571) 232-9224	Section 4.1.2.3; Section 4.1.2.6; Figure 4-1; Karl listed in Section 5.4.1; Attachment II AHAs; Attachment III Personnel Quals; Figure 9-1 Emergency Contacts of Attachment VII Emergency Info	--
NA: Not Applicable						

Page Revised by FCR-NW194112-02
Page Revised by FCR-NW194112-04

AGENCY	TELEPHONE
EMERGENCY (Navy Region Northwest Fire and Emergency Services)	**(360) 396-4444**
Primary Hospital – ~~Harrison Medical Center – Silverdale~~ St Michael Medical Center	(888) ~~825-3227 (non emergency)~~ (360) 744-8800
Non emergency medical care - ~~Occupational Medicine Associates of Kitsap~~The Doctors Clinic (TDC)	(360) ~~692-1848~~782-3660
US Navy COR/POC, ~~Raymond Kobeski~~ Janice Horton	~~(360) 396-0070 (office)~~ ~~(360) 265-1071~~ (360) 556-0621
Poison Control	(800) 222-1222
Chemtrec	(800) 424-9300
National Response Center	(800) 424-8802
CORE Occupational Medicine	(855) 683-9006
UXOSO/FOL/SSHO Anthony Aguirre ~~Karl Goehring~~	(571) 232-9224 (307) ~~256-0424 (cell)~~
Project Manager, Linda Klink	(412) 720-1421 (cell)
CLEAN Health and Safety Manager Matt Soltis ~~Stan Liang~~	(412) 921-8912 (412) ~~559-8415 (cell)~~

NOTE: Subcontractor information to be provided by SSHO upon selection and prior to the start of work.

Figure 9-1: Emergency Contacts

CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-01 MEC&MC QAPP&ESS DATE 02/28/20022

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Janice Horton

1. Documents to be changed. Identify revision, date, section, drawing, etc.

Final MEC QAPP dated June 2021 Munitions Response Quality Assurance Project Plan for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor

Final MC QAPP dated June 2021 Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Munitions Constituents Site Inspection, Multiple MRP Sites, Naval Base Kitsap Bangor

Final Explosives Safety Submission (ESS) dated December 2020, Munitions and Explosives of Concern Site Inspection Naval Base Kitsap Bangor (approved by DDESB in April 2021)

-Change in Navy RPM and Tetra Tech key field staff in MEC QAPP, MC QAPP, and ESS as identified in summary attachment.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

Key personnel has changed.

-Personnel changes throughout MEC QAPP, MC QAPP, and ESS as identified in summary attachment.

Tt Reason for Change (Attach sheet if necessary)

Due to changes in field work start date delays, originally planned personnel changed.

4. Originator: (print name and sign)	**Title**	**Date**
Linda Klink Linda Klink	Project Manager	2/28/2022
Reviewed by: (print name and sign) Norm Piper, UXO Manager	**Title:** UXO Manager	**Date**

Site Superintendent (Print name and sign)	**Date**	**Task Order Manager (Print name and sign)**	**Date**
Syd Rodgers (SUXOS)	2/28/22	Linda Klink Linda Klink	2/28/2022
Tt Program QC Manager (Print Name and Sign)	**Date**	**Navy Acknowledgement (Print name and sign)**	**Date**
Michelle Coffman Michelle Coffman	03/01/2022	Janice Horton	3/3/2022

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02/28/2022

PERSONNEL CHANGES: MEC QAPP, MC QAPP, AND ESS

POC Name in Final Planning Document	Role in Final Planning Document	Revised POC Name	Revised POC email	Revised POC phone	Worksheets/Tables/Sections Impacted			Any notes/comments
					MEC QAPP	MC QAPP	ESS	
Raymond Kobeski	COR / Lead RPM	Janice Horton	janice.l.horton5.civ@us.navy.mil	(360) 556-0621	WS 3&5; Figure 3-1; Figure 3-2; WS 4,7&8; WS 6; Appendix B-2: Table 1 MRP SOP 02 (PDF Pg 398) & Table 1 MRP SOP 09 (PDF Pg 550)	WS 3; WS 4; WS 5; WS 6; WS 7	Section 1.1	**MEC QAPP:** Ray listed in WS 9 but this is the project planning session and should remain as is **Global Comment:** Ray is listed on the signature page for the planning documents but will be left as is since he was the RPM at the time
Steve Negri	Habitat/Threat. & Endangered Species Lead	No Change			WS 9; Appendix A-1	NA	NA	--
Jeff Gamey	Project Geophysicist	No Change			WS 3&5; Table 3-1; WS 4,7&8; WS 6	NA	NA	--
Matthew Barner	QC Geophysicist	Jessie Powers	jessie.powers@tetratech.com	434-989-4879	WS 3&5; Table 3-1; Figure 3-2; WS 4,7&8; WS 6; WS 9; Appendix A-1	NA	NA	--
TBD	Site Geophysicist	*Brett Yarborough*	brett.yarborough@tetratech.com	214-908-1829	WS 3&5; Table 3-1; Figure 3-2	NA	NA	--
Syd Rogers	SUXOS	No Change			WS 3&5; Table 3-1; Figure 3-2; WS 4,7&8; WS 6	NA	NA	--
Joe Goehring	UXOQCS/UX OSO	Anthony Aguirre	Tony.aguirre@tetratech.com	571-232-9224	WS 3&5; Table 3-1; Figure 3-2; WS 4,7&8; WS 6; Appendix B-2: Table 1 MRP SOP 02 (PDF Pg 398) & Table 1 MRP SOP 09 (PDF Pg 550)	NA	NA	--
Tom Johnson	QAM	Michelle Coffman	Michelle.Coffman@tetratech.com	(412) 921-8549	WS 3&5; Table 3-1; Figure 3-2; WS 4,7&8; WS 6	WS1 (Signature), WS 3; WS 4; WS 5; WS 6; WS 7	--	--

02/28/2022

PERSONNEL CHANGES: MEC QAPP, MC QAPP, AND ESS

POC Name in Final Planning Document	Role in Final Planning Document	Revised POC Name	Revised POC email	Revised POC phone	Worksheets/Tables/Sections Impacted			Any notes/comments
					MEC QAPP	MC QAPP	ESS	
TBD	UXO Team (various)	NA (listed as group)			WS 4,7&8	NA	NA	--
Stan Liang	HSM	Matt Soltis	Matt.Soltis@tetratech.com	(412) 921-8912	NA	WS 3; WS 4; WS 5; WS 7	NA	--

NA: Not Applicable

.

CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-02MEC QAPP&ESS DATE 03/21/2022
LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Janice Horton

1. Documents to be changed. Identify revision, date, section, drawing, etc.

Final MEC QAPP dated June 2021 Munitions Response Quality Assurance Project Plan for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor and Final Explosives Safety Submission (ESS) dated December 2020, Munitions and Explosives of Concern Site Inspection Naval Base Kitsap Bangor (approved by DDESB in April 2021)

-Change in vegetation management requirements.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

Site conditions vegetation is denser than during the site visit several years ago and equipment is unable to traverse some areas. After discussion of issues, the Navy RPM (Janice Horton) resolved and provided the following email direction to Tt o(Linda Klink) in 03/17/2022 email: "After Charlie's discussion with Jerry Clarke, NBK Forester, we are clear to remove any size trees as needed to clear the path for our chipping equipment, even if those trees are larger than 3"dbh. He said. The slash and brush cleared can be chipped and blown onto the forest floor surrounding the cleared area with a very clear statement to not allow the chipped material to pile up, rather ensure the team disperses the chipped material. That which is too large to fit in the chipper can be lopped (branches) and scattered onto the forest floor outside of the cleared area as needed. If necessary to cut materials and pile for later chipping, those piles can pose a risk of decomposition and combustion if not chipped by the end of August when dry conditions would facilitate a spontaneous fire. If piles do need to be made for later chipping please let me know and we'll find a way to ensure those piles are located and removed within an acceptable timeframe based on weather conditions as the season progresses. Lastly, Jerry stated avoiding using blue or orange flagging as those are both used in forestry practices."
Associated changes are provided as per attachment.

Tt Reason for Change (Attach sheet if necessary)

Site conditions vegetation is denser than during the site visit several years ago and equipment is unable to traverse some areas. Accomodations are needed that are acceptable to the Base while still ensuring project objectives are met.

4. Originator: (print name and sign) Linda Klink Linda Klink		**Title** Project Manager	**Date** 3/18/2022
Reviewed by: (print name and sign) Norm Piper, UXO Manager		**Title:** UXO Manager	**Date** 3/18/2022
Site Superintendent (Print name and sign) Syd Rodgers (SUXOS) Syd Rodgers	**Date** 3/18/22	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 3/18/2022
Tt Program QC Manager (Print Name and Sign) Michelle Coffman Michelle Coffman	**Date** 3/18/22	**Navy Acknowledgement (Print name and sign)** Charlie Escola Charlie Escola	**Date** 3/21/2022

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03/18/2022

VEGETATION MANAGEMENT: MEC QAPP AND ESS

Vegetation Management Topic	Final QAPP Requirement	Revision as per Subject FCR-02	Worksheets/Tables/Sections Impacted		
			MEC QAPP	MC QAPP	ESS
Maximum diameter of tree allowable for clearance	3 inches	Allowable to remove any size trees as needed to clear the path for our chipping equipment, even if those trees are larger than 3" diameter.	WS 17, Section 17.2.6 Vegetation Reduction, 3rd paragraph, 4th sentence. Table 22-1, MQO: Vegetation clearance Verification. WS 35, Activity and Records Reviewed: Site Preparation (Vegetation clearance, land survey, ITS setup, mark site boundaries).	NA	Section 6.1, 2nd paragraph, last sentence.
Chipped material disposition	All removed vegetation is to be chipped, and all chipped material is to be collected and removed off site.	Vegetation which is too large to fit in the chipper can be lopped (branches) and scattered onto the forest floor outside of the cleared area as needed. Otherwise, vegetation will be chipped. The slash and brush cleared vegetation can be chipped and blown onto the forest floor surrounding the cleared area. However, it is mandatory to disperse the chipped material rather than allow the chipped material to pile up, which would be a decomposition and fire hazard risk. If it is necessary to cut materials and pile for chipping at a later date, those piles must be chipped by the end of August when dry conditions would facilitate a spontaneous fire. If piles do need to be made for later chipping, inform the forester find a way to ensure those piles are located and removed within an acceptable timeframe based on weather conditions as the season progresses.	WS 17, Section 17.2.6 Vegetation Reduction, 3rd paragraph, last sentence. Table 22-1, MQO: Vegetation clearance Verification. WS 35, Activity and Records Reviewed, Site Preparation (Vegetation clearance, land survey, ITS setup, mark site boundaries)	NA	NA
Flagging for access pathways into remote sites and site boundaries	High visibility flagging tape	Avoiding using blue or orange flagging as those are both used in forestry practices.	Table 22-1, MQO: Mark SI site boundary (each site). WS 35, Activity and Records Reviewed, Site Preparation (Vegetation clearance, land survey, ITS setup, mark site boundaries)	NA	NA

NA: Not Applicable

CLEAN

CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-03 MEC QAPP DATE 04/12/2022

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Janice Horton

1. Documents to be changed. Identify revision, date, section, drawing, etc.

Final MEC QAPP dated June 2021 Munitions Response Quality Assurance Project Plan for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor

-Change in Tetra Tech SUXOS in MEC QAPP:
Worksheets 3 and 5,;Table 3-1; Figure 3-2; Worksheets 4, 7 and 8; and Worksheet 6.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

Change in SUXOS from Syd Rodgers to Forrest Malone, effective 04/15/2022 (transition in progress).

Forrest Malone, UXO Tech 3, point of contact info:

email: forrest.malone@tetratech.com

Cell phone: 918.576.8136

Tt Reason for Change (Attach sheet if necessary)

Changeout of SUXOS.

4. Originator: (print name and sign) Linda Klink Linda Klink		**Title** Project Manager	**Date** 4/12/2022
Reviewed by: (print name and sign) Norm Piper, UXO Manager		**Title:** UXO Manager	**Date** 4/12/2022
Site Superintendent (Print name and sign) Syd Rodgers (SUXOS) Syd Rodgers	**Date** 4/12/22	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 4/12/2022
Tt Program QC Manager (Print Name and Sign) Michelle Coffman Michelle Coffman	**Date** 4/12/22	**Navy Acknowledgement (Print name and sign)** Janice Horton	**Date** 13 April 2022

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CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-04 MEC QAPP DATE 07/08/2022

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Steven Skeehan/Janice Horton

1. Documents to be changed. Identify revision, date, section, drawing, etc.

Final MEC QAPP dated June 2021 Munitions Response Quality Assurance Project Plan for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor

-Change in Tetra Tech key geophysicist personnel listed in MEC QAPP:
Worksheets 3 and 5;Table 3-1; Figure 3-2; Worksheets 4, 7 and 8; and Worksheet 6.
AND
-Change in MEC disposition, Section 17.10 MEC/MPPEH Management (DFW 9), 3rd bullet.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

Personnel Changes:

Project Geophysicist change Jeff Gamey to Matt Barner, PG, matt.barner@tetratech.com, 980.257.6800

QC Geophysicist change Matt Barner to Jessie Powers, jessie.powers@tetratech.com, 434.989.4879

-Site Geophysicist change TBD to Brett Yarborough, brett.yarborough@tetratech.com, 214.908.1829

MEC Disposition Change, Section 17.10 MEC/MPPEH Management (DFW 9), 3rd bullet: Location of MEC disposition expanded to include UXO 3 and UXO 7 for greater flexibility.

"• All controlled detonations will occur at the end of field operations at one location (Site A EOD Training Range) for all explosive waste safe to move." change to "• All controlled detonations will occur at the end of field operations at one of three locations (Site A EOD Training Range, UXO 3, and/or UXO 7 at the direction of the Navy) for all explosive waste safe to move."

Tt Reason for Change (Attach sheet if necessary)

G**eophysicist Personnel Changes:** Changeout of project personnel from June 2021 when MEC QAPP was finalized..
MEC Disposition Additional Areas: Allows for greater flexibility concerning controlled detonations of MEC. Controlled detonation at the EOD Range at the end of the project expanded to additionally allow MEC disposition at UXO 3 and/or UXO 7 at the direction of the Navy.

4. Originator: (print name and sign) Linda Klink Linda Klink		**Title** Project Manager	**Date** 7/7/2022
Reviewed by: (print name and sign) Norm Piper, UXO Manager		**Title:** UXO Manager	**Date** 7/7/2022
Site Superintendent (Print name and sign) Forrest Malone (SUXOS) F. Malone	**Date** 07/7/22	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 7/7/2022
Tt Program QC Manager (Print Name and Sign) Michelle Coffman Michelle Coffman	**Date** 7/8/2022	**Navy Acknowledgement (Print name and sign)**	**Date** 7/21/2022

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CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-05 MEC QAPP DATE 07/25/2022

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Janice Horton

1. Documents to be changed. Identify revision, date, section, drawing, etc.

Final MEC QAPP dated June 2021 Munitions Response Quality Assurance Project Plan for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor

-Change in acceptance criteria for MQO #3-14 in Worksheet #22, Table 22-3.
-Change in SOP4, Section 3.3, 2nd last sentence.
-Change in SOP5, Section 3.1, 10th bullet.
-Change in SOP5, Section 3.3, 5th last sentence.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

Existing requirement: All cited MEC QAPP references in previous section list the EM61-MK2HP sensor lower limit battery level at 11.85V. These citations all indicate that data collected at a battery level less than 11.85V are subject to rejection on the basis of being out of specification.

Recommended changes:
-Worksheet #22, Table 22-3, MQO #3-14 acceptance criteria: Change to "Voltage must be ≥11.0V."
-SOP4, Section 3.3, 2nd last sentence: Change to "During data collection the battery level will be monitored, and the battery will be replaced immediately if the voltage drops below 11.0V."
-SOP5, Section 3.1, 10th bullet: Change to "Continue until area is completely covered, batteries need replacing (<11.0V), RTK DGPS power light flashes, or a break is required."
-SOP5, Section 3.3, 5th sentence: Change to "During data collection the battery level will be monitored, and the battery will be replaced immediately if the voltage drops below 11.0 volts (V)."

Tt Reason for Change (Attach sheet if necessary)

GEM61-MK2 HP systems in use at the project site are on rent from Geonics, Ltd. (manufacturer). During initial system assembly/onsite testing prior to the start of production work, it was observed by the field teams and reported by the Site Geophysicist the batteries supplied with the rental systems would not maintain a 11.85V battery level for an appropriate amount of time to meet daily production goals and maintain schedule efficiency. After consulting with Geonics, it was determined the systems could be safely run to battery levels as low as 11.0V without adverse impact to data usability. These changes are proposed to both address acceptance criteria moving forward as well as retroactively.

4. Originator: (print name and sign) Matt Barner Matthew Barner Digitally signed by: Matthew Barner DN: CN = Matthew Barner email = matt.barner@tetratech.com C = US O = Tetra Tech OU = TMR Date: 2022.07.26 14:49:45 -04'00'		**Title** Project Manager Linda Klink		**Date** 7/26/2022	
Reviewed by: (print name and sign) Norm Piper, UXO Manager		**Title:** UXO Manager		**Date** 7/26/2022	
Site Superintendent (Print name and sign) Forrest Malone (SUXOS) F. Malone	**Date** 07/026/22	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink		**Date** 7/26/2022	
Tt Program QC Manager (Print Name and Sign) Michelle Coffman Michelle Coffman	**Date** 7/26/2022	**Navy Acknowledgement (Print name and sign)**		**Date**	

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CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-06 MEC QAPP DATE 01/17/2023, Rev 1

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Janice Horton

1. Documents to be changed. Identify revision, date, section, drawing, etc.

Final MEC QAPP dated June 2021 Munitions Response Quality Assurance Project Plan for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor.

There are numerous updates to the document sections and tables. These updates are presented in the attached pages in lieu of being summarized in this section.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

As stated in the previous section, the updates addressed by this FCR are numerous and apply to sections of text, tables and figures in the final MEC QAPP. The attached pages present the updates to cited sections of the MEC QAPP.

The FCR addresses an alternate approach to GPR surveying at the MRP sites in support of the SI based on the project team review of existing site conditions. Key updates include elimination of full coverage GPR surveys and opting for focused GPR profile surveys across anomaly footprints of interest identified in the DGM results.

The revised agreed-upon scope with the PDT for the GPR work is as follows:

- Site UXO 4: 12 profiles
- Site UXO 7: 7 profiles
- Site UXO 17: 9 profiles
- Site UXO 17B: 10 profiles

Attachments provided with this FCR include a summary table of the MRP geophysical sites, presenting original GPR approach and proposed alternative approach, updates to relevant text and tables in the MEC QAPP and figures depicting the GPR profile locations.

4. Originator: (print name and sign) Matt Barner Matthew Barner Digitally signed by: Matthew Barner DN: CN = Matthew Barner email = matt.barner@tetratech.com C = US O = Tetra Tech OU = TMR Date: 2023.01.17 15:11:08 -08'00'		**Title** Project Manager Linda Klink	**Date** 01/17/2023
Reviewed by: (print name and sign) Norm Piper, UXO Manager		**Title:** UXO Manager	**Date** 12/09/2022
Site Superintendent (Print name and sign) Forrest Malone (SUXOS)	**Date** 12/09/22	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 01/17/2023
Tt Program QC Manager (Print Name and Sign) Michelle Coffman Michelle Coffman	**Date** 1/17/2023	**Navy Acknowledgement (Print name and sign)** Charles Escola Charles Escola NTR	**Date** 02/07/2023

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MEC QAPP FCR-06, ATTACHMENT 1
EVALUATION OF MEC QAPP PLANNED GPR VERSUS CONSENSUS NEED FOR GPR/COVERAGE, BANGOR MRP SI

SITE NAME/ LOCATION (1,2)	TOTAL SITE SIZE (ac)	SI AREA (ac)	FOOTPRINT FOR GEOPHYSICAL MAPPING (ac)	GPR Geophysical Survey and Coverage		Comments
				Planned (3)	Consensus	
UXO 000003 [redacted] (Site D), Lower Base	37	20	20 ac	No	No	No change, no GPR
UXO 000004 [redacted] (Site 9), Upper Base	6	3.3	3.3 ac	Transects (27 feet nominal transect spacing = 0.3 ac)	Yes Transects (12 transects, 1,256 linear feet)	GPR transects as planned but less acreage. Consensus as per 10/07/2022 Navy/Tetra Tech telecon and determination of GPR transect locations as per 10/21/2022 Navy/Tetra Tech telecon with revised GPR transect mapping provided in email of 10/24/2022.
UXO 000007 [redacted] (Site 23), North Lower Base	1	1	1 ac	Transects (12 feet nominal transect spacing = 0.2 ac) plus Full coverage (= 0.7 ac)	Yes Transects (7 transects, 354 linear feet)	GPR but transects only. Consensus as per 09/19/2022 and 10/17/2022 Navy/Tetra Tech telecons and determination of GPR transect locations as per 10/21/2022 Navy/Tetra Tech telecon with revised GPR transect mapping provided in email of 10/24/2022.
UXO 000011 [redacted] (Site 14), Lower Base	2	1.3	1.3 ac	Transects (16 feet nominal transect spacing = 0.2 ac)	No	No GPR. Consensus as per followup site visit of 09/22/22 following 09/19/2022 Navy/Tetra Tech telecon.
UXO 000011B[4] [redacted] (Site 8), Lower Base	2	2	2 ac	Transects (50 feet nominal transect spacing = 0.1 ac)	No	No GPR. Consensus as per 10/21/2022 Navy/Tetra Tech telecon.
UXO 000013 [redacted] (Site 4 [redacted]), Lower Base	4.1	2.5	2.5 ac	No	No	No change, no GPR
UXO 000017 [redacted] (Site 2), Upper Base	9.3	9.3	9.3	Full Coverage (= 0.4 ac) of landfill area only	Yes Transects (9 transects, 1,121 linear feet)	GPR but transects vs full coverage and more areas than just landfill based on EM61-HP & TEM-8g results. Consensus as per 10/07/2022 Navy/Tetra Tech telecon and determination of GPR transect locations as per 10/31/22 Navy/Tetra Tech telecon with revised GPR transect mapping provided with telecon minutes.
UXO 000017B [redacted] (Site 1), Upper Base	67	13.3	13.3	Full Coverage (= 13.3 ac)	Yes Transects (10 transects, 1,371 linear feet)	GPR but less acreage and transects vs full coverage. Consensus and determination of GPR transect locations as per 11/04/2022 Navy/Tetra Tech telecon.

CONTRACT NUMBER N6247016D9008
TASK ORDER N4425519F4112
FCR-06, Attachment 2, Rev 1

This document summarizes updates to the final MEC QAPP for the subject task order. Text sections and tables in the MEC QAPP are presented in black font, whereas the proposed updates are in red font.

Worksheet #11, Section 11.5, Decision Rule #6.

Current Text:

Decision Rule #6: For sites where 100 percent coverage GPR surveys are planned, if localized site-specific conditions (e.g., micro-terrain, slopes) are not favorable for collection of high-quality GPR data across 100 percent of the survey area, then the Navy will be notified, and a suitable alternative will be discussed for gathering data to support the SI objective and data gathering goals (including, but not limited to, doing a partial GPR survey).

Update:

Decision Rule #6: If a site has GPR surveys planned, then the PDT will evaluate potential alternatives to the GPR data collection to the follow-up GPR approach with respect to site conditions and to still meet the project objectives. The decision-logic for this process will be documented in PDT meeting minutes, and alternative approaches to the GPR survey locations will be added to the master project GIS.

Worksheet #12, Table 12-1, Measurements #3 and #12.

Current Text:

Table 12-1. Measurement Performance Criteria (1)

Measurement	Data Quality Indicator	Specification	Activity Used to Assess Performance
3. Planned survey coverage (full coverage – analog and DGM and GPR)	Representativeness/ Completeness	For individual sites with full survey coverage approach, data collection will provide 100% coverage of the planned survey area. This criterion applies to sites undergoing full coverage analog, DGM and GPR surveys.	UXOQCS reviews analog survey findings to assess coverage; QC geophysicist reviews DGM survey results to assess coverage. Completion of coverage will be assessed against documented field conditions during site preparation activities.
12. Survey coverage (full coverage – DGM and GPR)	Accuracy/ Completeness	100% of specified acreage is surveyed at the achieved lane spacing.	QC Geophysicist evaluates coverage through data package verification and validation process

Update:

Table 12-1. Measurement Performance Criteria (1)			
Measurement	**Data Quality Indicator**	**Specification**	**Activity Used to Assess Performance**
3. Planned survey coverage (full coverage – analog and DGM)	Representativeness/ Completeness	For individual sites with full survey coverage approach, data collection will provide 100% coverage of the planned survey area. This criterion applies to sites undergoing full coverage analog and DGM surveys.	UXOQCS reviews analog survey findings to assess coverage; QC geophysicist reviews DGM survey results to assess coverage. Completion of coverage will be assessed against documented field conditions during site preparation activities.
12. Survey coverage (full coverage – DGM)	Accuracy/ Completeness	100% of specified acreage is surveyed at the achieved lane spacing.	QC Geophysicist evaluates coverage through data package verification and validation process

[1] Worksheet #17 details the site-specific requirements, including Table 17-1 Summary of SI Data Collection by Site, Table 17-2 DGM and GPR Transect Surveys, and Table 17-3 DGM Full Coverage Surveys. Site-specific requirements are important to ensure that appropriate areas were worked. See Worksheet #22 for Corrective Action dictating resurvey Root Cause Analysis and Corrective Action.

Worksheet #17, Section 17.1, 2nd and 3rd paragraphs.

Current Text:

Tables 17-1 through 17-3 present the field survey details for each site to be investigated during the SI. Table 17-1 includes MPPEH items reported to have been found at each site. As shown on Figures 17-1 through 17-21, the administrative extent (i.e., the footprint) of each site in some instances may be larger than the area undergoing inspection. Table 17-1 lists the size of each site along with the footprint of the survey areas for planned analog surface surveys, DGM and GPR surveys based on the scope of services requested by the Navy for this SI. Where MPPEH is listed in this table, it is not known whether munitions-related items were further categorized as MEC, MD, scrap or other. Table 17-1 and Figures 17-1 through 17-21 also provide information about the area where site preparation activities will be performed in advance of digital geophysical surveys at each site.

Additional survey design specifics are provided in Tables 17-2 and 17-3. Table 17-2 presents the survey design details for those sites where a portion of the site will undergo DGM and GPR surveys along transects. Table 17-3 presents the area at each site across which full coverage (i.e., 100 percent coverage) surveying will be completed.

Updates:

Tables 17-1 through 17-4 present the field survey details for each site to be investigated during the SI. Table 17-1 includes MPPEH items reported to have been found at each site. As shown on Figures 17-1 through 17-21, the administrative extent (i.e., the footprint) of each site in some instances may be larger than the area undergoing inspection. Table 17-1 lists the size of each site along with the footprint of the survey areas for planned analog surface surveys and DGM surveys based on the scope of services requested by the Navy for this SI. This table also notes whether GPR surveying will be performed at the site based on PDT evaluation of site conditions documented during the DGM surveys. Where MPPEH is listed in this table, it is not known whether munitions-related items were further categorized as MEC, MD, scrap or other. Table 17-1 and Figures 17-1 through 17-21 also provide information about the area where site preparation activities will be performed in advance of digital geophysical surveys at each site.

Additional survey design specifics are provided in Tables 17-2 through 17-4. Table 17-2 presents the survey design details for those sites where a portion of the site will undergo DGM surveys along transects. Table 17-3 presents the area at each site across which full coverage (i.e., 100 percent coverage) surveying will be completed. Table 17-4 presents the GPR data collection at each site where the survey will be performed.

Worksheet #17, Table 17-1.

This table is updated to reflect which MRP sites will have GPR surveying based on PDT meetings during the SI data reviews. Only the first and last columns of this table from the MEC QAPP are presented for brevity. These updates also reflect previous FCRs where geophysical surveys were eliminated altogether from certain sites.

Current Text:

TABLE 17-1: SUMMMARY OF SI DATA COLLECTION ACTIVITIES BY SITE

SITE NAME/ LOCATION	Planned Geophysical Survey Coverage[1]			
	Types	EM61-MK2 HP T/FC (acres)	TEM-8g T/FC (acres)	GPR T/FC (acres)
UXO 02 [redacted] (Site CC), Keyport Annex	N/A	Not Applicable (N/A)	N/A	N/A
UXO 03 [redacted] (Site D), Lower Base	T/FC	T (5.4)	FC (0.5)	N/A
UXO 04 [redacted] (Site 9), Upper Base	T/FC	T & FC (1.1)	T & FC (0.5)	T (0.3)
UXO 06 [redacted] (Site 22), North Lower Base	NA	N/A	N/A	N/A
UXO 07 [redacted] (Site 23), North Lower Base	T/FC	T (0.1)	FC (0.8)	T & FC (0.9)
UXO 07B [redacted] (OU1 Site A), North Lower Base	N/A	N/A	N/A	N/A
UXO 08 [redacted] (Site NN), Waterfront Restricted Area	T/FC	T & FC (0.7)	FC (3.7)	T (0.8)
UXO 09 [redacted] (Site OO), North Lower Base	NA	N/A	N/A	N/A
UXO 10 [redacted] (Site 12), Waterfront Restricted Area	T	T (1.1)	N/A	T (0.2)
UXO 11 [redacted] (Site 14), Lower Base	T	T (0.3)	N/A	T (0.2)
UXO 11B [redacted] (Site 8), Lower Base	T	T (0.3)	N/A	T (0.1)
UXO 12 [redacted] (Site HH), Lower Base	NA	N/A	N/A	N/A
UXO 13 [redacted] (Site 4[redacted]), Lower Base	T	T (0.3)	N/A	N/A
UXO 14 [redacted] (Site JJ), Waterfront Restricted Area	NA	N/A	N/A	N/A
UXO 15 [redacted] (Site KK), Waterfront Restricted Area	T/FC	T (0.8)	FC (5.6)	T (0.2)
UXO 16	T/FC	T (1.1)	FC (2.2)	N/A

SITE NAME/ LOCATION	Planned Geophysical Survey Coverage[1]			
	Types	EM61-MK2 HP T/FC (acres)	TEM-8g T/FC (acres)	GPR T/FC (acres)
[redacted] (Site LL), Waterfront Restricted Area				
UXO 17 [redacted] (Site 2), Upper Base	FC	FC (5)	FC (9.3)	FC (0.4)
UXO 17B [redacted] (Site 1), Upper Base	FC	FC (13.3)	FC (13.3)	FC (13.3)
UXO 17C [redacted] (Site BB), Upper Base	NA	N/A	N/A	N/A

[1] Transect-based survey (T) or full coverage (FC) (i.e., grid-based survey across portion of footprint requiring geophysical mapping) or combination of the two (T/FC).

Update:

TABLE 17-1: SUMMMARY OF SI DATA COLLECTION ACTIVITIES BY SITE

SITE NAME/ LOCATION	Planned Geophysical Survey Coverage[1]			
	Types	EM61-MK2 HP T/FC (acres)	TEM-8g T/FC (acres)	GPR YES OR N/A
UXO 02 [redacted] (Site CC), Keyport Annex	N/A	Not Applicable (N/A)	N/A	N/A
UXO 03 [redacted] (Site D), Lower Base	T/FC	T (5.4)	FC (0.5)	N/A
UXO 04 [redacted] (Site 9), Upper Base	T/FC	T & FC (1.1)	T & FC (0.5)	YES
UXO 06 [redacted] (Site 22), North Lower Base	NA	N/A	N/A	N/A
UXO 07 [redacted] (Site 23), North Lower Base	T/FC	T (0.1)	FC (0.8)	YES
UXO 07B [redacted] (OU1 Site A), North Lower Base	N/A	N/A	N/A	N/A
UXO 08 [redacted] (Site NN), Waterfront Restricted Area	N/A	N/A	N/A	N/A
UXO 09 [redacted] (Site OO), North Lower Base	NA	N/A	N/A	N/A
UXO 10 [redacted] (Site 12), Waterfront Restricted Area	N/A	N/A	N/A	N/A
UXO 11 [redacted] (Site 14), Lower Base	T	T (0.3)	N/A	N/A
UXO 11B [redacted] (Site 8), Lower Base	T	T (0.3)	N/A	N/A
UXO 12 [redacted] (Site HH), Lower Base	NA	N/A	N/A	N/A
UXO 13 [redacted] (Site 4 [redacted] [redacted]), Lower Base	T	T (0.3)	N/A	N/A
UXO 14 [redacted] (Site JJ), Waterfront Restricted Area	NA	N/A	N/A	N/A
UXO 15 [redacted] (Site KK), Waterfront Restricted Area	N/A	N/A	N/A	N/A
UXO 16 [redacted] (Site LL), Waterfront Restricted Area	N/A	N/A	N/A	N/A

SITE NAME/ LOCATION	Planned Geophysical Survey Coverage[1]			
	Types	EM61-MK2 HP T/FC (acres)	TEM-8g T/FC (acres)	GPR YES OR N/A
UXO 17 [redacted] (Site 2), Upper Base	FC	FC (5)	FC (9.3)	YES
UXO 17B [redacted] (Site 1), Upper Base	FC	FC (13.3)	FC (13.3)	YES
UXO 17C [redacted] (Site BB), Upper Base	NA	N/A	N/A	N/A

[1] Transect-based survey (T) or full coverage (FC) (i.e., grid-based survey across portion of footprint requiring geophysical mapping) or combination of the two (T/FC).

Worksheet #17, Table 17-2.

Due to the nature of the updates made to the GPR scope, this table will be renamed and updated to remove references to GPR. The revised GPR scope will be summarized in new Table 17-4. The proposed updates also reflect previous FCRs where geophysical surveys were eliminated altogether from certain sites. Sites with no geophysical surveys completed are removed from the proposed updates to Table 17-2.

Current Text:

TABLE 17-2: DGM AND GPR TRANSECT SURVEYS

SITE NAME/ LOCATION	EM61-MK2[1] Nominal Transect Spacing[4] (feet)	TEM-8g[2] Nominal Transect Spacing[4] (feet)	GPR[3] Nominal Transect Spacing[4] (feet)	Geophysical Survey Transect Coverage		
				EM61-MK2 HP (acres)	TEM-8g (acres)	GPR (acres)
UXO 03 [redacted] (Site D), Lower Base	12	N/A	N/A	5.4	N/A	N/A
UXO 04 [redacted] (Site 9), Upper Base	10	190	27	1	0.1	0.3
UXO 07 [redacted] (Site 23), North Lower Base	33	N/A	12	0.1	N/A	0.2
UXO 08 [redacted] Site NN), Waterfront Restricted Area	61	N/A	12	0.2	N/A	0.8
UXO 10 [redacted] (Site 12), Waterfront Restricted Area	7	N/A	29	1.1	N/A	0.2
UXO 11 [redacted] (Site 14), Lower Base	22	N/A	16	0.3	N/A	0.2
UXO 11B [redacted] (Site 8), Lower Base	22	N/A	50	0.3	N/A	0.1
UXO 13 [redacted] (Site 4 [redacted]), Lower Base	27	N/A	N/A	0.3	N/A	N/A

SITE NAME/ LOCATION	EM61-MK2[1] Nominal Transect Spacing[4] (feet)	TEM-8g[2] Nominal Transect Spacing[4] (feet)	GPR[3] Nominal Transect Spacing[4] (feet)	Geophysical Survey Transect Coverage		
				EM61-MK2 HP (acres)	TEM-8g (acres)	GPR (acres)
UXO 15 [redacted] (Site KK), Waterfront Restricted Area	28	N/A	85	0.8	N/A	0.2
UXO 16 [redacted] (Site LL), Waterfront Restricted Area	30	N/A	N/A	1.1	N/A	N/A

[1] EM61-MK2 HP sensor swath: 3.3ft
[2] TEM-8g sensor swath: 5.8ft
[3] GPR antenna swath: 2.5ft (note: this is specific to the Noggin 100 GPR system)
[4] Transect spacing refers to center-to-center spacing

Updates:

TABLE 17-2: DGM TRANSECT SURVEYS

SITE NAME/ LOCATION	EM61-MK2[1] Nominal Transect Spacing[4] (feet)	TEM-8g[2] Nominal Transect Spacing[4] (feet)	Geophysical Survey Transect Coverage	
			EM61-MK2 HP (acres)	TEM-8g (acres)
UXO 03 [redacted] (Site D), Lower Base	12	N/A	5.4	N/A
UXO 04 [redacted] (Site 9), Upper Base	10	190	1	0.1
UXO 07 [redacted] (Site 23), North Lower Base	33	N/A	0.1	N/A
UXO 11 [redacted] (Site 14), Lower Base	22	N/A	0.3	N/A
UXO 11B [redacted] (Site 8), Lower Base	22	N/A	0.3	N/A
UXO 13 [redacted] (Site 4[redacted]), Lower Base	27	N/A	0.3	N/A

[1] EM61-MK2 HP sensor swath: 3.3ft
[2] TEM-8g sensor swath: 5.8ft

Worksheet #17, Table 17-3.

Due to the nature of the updates made to the GPR scope, this table will be renamed and updated to remove references to GPR. The revised GPR scope will be summarized in new Table 17-4. The proposed updates also reflect previous FCRs where geophysical surveys were eliminated altogether from certain sites. Sites with no geophysical surveys completed are removed from the proposed updates to Table 17-3.

Current Text:

TABLE 17-3: DGM AND GPR FULL COVERAGE SURVEYS

SITE NAME/ LOCATION	EM61-MK2 HP (acres)	TEM-8g (acres)	GPR (acres)
UXO 03 [redacted] (Site D), Lower Base	N/A	0.5	N/A
UXO 04 [redacted] (Site 9), Upper Base	0.1	0.4	N/A
UXO 07 [redacted] (Site 23), North Lower Base	N/A	0.8	0.7
UXO 08 [redacted] (Site NN), Waterfront Restricted Area	0.5	3.7	N/A
UXO 15 [redacted] (Site KK), Waterfront Restricted Area	N/A	5.6	N/A
UXO 16 [redacted] (Site LL), Waterfront Restricted Area	N/A	2.2	N/A
UXO 17 [redacted] (Site 2), Upper Base	5	9.3	0.4
UXO 17B [redacted] (Site 1), Upper Base	13.3	13.3	13.3

Updates:

TABLE 17-3: DGM FULL COVERAGE SURVEYS

SITE NAME/ LOCATION	EM61-MK2 HP (acres)	TEM-8g (acres)
UXO 03 [redacted] (Site D), Lower Base	N/A	0.5
UXO 04 [redacted] (Site 9), Upper Base	0.1	0.4
UXO 07 [redacted] (Site 23), North Lower Base	N/A	0.8
UXO 17 [redacted] (Site 2), Upper Base	5	9.3
UXO 17B [redacted] (Site 1), Upper Base	13.3	13.3

Worksheet #17, Table 17-4 (new).

Due to the nature of the updates made to the GPR scope, this table is added as part of this FCR to document the GPR scope to be completed at each MRP site. This table is a new addition and not an update from an existing table.

TABLE 17-4: SITES WITH GPR SURVEYING

SITE NAME/ LOCATION	GPR SCOPE	TRANSECT LENGTH (linear feet)
UXO 04 [redacted] (Site 9), Upper Base	12 profiles	1,256
UXO 07 [redacted] (Site 23), North Lower Base	7 profiles	354
UXO 17 [redacted] (Site 2), Upper Base	9 profiles	1,121
UXO 17B [redacted] (Site 1), Upper Base	10 profiles	1,371

Worksheet #17, Section 17.1 1st paragraph after Tables 17-1 through 17-4.

Current Text:

For the sites listed in Tables 17-1 through 17-3, the primary rationale for the survey design is gathering an appropriate amount of data to meet the DQOs in Worksheet #11. Onboard review of the sites during QAPP development was performed by the Navy and Tetra Tech, assisted by available historical documentation and aerial images of the individual sites. The aerial imagery guided the decisions regarding the deployment of planned geophysical sensors, and potential site access restrictions were also considered.

Update:

For the sites listed in Tables 17-1 through 17-4, the primary rationale for the survey design is gathering an appropriate amount of data to meet the DQOs in Worksheet #11. Onboard review of the sites during QAPP development was performed by the Navy and Tetra Tech, assisted by available historical documentation and aerial images of the individual sites. The aerial imagery guided the decisions regarding the deployment of planned geophysical sensors, and potential site access restrictions were also considered.

Worksheet #17, Section 17.8, 1st and 2nd paragraphs.

Current Text:

GPR surveys will be performed during the SI as a combination of transect surveys and full coverage surveys using grids (see Tables 17-1 through 17-3). GPR surveys will be conducted after site preparation activities, QC seeding and UXO detector-aided surface surveys are complete. Tetra Tech intends to use a Sensors & Software, Inc. Noggin 100 GPR system for completion of the GPR surveys. However, if during site preparation it is determined a different GPR system or antenna frequency would be more appropriate for the site conditions, Tetra Tech will switch to a system that provides optimal data quality and productivity for meeting the survey objectives. The selected GPR system will be assembled and operated in accordance with the manufacturer instruction manual.

The Noggin 100 system includes integrated GPS capabilities as well as a built-in odometer for tracking along-line distances. Where conditions are favorable, Tetra Tech will use GPS or RTS positioning methods with the GPR surveys.

Update:

GPR surveys will be performed during the SI in accordance with Table 17-4. The surveys will comprise collection of individual profiles strategically focusing on features of interest identified in the DGM results. The selected GPR system will be assembled and operated in accordance with the manufacturer instruction manual.

Tetra Tech will use the Geophysical Survey Systems, Inc. (GSSI) SIR-4000 GPR system with a 350-MHz scanning antenna to perform the GPR surveys. The GSSI system includes integrated Juniper Systems sub-meter GPS capabilities as well as a built-in odometer for tracking along-line distances. The entire system is mounted to a 4-wheel pushcart for collection of data at the sites. The objective of the GPR survey is to assess subsurface conditions at select DGM features; survey-grade positioning methods (i.e., centimeter-level accuracy) will not be used.

Worksheet #17, Section 17.8.1.

Current Text:

Table 17-2 presents the spacing for the sites where GPR surveying will be completed along transects. For full coverage GPR surveys (Table 17-3), a nominal profile spacing of 10 feet will be used. Unlike the DGM surveys, the objective of the GPR surveys is not to identify discrete objects in the subsurface potentially indicative of munitions-related items. Therefore, a spacing of 10 feet for full coverage GPR surveys will provide an appropriate amount of data coverage to meet the survey objectives and support achievement of the project DQOs in Worksheet #11.

Navigation along GPR transects will occur in a similar manner as the EM61-MK2 HP transect and grid surveys (DFW 6). Where conditions are favorable, the survey lanes will be marked in the field to assist with along-line navigation, or a UXO technician with transect lines pre-loaded on a GPS device will walk ahead of the GPR operator. Full coverage surveys will be completed using the established grid network onsite, but the final presentation of the data will not be registered to individual grids and presented as such because meaningful interpretation of the sitewide GPR results does not lend itself to this type of presentation.

GPR field data management will conform to the same requirements in this worksheet discussed for the DGM surveys.

Update:

Unlike the DGM surveys, the objective of the GPR surveys is not to identify discrete objects in the subsurface potentially indicative of munitions-related items. The GPR will be used to further evaluate the depth of features of interest identified in the DGM results. These features are generally characterized as saturated response areas in the DGM data.

Navigation along GPR transects will occur in a similar manner as the EM61-MK2 HP transect and grid surveys (DFW 6). Where conditions are favorable, the profile locations will be marked in the field to assist with along-line navigation, or a UXO technician with transect lines pre-loaded on a GPS device will walk ahead of the GPR operator.

GPR field data management will conform to the same requirements in this worksheet discussed for the DGM surveys.

Worksheet #17, Section 17.9.3.

Current Text:

GPR data processing will be performed using manufacturer-supplied software in accordance with the software instruction manual. The specific data reduction steps during GPR data processing may vary from one type of system to the next but will generally consist of the following steps:

- Adjusting gains and dielectric constant based on observed field conditions
- Removing reflections between the bottom of the antenna and the ground surface
- Normalizing the distance profiles relative to marker locations (i.e., fiducials) inserted in the data (as applicable)

- Removing background and noise-related effects in the data (as appropriate)
- Generating 2-Dimensional profiles for interpretation of depth to buried wastes, debris or other features of interest

Tetra Tech will also generate individual depth slices of the GPR data, provided the collected data density supports this additional analysis. This additional analysis would be performed for full coverage GPR data sets and would be performed to assist the interpretation of the lateral extent and depth to buried wastes on a sitewide basis, as opposed to attempting to draw this level of interpretation from a series of closely-spaced individual 2-Dimensional profiles. Manufacturer-supplied software (Sensors & Software, Inc.) will be used, or Tetra Tech will use the third-party software GPR-SLICE by the Geophysical Archaeometry Laboratory. Analysis of the data through generation of depth slices will be performed in accordance with the specific software manufacturer instruction manual.

With the generation of individual depth slices, a volume of collected GPR data is analyzed. After setting the survey geometry, the data are re-gained, undergo background removal and filtering, as appropriate, to generate individual 2-Dimensional slices (i.e., cuts along the z-axis) of the survey area at a user-specified depth interval (e.g., 1 foot). Individual intervals may overlap each other or may be successive in depth.

Update:

GPR data processing will be performed using manufacturer-supplied software in accordance with the software instruction manual. The specific data reduction steps during GPR data processing will consist of the following steps:

- Adjusting gains and dielectric constant based on observed field conditions
- Removing reflections between the bottom of the antenna and the ground surface
- Removing background and noise-related effects in the data (as appropriate)
- Generating 2-Dimensional profiles for interpretation of depth to buried wastes, debris or other features of interest

Worksheet #17, Section 17.9.4, 2nd last paragraph.

Current Text:

Final processed GPR data packages will include field notes, raw and processed instrument-specific profiles, and as applicable, plan-view depth slice images and supporting processing files associated with generation of the depth slices. Results maps will include polygons indicating suspected buried wastes.

Update:

Final processed GPR data packages will include field notes, raw and processed two-dimensional cross-sections of the collected profiles.

<u>Worksheet #22, Table 22-4.</u>

Current Text:

Table 22-4. GPR Surveys(1)

Measurement Quality Objective	Applicable DFWs	MQO#	Frequency	Responsible Person/ Reporting Method/ Verified by:	Acceptance Criteria	Failure Response
Verify correct assembly	7	4-1	Each time sensor is assembled	Site Geophysicist / Daily field log / QC Geophysicist	As specified in instrument operation manual	Make necessary adjustments and re-verify prior to use of sensor. If failure identified after start of GPR operations, then RCA/CA.
Instrument Function Test	7	4-2	Each time sensor is turned on.	Site Geophysicist / Daily field log / QC Geophysicist	• Communication established between antenna and data logger • GPR antenna receives signal	Make necessary adjustments and re-verify prior to use of sensor. If failure identified after start of GPR operations, then RCA/CA.
Odometer Function Test (Survey Wheel Mode)	7	4-3	At the start of each day data collection is performed without the use of RTK GPS or RTS.	Site Geophysicist / Daily field log / QC Geophysicist	Odometer (survey wheel) accurate to within ±3.3ft when odometer/survey wheel data used for positioning	Make necessary adjustments and re-verify prior to use of sensor. If failure identified after start of daily GPR operations, then RCA/CA.
Transect Coverage	7	4-3	Verified for each GPR transect collected with RTK GPS or RTS	Project Geophysicist/ GPR results maps/ GPR Data Processor; QC Geophysicist	Survey path within 25ft of planned transect alignment. Missing transects or deviations outside tolerance are explained (e.g., navigate around obstruction)	RCA/CA when no adequate explanation provided for deviation; collect missing transects or transect segments.
Full Coverage	7	4-4	Verified for each processed data set collected with RTK GPS or RTS	Project Geophysicist/ GPR results maps/ GPR Data Processor; QC Geophysicist	≥90% survey paths within ±5ft of planned transect spacing of 10ft; ≥98% survey paths within ±10ft. Missing transects or deviations outside tolerance are explained (e.g., navigate around obstruction)	RCA/CA for gaps not identified by GPR Data Processor and resolved with field team or for gaps not otherwise adequately explained in field notes.

Measurement Quality Objective	Applicable DFWs	MQO#	Frequency	Responsible Person/ Reporting Method/ Verified by:	Acceptance Criteria	Failure Response
Full Coverage – Line and Fiducial Positioning	7	4-5	Verified for processed data set collected with line and fiducial positioning method	Project Geophysicist/ GPR results maps/ GPR Data Processor; QC Geophysicist	Visual inspection and photographic records of field positioning methods	RCA/CA
Valid position data (RTK GPS)	5, 7	3-15	Verified for each processed data set collected with RTK GPS or RTS	Project Geophysicist/ DGM processed database/ DGM Data Processor; QC Geophysicist	≥98% GPS fix quality 4. Gaps must be bounded by GPS fix quality 4 data.	RCA/CA for gaps not identified by GPR Data Processor and sent to the field for in-fill data collection.

[1] Stand-alone SOPS are not available for GPR surveys; governing means and methods for GPR are included within the QAPP worksheets.

Update:

Table 22-4. GPR Surveys(1)

Measurement Quality Objective	Applicable DFWs	MQO#	Frequency	Responsible Person/ Reporting Method/ Verified by:	Acceptance Criteria	Failure Response
Verify correct assembly	7	4-1	Each time sensor is assembled	Site Geophysicist / Daily field log / QC Geophysicist	As specified in instrument operation manual	Make necessary adjustments and re-verify prior to use of sensor. If failure identified after start of GPR operations, then RCA/CA.
Instrument Function Test	7	4-2	Each time sensor is turned on.	Site Geophysicist / Daily field log / QC Geophysicist	• Communication established between antenna and data logger • GPR antenna receives signal	Make necessary adjustments and re-verify prior to use of sensor. If failure identified after start of GPR operations, then RCA/CA.
Odometer Function Test (Survey Wheel Mode)	7	4-3	At the start of each day data collection is performed without the use of GPS.	Site Geophysicist / Daily field log / QC Geophysicist	Odometer (survey wheel) accurate to within ±3.3ft when odometer/survey wheel data used for positioning	Make necessary adjustments and re-verify prior to use of sensor. If failure identified after start of daily GPR operations, then RCA/CA.

[1] Stand-alone SOPS are not available for GPR surveys; governing means and methods for GPR are included within the QAPP worksheets.

Worksheet #29, Part 2, DGM and GPR Deliverables; Three Phase Inspection Checklists (TPC).

Current Text:

Document/Record	Generation Purpose	Completion/ Update Frequency	Format/Storage Location/Archive Requirements
Three Phase Inspection Checklists (TPC)	Documents the completion of the three phases of control undertaken for each DFW.	Preparatory: Once prior to the start of work for each DFW (per DFW). Initial: Once at the onset of work for each DFW to summarize completion of the preparatory phase (per DFW). Ongoing: Weekly per DFW, unless otherwise specified in this MEC QAPP or in SOPs and if not address via another reporting means (e.g. daily production reports, weekly geophysical QC reports, etc.).	Electronic copy/SharePoint or Server/ Archived electronically
DGM and GPR Data Deliverables	Digital instrument files (raw data), preliminary processing and final processing files (e.g., Geosoft databases, target lists, false color DGM mosaics, SRA outlines, GPR maps, etc.)	Raw preliminary and processed files updated weekly (along with weekly geophysical QC report). Note: data processing will occur each day after the start of field operations, although delivery of final processed files will be on a weekly basis.	Digital data files/SharePoint, Server, Archived electronically

Update:

Document/Record	Generation Purpose	Completion/ Update Frequency	Format/Storage Location/Archive Requirements
Three Phase Inspection Checklists (TPC) checklists	Documents the completion of the three phases of control undertaken for each DFW.	Preparatory: Once prior to the start of work for each DFW specified in Section 14.1. Initial: Once at the onset of work for each DFW specified in Section 14.1. Ongoing: Weekly per DFW, unless otherwise specified in this MEC QAPP or in SOPs and if not address via another reporting means (e.g. daily production reports, weekly geophysical QC reports, etc.).	Electronic copy/SharePoint or Server/ Archived electronically
DGM and GPR Data Deliverables	Digital instrument files (raw data), preliminary processing and final processing files (e.g., Geosoft databases, target lists, false color DGM mosaics, SRA outlines, GPR profiles, etc.)	Raw preliminary and processed files updated weekly (along with weekly geophysical QC report). Note: data processing will occur each day after the start of field operations, although delivery of final processed files will be on a weekly basis.	Digital data files/SharePoint, Server, Archived electronically

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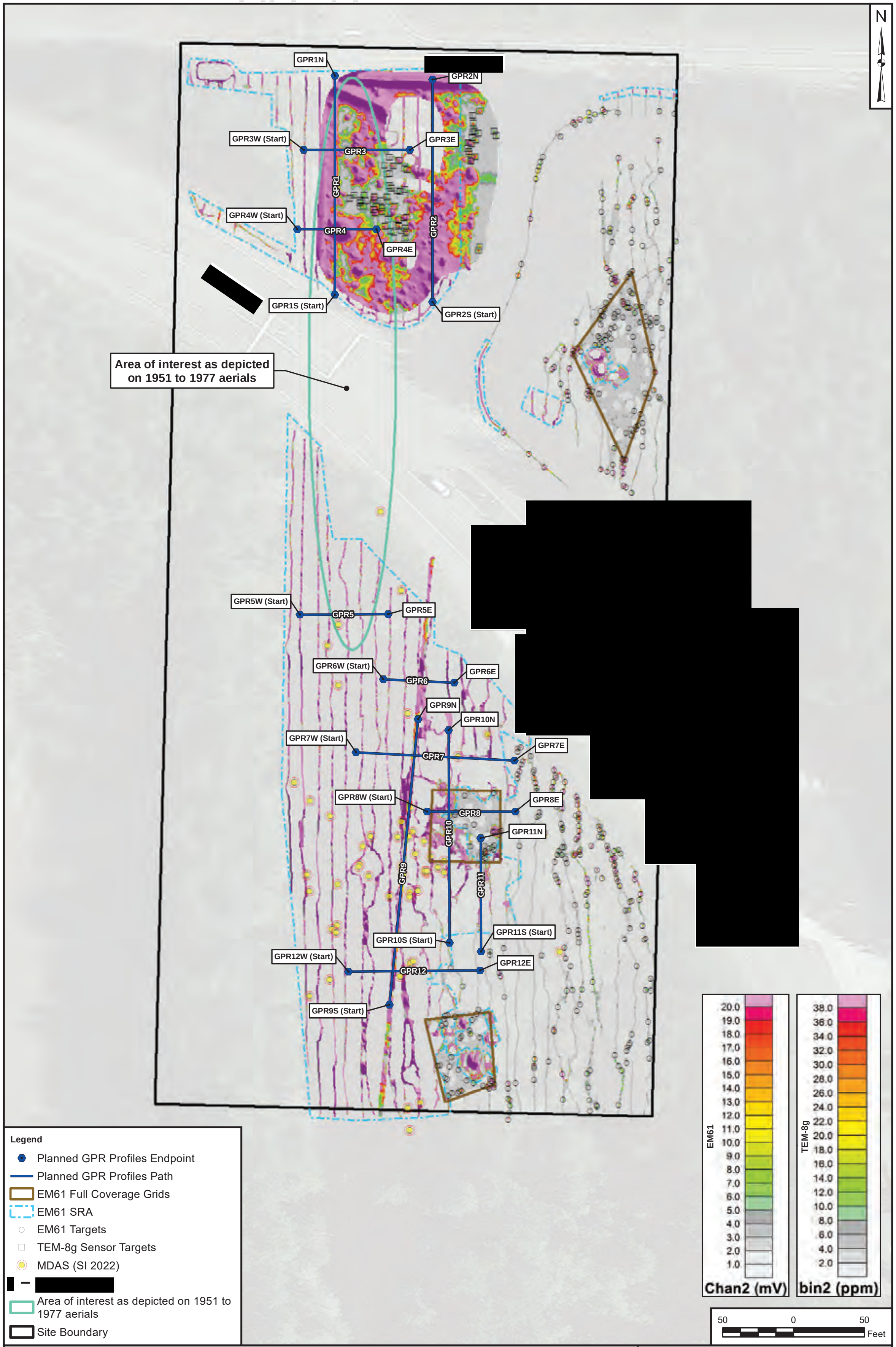

2022 SITE INSPECTION RESULTS
UXO 04 [redacted] (SITE 9)
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC
Naval Facilities Engineering Systems Command

DRAWN BY	DATE	CTO
J.MADDEN	10/24/22	-
CHECKED BY	DATE	FIGURE NUMBER
M.BARNER	10/24/22	0

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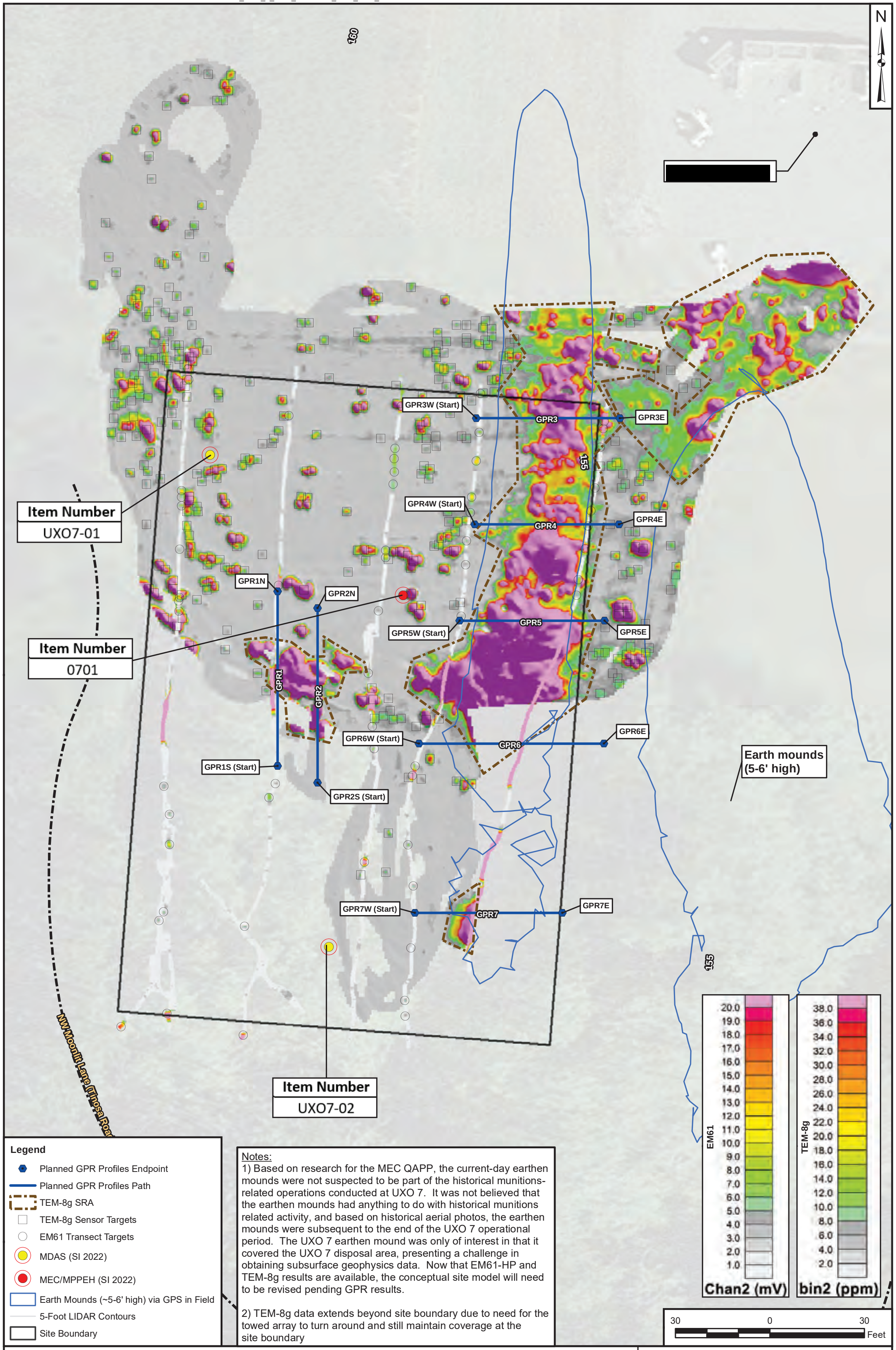

Legend

- ⬢ Planned GPR Profiles Endpoint
- — Planned GPR Profiles Path
- ▭ TEM-8g SRA
- □ TEM-8g Sensor Targets
- ○ EM61 Transect Targets
- ● MDAS (SI 2022)
- ● MEC/MPPEH (SI 2022)
- ▭ Earth Mounds (~5-6' high) via GPS in Field
- — 5-Foot LIDAR Contours
- ▭ Site Boundary

Notes:

1) Based on research for the MEC QAPP, the current-day earthen mounds were not suspected to be part of the historical munitions-related operations conducted at UXO 7. It was not believed that the earthen mounds had anything to do with historical munitions related activity, and based on historical aerial photos, the earthen mounds were subsequent to the end of the UXO 7 operational period. The UXO 7 earthen mound was only of interest in that it covered the UXO 7 disposal area, presenting a challenge in obtaining subsurface geophysics data. Now that EM61-HP and TEM-8g results are available, the conceptual site model will need to be revised pending GPR results.

2) TEM-8g data extends beyond site boundary due to need for the towed array to turn around and still maintain coverage at the site boundary

2022 SITE INSPECTION RESULTS
UXO 07 [redacted] (SITE 23)
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC
Naval Facilities Engineering Systems Command

DRAWN BY	DATE	CTO
J.MADDEN	10/24/22	-
CHECKED BY	DATE	FIGURE NUMBER
M.BARNER	10/24/22	0

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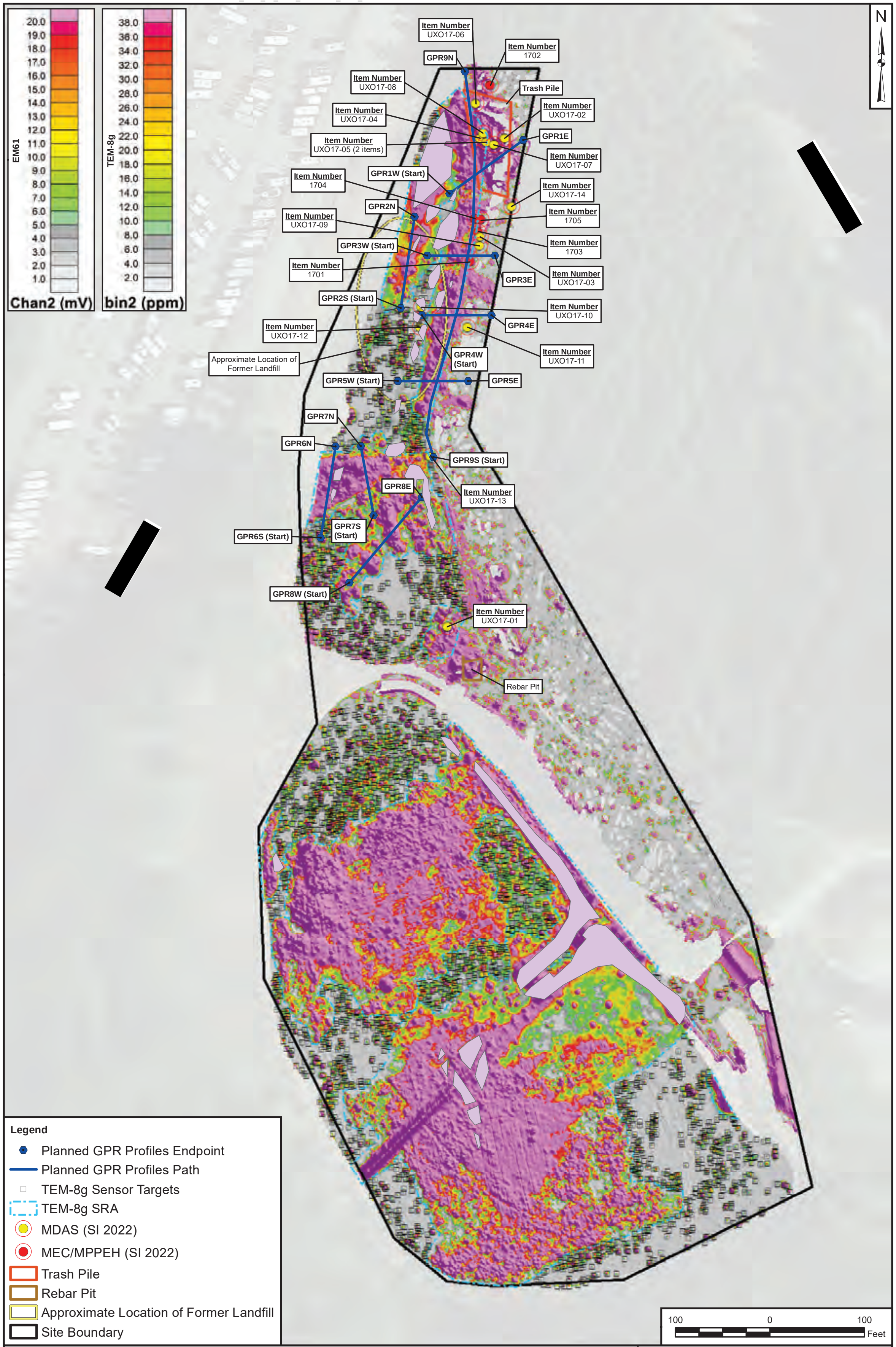

2022 SITE INSPECTION RESULTS
UXO 17 [redacted] (SITE 2)
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC Naval Facilities Engineering Systems Command

DRAWN BY	DATE	CTO
J.MADDEN	11/01/22	-
CHECKED BY	DATE	FIGURE NUMBER
M.BARNER	11/01/22	0

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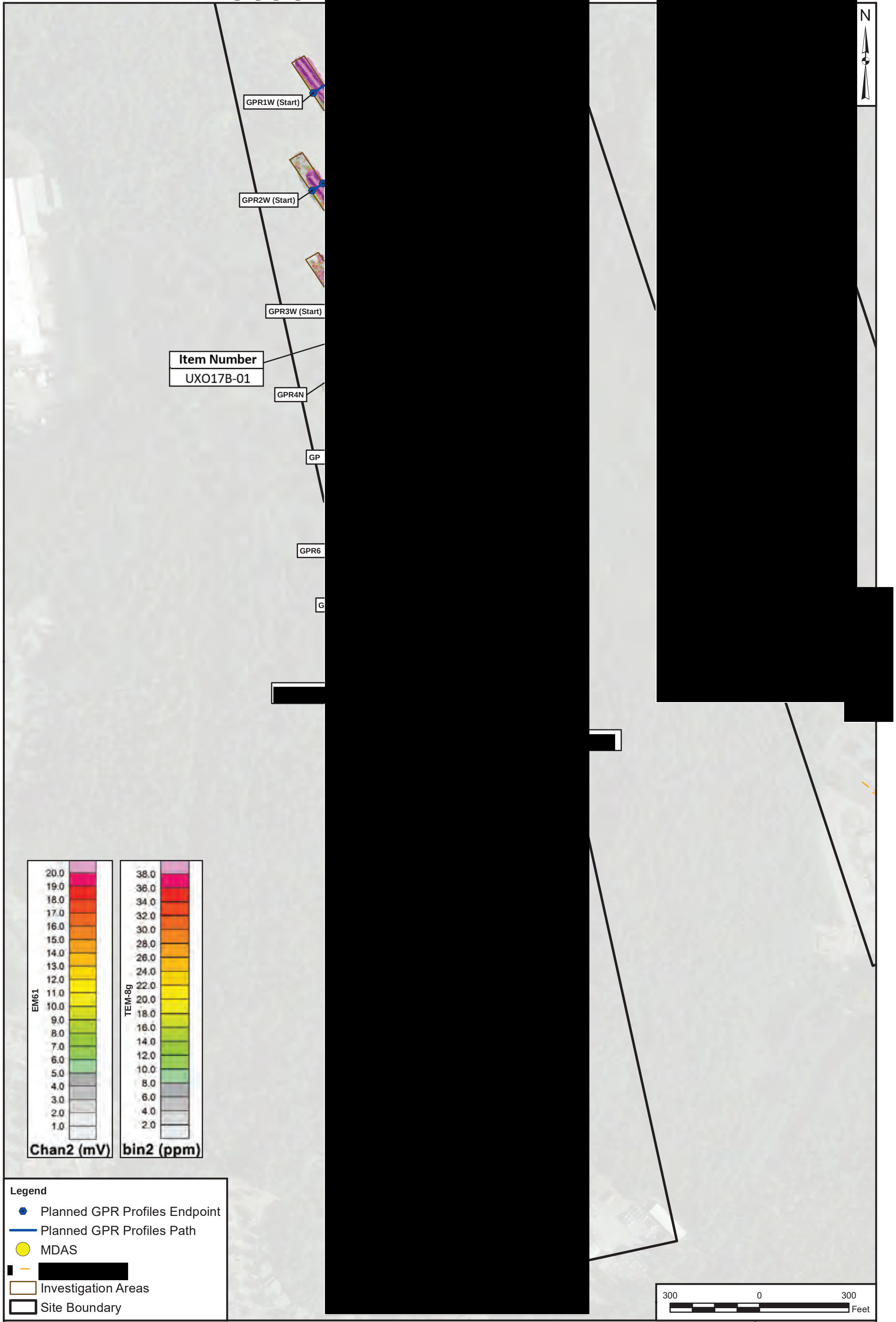

[redacted]

[redacted]

[redacted]

Legend
- ● Planned GPR Profiles Endpoint
- — Planned GPR Profiles Path
- ● MDAS
- [redacted]
- ▭ Investigation Areas
- ▭ Site Boundary

NAVFAC

2022 SITE INVESTIGATION RESULTS
UXO 17B - [redacted]
KITSAP BANGOR
BANGOR, WASHINGTON

CTO	
-	
DRAWN BY	DATE
J.MADDEN	11/07/22
CHECKED BY	DATE
M.BARNER	11/07/22
FIGURE NUMBER	

CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-01 Cultural Report Appx F DATE 02/28/20022

LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Janice Horton

1. Documents to be changed. Identify revision, date, section, drawing, etc.

Final Historical and Cultural Resources Survey Report date March 2021 Munitions Response for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor - Appendix F Cultural Resources Monitoring Plan

-Change in Navy RPM and Tetra Tech key staff in the Cultural Work Plan included as Appendix F of the referenced report, as identified in summary attachment.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

Key personnel has changed.

-Personnel changes associated with Appendix F (Cultural Work Plan) of the Historical and Cultural Resources Survey Report as identified in summary attachment.

Tt Reason for Change (Attach sheet if necessary)

Due to changes in field work start date delays, originally planned personnel changed.

4. Originator: (print name and sign) Linda Klink Linda Klink		**Title** Project Manager	**Date** 2/28/2022
Reviewed by: (print name and sign) Norm Piper		**Title: UXO Manager**	**Date**
Site Superintendent (Print name and sign) Syd Rodgers (SUXOS)	**Date** 2/28/22	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 2/28/2022
Tt Program QC Manager (Print Name and Sign) Michelle Coffman Michelle Coffman	**Date** 03/01/2022	**Navy Acknowledgement (Print name and sign)** Janice Horton	**Date** 3/3/2022

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02/28/2022

PERSONNEL CHANGES: HISTORICAL/CULTURAL RESOURCES SURVEY REPORT

POC Name in Final Planning Document	Role in Final Planning Document	Revised POC Name	Revised POC email	Revised POC phone	Appendix F (Cultural Resources Monitoring Plan) of Cultural/ Historical Report	Any notes/comments
Raymond Kobeski	COR / Lead RPM	Janice Horton	janice.l.horton5.civ@us.navy.mil	(360) 556-0621	Table 3-3	
Erin King	Co-Principal Investigator & SI Team Lead	Erin King	Erin.King@tetratech.com	(612) 643-2227	Table 3-3	**Appendix F Cultural/Hist. Report:** No personnel changes; table currently reads TBD
Steven Anderson	Co-Principal Investigator & Field Director	Stephen Anderson	Stephen.Anderson@tetratech.com	(303) 980-3601	Table 3-3	**Appendix F Cultural/Hist. Report:** No personnel changes; table currently reads TBD
Andrew Lambert	CRM	Andrew Lambert	Andrew.Lambert@tetratech.com	(303) 217-5700	Table 3-3	**Appendix F Cultural/Hist. Report:** No personnel changes; table currently reads TBD

CLEAN
CONTRACT NUMBER N6247016D9008

FIELD CHANGE REQUEST (FCR)

TASK ORDER # N4425519F4112 FCR # FCR-01 MC QAPP DATE 12/16/2022, Rev 1
LOCATION: Naval Base Kitsap Bangor, Silverdale WA NTR/RPM Janice Horton

1. Document to be changed. Identify revision, date, section, drawing, etc.

Final, Rev 0 - Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Munitions Constituents Site Inspection. Dated June 2021.

Change of laboratory for analysis of Nitrocellulose, one of the analytes on the explosives list. Includes all worksheet sections affected by this change.

2. Description of existing requirement and proposed change (Attach sheet if necessary)

Laboratory for analysis of Nitrocellulose, change from Eurofins TestAmerica Sacramento to Agriculture & Priority Pollutants Laboratory, Inc. (APPL).

To address this change, the following Worksheets are affected with revised worksheet sections included in this FCR.
(note that additions/changes are shown in bold, red font):
- Worksheets #3 through 7, 14, 26, 30, 31, & 33 (worksheets which notate laboratory identification). Worksheets revised to include APPL.
- Worksheet #15 Worksheet Limits and Evaluation Tables revised with APPL reference limits for Nitrocellulose.
- Worksheet #19 Analytical SOP Requirements Table revised with APPL requirements.
- Worksheet #23 Analytical SOP Reference Table revised with addition of APPL SOP.
- Worksheet #24 Analytical Instrument Calibration Table revised with addition of APPL Nitrocellulose analyzer instrument.
- Worksheet #25 Analytical Instrument and Equipment Maintenance, Testing, and Inspection revised with addition of APPL instrument for Nitrocellulose analysis.
- Worksheet #28 Laboratory QC Samples Table revised with addition of APPL QC for Nitrocellulose.
- Appendix D Laboratory Accreditations, addition of APPL DoD ELAP accreditation.

Tt Reason for Change (Attach sheet if necessary)

The planned laboratory for analysis of Nitrocellulose, Eurofins TestAmerica Sacramento (or primary lab Denver), no longer support performing Nitrocellulose analysis. APPL was selected from review of DoD Environment, Safety, and Occupational Health Network and Information Exchange (DENIX) web site of DoD accredited laboratories for analysis of Nitrocellulose.

4. Originator: (print name and sign) Mitch Baron Mitch Baron	**Title** Field Operations Lead	**Date** 12/16/2022
Reviewed by: (print name and sign) Kelly Carper Kelly A Carper	**Title** CLEAN Project Chemist	**Date** 12/16/2022

Site Superintendent (Print name and sign) FOL, Mitch Baron Mitch Baron	**Date** 12/16/22	**Task Order Manager (Print name and sign)** Linda Klink Linda Klink	**Date** 12/16/2022
Tt Program QC Manager (Print Name and Sign) Michelle Coffman Michelle Coffman	**Date** 12/19/22	**Navy QAO/Chemist (Print name and sign)**	**Date**

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REDLINE/STRIKEOUT MC QAPP
FCR-01 DATED 02/28/2022: MEC QAPP/ MC QAPP/ ESS ADMINISTRATIVE PERSONNEL CHANGES
FCR-01 REVISION 1 DATED 12/16/2022 MC QAPP NITROCELLULOSE/LABORATORY REVISIONS

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Naval Facilities Engineering Command Northwest
Silverdale, Washington

FINAL, Revision 0
Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Munitions Constituents Site Inspection

FCR-01 dated 02/28/2022: MEC QAPP/ MC QAPP/ ESS
Administrative Personnel Changes
(Shown in Redline/Strikeout)
FCR-01 Revision 1 dated 12/16/2022: MC QAPP
Nitrocellulose/Laboratory Revisions (Shown in Redline/Strikeout
Blue Highlight)

Multiple MRP Sites

Naval Base Kitsap Bangor
Silverdale, Washington

June 2021

SAP Worksheet #1 – Title and Approval Page

(UFP-QAPP Manual Section 2.1)

Document Title: Revision 0 Sampling and Analysis Plan, (Field Sampling Plan and Quality Assurance Project Plan) for Munitions Constituents (MC) Site Inspection (SI) at Naval Base Kitsap Bangor, Silverdale Washington, Multiple MRP Sites

Lead Organization: Naval Facilities Engineering Command (NAVFAC) Northwest (NW)

Preparer's Name and Organizational Affiliation: Tetra Tech

Preparer's Address and Telephone Number:
661 Andersen Drive
Suite 200
Pittsburgh, Pennsylvania 15220
(412) 921-7090

Preparation Date (Day/Month/Year): 03 June 2021

Investigative Organization's Project Manager: Linda Klink 06/03/2021
Signature/Date
Linda Klink, PE, PMP, Tetra Tech

Investigative Organization's Project QA Manager: T.E. Johnston 06/04/2021
Signature/Date
Tom Johnston, PhD, Tetra Tech

Lead Organization's Project Manager: See transmittal letter
Signature/Date
Raymond Kobeski, NAVFAC NW

Lead Organization QA Officer: See signature following page
Signature/Date
Kenneth Bowers, NAVFAC Atlantic

Approval Signature: Ronnie Johnson 6/8/2021
Signature/Date
Ron Johnson, Washington State Department of Ecology

SAP Worksheet #1 – Title and Approval Page

(UFP-QAPP Manual Section 2.1)

Document Title: Revision 0 Sampling and Analysis Plan, (Field Sampling Plan and Quality Assurance Project Plan) for Munitions Constituents (MC) Site Inspection (SI) at Naval Base Kitsap Bangor, Silverdale Washington

Lead Organization: Naval Facilities Engineering Command (NAVFAC) Northwest (NW)

Preparer's Name and Organizational Affiliation: Tetra Tech

Preparer's Address and Telephone Number:
661 Andersen Drive
Suite 200
Pittsburgh, Pennsylvania 15220
(412) 921-7090

Preparation Date (Day/Month/Year): ~~26 February~~06 May 2020

Investigative Organization's Project Manager: Linda Klink 2/26/2020
Signature/Date
Linda Klink, PE, PMP, Tetra Tech

Investigative Organization's Project QA Manager: T.E. Johnston
Signature/Date
Tom Johnston, PhD, Tetra Tech

Lead Organization's Project Manager:
Signature/Date
Raymond Kobeski, NAVFAC NW

Lead Organization QA Officer: BOWERS.KENNETH.A.1230092474 Digitally signed by BOWERS.KENNETH.A.1230092474 Date: 2020.05.28 14:15:22 -04'00'
Signature/Date
TBD, NAVFAC Atlantic

Approval Signatures:
Signature/Date
Harry Craig, USEPA

Signature/Date
Ron Johnson, Washington State Department of Ecology

EXECUTIVE SUMMARY

This Sampling and Analysis Plan (SAP) (Field Sampling Plan and Quality Assurance Project Plan [QAPP]) has been prepared by Tetra Tech on behalf of Naval Facilities Engineering Command Northwest under the Comprehensive Long-Term Environmental Action Navy Contract Number N6247016D9008, Contract Task Order N4425519F4112. This SAP was generated for, and complies with, applicable United States Navy, United States Environmental Protection Agency (USEPA), and Washington State Department of Ecology (WSDE) requirements, regulations, guidance, and technical standards. This includes the Department of Defense, Department of Energy, and USEPA Interagency Data Quality Task Force (IDQTF) environmental requirements regarding federal facilities. To comply with IDQTF requirements, this SAP is presented in the format of standard worksheets as specified in the Uniform Federal Policy-Quality Assurance Project Plan guidance document. Site Inspection (SI) activities at Naval Base Kitsap (NBK) Bangor are being conducted under the Comprehensive Environmental Response, Compensation and Liability Act (also known as Superfund).

NBK Bangor occupies approximately 6,130 acres and is located approximately 5 miles northwest of the Town of Silverdale in Kitsap County, Washington. The installation is situated on the eastern bank of Hood Canal, a long fjord-like body of marine water and arm of the Puget Sound. Hood Canal adjacent to NBK Bangor averages approximately 1.5 miles wide and is bordered on the west by a Navy-owned buffer zone (approximately 770 acres) on the Toandos Peninsula in Jefferson County, Washington.

The current primary missions of NBK Bangor are to maintain and support a Trident submarine group and other vessels home ported or moored at the installation and to operate administrative and personnel support facilities. The installation contains an Intermediate Maintenance Facility adjacent to Hood Canal. Strategic Weapons Facility Pacific (SWFPAC) occupies the majority of the interior installation. The mission of SWFPAC is to service the Trident missiles carried by the Trident submarines. Naval Undersea Warfare Center (NUWC) Keyport maintains an ordnance annex (NUWC Ordnance Annex; otherwise, known as Keyport Annex) in the eastern portion of NBK Bangor.

NBK Bangor is a component command of the larger NBK, which is composed of NBK Bangor which consist of locations at Bremerton, Keyport, Manchester, and Indian Island.

The objective of this SI is to determine if there are exceedances of criteria for munitions constituents (MC) in surface soil at three sites with significant potential for MC contamination from breached munitions and explosives of concern (MEC) or material potentially presenting an explosive hazard (MPPEH) items. Surface soil is defined as 0 to 6 inches below ground surface, and criteria is applicable risk-based screening criteria which may present an unacceptable risk to human health or the environment. For a given site, MC soil sampling will be biased toward potentially contaminated areas. Visual evidence of soil contamination (e.g., soil staining) may or may not be present with breached munitions items. All surface soil samples will be collected based on the presence of breached MEC and/or MPPEH and on the results of a geophysical investigation for subsurface anomalies at the sites.

The SI has two components; the MEC SI and MC SI. A separate MEC QAPP has been developed to detail the procedures associated with the MEC investigation at the sites. There are 21 total sites included in the SI, two of which will not have any SI field work but will be desktop studies. This SAP is for the MC SI portion of the project and will include the following to achieve the MC SI objectives:

- Biased soil sampling at select sites at NBK Bangor for laboratory analysis of explosives, and
- Determination of potential MC at concentrations greater than applicable screening criteria that may pose unacceptable risks to human health or the environment.

Of the 21 total sites within NBK Bangor, only three sites currently warrant MC SI Sampling. This SAP includes soil sampling at up to three sites (i.e., sampling at two sites will be conditional based on the presence of breached MEC/MPPEH items) including:

- UXO 000002 – [redacted] (Site CC)
- UXO 000003 – [redacted] (Site D)
- UXO 000006 – [redacted] (Site 22)

The separate MEC QAPP (aka, Munitions Response QAPP) will govern investigations for MPPEH/MEC at 18 sites (21 locations) at NBK Bangor, and the possibility exists that soil sampling may be necessary in the future at one or more of these sites based on the outcome of UXO surface clearance and geophysical investigations. Should additional MC sampling be required in the future, the sampling methods and laboratory analyses are anticipated to be identical to those discussed in this SAP. The additional sampling would occur only after approval from the NAVFAC NW COR/RPM who will notify the Project Team including the WSDE, while Tetra Tech prepares a Field Change Request form to document the changes.

As previously stated, a separate MEC QAPP has been developed to detail the procedures for conducting UXO detector-aided surface surveys and ground-based geophysical surveys, and these activities are therefore not discussed in detail in this MC SAP.

SAP WORKSHEETS

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SAP Worksheet #3: Distribution List 13
SAP Worksheet #4: Project Personnel Sign-Off Sheet 16
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SAP Worksheet #6: Communication Pathways .... 21~~20~~
SAP Worksheet #7: Personnel Responsibilities Table .... 28~~27~~
SAP Worksheet #8: Special Personnel Training Requirements Table .... 31~~29~~
SAP Worksheet #9: Project Scoping Session Participants Sheet .... 32~~30~~
SAP Worksheet #10: Conceptual Site Model .... 34~~32~~
SAP Worksheet #11: Project Quality Objectives/Systematic Planning Process Statements .... 51~~49~~
SAP Worksheet #12: Field Quality Control Samples .... 57~~55~~
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SAP Worksheet #29: Project Documents and Records Table .... 109~~104~~
SAP Worksheet #30: Analytical Services Table .... 111~~106~~
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LIST OF FIGURES

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10-2 Site Map
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10-4 Site Location Map – UXO 02 [redacted] (Site CC)
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10-6 Site Location Map – UXO 06 [redacted] (Site 22)
17-1 Site Map for MC SI Sampling – UXO 02 [redacted] (Site CC)
17-2 Site Map for MC SI Sampling – UXO 03 [redacted] (Site D)
17-3 Site Map for MC SI Sampling – UXO 06 [redacted] (Site 22)

LIST OF APPENDICES

Appendix A Project Scoping Session Meeting Minutes
Appendix B Field Forms
Appendix C Field Standard Operating Procedures
Appendix D Laboratory Accreditations, and In-House Laboratory Control Sample Limits

ACRONYMS AND ABBREVIATIONS

APPL	Agricultural and Priority Pollutants Laboratories
bgs	Below ground surface
BOSC	Base Operating and Support Contractor
°C	Degree Celsius
CA	Corrective Action
CAS	Chemical Abstract Service
CCB	Continuing Calibration Blank
CCV	Continuing Calibration Verification
cfs	Cubic foot per second
CLEAN	Comprehensive Long-Term Environmental Action Navy
COR	Contracting Officer Representative
CSM	Conceptual site model
CTO	Contract Task Order
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
DL	Detection Limit
DoD	Department of Defense
DPS	Designated Population Segment
DQI	Data Quality Indicator
DQO	Data Quality Objective
DVM	Data Validation Manager
EcoSSL	Ecological Soil Screening Level
EDD	Electronic data deliverable
EICP	Extracted Ion Current Profile
ELAP	Environmental Laboratory Accreditation Program
EOD	Explosive Ordnance Disposal
°F	Degree Fahrenheit
FCR	Field Change Request
FOL	Field Operations Leader
FRC	Federal Record Center
g	Gram
GC/MS	Gas chromatography/mass spectrometry
GPS	Global positioning system
HDPE	High-density polyethylene
HPLC	High-performance liquid chromatography

HSM	Health and Safety Manager
ICAL	Initial Calibration
ICB	Initial Calibration Blank
ICV	Initial Calibration Verification
IDQTF	Interagency Data Quality Task Force
IDW	Investigation-derived waste
IMF	Intermediate Maintenance Facility
INRMP	Integrated Resources Management Plan
IS	Internal Standards
L	Liter
LANL	Los Alamos National Laboratory
LCS	Laboratory Control Sample
LOD	Limit of Detection
LOQ	Limit of Quantitation
MB	Method Blank
MC	Munitions Constituent
MD	Matrix Duplicate
MDAS	Material documented as safe
MEC	Munitions and explosives of concern
mL	Milliliter
mm	Millimeter
MMRP	Military Munitions Response Program
MPC	Measurement Performance Criterion
MPPEH	Material potentially presenting an explosive hazard
MS	Matrix Spike
MSD	Matrix Spike Duplicate
msl	Mean sea level
MU	Mobile Unit
NAD	Naval Ammunition Depot
NAD83	North American Datum of 1983
NAVFAC	Naval Facilities Engineering Command
NBK	Naval Base Kitsap
NC	No criterion
NEDD	NIRIS Electronic Data Deliverable
NEW	Net Explosive Weight
NFA	No further action
NFG	National Functional Guideline

NIRIS	Naval Installation Restoration Information Solution
NSB	Naval Submarine Base
NTS	Naval Torpedo Station
NUWC	Naval Undersea Warfare Center
NUWES	Naval Undersea Weapons Engineering Station
NW	Northwest
OB/OD	Open Burning/Open Detonation
OP	Ordnance Pamphlet
PM	Project Manager
POC	Point of Contact
POMFPAC	Polaris Missile Facility Pacific
PQLG	Practical Quantitation Limit Goal
PQO	Project Quality Objective
PSL	Project Screening Level
QA	Quality assurance
QAM	Quality Assurance Manager
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	Quality control
QSM	Quality Systems Manual
%R	Percent Recovery
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RF	Response Factor
RL	Reporting Limit
RPD	Relative Percent Difference
RPM	Remedial Project Manager
RRT	Relative Retention Time
RSD	Relative Standard Deviation
RSL	Regional Screening Level
RT	Retention Time
SAP	Sampling and Analysis Plan
SI	Site Inspection
SLBM	Submarine-launched ballistic missile
SOP	Standard Operating Procedure
SPE	Solid Phase Extraction
SSHO	Site Safety and Health Officer
SSL	Soil screening level

SVOC	Semivolatile organic compound
SWFPAC	Strategic Weapons Facility Pacific
TBD	To be determined
TCLP	Toxicity Characteristic Leaching Procedure
TNT	2,4,6-Trinitrotoluene
TP	Technical Paper
TTF	Trident Training Facility
UFP-QAPP	Uniform Federal Policy for Quality Assurance Project Plan
µg/kg	Microgram per kilogram
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
UXO	Unexploded Ordnance
WSDE	Washington State Department of Ecology

SAP Worksheet #2: Sampling and Analysis Plan Identifying Information

(UFP-QAPP Manual Section 2.2.4)

Site Name/Number: Naval Base Kitsap (NBK) Bangor
Operable Units: Not applicable (NA)
Contractor Name: Tetra Tech
Contract Number: N6247016D9008
Contract Title: Comprehensive Long-Term Environmental Action Navy (CLEAN)
Work Assignment Number: Contract Task Order (CTO) N4425519F4112

1. This Sampling and Analysis Plan (SAP) was prepared in accordance with the requirements of the *Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP)* (USEPA, 2005a) and United States Environmental Protection Agency (USEPA) *Guidance for Quality Assurance Project Plans*, QA/G-5, QAMS (2002).

2. Identify regulatory program: Department of Defense (DoD) Military Munitions Response Program (MMRP) using the general Comprehensive Environmental Response, Compensation, and Liability Act process.

3. Identify approval entity: Washington State Department of Ecology (WSDE)

4. This SAP is a project-specific SAP.

5. List organizational partners (stakeholders) and connection with lead organization:

   WSDE (regulatory stakeholder)

   NBK Bangor (property owner)

   Tetra Tech (Navy contractor)

   Native American Tribes

6. Lead organization: NAVFAC NW

7. List Data Users:

   WSDE and NAVFAC NW – see Worksheet #5 for individuals.

8. If any required SAP elements or required information are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion below:

   NA because there are no exclusions.

UFP SAP Worksheet #	Required Information	Crosswalk to Related Information
A. Project Management and Objectives		
Documentation		
1	Title and Approval Page	NA, Worksheet Included
2	SAP Identifying Information	NA, Worksheet Included
3	Distribution List	NA, Worksheet Included
4	Project Personnel Sign-Off Sheet	NA, Worksheet Included
Project Organization		
5	Project Organizational Chart	NA, Worksheet Included
6	Communication Pathways	NA, Worksheet Included
7	Personnel Responsibilities Table	NA, Worksheet Included
8	Special Personnel Training Requirements Table	Training requirements are detailed in the project specific health and safety plan (SSHP/APP)
Project Planning/Problem Definition		
9	Project Scoping Session Participants Sheet	NA, Worksheet Included
10	Conceptual Site Model	NA, Worksheet Included
11	Project Quality Objectives/Systematic Planning Process Statements	NA, Worksheet Included
12	Field Quality Control Samples	NA, Worksheet Included
13	Secondary Data Criteria and Limitations Table	NA, Worksheet Included
14	Summary of Project Tasks	NA, Worksheet Included
15	Reference Limits and Evaluation Tables	NA, Worksheet Included
16	Project Schedule/Timeline Table	NA, Worksheet Included
B. Measurement/Data Acquisition		
Sampling Tasks		
17	Sampling Design and Rationale	NA, Worksheet Included
18	Location-Specific Sampling Methods/SOP Requirements Table	NA, Worksheet Included
19	Field Sampling Requirements Table	NA, Worksheet Included
20	Field QC Sample Summary Table	NA, Worksheet Included
21	Project Sampling SOP References Table	NA, Worksheet Included

UFP SAP Worksheet #	Required Information	Crosswalk to Related Information
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	NA, Worksheet Included
Analytical Tasks		
23	Analytical SOP References Table	NA, Worksheet Included
24	Analytical Instrument Calibration Table	NA, Worksheet Included
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	NA, Worksheet Included
Sample Collection		
26	Sample Handling System	NA, Worksheet Included
27	Sample Custody Requirements	NA, Worksheet Included
Quality Control Samples		
28	Laboratory QC Samples Table	NA, Worksheet Included
Data Management Tasks		
29	Project Documents and Records Table	NA, Worksheet Included
30	Analytical Services Table	NA, Worksheet Included
C. Assessment Oversight		
31	Planned Project Assessments Table	NA, Worksheet Included
32	Assessment Findings and Corrective Action Responses Table	NA, Worksheet Included
33	QA Management Reports Table	NA, Worksheet Included
D. Data Review		
34-36	Data Verification and Validation (Steps I and IIa/IIb) Process Table	NA, Worksheet Included
37	Usability Assessment	NA, Worksheet Included

Notes:

QA	Quality assurance
QC	Quality control
SOP	Standard Operating Procedure

SAP Worksheet #3: Distribution List
(revision of personnel by MEC QAPP/ MC QAPP/ ESS FCR-01 dated 02-28-2022 [see redline/strikeout])
(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])
(UFP-QAPP Manual Section 2.3.1)

Name of SAP Recipient	Title/Role	Organization	Telephone Number	Email Address or Mailing Address
~~Raymond Kobeski~~ Janice Horton	Contracting Officer Representative (COR)/Remedial Project Manager (RPM)	NAVFAC NW	~~(360) 396-0070~~ (360) 556-0621	~~raymond.kobeski@navy.mil~~ janice.l.horton5@us.navy.mil
Ron Johnson	WSDE RPM/ Provides regulatory oversight	WSDE, Governmental Hazardous Waste Branch, Land Division	(360) 407-6487	ronj461@ecy.wa.gov
Dan Kranenburg	NBK Bangor – Point of Contact (POC)/Manages and oversees site operations	NBK Bangor	(360) 476-6673	daniel.kranenburg@navy.mil
Linda Klink	Project Manager (PM)/Manages project activities	Tetra Tech	(412) 921-8650	linda.klink@tetratech.com
Norm Piper	Unexploded Ordnance (UXO) Program Manager/ Manages UXO activities	Tetra Tech	(404) 316-2429	norm.piper@tetratech.com

Name of SAP Recipient	Title/Role	Organization	Telephone Number	Email Address or Mailing Address
Mitch Baron	Tetra Tech Field Operations Leader (FOL) and Site Safety and Health Officer (SSHO)/ Coordination and oversight of daily field operations	Tetra Tech	(360) 377-0157 (office) (360) 908-3246 (cell)	mitch.baron@tetratech.com
~~Tom Johnston~~ Michelle Coffman (electronic copy only)	Tetra Tech QA Manager (QAM)/ Implementation and oversight of Tetra Tech CLEAN quality program and manages Corporate QA Program and implementation	Tetra Tech	~~(412) 921-8615~~ (412) 921-8549	~~tom.johnston@tetratech.com~~ michelle.coffman@tetratech.com
~~Stan Liang~~ Matt Soltis, Certified Industrial Hygienist (CIH) (Site Safety and Health Plan/ Accident Prevention Plan (SSHP/APP)) (electronic copy)	Health and Safety Manager (HSM)/Manages Corporate Health and Safety Program	Tetra Tech	~~(412) 921-4037~~ (412) 921-8912	~~stan.liang@tetratech.com~~ matt.soltis@tetratech.com
Kelly Carper (electronic copy only)	Project Chemist/ Interfaces with laboratory, coordinates data validation	Tetra Tech	(412) 921-7273	kelly.carper@tetratech.com

Name of SAP Recipient	Title/Role	Organization	Telephone Number	Email Address or Mailing Address
Joseph Samchuck (electronic copy only)	Data Validation Manager (DVM)/ Oversight of data validation process	Tetra Tech	(412) 921-8510	joseph.samchuck@tetratech.com
Lee Leck (electronic copy only)	Data Manager/ Coordinates data management activities	Tetra Tech	(412) 921-8856	lee.leck@tetratech.com
Steve Ruffing (distribution letter only)	Tetra Tech Program Manager/Manages Navy Initiatives	Tetra Tech	(757) 466-4906	steve.ruffing@tetratech.com
~~John Trepanowski~~Cathy Kohler (copy of cover letter only)	Deputy Program Manager/Manages Program Activities	Tetra Tech	(757~~610~~) 278-3144~~382-1532~~	Cathy.Kohler@tetratech.com ~~john.trepanowski@tetratech.com~~
Lee Ann Heathcote (electronic copy only)	Laboratory PM/ Directs laboratory operations	Eurofins TestAmerica	(916) 374-4333	LeeAnn.Heathcote@testamerica.com
Greg Salata	Laboratory PM/ Directs laboratory operations	Agriculture and Priority Pollutants Laboratories (APPL)	(559) 862-2133	greg.salata@applinc.com

Notes:
Managers for individual organizations will ensure that support staff have access to the current SAP prior to conducting work.
Before the MC SAP is finalized and crews mobilize to the field, TBD information in Worksheet #3 will be updated.

SAP Worksheet #4: Project Personnel Sign-Off Sheet

(revision of personnel by MEC QAPP/ MC QAPP/ ESS FCR-01 dated 02-28-2022 [see redline/strikeout])

(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 2.3.2)

Certification that project personnel have read the text will be obtained by one of the following methods as applicable:

1. In the case of regulatory agency personnel with oversight authority, approval letters or emails will constitute verification that applicable sections of the SAP have been reviewed. Copies of regulatory agency approval letters/emails will be retained in the project files as project records (see Worksheet #29).

2. Emails will be sent to the listed Navy, Tetra Tech, and subcontractor project personnel who will be requested to verify by email that they have read the applicable SAP/sections and the dates on which they were reviewed. Copies of the verification emails will be included in the project files (see Worksheet #29).

A copy of the signed Worksheet #4 will be retained in the project files and identified as a project document in Worksheet #29.

Key personnel will be instructed to read the SAP prior to attending an internal site-specific kick-off meeting for field activities. The Tetra Tech PM will track when the reviews have been completed, obtain signatures, and ensure that the completed sign-off sheet is included in the central project file.

Name	Organization/ Title/Role	Telephone Number	Signature/Email Receipt	SAP Section Reviewed	Date SAP Read
Navy and Regulatory Team Personnel					
~~Raymond Kobeski~~ Janice Horton	NAVFAC NW/ COR/RPM/ Manages Project for NAVFAC NW	~~(360) 396-0070~~ (360) 556-0621	See Worksheet #1 for signature	All	
Dan Kranenburg	NBK Bangor – Point of Contact (POC)/Manages and oversees site operations	(360) 476-6673	Either$^{(1)}$	All	

Name	Organization/ Title/Role	Telephone Number	Signature/Email Receipt	SAP Section Reviewed	Date SAP Read
Ron Johnson	WSDE/RPM/ Provides regulatory input and oversight	(360) 407-6487	See Worksheet #1 for signature	All	
Tetra Tech Project Team Personnel					
Linda Klink	Tetra Tech/PM/ Manages project activities	(412) 921-8650	See Worksheet #1 for signature	All	
Mitch Baron	Tetra Tech/FOL and SSHO/ Oversees health and safety activities in the field	(360) 377-0157 (office) (360) 908-3246 (cell)	Either$^{(1)}$	All	
~~Tom Johnston~~ Michelle Coffman (electronic only)	Tetra Tech/QAM/Implementation and oversight of Tetra Tech CLEAN quality program and manages Corporate QA Program and implementation	~~(412) 921-8615~~ (412) 921-8549	See Worksheet #1 for signature	All	
~~Stan Liang~~ Matt Soltis (electronic only)	Tetra Tech/HSM/ Manages Corporate Health and Safety Program	~~(412) 921-4037~~ (412) 921-8912	See SSHP/APP for signature	SSHP/APP	

Name	Organization/ Title/Role	Telephone Number	Signature/Email Receipt	SAP Section Reviewed	Date SAP Read
Kelly Carper	Tetra Tech/Project Chemist/ Coordinates with laboratory	(412) 921-7273	Either(1)	All	
Joseph Samchuck	Tetra Tech/DVM/ Manages data validation	(412) 921-8510	Either(1)	All (emphasis on Worksheets #s 12, 14, 15, 19, 20, 23-28, 30, and 34-37)	
Lee Leck (electronic copy only)	Data Manager/ Coordinates data management activities	(412) 921-8856	Either(1)	All (emphasis on Worksheet #s 6, 12, 14, 15, 19, 23-28, 30, and 34-37)	
Subcontractor Personnel					
Lee Ann Heathcote(2) (electronic copy only)	Eurofins TestAmerica, Laboratory/PM/ Oversees project-specific laboratory operations	(916) 374-4333	Either(1)	Worksheet #s 6, 12, 14, 15, 19, 23-28, 30, and 34-36	
Greg Salata(2)	APPL/PM/ Oversees project-specific laboratory operations	(559) 862-2133	Either(1)	Worksheet #s 6, 12, 14, 15, 19, 23-28, 30, and 34-36	

1 In lieu of gathering signatures on this worksheet, the Tetra Tech PM may obtain email acknowledgements that individuals have read and will execute the appropriate portions of the SAP as indicated above.
2 Contact information provided is for the primary laboratory POC. The Laboratory PM is the single POC for all Eurofins TestAmerica and APPL laboratory locations.

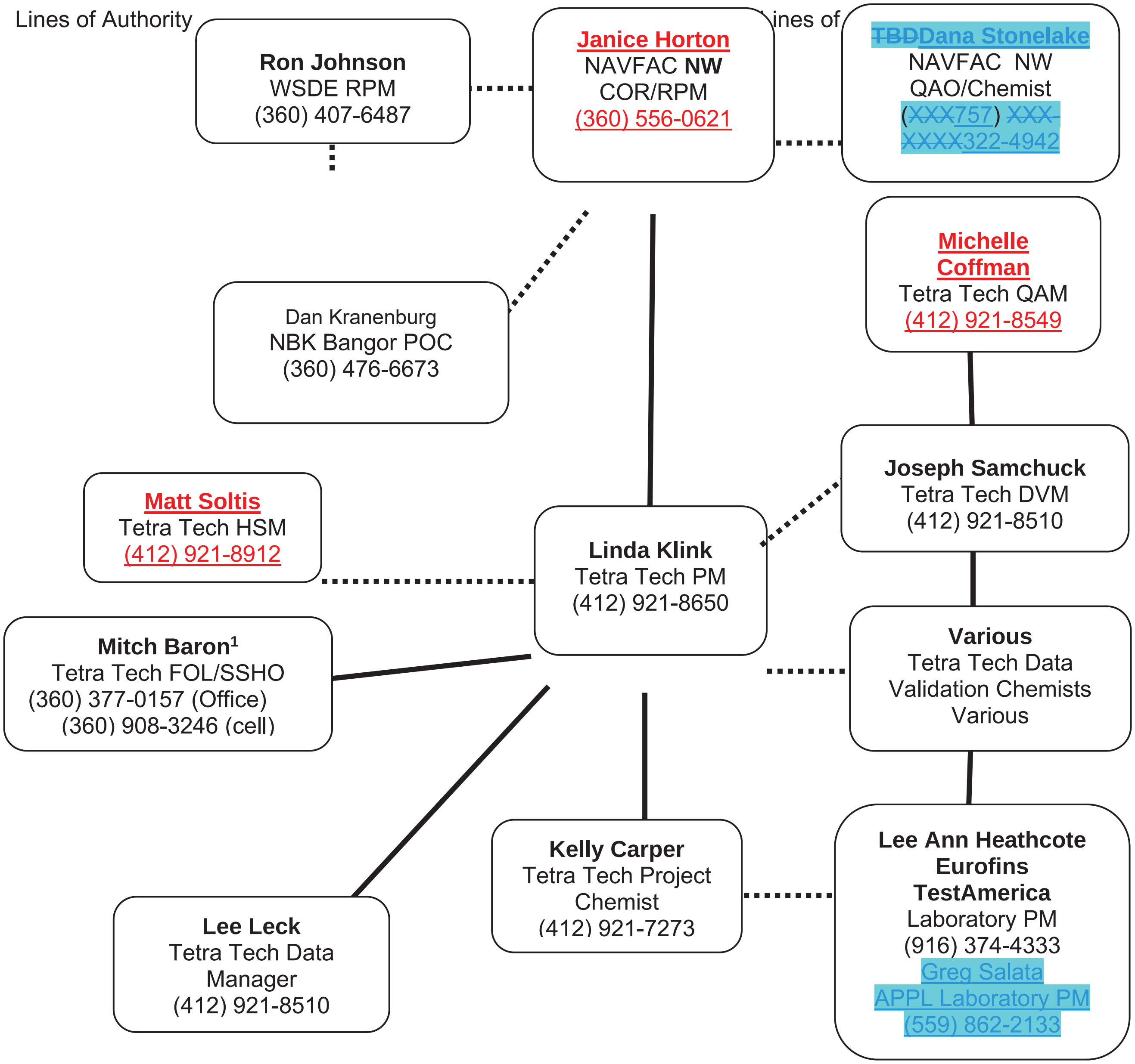
Persons listed on this worksheet will be responsible for distributing the SAP to the appropriate people within their organization.
Before the SAP is finalized and personnel mobilize to the field, TBD information in Worksheet #4 will be updated.

SAP Worksheet #5: Project Organizational Chart

(revision of personnel by MEC QAPP/ MC QAPP/ ESS FCR-01 dated 02-28-2022 [see redline/strikeout])

(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 2.4.1)



1 MC field samplers will conduct MC sampling under the direction of a UXO Escort and practicing UXO avoidance (see separate MEC QAPP and SSHP/APP for additional details).

SAP Worksheet #6: Communication Pathways

(revision of personnel by MEC QAPP/ MC QAPP/ ESS FCR-01 dated 02-28-2022 [see redline/strikeout])
(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])
(UFP-QAPP Manual Section 2.4.2)

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or Email Address	Procedure
Draft SAP Review/Revisions	Tetra Tech PM NAVFAC NW COR/RPM NAVFAC QAO/Chemist	Linda Klink ~~Raymond Kobeski~~ Janice Horton ~~TBD~~Dana Stonelake	(412) 921-8650 ~~(360) 396-0070~~ (360) 556-0621 ~~(XXX) XXX-XXXX~~(757) 322-4942	Within 2 days of completing the draft SAP, the SAP will be submitted to Naval Installation Restoration Information Solution (NIRIS) by the Tetra Tech PM. NAVFAC QAO/Chemist comments will be resolved to the satisfaction of the QAO/Chemist, and the SAP will be uploaded to NIRIS for QAO/Chemist signature.
Regulatory Agency Interface	NAVFAC NW COR/RPM	~~Raymond Kobeski~~ Janice Horton	~~(360) 396-0070~~ (360) 556-0621	NAVFAC NW primary POC for all agency communications
Request for Utility Clearance/Permit	Tetra Tech FOL	Mitch Baron	(360) 908-3246 (cell)	The FOL will submit a request for a utility clearance/permit with appropriate supporting documentation to the NAVFAC NW COR/RPM a minimum of 12 calendar days before intrusive activities are planned to be conducted.
Preparation for Sampling	Tetra Tech PM Laboratory PM	Linda Klink Lee Ann Heathcote	(412) 921-8650 (916) 374-4333	At a time that ensures sample bottles will be available on site early enough to collect samples, the Tetra Tech PM will contact the laboratory PM via email or teleconference to order bottles. The Tetra Tech PM or project chemist will maintain weekly contact with the laboratory throughout the project to ensure project goals, including changes to laboratory-specific limits, are acceptable prior to and during the analyses.

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or Email Address	Procedure
Field Progress Reports	Tetra Tech FOL Tetra Tech PM NAVFAC NW COR/RPM	Mitch Baron Linda Klink ~~Raymond Kobeski~~ Janice Horton	(360) 908-3246 (cell) (412) 921-8650 ~~(360) 396-0070~~ (360) 556-0621	The FOL prepares daily production reports and forwards them to the Tetra Tech PM for review. The Tetra Tech PM forwards accepted daily reports to the NAVFAC NW COR/RPM.
Stop Work Due to Safety Issues.	Tetra Tech FOL Tetra Tech PM NAVFAC NW COR/RPM NBK Bangor POC	Mitch Baron Linda Klink ~~Raymond Kobeski~~ Janice Horton Dan Kranenburg	(360) 908-3246 (cell) (412) 921-8650 ~~(360) 396-0070~~ (360 556-0621 (360) 476-6673	The Tetra Tech FOL will inform on-site personnel, subcontractor(s), the NAVFAC NW COR/RPM and installation POC, and the identified Project Team members within 1 hour (verbally or by email).
SAP Changes Prior to Field/ Laboratory Work.	Tetra Tech FOL Tetra Tech PM NAVFAC NW COR/RPM NBK Bangor POC NAVFAC QAO/Chemist	Mitch Baron Linda Klink ~~Raymond Kobeski~~ Janice Horton Dan Kranenburg ~~Ken Bowers~~Dana Stonelake	(360) 908-3246 (cell) (412) 921-8650 ~~(360) 396-0070~~ (360) 556-0621 (360) 476-6673 ~~See Raymond Kobeski~~(757) 322-4942	The Tetra Tech PM will document the required change via a Field Change Request (FCR) form within 5 days and send it to the NAVFAC NW COR/RPM and installation POC. If necessary, the PM will submit a concurrence letter within 7 days of identifying the need for change. SAP amendments will be submitted by the Tetra Tech PM to the NAVFAC NW COR/RPM for review and approval. SAP amendments will be forwarded by the NAVFAC NW COR/RPM or by the Tetra Tech PM if directed by the NAVFAC NW COR/RPM. At the COR/RPM's discretion, SAP changes will be submitted to the NAVFAC QAO for approval (e.g., when significant Data Quality Objective [DQO]-related changes occur or when the laboratory is changed). The Navy COR/RPM will communicate scope changes to the Project Team via email within 1 business day.

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or Email Address	Procedure
Installation Security Concerns During Field Work	NAVFAC NW COR/RPM Tetra Tech PM	~~Raymond Kobeski~~ Janice Horton Linda Klink	~~(360) 396-0070~~ (360) 556-0621 (412) 921-8650	The NAVFAC NW COR/RPM will communicate security requirements to the Tetra Tech PM and will obtain the necessary number of Navy Escorts (one Navy Escort per five field personnel) and Navy personnel with camera passes to support the Tetra Tech field effort. The Tetra Tech PM will provide a detailed field schedule 2 months in advance of fieldwork for a given site and weekly updates of any changes needed. The NAVFAC NW COR/RPM will also communicate in as far in advance as possible of any security restrictions related to the installation mission that would impact site access for fieldwork.
SAP Changes in the Field	Tetra Tech FOL Tetra Tech PM NAVFACNW COR/RPM NBK Bangor POC	Mitch Baron Linda Klink ~~Raymond Kobeski~~ Janice Horton Dan Kranenburg	(360) 908-3246 (cell) (412) 921-8650 ~~(360) 396-0070~~ (360) 556-0621 (360) 476-6673	The Tetra Tech FOL will verbally inform the Tetra Tech PM within 24 hours of realizing the need for a change. The Tetra Tech PM will document the change via an FCR form within 5 days and send it to the NAVFAC NW COR/RPM. FCRs will be forwarded to the Installation POC by the NAVFAC NW COR/RPM or by the Tetra Tech PM if directed by the COR/RPM. If necessary, a concurrence letter will be submitted within 7 days of identifying the need for a change.

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or Email Address	Procedure
Field Corrective Actions In Response to Unusual Field Conditions or Conditions Otherwise Adverse to Quality (e.g., sample representativeness, comparability or other quality concerns)	Tetra Tech FOL Tetra Tech PM NAVFAC NW COR/RPM NBK Bangor POC Subcontractor PM NAVFAC NW QAO/Chemist	Mitch Baron Linda Klink ~~Raymond Kobeski~~ Janice Horton Dan Kranenburg TBD ~~TBD~~Dana Stonelake	(360) 908-3246 (cell) (412) 921-8650 ~~(360) 396-0070~~ (360) 556-0621 (360) 476-6673 TBD ~~TBD~~(757) 322-4942	The FOL will alert the Tetra Tech PM verbally of the condition adverse to quality as soon as it is safe to do so. The Tetra Tech PM and FOL will immediately develop appropriate corrective actions to preserve quality. This may require consult with other Tetra Tech technical staff (such as the Project Chemist) or subcontractor PM. If an appropriate action cannot be developed quickly or upon developing an appropriate action, the Tetra Tech PM will notify the NAVFAC NW COR/RPM verbally or via email and, at the COR/RPM's discretion, other NAVFAC NW personnel such as the Site POC or NAVFAC NW QAO/Chemist. Upon agreement between the Tetra Tech PM and NAVFAC NW COR/RPM regarding appropriate corrective actions, significant deviations from this SAP (if any) will be documented in the field logbook and on a Field Task Modification Request (FTMR) form. The Tetra Tech FOL will initiate corrective actions (CAs) and will notify the Tetra Tech PM verbally within 1 business day of taking action.
Sample Receipt Variances	Laboratory Sample Custodian Tetra Tech FOL Tetra Tech Project Chemist Tetra Tech PM	Various Mitch Baron Kelly Carper Linda Klink	Various (360) 908-3246 (cell) (412) 921-7273 (412) 921-8650	The Laboratory Sample Custodian will report variances to the Tetra Tech FOL or PM verbally or via email within 24 hours of identifying a variance, and those individuals will attempt to resolve the variance with the laboratory. If the variance cannot be resolved, the Tetra Tech PM will notify the NAVFAC NW COR/RPM verbally or via email within 1 business day of the variance being brought to his attention. If necessary, the NAVFAC NW COR/RPM will take CA commensurate with the deficiency.

Communication Drivers	**Responsible Affiliation**	**Name**	**Phone Number and/or Email Address**	**Procedure**
Laboratory Quality Variances	Laboratory PM Laboratory PM Tetra Tech Project Chemist Tetra Tech PM Data validators NAVFAC NW COR/RPM NAVFAC NW QAO/Chemist	Lee Ann Heathcote Greg Salata Kelly Carper Linda Klink Various ~~Raymond Kobeski~~ Janice Horton ~~TBD~~Dana Stonelake	(916) 374-4333 (559) 862-2133 (412) 921-7273 (412) 921-8650 Various ~~(360) 396-0070~~ (360) 556-0621 ~~TBD~~(757) 322-4942	The Laboratory PM will notify (verbally or via email) the Tetra Tech Project Chemist within 1 business day of when an issue related to laboratory data is discovered. The Tetra Tech Project Chemist will notify (verbally or via email) the data validation staff and Tetra Tech PM within 1 business day. The Laboratory PM will document all quality variances in the Case Narrative of the Analytical Laboratory Report. Corrective actions may include a consult with the COR/RPM and, at the COR/RPM's discretion, with the NAVFAC NW QAO/Chemist.
Analytical Corrective Actions	Laboratory PM Laboratory PM Tetra Tech FOL Tetra Tech Project Chemist Tetra Tech PM NAVFAC NW COR/RPM NAVFAC NW QAO/Chemist	Lee Ann Heathcote Greg Salata Mitch Baron Kelly Carper Linda Klink ~~Raymond Kobeski~~ Janice Horton ~~TBD~~Dana Stonelake	(916) 374-4333 (559) 862-2133 (360) 908-3246 (cell) (412) 921-7273 (412) 921-8650 ~~(360) 396-0070~~ (360) 556-0621 ~~TBD~~(757) 322-4942	If the impact of an identified deficiency is limited to this project, it will be resolved between the Laboratory PM and Tetra Tech PM and support staff and will be documented in the project report. If the deficiency is systemic and potentially affects other projects, the Tetra Tech PM will verbally advise the NAVFAC NW COR/RPM within 24 hours of notification from the Tetra Tech Project Chemist or DVM. The NAVFAC NW COR/RPM will take CA appropriate for the identified deficiency. CAs may include a consult with the NAVFAC NW QAO/Chemist and coordination with the laboratory.

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or Email Address	Procedure
Reporting Data Validation Issues	Tetra Tech Data Validation Chemist Tetra Tech Project Chemist Tetra Tech PM NAVFAC NW COR/RPM	Various Kelly Carper Linda Klink ~~Raymond Kobeski~~ Janice Horton	Various (412)921-7273 (412) 921-8650 ~~(360) 396-0070~~ (360) 556-0621	The Tetra Tech Data Validation Chemist will document data qualifications in the data validation report and database. For serious deficiencies, the Data Validation Chemist will notify Tetra Tech PM verbally or via email within 48 hours of recognizing that a significant laboratory quality deficiency has been detected that could affect this project and/or other projects. The Tetra Tech PM will relay information regarding serious data concerns or laboratory concerns to the NAVFAC NW COR/RPM.
Data Validation Corrective Actions	Tetra Tech Data Validation Chemist Tetra Tech Project Chemist Tetra Tech PM NAVFAC NW QAO/Chemist	Various Kelly Carper Linda Klink ~~TBD~~Dana Stonelake	Various (412)921-7273 (412) 921-8650 ~~TBD~~(757) 322-4942	If a data validation issue cannot be resolved between the Tetra Tech Data Validation Chemist and the laboratory or if the issue appears to be systemic, the Tetra Tech PM will verbally advise the NAVFAC NW COR/RPM within 24 hours of notification from the Data Validation Chemist. The NAVFAC NW COR/RPM will take CA that is appropriate for the identified deficiency. This may include a consult with the NAVFAC NW QAO/Chemist.
Project Report Review	Tetra Tech PM Tetra Tech support staff NAVFAC NW COR/RPM	Linda Klink Various ~~Raymond Kobeski~~ Janice Horton	(412) 921-8650 Various ~~(360) 396-0070~~ (360) 556-0621	Internal reviews will be conducted by the Tetra Tech PM and support staff. Comments will be resolved internally to the satisfaction of the Tetra Tech PM. When the PM is satisfied with resolution of all comments, the report will be submitted by the Tetra Tech PM or designee to the NAVFAC NW COR/RPM in accordance with the project scope of work requirements. Upon resolution of NAVFAC NW comments, the report will be submitted to the NAVFAC NW COR/RPM for transmittal to the regulators for review. Comments will be resolved to the satisfaction of the NAVFAC NW COR/RPM, revisions will be made, and the report will be finalized for final distribution and submittal to NIRIS.

Communication Drivers	Responsible Affiliation	Name	Phone Number and/or Email Address	Procedure
Identification of Systemic Quality Deficiencies on the Project	Tetra Tech PM Tetra Tech support staff Tetra Tech QAM	Linda Klink Various ~~Tom Johnston~~ Michelle Coffman	(412) 921-8650 Various ~~(412) 921-8615~~ (412) 921-8549	The person identifying the concern will communicate to the Tetra Tech PM and QAM in a timeframe that supports correction of the concern as soon as practicable and sharing of ~~"~~“Lessons Learned~~"~~” to prevent propagation of deficiencies.

Note: Before the SAP is finalized and crews mobilize to the field, TBD information in Worksheet #6 will be updated

OUT-OF-CONTROL EVENTS

An out-of-control event is defined as any deviation from SAP procedures due to circumstances and/or conditions beyond the control of the field crew that could have an adverse impact on project performance. Some examples of these conditions and circumstances include health and safety situations such as explosive atmosphere conditions and unforeseen site conditions that interfere with the collection of critical data.

The Tetra Tech PM or FOL will be responsible for identification of an out-of-control field event. Upon recognition or identification of an out-of-control event in the field, the Tetra Tech PM/FOL will stop work and shift to a different unaffected activity/task if possible. The Tetra Tech PM/FOL will notify, as soon as possible, the appropriate field personnel. The field personnel will be responsible for providing documentation of the event to both the Tetra Tech PM and FOL, who will coordinate with the Project Team and recommend Cas.

SAP Worksheet #7: Personnel Responsibilities Table

(revision of personnel by MEC QAPP/ MC QAPP/ ESS FCR-01 dated 02-28-2022 [see redline/strikeout])

(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 2.4.3)

Name	Title/Role	Organizational Affiliation	Responsibilities
~~Raymond Kobeski~~ Janice Horton	COR/RPM/Provides oversight and daily management	NAVFAC NW	Oversees project implementation, including contracting, scoping, and overall financial and technical implementation of the project.
~~TBD~~Dana Stonelake	NAVFAC QAO/ Chemist	NAVFAC Atlantic	Oversees compliance of SAP with established DoD guidance, Navy guidance, and SAP-specific requirements. Provides input as requested by the COR/RPM regarding quality.
Dan Kranenburg	NBK Bangor POC/ Serves as installation POC	NBK Bangor	Oversees project implementation, including scoping and evaluation of site activities, coordinates site access and communication, conducts data review and evaluation, and reviews the SAP.
Ron Johnson	Regulatory COR/RPM/Provides oversight and regulatory input	WSDE	Participates in scoping and data review and evaluation and approves the SAP.
Linda Klink	PM/Manages daily operations	Tetra Tech	Ensures that health and safety requirements are implemented. Oversees project, financial, schedule, and technical day-to-day management of the project. Oversees project implementation, including scoping and data review and evaluation for this project. Coordinates and oversees review of Tetra Tech project deliverables.
Mitch Baron	FOL/SSHO	Tetra Tech	Supervises, coordinates, and performs field sampling activities. Ensures that health and safety requirements are implemented during fieldwork. Functions as the on-site communications link between field staff members, the installation POC, and Tetra Tech PM. Oversees mobilization and demobilization of all field equipment and subcontractors. Ensures proper maintenance of site logbooks, field logbooks, and field recordkeeping. Identifies and resolves problems in the field, resolving difficulties via consultation with the installation POC and NAVFAC NW COR/RPM, implementing and documenting CA procedures, and facilitating communication between the field team and project management. Responsible for on-site project-specific health and safety training and monitoring site conditions. Details of health and safety responsibilities are presented in the SSHP/APP.

Name	Title/Role	Organizational Affiliation	Responsibilities
~~Tom Johnston~~ Michelle Coffman	QAM/Directs the Tetra Tech CLEAN QA Program	Tetra Tech	Ensures that quality aspects of the CLEAN program are implemented. Oversees review of the SAP, approves the SAP, oversees preparation of laboratory scopes of work, coordinates with the laboratories, and conducts data quality reviews.
~~Stan Liang~~ Matt Soltis	HSM/Directs the CLEAN Health and Safety Program	Tetra Tech	Ensures that health and safety aspects of the Tetra Tech CLEAN Health and Safety Program are implemented. Oversees review of health and safety documents and approves health and safety documents.
Kelly Carper	Project Chemist/ Serves as focal point for chemistry-related issues	Tetra Tech	Coordinates analyses with laboratory chemists, ensures that laboratory scopes of work are followed, and that QA has been performed for QA data packages, and communicates with Tetra Tech staff. Ensures that the project meets objectives from the standpoint of laboratory performance. Provides technical advice to the Tetra Tech team on project chemistry matters. Functions as the primary interface with the subcontracted laboratory and Tetra Tech PM. Ensures completion of Tetra Tech data validation.
Joseph Samchuck	DVM/Directs and provides oversight data validation activities	Tetra Tech	Manages data validation activities within Tetra Tech, including ensuring QA of data validation deliverables, providing technical advice on data usability, and coordinating and maintaining the data validation review schedule.
Lee Leck	Data Manager/ Manages data receipt, database uploads, data archiving	Tetra Tech	Coordinates data receipt and upload to Tetra Tech and Navy databases and manages and controls the flow of data to ensure that data are secure.
Lee Ann Heathcote	Laboratory PM/ Directs and provides oversight of laboratory activities	Eurofins TestAmerica	Coordinates analyses with laboratory chemists, ensures that the laboratory scope of work is followed, performs QA of data packages, and communicates with Tetra Tech staff.
Greg Salata	Laboratory PM/ Directs and provides oversight of laboratory activities	APPL	Coordinates analyses with laboratory chemists, ensures that the laboratory scope of work is followed, performs QA of data packages, and communicates with Tetra Tech staff.

Note: Before the SAP is finalized and crews mobilize to the field, TBD information in Worksheet #7 will be updated.

In some cases, one person may be designated responsibilities for more than one position. For example, the FOL will be responsible for SSHO duties. This action will be performed only as credentials, experience, and availability permits.

SAP Worksheet #8: Special Personnel Training Requirements Table

(UFP-QAPP Manual Section 2.4.4)

Project-specific safety requirements are addressed in greater detail in the project-specific SSHP/APP.

MC field samplers will conduct MC sampling under the direction of a UXO Escort and practicing UXO avoidance (see separate MEC QAPP and SSHP/APP for additional details).

SAP Worksheet #9: Project Scoping Session Participants Sheet

(UFP-QAPP Manual Section 2.5.1)

Project Name:	Naval Base Kitsap Bangor	**Site Name:**	Various Sites
Projected Date(s) of Sampling:	Fall 2020 through Fall 2021	**Site Location:**	NBK Bangor
Project Manager:	Linda Klink		
Date of Session:	September 23 to 27, 2019		
Scoping Session Purpose:	Project Scope Understanding Meeting: Site Visit and Tetra Tech/NAVFAC NW Kickoff Meeting		

Name	Title	Affiliation	Phone Number	Email Address	Project Role
Raymond Kobeski	COR/RPM	NAVFAC NW	(360) 396-0070	raymond.kobeski@navy.mil	COR/RPM
Linda Klink	PM	Tetra Tech	(412) 921-8650	linda.klink@tetratech.com	PM
Norm Piper	UXO Lead	Tetra Tech	(404) 316-2429	norm.piper@tetratech.com	UXO Project Support
Matt Barner	Geophysics Lead	Tetra Tech	(980) 257-6800	matt.barner@tetratech.com	Geophysics Project Support
Steve Negri	Habitat/Threatened and Endangered Species Lead	Tetra Tech	(425) 482-7674	steve.negri@tetratech.com	Biological Project Support
Scot Wilson	Project Support	Tetra Tech	(360) 598-8111	soct.wilson@tetratech.com	Project Support
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Comments/Decisions:

A project scope understanding meeting between the Navy and Tetra Tech was held from September 23 to 27, 2019, with the intent of developing the planning documents (see Appendix A for meeting minutes).

Project Name:	Naval Base Kitsap Bangor	**Site Name:**	Various Sites
Projected Date(s) of Sampling:	Fall 2020 through Fall 2021	**Site Location:**	NBK Bangor
Project Manager:	Linda Klink		
Date of Session:	January 7 to 9, 2020		
Scoping Session Purpose:	Project Scope Understanding Meeting: Meeting, Preview of SI Planning Documents and Site Visit		

Name	Title	Affiliation	Phone Number	Email Address	Project Role
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Comments/Decisions:

A project scope understanding meeting between the Navy and Tetra Tech was held from January 7 to 9, 2020, with the intent of developing and previewing the SI planning documents (see Appendix A for meeting minutes).

SAP Worksheet #10: Conceptual Site Model

(UFP-QAPP Manual Section 2.5.2)

10.0 Introduction

The purpose of this SAP is to provide a framework for the collection of surface soil samples to assess the potential presence of MC contamination (i.e., explosives) at three areas within NBK Bangor. This worksheet presents a brief facility and site description, history, and conceptual site model (CSM) for the sites. The text in the following sections comes from the 2017 Preliminary Assessment (PA) (Battelle) and will be updated in the future as more information is obtained about the sites.

10.1 Facility Background

NBK Bangor occupies approximately 6,130 acres and is located approximately 5 miles northwest of the Town of Silverdale in Kitsap County, Washington. The installation is situated on the eastern bank of Hood Canal, a long fjord-like body of marine water and arm of the Puget Sound. Hood Canal adjacent to NBK Bangor averages approximately 1.5 miles wide and is bordered on the west by a Navy-owned buffer zone (approximately 770 acres) on the Toandos Peninsula in Jefferson County, Washington (Figure 10-1).

Major regional population centers near NBK Bangor include the Cities of Bremerton (approximately 10 miles to the south), Seattle (approximately 15 miles to the east across the Puget Sound), and Tacoma (approximately 30 miles to the south). The Town of Keyport is located approximately 4 miles east of NBK Bangor (Figure 10-1). In the Puget Sound area, the Navy has operations at facilities in Bangor, Bremerton, Everett, Indian Island, Keyport, Manchester, and Whidbey Island.

[redacted]

NBK Bangor is a component command of the larger NBK, which is composed of NBK Bangor which consist of locations at Bremerton, Keyport, Manchester, and Indian Island.

Figure 10-1 shows the general location of NBK Bangor, and Figure 10-2 shows the installation layout.

10.2 Facility Setting

Reports of previous investigations, including the Base-wide MMRP PA Report (Battelle, 2017), provide detailed information regarding the site setting for NBK Bangor. Pertinent information on the land features, hydrogeology, hydrology, and environmental setting are presented below.

10.2.1 Land Features

Physiography and Topography

The region that includes NBK Bangor lies on the western edge of the central Puget Sound Lowlands at its intersection with the western Upland Plateau physiographic region. The lowlands are part of a regional north-south-trending structural trough extending from the Fraser River valley in British Columbia to Eugene, Oregon. The plateau is characterized by flat-topped ridges with steep flanks sloping to sea level.

The southern and eastern parts of NBK Bangor consist of a till plain with several north-south-trending drumlins (oval-shaped mounds and hills formed by glacial action). Till plains are nearly level or gently undulating areas that were formed when soils and rocks were transported and deposited by glacial ice sheets. The northern and western portions of the installation are consistent with the Upland Plateau, incised by north-south-trending post-glacial drainages that discharge to Hood Canal and Puget Sound. Topographic ridges at NBK Bangor range in elevation from 300 to 500 feet above mean sea level (msl).

The Navy-owned buffer zone on the Toandos Peninsula on the western shore of Hood Canal is characterized by more ridges and sharp canyons compared to NBK Bangor. The Olympic Mountains begin west of the Toandos Peninsula and rise to nearly 7,900 feet above msl 11(Battelle, 2017).

Soils

Soil types found at NBK Bangor are associated with glacial till plains and glacial outwash terraces. Soils located on glacial till at NBK Bangor are moderately compacted, generally extend 20 to 40 inches below ground surface (bgs), and typically overlie very compacted till or hardpan. Soils formed from glacial lake sediments are also found in association with glacial till plains; these soils were deposited when ice dams caused lakes to form and deposit fine sediments. The glacial lake deposits were subsequently eroded, leaving remnant areas of fine sediments characterized by silt loam and silty clay loam soils occurring to depths up to 60 inches. Soils on glacial outwash terraces are predominantly composed of layers of gravel, sand, and silt that were deposited from glacial meltwater as glaciers retreated. These soils are very deep and, because of their coarse nature, are well to excessively drained.

Geology

Several continental ice sheets covered the region that includes NBK Bangor during the Quaternary period, resulting in the complex deposition of glacial and interglacial deposits. The latest of these is called the Fraser glaciation and consisted of several ice advances, of which the Vashon Stade was the most extensive and responsible for depositing many of the geologic strata that underlie the installation.

In general, the Puget Sound Lowlands are filled with unconsolidated sediments of Miocene to Recent age overlying volcanic bedrock. Six stratigraphic units are significant to understanding the geologic system at NBK Bangor. These units are, from youngest (shallowest) to oldest (deepest), Vashon recessional outwash, Vashon till, Vashon advanced outwash, Kitsap Formation, Older sand and gravel, and Tertiary volcanic bedrock.

The Vashon recessional outwash occurs generally as scattered surface deposits of unconsolidated sand and gravel with localized silt layers. The Vashon till is a very dense poorly sorted mixture of sand, silt, and gravel. The Vashon till contains layers of better sorted, less compact, ablation till that were deposited above Lodgment till during glacial retreat. Scattered sand and gravel beds within the Vashon till represent subglacial or interglacial paleo stream channels. The Vashon advanced outwash unit is typically 20 to 200 feet thick. Vashon advanced outwash deposits are typically dense well-stratified lenses of silt and gravel, typically gray to brown in color, and underlie till throughout most of NBK Bangor. However, the Vashon advanced outwash unit is exposed at the surface in some locations, particularly in stream drainages or on terraces where till units have been eroded. The Kitsap Formation is hard, gray, laminated to massive silt with scattered lenses and interbeds of clay, sand, peat, and gravel. This unit is non-glacial lacustrine in origin and ranges from 200 to 350 feet thick. The Older sand and gravel unit consists of sand and gravel with smaller amounts of silt and clay and is consistent with both glacial and non-glacial deposits. The Older sand and gravel unit is typically 300 to 350 feet thick and may be underlain by bedrock or a distinct layer of clay and silt known as the Older clay followed by bedrock. Bedrock is dark-colored fine-grained basalts and other volcanic rock types and is several thousand feet thick in the region.

10.2.2 Hydrology and Hydrogeology

Hydrology

Several substantial lakes/ponds and defined marsh areas are present at NBK Bangor. The lakes/ponds include [redacted] in the northwestern portion of the installation, [redacted] in the western central portion of the installation, [redacted] in the central eastern portion of the installation, and [redacted] at the southern edge of the installation. [redacted] Other stormwater retention basins, lagoons, reservoirs, minor impoundments, and wetland areas also exist at the installation.

[redacted] The total area of the [redacted] lakes is approximately 30 acres [redacted]). The primary functions of these water bodies are to provide stormwater control, outdoor recreation opportunities, and habitat for a variety of wildlife species. The [redacted] Lakes were specifically constructed as stormwater retention facilities to prevent large fluctuations in volume and speed of stormwater entering [redacted] southeast of the installation. [redacted] (Battelle, 2017).

Surface drainage at NBK Bangor consists of five small streams flowing west to Hood Canal and two tributaries of Clear Creek flowing from the installation to the southeast and ultimately emptying into Dyes Inlet. Clear Creek drains approximately 750 acres of the southeastern portion of NBK Bangor. [redacted] Drainage areas for the streams vary from 0.03 to 3.68 square miles. Recorded stream flows range from a minimum flow of 0.01 cubic foot per second (cfs) to a maximum of 4 cfs (Malcolm Pirnie, Inc., 2006). Overland flow from much of the western portion of NBK Bangor is routed to Hood Canal through a series of stormwater outfalls.

Hydrogeology

Three distinct aquifer systems have been identified at NBK Bangor. These aquifers are designated, in order of increasing depth, the seasonal/perched aquifer, shallow aquifer, and sea level aquifer. The general correlation between geologic and hydrogeologic units at NBK Bangor is as follows:

- Vashon recessional outwash – seasonal/perched aquifer
- Vashon till – aquitard
- Vashon advanced outwash – shallow aquifer
- Kitsap Formation – aquitard
- Older sand and gravel – sea level aquifer

The seasonal/perched aquifer likely occurs in the Vashon recessional outwash above the Vashon till throughout much of NBK Bangor, although this can only be determined locally from subsurface explorations. Local precipitation is the primary source of water recharging the aquifers in the study area. The bulk of the precipitation occurs during the winter months. The precipitation and subsequent infiltration directly recharge the seasonal/perched aquifer in the Vashon recessional outwash and the shallow aquifer beneath the till. The Kitsap Formation, which functions overall as an aquitard between the shallow and sea level aquifers, contains relatively more transmissive intervals that yield intermediate water-bearing zones. Regionally, recharge to the intermediate groundwater zones is through flow from the shallow aquifer, as indicated regionally by vertical pressure gradients that are primarily downward.

Regional groundwater flow in both the shallow and sea level aquifers is generally from surrounding upland areas in the center of the Kitsap peninsula, located along the eastern boundary of NBK Bangor, toward Hood Canal to the west and Liberty Bay to the east. The potentiometric surface of the shallow aquifer is affected by the presence of deep stream drainages and past channels in the till, which results in local flow directions differing from regional flow directions. The local groundwater flow direction of the shallow aquifer could also be influenced by changes in permeability, aquifer thickness, and recharge and discharge boundaries.

Groundwater discharge occurs from the shallow aquifer at springs along the Hood Canal shoreline and in stream drainages where the shallow aquifer intersects the ground surface. The sea level aquifer regionally discharges to Hood Canal to the west and Puget Sound to the east.

10.2.3 Environmental Setting

The following sections describe the environmental setting at NBK Bangor including land use, climate, endangered species and sensitive habitats, and cultural resources.

Land Use

NBK Bangor is an active military installation with several distinct operational areas. Land uses associated with installation operational areas include, but are not limited to, light to relatively heavy industrial activities (including manufacturing, assembly, and maintenance), commercial activities, military exercises and training, transportation, and municipal and industrial waste handling, shipping, and storage.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Multiple piers and wharves are present at the installation along Hood Canal. These piers and wharves are used for various purposes, [redacted], routine maintenance, and [redacted].

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

The administrative and public works area in the [redacted] of the installation is the location of various administrative buildings, various storage buildings, various maintenance shops, [redacted], visitor center, fire station, enlisted dining hall, recycling center, and multiple other administration and light industrial operations.

The community core area in the [redacted] the installation is the location of bachelor enlisted quarters, Navy exchange and retail stores, the post office, uniform shop, and various recreational facilities (e.g., bowling, tennis, basketball, baseball, football, track, and theatre).

An outdoor recreation area is present in the [redacted] of the installation. This area contains open spaces, various athletic fields, trails, pavilions, and manmade lakes suitable and stocked for fishing [redacted]

Two residential housing areas are present at NBK Bangor. [redacted]

Large portions of the installation remain densely vegetated/forested and unused. A network of trails and roads traverses even some of the densely forested areas of the installation, and these trails and roads are used at least occasionally for recreation, including hiking, running, and accessing fishable water bodies. Although hunting is not permitted at NBK Bangor, illicit hunting may occur on occasion in the forested and other portions of the installation. Permitted timber harvesting has occurred in the past at NBK Bangor, but it is not known if any timber harvest currently occurs at the installation (Battelle, 2017).

The area surrounding NBK Bangor is generally rural or semi-rural with undeveloped land, minor agriculture, and residential land use. North of NBK Bangor is the community of Vinland, with intermixed residences and undeveloped forested land. The area east of the installation is largely undeveloped with scattered residential properties. South of NBK Bangor is the community of Silverdale, also characterized by undeveloped forested land and residential properties. Hood Canal is used for recreational activities including boating, fishing, and shell fishing, although there are exclusion zones within the canal associated with activities at NBK Bangor, and security personnel from the installation observe and patrol the area offshore of the installation to monitor and prevent unauthorized incursion.

There are numerous buildings and structures at NBK Bangor. Full-scale development of the installation began in 1944 [redacted]

[redacted]

Since early development in 1944 and 1945, NBK Bangor has undergone numerous phases of construction to add, alter, or improve infrastructure. Extensive construction and renovation projects were undertaken [redacted]. Numerous utilities, including electrical, drinking water, sanitary sewer, storm sewer, fuel, and steam support general military and specific command operations at NBK Bangor.

Several wharves and piers are located on the western side of NBK Bangor on Hood Canal. [redacted] Carderock Pier was constructed in 2009 [redacted]. The Service Pier [redacted] was constructed in 1981 and has had numerous modifications [redacted]. The K/B Pier Complex (also known as K/B Docks) [redacted] was constructed in 1951 [redacted] The Delta Pier, [redacted], was constructed in the early 1980s [redacted] The Marginal Wharf was first constructed during initial facility development in 1944 [redacted] [redacted] The Explosives Handling Wharf was initially constructed in 1953 [redacted]. [redacted]

Climate

The Olympic Mountains, which begin just west of Hood Canal and rise to 7,900 feet, create a significant orographic effect on the local climate. This area receives the full force of storms moving inland from over the Pacific Ocean, and heavy precipitation and winds of gale force occur frequently, particularly during the winter. The southwestern and western slopes of the Olympic Mountains receive the heaviest precipitation in the continental United States. Annual precipitation ranges to 150 inches or more along the windward slopes of the mountains. Winter seasonal snowfall ranges from 10 to 30 inches in the lower elevations and between 250 to 500 inches in the higher mountains. The easterly movement of moist air from the Pacific Ocean produces downslope winds in the foothills along the eastern side of the Olympic Mountains, significantly reducing the amount of precipitation received.

NBK Bangor itself has a marine climate with generally mild temperatures and moderate to heavy precipitation. The area receives an average of 47 inches of precipitation annually. Precipitation occurs throughout the year, but the heaviest rainfall typically is in the late fall and winter months, decreasing into spring. The total annual snowfall is light (approximately 16 inches), and snow usually melts shortly after reaching the ground. Icing conditions are not unusual in the winter months.

Summer temperatures average from 65 to 75 degrees Fahrenheit (ºF). Historical data indicate an average annual temperature of 52 °F, with extremes in daily temperature of 101 and 7 ºF (Malcolm Pirnie, 2006).
The prevailing direction of the winds is from the south or southwest during the fall and winter, gradually shifting to west and northwest during the late spring and summer.

Endangered Species, Sensitive Habitats

The wildlife composition at NBK Bangor is derived from the regional natural diversity and reflects the marine climate and diverse habitats defined by wetland and upland characteristics and varied vegetation assemblages. The habitats at NBK Bangor support a considerable variety of shellfish, fish, birds, mammals, and plants, and the respective habitats are managed to fully support the conservation and recovery of federally and state-listed species, as outlined in the 2018 Integrated Resources Management Plan (INRMP) (NAVFAC, 2018).

Habitats at NBK Bangor support three listed federally endangered species, the Bocaccio, Southern Resident Killer Whale, and Humpback Whale (Central America Designated Population Segment [DPS]). In addition, nine species are considered federal threatened, including the Marbled Murrelet, Yellow-billed Cuckoo, Bull Trout, Hood Canal summer-run Chum Salmon, Puget Sound Chinook Salmon, Yelloweye Rockfish, Puget Sound Steelhead, Howellia, and Humpback Whale (Mexico DPS), which has been observed in Hood Canal adjacent to the installation.

Cultural Resources

The highest probability of culturally significant resources being present at NBK Bangor is along the coastline and known areas of historic use [redacted] When culturally significant resources are found at the installation, the location and extent of the resources are not made public nor are they provided to Navy personnel other than on a need-to-know basis until such time as they may be displayed and interpreted in a manner that provides protection from vandalism.

The Point No Point Treaty Council, a coalition of local Native American Tribes that had use of the area prior to European habitation, has treaty rights that include uses of environmental resources at NBK Bangor. Treaty-protected traditional uses (such as shellfish harvest by the Point No Point Treaty Council and cedar bark harvest by the Suquamish Tribe) are conducted at the installation (Malcolm Pirnie, 2006).

Orchard trees remaining at and around NBK Bangor may be from original stock brought to the United States by early settlers. Seed stock from these trees could be an important historical and cultural resource.

10.3 Site Description and History

The first use of land by the Navy at present day NBK Bangor began in 1942 with the establishment of a facility near the Town of Bangor for shipping ammunition to the Pacific Theater during World War II. The facility provided a deepwater transshipment point for military ammunition and explosives. The initial mission of the facility was to receive, renovate, rework, maintain, store, and issue ammunition, explosives, expendable ordnance items, and/or weapons and technical ordnance material for the Navy.

In 1944, the Navy purchased a total of 7,676 acres at and around the facility. The military installation was first officially commissioned on August 10, 1945, as the United States Naval Magazine Facility Bangor. The installation was re-designated as the Naval Ammunition Depot (NAD) Bangor in December 1947. In 1948, the Bremerton Annex (formerly NAD Puget Sound) and Indian Island Annex (formerly United States Naval Magazine and Net Depot Indian Island) came under control of NAD Bangor, under the overall management of the Bureau of Ordnance.

NAD Bangor was consolidated with United States Naval Torpedo Station (NTS) Keyport in 1950, and the consolidated installation was renamed NAD Keyport. The relative activities of the two commands proved to be too substantially dissimilar, and NAD Bangor was re-established as an independent installation in 1952. Ordnance production facilities located at the Bremerton Annex were deactivated between 1958 and 1959, and these operations were moved to NAD Bangor. However, with the exception of test, segregation, renovation, overhaul, and storage facilities, the ordnance production facilities from the Bremerton Annex were not duplicated at NAD Bangor.

NAD Bangor was selected in April 1962 as the Pacific region Polaris missile assembly facility. Polaris missiles were two-stage, solid-fueled, nuclear-armed, submarine-launched ballistic missiles (SLBMs). Construction of POMFPAC began at the installation in March 1963, and POMFPAC was officially commissioned as a tenant command of NAD Bangor on September 11, 1964. POMFPAC made its first tactical outload of Polaris missiles (specifically Polaris A3 missiles) to the submarine USS Stonewall Jackson in March 1965.

NAD Bangor experienced a significant surge in operations during the Vietnam War, with nearly one-third of all ordnance and ammunition shipped to Vietnam between 1965 and 1970 being loaded at the installation. Ship loading operations were transferred from NAD Bangor to Naval Weapons Station Concord in March 1970, and NAD Bangor was disestablished. Residual functions were consolidated with NTS Keyport in October 1970. In 1972, NAD Bangor was reactivated. POMFPAC remained operational between 1970 and 1972.

[redacted] NAD Bangor thereafter became Naval Submarine Base (NSB) Bangor. The official activation of NSB Bangor occurred on February 1, 1977. [redacted]

NSB Bangor merged with Naval Station Bremerton in June 2004 to form the new command NBK (consisting of NBK Bangor and NBK Bremerton).

In support of historical munitions transshipment operations at NBK Bangor from the mid-1940s to the mid-1970s, munitions were brought to the installation via rail car from military ordnance manufacturing facilities. [redacted]

Ordnance transshipment operations at NBK Bangor were heaviest during the latter stages of World War II (1944 to 1945), the Korean War (1950 to 1953), and the Vietnam War (1963 to 1973). [redacted]

[redacted]

[redacted]

10.4 Previous Investigations

Several assessments and investigations have been implemented at NBK Bangor that have identified sites where munitions-related activities and munitions-related impacts have or may have occurred. In many instances, information about specific sites and associated histories and operations were iteratively augmented over a series of assessments and investigations.

In February 2015, the Base Operating and Support Contractor (BOSC) discovered potential military munitions items while conducting routine vegetation clearance along [redacted] railroad tracks at NBK Bangor. EOD Mobile Unit (MU) 11 at NBK Bangor responded to the area and discovered material potentially presenting an explosive hazard (MPPEH) near the surface and partially buried in soil and determined that MC contamination could be present. The 2015 observation of potential explosive safety hazards and the potential for MC contamination in an area not previously identified through assessment and investigation activities called into question the scope of previous assessments of historical munitions-related operations and related impacts (or potential impacts) at the installation. In response, NAVFAC NW contracted Battelle to implement a current, comprehensive, installation-wide, MMRP PA for NBK Bangor in order to assess potential ordnance and munitions-related issues (Battelle, 2017).

The purpose of the PA was to document the munitions-related sites previously identified at NBK Bangor and set recommendations and priorities for further investigation or action. In conjunction with and following the installation reconnaissance phase of the MMRP PA, the 76 identified areas of interest at NBK Bangor were preliminarily screened to eliminate from further consideration those sites that, based on weight of evidence, were not considered to have any specific ordnance- or munitions-related past use and/or potential impacts that have been or are being sufficiently investigated and/or addressed under other programs (e.g., the Installation Restoration Program) such that no additional consideration under the MMRP is needed, and to consolidate individual sites that were identified through different means but likely reflect the same site.

Based on the information and data acquired during the PA, the 76 discrete areas were initially identified as areas of interest due to the presence of surface MPPEH, presence of observed MC contamination (e.g., visual staining consistent with a particular explosive filler material), and from evidence and data suggesting the likely presence of MPPEH and/or MC contamination. A screening based on the site history and function resulted in 21 sites requiring further UXO surface clearance and geophysical evaluation. Of these 21 sites, which will be addressed under the separate Munitions and Explosives of Concern (MEC) QAPP, up to three sites were identified for soil sample collection and analysis based on the historical activities and recommendations included in the 2017 MMRP PA. MC Sampling will be conducted at one of the three sites (UXO 000003) based on evidence of a MEC/MPPEH release but will only occur at the other two sites (UXO 000002 and UXO 000006) if breached MEC/MPPEH items are present since a release is suspected but not confirmed based on the 2017 PA Report. The one planned and two conditional sites for sampling are the subjects of this MC SAP.

10.5 Conceptual Site Model

The conceptual site model (CSM) discusses contaminants, contaminant release mechanisms, migration pathways, affected environmental media, receptors potentially exposed to contaminated environmental media, and the mechanisms by which the receptors could be exposed (i.e., receptor exposure pathways or routes).

The current CSM for MC exposure at each of the three UXO sites currently included for MC sampling is summarized below. The basis for selection of these three sites is either evidence of a MEC/MPPEH release or a MEC/MPPEH release is suspected but not confirmed. The CSM for potential exposure to MC from MEC/MPPEH is depicted on Figure 10-3. It is important to note that the formal numbers for the UXO sites will be included in the text but will be abbreviated in the figures.

10.5.1 UXO 000002 – [redacted] (Site CC)

UXO 0000002 is located within the Lower Base in the southeastern portion of NBK Bangor (Figure 10-2). The overall site comprises approximately 19 acres along a railroad line that operated from 1946 to the present day (Figure 10-4).

In February 2015, EOD responded to the site due to the observation of MPPEH on the ground surface during routine vegetation management activities [redacted] Four discrete areas of metallic debris were observed, and three of these areas contained various MPPEH including ammunition cans, ordnance storage containers, 40-millimeter (mm) cartridge casings, .50-caliber cartridge casings, and a potential smoke pot. The EOD response team reportedly did not specifically identify explosives or explosive residue within the items inspected; however, the items were not designated as material documented as safe (MDAS), and the area was not completely investigated and delineated. Based on the presence of MPPEH and the potential presence of MC contamination, the area was classified by the Navy as an MMRP Area of Concern requiring further investigation (Battelle, 2017).

The 2017 PA Report recommended that a removal action for the surface removal of MPPEH/MEC be performed followed by confirmatory MC soil sampling. A previously planned detector-aided survey was not completed due to very dense vegetation, chain-link fencing, and barbed wire. Although the 2017 PA recommended a removal action followed by confirmatory MC sampling, upon further evaluation during the SI planning, the EOD records were not detailed, and it is unknown if a significant MEC/MPPEH release could have resulted in MC contamination. Currently, the site can be most accurately described as a debris field with scattered munitions items as opposed to a dumpsite with a high density of munitions items.

The portion of the site identified for SI sampling includes the primary area of concern, which encompasses approximately 3.5 acres with a width of approximately 80 feet and a length of approximately 1,900 feet. [redacted] Vegetation observed at the site during the September 2019 site visit included young alder, cedar, and Douglas fir trees along both sides of the railroad line. Ground cover consists primarily of ferns, mullen, and scattered Scot's broom. There is a ditch along the eastern side of the primary area of concern that may be a wetland area for at least a portion of the run.

Additional information concerning MEC/MPPEH is included in the MEC QAPP.

10.5.1.1 MC Exposure Pathway Analysis

UXO 000002 is identified as a surface disposal area. Potential receptors at UXO 000002 include both human and ecological receptors. Potentially complete exposure pathways include:

Current and Future Industrial Workers: Incidental ingestion, dermal contact, and inhalation of soil from the 0 to 2-foot-bgs interval are potentially complete exposure pathways.

Future Construction Workers: Incidental ingestion of, dermal contact with, and inhalation of soil from 0 to 2 feet bgs are potentially complete exposure pathways. Exposure to potential contaminants in groundwater is also possible for construction workers during excavation activities through direct contact (i.e., incidental ingestion, dermal contact, and inhalation).

Terrestrial Ecological Receptors: Incidental ingestion of and direct contact with soil and ingestion of plants/animals present potentially complete exposure pathways.

Summary of Exposure Analysis

The primary MC of concern at UXO 000002 [redacted] (Site CC) are explosives based on the types of MPPEH observed at the site. Current human and ecological receptors have the potential to access surface soil at UXO 000002.

Potentially complete exposure pathways exist for human and ecological receptors to be exposed to MC in soil, if present, under current and future land uses.

10.5.2 UXO 000003 – [redacted] (Site D)

UXO 000003 is identified as a surface/subsurface ordnance disposal area. UXO 000003 is located within the Lower Base in the east-central portion of NBK Bangor (Figure 10-2). The overall site comprises approximately 37 acres [redacted] (Figure 10-5). The site included a burn trench and a small arms ammunition incinerator and was operational from 1946 to 1965. The area was used to burn Explosive D sludge from demilitarization operations at NAD Bremerton Annex as well as ordnance wastes containing Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) and 2,4,6-Trinitrotoluene (TNT). Rocket grains, smokeless powder, black powder, ammonium blocks, and photoflash bombs were also burned at the site, and white phosphorus shells may have been tested at the site. The 2017 PA Report recommended a removal action followed by confirmatory MC sampling. Upon further evaluation during SI planning, because staining is present at the site as an indication of a release from a breached MEC/MPPEH item, MC sampling will be conducted during the SI.

The portion of the site identified for SI sampling includes approximately 20 acres in a heavily wooded area that contained the burn trench, burn mounds, and small arms incinerator. Vegetation observed at the site during the September 2019 site visit included mostly 50-year-old or older alder hillside with a large wetland complex downslope of the small arms incinerator. Snags are present. Heavy grasses include reed canary grass.

Additional information concerning MEC/MPPEH is included in the MEC QAPP.

10.5.2.1 MC Exposure Pathway Analysis

Potential receptors at UXO 000003 include both human and ecological receptors. Potentially complete exposure pathways include:

> **Current and Future Industrial Workers:** Incidental ingestion of, dermal contact with, and inhalation of soil from 0 to 2 feet bgs are potentially complete exposure pathways.
>
> **Future Construction Workers:** Incidental ingestion of, dermal contact with, and inhalation of soil from 0 to 2 feet bgs are potentially complete exposure pathways. Exposure to potential contaminants in groundwater is also possible for construction workers during excavation activities through direct contact (i.e., incidental ingestion, dermal contact, and inhalation).
>
> **Terrestrial Ecological Receptors:** Incidental ingestion of and direct contact with soil and ingestion of plants/animals present potentially complete exposure pathways.

Summary of Exposure Analysis

The primary MC of concern at UXO 000003 – [redacted] (Site D) are explosives based on the types of munitions observed at the site. Current human and ecological receptors have the potential to access surface soil at UXO 000003.

Potentially complete exposure pathways exist for human and ecological receptors to be exposed to MC in soil, if present, under current and future land uses.

10.5.3 UXO 000006 [redacted] (Site 22)

UXO 000006 is identified as a surface disposal area. UXO 000006 is located within the Lower Base in the northern portion of NBK Bangor (Figure 10-2). The overall site comprises approximately 1 acre and was used as a disposal area from 1965 to 1973 (Figure 10-6). Although the 2017 PA Report recommended a removal action followed by confirmatory MC sampling, upon further evaluation during the SI planning, the EOD records are not detailed, and there may or may not be a significant MEC/MPPEH release that could result in MC contamination. Currently, the site can be most accurately be described as a debris field with scattered munitions items as opposed to a dumpsite with a high density of munitions items.

The portion of the site identified for SI sampling includes the entire 1-acre site, which is located in a heavily wooded area where metallic debris including ammunition cans, 40-mm cartridges, and various unopened ordnance storage containers were observed. Vegetation observed at the site during the September 2019 site visit included alder hillside with mature western hemlock and Douglas fir and light understory.

Additional information concerning MEC/MPPEH is included in the MEC QAPP.

10.5.3.1 MC Exposure Pathway Analysis

Potential receptors at UXO 000006 include both human and ecological receptors. Potentially complete exposure pathways include:

> **Current and Future Industrial Workers:** Incidental ingestion of, dermal contact with, and inhalation of soil from 0 to 2 feet bgs are potentially complete exposure pathways.
>
> **Future Construction Workers:** Incidental ingestion, dermal contact, and inhalation of soil from the 0 to 2-foot-bgs interval are potentially complete exposure pathways. Exposure to contaminants in groundwater is also possible for construction workers during excavation activities through direct contact (i.e., incidental ingestion, dermal contact, and inhalation).
>
> **Terrestrial Ecological Receptors:** Incidental ingestion of and direct contact with soil and ingestion of plants/animals present potentially complete exposure pathways.

Summary of Exposure Analysis

The primary MC of concern at UXO 000006 [redacted] (Site 22) are explosives based on the types of munitions observed at the site. Current human and ecological receptors have the potential to access surface soil at UXO 000006.

Potentially complete exposure pathways exist for human and ecological receptors to be exposed to MC in soil, if present, under current and future land uses.

SAP Worksheet #11: Project Quality Objectives/Systematic Planning Process Statements

(UFP-QAPP Manual Section 2.6.1)

The following text describes the development of the Project Quality Objectives (PQOs) using USEPA's DQO (System Planning) Process. This MC SAP serves as the SI Work Plan for the MC investigative portion of the SI and has been developed to describe the MC soil sampling. As previously noted, a separate MEC QAPP has been developed to detail the procedures for conducting UXO detector-aided surface surveys and ground-based geophysical surveys. The PQOs discussed below are for both the MEC/MPPEH and MC portions of the SI.

11.1 Problem Statement

The following three UXO sites at NBK Bangor have been identified for MC sampling based on the 2017 PA evaluation and site visits during the SI planning process:

- UXO 000002 [redacted] (Site CC)
- UXO 000003 [redacted] (Site D)
- UXO 000006 [redacted]Site 22)

Surface soil at these three sites may be contaminated with MC (i.e., explosives) from breached MPPEH that may potentially exist at the sites. One site is planned for the MC sampling based on evidence of a release while the other two sites are planned for conditional MC sampling (i.e., breached MEC/MPPEH items are present) since a MEC/MPPEH release is suspected but not confirmed.

The overall primary objective of the SI is to determine if there are exceedances of criteria for MC in surface soil at three sites with significant potential for MC contamination (i.e., explosives) based on breached MPPEH items and therefore present an unacceptable risk to human health or the environment. The focus of this MC SAP is the potential for MC to exist in surface soil at concentrations greater than applicable screening criteria and taking action protective of human health and the environment. Also, to note, a separate MEC QAPP will be used to complete DGM and GPR and the results will be used to determine if further MC Sampling is necessary.

11.2 Data Needs

The following information is required to resolve the MC problem described in Section 11.1:

1. Chemical Data: Concentrations of target analytes in soil. The complete list of target analytes is presented in Worksheet #15. These target analytes are the contaminants most likely to be released in quantities of concern from potential MEC/MPPEH at the sites. The sampling methods that must

be used are presented in Worksheet #17, and the analytical methods are presented in Worksheet #19. The target medium (i.e., surface soil) will be analyzed for explosives.

2. Sample Location Data: Horizontal coordinates for all discrete soil sample locations must be established and measured using a global positioning system (GPS) unit with submeter accuracy using Washington State – North State Plane, measured in United States survey feet. These coordinates must be documented using the datums identified in Worksheet #14, "GPS Locating" section.

3. Project Screening Levels (PSLs): Concentrations of target analytes in surface soil must be compared to one or more criteria, as appropriate, to determine if elevated concentrations of potential environmental concern are present at the site. The PSLs selected for these comparisons are provided in Worksheet #15. Worksheet #30 details the analytical laboratory and its associated certifications by analyte.

4. Data Summary Statistics: Measured concentrations of individual target analytes are needed for determining contamination levels at selected locations. Field duplicate samples are required to provide a measure of data variability.

To conduct comparisons of site data to selected PSLs in the environmental medium of interest, the selected laboratory should have Limits of Quantitation (LOQs) that are low enough to measure constituent concentrations less than the PSLs. Consult Worksheet #15 footnotes for additional details regarding interpretation of data associated with PSLs that are less than LOQs or Detection Limits (DLs).

The following conventions must be used to report analytical laboratory data:

- Report all results for soil on a dry-weight basis.
- Report results of percent moisture determinations in each analytical data package and electronic data deliverable (EDD).
- Capture this information in the project database, which will eventually be uploaded to NIRIS.
- Classify all results less than DLs as non-detects.
- Report non-detects at the Limit of Detection (LOD) with a "U" qualifier.
- J-flag positive results reported at concentrations between the DL and LOQ. These results will be used as reported but with consideration for the additional uncertainty represented by the "J" flags.
- Assign "X" flags to any data that are found during data validation (described later) to exhibit serious quality deficiencies and, if appropriate, convert "X" flags to "R" flags during data usability assessment (also described later) to indicate unusable data.

All of the analytical laboratory data will be captured in the project database, which will then be uploaded to NIRIS.

11.3 Study Boundaries

The SI includes evaluation of soil to determine if any explosives concentrations are greater than applicable screening criteria. The discrete sample areas may be adjusted in the field if visual evidence is observed to indicate a different location represents a more likely MC release. This will help to ensure that any potential contamination at the site has the greatest chance of being detected. In general, data collection must be biased toward areas of each site that have the greatest potential for being contaminated to ensure that contamination has the greatest chance of being detected. The samples will be biased toward locations where MEC/MPPEH is present considering that the investigation is an SI and determining the lateral and vertical extent of MC (or MEC/MPPEH) is not the objective. The SI recommendations will need to include additional lateral and/or vertical investigation if MC contamination is encountered during the SI.

The investigative boundaries for each of the three sites considered for MC sampling are presented below. All fieldwork for ESA affected locations will be performed within work window for Marbled Murrelet between Sept 24 to March 31 (UXO 2, 4, 6, 7, 7B, 9, and 11B). All other sites have no ESA restrictions.

UXO 000002 [redacted] (Site CC)

The overall UXO 000002 site, considered a disposal area, occupies approximately 19 acres [redacted] (Site CC). As previously discussed in Worksheet #10, the site is currently believed to be a scattered debris field as opposed to a dumpsite. The area to be investigated for surface MEC/MPPEH and subsurface anomalies is a vegetated area of approximately 3.5 acres with a width of approximately 80 feet and a length of approximately 1,900 feet. [redacted]

Surface soil (0 to 6 inches bgs) at the Keyport Annex Rail Line (Site CC) is of interest because MPPEH had previously been observed on the ground surface during routine vegetation management activities along the railroad tracks and during the PA. The findings included a 40-mm projectile and ammunition containers labeled Explosive D, RDX, smokeless powder, and TNT. Reportedly, three locations of concern were staked in the field.

While MPPEH had previously been observed on the site, evidence of a MEC and/or MPPEH release has not yet been documented, and MEC and/or MPPEH may not be encountered during the SI. Therefore, the need for MC sampling will be assessed in the field during the SI; MC sampling will only be conducted associated with MEC/MPPEH release that could result in MC contamination (e.g., breached MEC/MPPEH item). Up to six composite surface soil samples must be collected (comprised of five aliquots each). The maximum investigative depth at the site is 0 to 6 inches. If more than six locations are encountered in the field, the NAVFAC NW COR/RPM will be consulted and a FCR will be completed to collect additional samples, if necessary.

UXO 0000003 [redacted] (Site D)

The overall UXO 000003 site occupies approximately 37 acres located just west of [redacted] Road. The area to be investigated for surface MEC/MPPEH and subsurface anomalies is a vegetated area of approximately 20 acres and includes an area believed to historically have been used for OB/OD, and possibly disposal. A masonry block structure was observed at the site and is believed to be a former small arms incinerator. Historical drawings indicate that a burn trench existed just south of the small arms incinerator and that burn mounds or residual soil existed behind (northwest of) the small arms incinerator.

Surface soil (0 to 6 inches bgs) at the [redacted] OB/OD (Site D) is of interest because , MPPEH had been previously observed on the ground surface during the PA near the former incinerator, and other areas of MPPEH accumulation may be present based on the site history. The findings included 20-mm caps. Suspected contamination may include ammonium picrate sludge, rocket grains, smokeless powder, ammonium nitrate blocks, white phosphorus shells, 20-mm small arms, 3-inch projectiles, 40-mm projectiles, and various other munitions items containing RDX/TNT.

Up to six composite surface soil samples must be collected (comprised of five aliquots each) from various areas within the site where a release of MEC and/or MPPEH is observed on the ground surface during the MEC/MPPEH investigation that could result in MC contamination (e.g., breached MEC/MPPEH item). During the SI, up to five composite surface soil samples (comprised of five aliquots each) will be collected where a MEC/MPPEH is observed, and one sample (five aliquots) will be collected from the burn mounds/residual soil area, which represents an area where MC may be concentrated. The maximum investigative depth at the site is 0 to 6 inches.

White phosphorus is a specialty analyses not included in the explosives grouping of analytes. If white phosphorus is visually identified during the SI, all work will be stopped at the site, and the NAVFAC NW COR/RPM will be informed. If more than six locations are encountered in the field, the NAVFAC NW COR/RPM will be consulted and a FCR will be completed to collect additional samples, if necessary.

UXO 000006 [redacted] (Site 22)

The UXO 000006 site is a sloped vegetated area occupying approximately 1 acre. The area to be investigated for surface MEC/MPPEH and subsurface anomalies includes the entire 1-acre area that may have been used as a disposal area for potential MEC/MPPEH.

Surface soil (0 to 6 inches bgs) in the Debris Area 2 (Site 22) is of interest because MPPEH was previously observed at the surface of the site, at the top of the slope, during the PA. The findings included ammunition cans, a 40-mm projectile, and various other unopened ordnance storage containers.

While MPPEH had previously been observed on the site, evidence of a MEC and/or MPPEH release has not yet been documented and MEC/MPPEH may or may not be encountered during the SI. Therefore, the need for MC sampling will be assessed in the field during the SI; MC sampling will only be conducted associated with MEC/MPPEH release that could result in MC contamination (e.g., breached MEC/MPPEH item). Up to six composite surface soil samples must be collected (comprised of five aliquots each). The maximum investigative depth at the site is 0 to 6 inches.

11.4 Analytic Approach

The following decision rule, developed to govern data use for MC, are based on direct comparison of laboratory analytical results to applicable PSLs and must be applied to data from each site.

Decision Rule #1

- If the laboratory-measured concentration of any target analyte in any composite soil sample from a site is greater than the respective PSL in Worksheet #15, then plan and conduct a Remedial Investigation (or more limited alternative methods of investigation as per Note below) to fully delineate the contamination and conduct human health and ecological risk assessments for that site; otherwise, apply the decision rules of the MEC SAP to determine whether any additional investigation is warranted.

Note: When applying this decision rule, the project team must consider the number of MEC/MPPEH items found overall (few or many), the density of those items (scattered or in a group), the observed extent of soil staining, and the type of MEC/MPPEH item (training item or high explosive item). If these considerations lead to development of a different CSM and investigative strategy, the changes must be documented in the follow-up plan or other suitable change document such as an FTMR. For example, further delineation in an SI Addendum may allow delineation of a small area of soil contamination that could be readily addressed via a future removal action versus a more extensive process of Record of Decision (ROD). As another example (considering that Worksheet 15 has Project Action Levels that are based on leachability to groundwater rather than simply direct exposure), soil concentrations might exceed Project Action Levels that are conservatively based on leachability to groundwater but less than SSL values for direct exposure to soil; in this instance, rather than proceeding to an RI regarding MC, the project team may consider recommending collection of a groundwater sample(s) before proceeding to an RI for MC.

11.5 Performance Criteria

After sample collection and data analysis, the Project Team will review the information to determine if additional soil sampling is required. Additionally, the Project Team will review the targeted sample and analyte lists and assess whether all the planned samples and data have been acquired and whether any significant data quality deficiencies have been identified. Details regarding data verification, review, and validation are provided in Worksheet #s 34 through 37. This SAP requires use of standardized sampling and analysis processes as well as QC checks to limit the potential for errors and to minimize uncertainties. If the data are compromised in terms of quality or completeness, the Project Team will convene to identify data gaps and determine whether the decision rules can be applied. If the decision rules can be applied, no CA will be required; however, if the decision rules cannot be applied, the team will identify data gaps and devise an appropriate path forward to reconcile the data gaps with project objectives.

11.6 Sampling Design and Rationale

The sampling design, rationale, and locations are summarized in Worksheet #17.

SAP Worksheet #12: Field Quality Control Samples

(UFP-QAPP Manual Section 2.6.2)

QC Sample	Analytical Group	Frequency	Data Quality Indicators (DQIs)	Measurement Performance Criteria (MPCs)
Field Duplicates	Explosives	One per 10 composite field samples, for all sites combined[1]	Precision	If both the original and duplicate results are ≥ 2x LOQ, Relative Percent Difference (RPD) must be ≤ 50% for solid samples. If either the original or duplicate result is < 2x LOQ, use professional judgment.
Equipment Rinsate Blank	Explosives	One per sampling equipment	Bias/Contamination	No analytes ≥ ½ LOQ.
Cooler Temperature Indicator	Explosives	One per cooler	Representativeness	Temperature must be between 0 and 6 degrees Celsius (°C), but samples must not be frozen.
Matrix Spike (MS)	Explosives	One per 20 composite field samples collected	Bias	See Worksheet #28.
Matrix Spike Duplicate (MSD)	Explosives	One per 20 composite field samples collected	Bias and precision	See Worksheet #28.

[1] As opposed to collecting one composite field duplicate per UXO site, one composite field duplicate will be collected per every 10 composite field samples based on the total number of samples collected during the MC sampling effort.

SAP Worksheet #13: Secondary Data Criteria and Limitations Table

(UFP-QAPP Manual Section 2.7)

Secondary Data	**Data Source** (originating organization, report title and date)	**Data Generator(s)** (originating organization, data types, data generation / collection dates)	**How Data Will Be Used**	**Limitations on Data Use**
Previous Report	Military Munitions Response Program Preliminary Assessment Report, Naval Base Kitsap Bangor, Bangor, Washington. February 2017.	Background information, site history, previous investigations	The reported background information for each site will be used to support the CSM.	None
Previous Report	Second Five-Year Review of Record of Decision, Naval Base Kitsap at Bangor, Silverdale, Washington. April 2005.	Background information, site history, previous investigations	The reported background information for each site will be used to support the CSM.	None
Previous Report	Annual Summary Report of Navy Assessment and Control of Installation Pollutants (NACIP) Program at Naval Submarine Base, Bangor. June 1983.	Background information, site history	The reported background information for each site will be used to support the CSM.	None

SAP Worksheet #14: Summary of Project Tasks

(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 2.8.1)

14.1 Field Investigation Task Plan

The following field tasks will be completed during the MC portion of the SI, as summarized in subsequent text:

- Mobilization/Demobilization and Safety Training
- Utility Clearance
- UXO Anomaly Avoidance and UXO Escort Activities
- GPS Locating and Mapping
- MC Sampling
- Investigation-Derived Waste (IDW) Management
- Field Decontamination Procedures
- Field Documentation Procedures

Additional project activities include the following:

- Analytical Tasks
- Data Management
- Data Tracking
- Data and Records Storage, Archiving, and Retrieval
- Data Security
- Electronic Data
- Data Review
- Project Reporting, including human health and ecological risk assessment

14.1.1 Mobilization/Demobilization and Safety Training

Mobilization will consist of the delivery of all equipment, materials, and supplies to the site, the complete assembly in satisfactory working order of all such equipment at the site, and the satisfactory storage at the site of all such materials and supplies. Tetra Tech will coordinate with the NAVFAC NW COR/RPM to identify locations for the storage of equipment and supplies. Site-specific health and safety training for all Tetra Tech field staff and subcontractors will be provided as part of site mobilization and is also addressed in Worksheet #8.

Demobilization will consist of the prompt and timely removal of all equipment, materials, and supplies from the site following completion of the work. Demobilization includes the cleanup and removal of IDW generated during the investigation.

14.1.2 Utility Clearance

Clearances needed for soil sample collection will be obtained in accordance with the Navy's established procedures and requirements. Utility clearance requirements will be completed through Washington One-Call service and NBK Bangor Public Works Department. See the SSHP/APP for further information concerning utility clearance activities.

14.1.3 UXO Anomaly Avoidance and UXO Escort Activities

As a safety measure, because the MC sampling fieldwork is being conducted within the boundaries of MEC/MPPEH investigation areas across NBK Bangor (see the MEC QAPP for details of this investigation), a qualified UXO Technician serving as an escort is required and will be present during all MC field activities conducted within the boundaries of MEC/MPPEH investigation areas.

A UXO Technician II or above will be part of the field sampling team in areas associated with the MEC/MPPEH investigation to provide anomaly avoidance of MEC/MPPEH during field activities. The UXO escort will report any MEC/MPPEH to the UXO team leader and the Tetra Tech PM who will in turn contact the Navy COR/RPM. In addition:

- No ordnance, munitions, explosives, or ordnance-related materials will be moved, removed, or disposed of during UXO escort duties associated with MC sampling activities. Prior to MC sampling, the breached MEC/MPPEH will be removed and the location flagged for MC sampling; MC sampling will be conducted under the direction of a UXO Escort and practicing UXO avoidance (as described in the separate MEC QAPP).

- The UXO escort will conduct a UXO detector-aided survey to screen all proposed sample locations within the site MEC/MPPEH investigation boundary using a hand-held, industry-standard, metal detector to check for possible ordnance or ordnance-related material. The UXO escort will use a hand-held metal detector to check the planned soil sampling location. If any surface MEC, MPPEH, metal debris, or subsurface anomalies are detected, sample locations will be adjusted (i.e., to an area free of concerns or suspect anomalies), as necessary, to safely avoid contact with the suspect items, or the MC sampling will be deferred until the suspect surface items are removed by the UXO team for the MEC/MPPEH investigations, as covered by the MEC QAPP. Any significant alterations to the proposed investigation area boundaries will be recorded and documented in an FCR.

The UXO escort will have the appropriate level of training and experience as stated in DoD Explosives Safety Board (DDESB) Technical Paper (TP)-18 (see Appendix B). Although this SAP is specific to MC soil sampling and the MEC/MPPEH portion of the work is presented under a separate MEC-specific QAPP, field personnel responsible for soil sample collection will undergo a safety briefing conducted by the UXO Technician in regard to potential site MEC/MPPEH.

14.1.3.1 Vegetation Removal with MEC/MPPEH Surface Clearance

Vegetation removal will be conducted as part of the MEC/MPPEH investigation of the site, as covered by the MEC QAPP.

14.1.3.2 Monitoring Equipment Calibration

These procedures are described in Worksheet #22.

14.1.3.3 Land Surveying

Land surveying will be conducted as part of the MEC/MPPEH investigation of the site, to document and map investigation areas, as covered by the MEC QAPP. A GPS unit will be used to document and map MC sample locations (see below).

14.1.4 GPS Locating and Mapping

A sub-meter, hand-held, Trimble GPS or equivalent will be used to collect location coordinates of each composite aliquot. The GPS coordinate system will be set up so that horizontal coordinates are collected and documented in the field using the North American Datum of 1983 (NAD83), Washington State Plane Coordinate System, in United States survey feet for easting and northing.

The GPS survey will use third-order monument data if available. Select monuments or markers will be visited at the start and end of each day. See Worksheet #22 for more information regarding GPS surveying. Tetra Tech will load site boundaries, known cultural or terrain features that may affect surveys, and background maps into the GPS prior to deployment. GPS data collected during the investigation will be stored in the GPS unit and downloaded to a computer daily or as soon as possible after acquisition. Data will also be manually entered into a field log as it is collected. Once downloaded from the GPS unit, the data will then be uploaded for processing by Tetra Tech Geographic Information System personnel.

To ensure sub-meter accuracy, a minimum of six satellites are required to capture a position. If GPS accuracy is not sub-meter, data will not be collected until more satellites become available. In locations where the overhead canopy interferes with satellite lines of sight and GPS accuracy cannot be reasonably established, an alternative positioning technique will be employed (e.g., compass and tape measure, fiducials, or total station) at the discretion of FOL to ensure that locations can be reacquired at a later date if necessary.

14.1.5 Munitions Constituents Soil Sampling

Composite surface soil samples will be collected within the various areas at NBK Bangor. The sample aliquots will be collected by hand auger or hand trowel at the discretion of the FOL in accordance with Tetra Tech SOP SA-1.3 (Appendix C). Any qualitative visual signs of potential contamination (such as soil staining) will be noted on the soil sample log sheet. The horizontal extent of staining, if present, will be measured in the field.

Each composite soil sample will be comprised of five surface soil aliquots. The aliquots will be collected from 0 to 6 inches bgs. Upon identification of the sample location (i.e., identification of breached MEC/MPPEH item), the aliquots will be laid out in a pattern similar to the five dots on the face of a game die, with the center aliquot positioned on the desired sample location. The other four aliquots will be positioned approximately 5 feet from this center point into the northeast, northwest, southeast, and southwest. The soil samples will be collected from those areas where MC contamination is expected based on the surface location of the breached MEC/MPPEH. If more than six locations are encountered in the field, the NAVFAC NW COR/RPM will be consulted and a FCR will be completed to collect additional samples, if necessary.

The total number of soil samples is tabulated in Worksheet #18 and summarized in Worksheet #20. Soil QC samples are also listed in Worksheet #20. Worksheet #17 presents details regarding sample collection. Worksheet #19 presents a summary of the sample analyses, container types and volumes, preservation requirements, and holding times for the soil samples to be collected. Upon compositing the individual aliquots for a particular sample location (see Worksheet #17), the soil samples will be placed in sample jars, labeled, and placed immediately in an iced cooler for shipment to the fixed-base laboratory. The soil samples will be analyzed for MC-related explosives.

14.1.6 Investigation-Derived Waste Management

Nominal excess soil is expected to be generated from hand auguring or using the hand trowel and any excessive sample material will be placed back in the sample area rather than containerized. Any excess soil from decontamination wastes derived from site investigation activities (e.g., hand auguring) will be containerized in Department of Transportation-approved (Specification 17C) 55-gallon (or smaller) drums and managed as IDW as discussed below and in SOP SA-7.1. Aqueous samples will be collected from the drum containing aqueous IDW and will be sampled for the chemicals of potential concern (explosives). The drums of IDW will be clearly marked with a label that describes the accumulation start date, contents, POC, and a message stating that the drum contents are on hold pending analysis. IDW will be disposed of in accordance with applicable federal, state, and local laws and regulations.

14.1.7 Field Decontamination Procedure

Decontamination of sampling equipment will be in general accordance with SOP SA-7.1.

14.1.8 Field Documentation Procedures

Pre-preserved certified-clean bottle ware will be supplied by the analytical laboratory. Sample log sheets will be maintained for samples collected. In addition, sample collection information will be recorded in bound field logbooks or on specific field forms. Samples will be packaged and shipped according to SOP SA-6.1.

Field documentation will be performed in accordance with SOP SA-6.3. A summary of all field activities will be properly recorded in a bound logbook with consecutively numbered pages that cannot be removed. Logbooks will be assigned to field personnel and will be stored in a secured area when not in use. Field forms are provided in Appendix B.

At a minimum, the following information will be recorded in the site logbook:

- Name of the person to whom the logbook is assigned.
- Project name.
- Project start date.
- Names and responsibilities of on-site project personnel including subcontractor personnel.
- Arrival and departure of site visitors.
- Arrival and departure of equipment.
- Sampling activities and sample log sheet references.
- Description of subcontractor activities.
- Sample shipping information, including chain-of-custody numbers, air bill numbers, carrier, times, and dates.
- Health and safety issues.
- Descriptions of photographs including date, time, photographer, picture number, location, and compass direction of each photograph.

All entries will be written in ink, and no erasures will be made. If an incorrect entry is made, striking a single line through the incorrect information will make the correction; the person making the correction will initial and date the change.

14.2 Analytical and Reporting Tasks

A short description of each analytical and reporting task is provided below.

14.2.1 Analytical Tasks

Fixed-base chemical analysis for explosives will be performed by Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~. Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~ are current DoD Environmental Laboratory Accreditation Program (ELAP)-approved laboratories and are also accredited by the WSDE for all analytes with the exception of diphenylamine. Eurofins TestAmerica Denver is DoD ELAP accredited for the analysis of diphenylamine; however, they are not accredited by the State of Washington for this analysis. APPL is DoD ELAP accredited for the analysis of Nitrocellulose. Copies of accreditation letters for both laboratories can be found in Appendix D. Analyses will be performed in accordance with the analytical methods identified in Worksheet #19. The analytical laboratories are expected to meet the PSLs to the extent identified in Worksheet #15. The analytical laboratories will perform chemical analysis following laboratory-specific SOPs (listed in Worksheet #23) developed based on the analytical methods listed in Worksheet #19. Laboratory data will be delivered to Tetra Tech in the form of an EDD and pdf data package. This information will be captured in the project database that will eventually be uploaded to NIRIS.

14.2.2 Data Management

After the field investigation is completed, the field sampling log sheets will be organized by date and filed in the project files. The field logbooks for this project will be used only for this site and will also be categorized and maintained in the project files after completion of the field program. The field logbooks will be titled based on date and activity. The data handling procedures to be followed by the laboratories will meet the requirements of the laboratory technical specification. The electronic data will be automatically downloaded into the Tetra Tech database in accordance with proprietary Tetra Tech processes.

14.2.3 Data Tracking

Data are tracked from generation to archiving in the Tetra Tech project-specific files. The Tetra Tech Project Chemist (or designee) is responsible for tracking the samples collected and shipped to the analytical laboratory. Upon receipt of the data packages from Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~, the Tetra Tech Project Chemist will monitor the data validation effort, which includes verifying that the data packages are complete and that results for all samples have been delivered by the analytical laboratory.

14.2.4 Data and Records Storage, Archiving, and Retrieval

After the data are validated, the data packages are entered into the Tetra Tech Navy CLEAN file system and archived in secure files. The field records including field logbooks, sample log sheets, chain-of-custody records, and field calibration logs will be submitted by the Tetra Tech FOL to be entered into the file system prior to archiving in secure project files. As documents are finalized, all relevant data and records will be uploaded electronically to NIRIS and retained there indefinitely. Tetra Tech will submit Administrative Record Files, Site Files, and Post Decision Files in accordance with the specifications defined in the *NAVFAC Environmental Restoration Program Recordkeeping Manual* (2017). Upon project completion, paper copies are submitted to the Federal Record Center (FRC) for long-term storage (50 years archival).

14.2.5 Data Security

The Tetra Tech project files are restricted to designated personnel only. Records may only be borrowed temporarily from the project file using a sign-out system. The Tetra Tech Data Manager maintains the electronic data files. Access to the data files is restricted to qualified personnel only. File and data backup procedures are routinely performed.

14.2.6 Electronic Data

All electronic results will be verified against the hardcopy data package Form Is for accuracy. One hundred percent of the electronic results will be validated in accordance with specifications in Worksheet #36, and qualifiers will be manually added to the database. The manually entered qualifiers will be verified by the DVM or designee and are also verified during an electronic verification step using proprietary Tetra Tech processes. The data will then be compiled into a NIRIS Electronic Data Deliverable (NEDD) and loaded into NIRIS in accordance with Navy procedures. This process includes a QA review of the data to ensure that the content and format of the data satisfy the requirements of NIRIS uploads. The NEDD is submitted through a data checker into NIRIS, which also ensures that the format is acceptable.

14.2.7 Data Review

Data verification, validation, and usability assessment processes are described in Worksheet #s 34 through 37.

14.2.8 Project Reporting

At the completion of data review and resolution of anomalies, should they occur, a SI Report will be prepared to present results of the MC and MEC/MPPEH investigations and satisfy DQOs as identified in Worksheet #11. The draft report will be submitted to the Navy for comments and approval, and the draft final will then be submitted to regulatory agencies for comments and approval. Responses to comments and necessary revisions will be made to the draft and draft final reports before issuing a final report and will be managed similar to other project records.

SAP Worksheet #15: Reference Limits and Evaluation Table

(addition of Nitrocellulose by APPL per MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 2.8.1)

Matrix: Soil
Analytical Group: Explosives

Analyte	CAS Number	Human Health PSL	Human Health PSL Reference(1)	Ecological PSL	Ecological PSL Reference(2)	~~PQLQ~~	Laboratory Reference Limits		
							LOQ	LOD	DL
Explosives (µg/kg)									
1,3,5-Trinitrobenzene	99-35-4	2,100	USEPA SSL	300	R4	~~100~~	100	40	13.8
1,3-Dinitrobenzene	99-65-0	**1.8**	**USEPA SSL**	**34**	**R4**	~~0.6~~	100	40	16.6
TNT (2,4,6-Trinitrotoluene)	118-96-7	**15**	**USEPA SSL**	7500	LANL	~~5~~	100	100	30.7
2,4-Dinitrotoluene	121-14-2	**0.32**	**USEPA SSL**	6000	Draft EcoSSL	~~0.11~~	100	40	14.7
2,6-Dinitrotoluene	606-20-2	**0.067**	**USEPA SSL**	4000	LANL	~~0.022~~	100	40	19.1
2-Amino-4,6-dinitrotoluene	35572-78-2	**1.5**	**USEPA SSL**	14000	Draft EcoSSL	~~0.5~~	100	100	32.9
2-Nitrotoluene	88-72-2	**0.3**	**USEPA SSL**	**190**	**R4**	~~0.1~~	200	100	47.2
3-Nitrotoluene	99-08-1	**1.6**	**USEPA SSL**	12000	LANL	~~0.53~~	200	200	64
4-Amino-2,6-dinitrotoluene	19406-51-0	**1.5**	**USEPA SSL**	12000	LANL	~~0.5~~	100	100	29.9
4-Nitrotoluene	99-99-0	**4**	**USEPA SSL**	**140**	**R4**	~~1.3~~	200	100	36.5
HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	2691-41-0	1,300	USEPA SSL	16000	Draft EcoSSL	~~430~~	100	70	22.7
Nitrobenzene	98-95-3	**0.092**	**USEPA SSL**	4800	LANL	~~0.031~~	300	200	85
Nitrocellulose	9004-70-0	13,000,000[5]	USEPA SSL	NC	NA	~~4300000~~	10000~~5000~~	8000~~1820~~	4000~~780~~
Nitroglycerin	55-63-0	**0.85**	**USEPA SSL**	13000	Draft EcoSSL	~~0.28~~	2000	700	215
Nitroguanidine	556-88-7	480	USEPA SSL	NC	NA	~~160~~	250	40	20
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	121-82-4	**0.37**	**USEPA SSL**	2300	LANL	~~0.12~~	200	100	43
Tetryl (2,4,6-trinitrophenylmethylnitramine)	479-45-8	370	USEPA SSL	**18**	**R4**	~~120~~	200	100	43.9
Diphenylamine	122-39-4	2,300	USEPA SSL	1010	R4	~~337~~	330	167	44
N-Nitrosodiphenylamine	86-30-6	**67**	**USEPA SSL**	545	R4	~~22~~	330	67	21
3,5-Dinitroaniline	618-87-1	<10% of NEW	OP-5[3]	NC	NA	~~NA~~	100	20	9
Picric Acid (2,4,6-trinitrophenol)	88-89-1	**84**	**USEPA SSL**	NC	NA	~~28~~	200	150	56.3
2,4-Dinitrophenol	51-28-5	**44**	**USEPA SSL**	**61**	**R4**	~~15~~	1600	1000	333

Analyte	CAS Number	Human Health PSL	Human Health PSL Reference$^{(1)}$	Ecological PSL	Ecological PSL Reference$^{(2)}$	~~PQLQ~~	Laboratory Reference Limits		
							LOQ	LOD	DL
PETN (pentaerythritol)	78-11-5	**28**	**USEPA SSL**	100000	LANL	~~9.3~~	2000	1000	493

1. Human health PSL is lesser of State of Washington Method A Soil Cleanup Levels for Unrestricted Land Use, Method B Soil Cleanup Levels for Unrestricted Land Use, and Soil Cleanup Levels Protective of Groundwater Vadose @ 13 degrees C (January 2020); and USEPA Regional Screening Levels (RSLs) for residential soil, industrial soil, and risk-based soil screening levels (SSLs) for protection of groundwater (May 2020).
2. PSL Reference: USEPA risk-based SSLs for protection of groundwater (May 2020). The SSLs presented correspond to a dilution attenuation factor of 1; carcinogenic values (C) represent an incremental cancer risk of 1x10^{-6}, and noncarcinogenic values (N) correspond to a hazard quotient of 1.
3. There are no screening values for this chemical; therefore, the screening consideration is instead for explosives safety even through it is unexpected that soil would be an explosive hazard. Specifically, 10% of the net explosive weight (NEW) is appropriate for this chemical, a secondary chemical. (Naval Sea Systems, 2017)
4. Ecological screening value selected from the following sources listed in order of preference:
   WAC - Washington State Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3).
   Draft EcoSSL - Draft Ecological Soil Screening Levels (SERDP, 2012).
   Draft EcoSSL (1) - Draft Ecological Soil Screening Levels (Checkai et al., 2012).
   LANL - Los Alamos National Laboratory (2017).
   Region 4 - USEPA Region 4 Soil Screening Levels (March 2018).
5. ~~The PQLG is approximately one-third of the lowest PSL.~~PSL Reference (Nitrocellulose): Human health PSL is the lesser of USEPA Regional Screening Levels (RSLs) for residential soil (1.9E+11 µg/kg), industrial soil (2.5E+12 µg/kg), and risk-based soil screening level (SSLs) (1.3E+7 µg/kg) for protection of groundwater (May 2022), resulting in the selection of USEPA risk-based SSL for protection of groundwater as the PSL. The SSL presented correspond to a dilution attenuation factor of 1; carcinogenic values (C) represent a noncarcinogenic value (N) correspond to a hazard quotient of 1.

CAS - Chemical Abstract Service.
NC – No criterion.
PSL – Project screening level.
PQLG – Project Quantitation Limit Goal.
µg/kg – Micrograms per kilogram.

All units for the listed values above are in µg/kg.

Note: Multiple PSLs are exceeded by the DL, indicating that direct evidence of contaminant presence greater than the PSL will not be obtained using conventional analytical methods. A good faith effort was made to identify and select laboratories with the proper accreditations/certifications and sufficiently sensitive analysis capabilities to measure as low as possible. Given these limitations, the project team will use the analysis results collectively as well as individually to assess whether spatial patterns indicate that a chemical is likely be present even if the DL exceeded the PSL.

Bolded values indicate that the PSL is between the laboratory LOQ and DL, which is a concentration range accompanied by more analytical uncertainty than concentrations greater than the LOQ. The Project Team has agreed to accept results in this concentration range, as reported, but the project report will describe any perceived data limitations that are incurred because of the relatively high uncertainty. A "J" validation flag will be applied to these results to indicate the increased level of uncertainty associated with them.

Shaded and bolded values indicate the PSL is less than the DL, which is the lowest concentration that is discernable from a blank with 99-percent statistical confidence. In these cases, analytes with concentrations between the PSL and the DL are likely to go undetected. However, the Project Team may qualitatively infer the presence of otherwise undetectable analytes in this concentration range based on, for example, concentration patterns observed for these and other analytes, knowledge of site operations, and similarities between this site and other sites of a similar history where greater analytical sensitivity may have been achieved. Results less than the DL will be reported as the LOD with a "U" flag to indicate that the analyte was not detected, and any limitations on data use that result from having detection limits that are greater than PSLs will be described in the project report.

SAP Worksheet #16: Project Schedule/Timeline Table
(UFP-QAPP Manual Section 2.8.2)

Activity	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date of Initiation	**Anticipated Date of Completion**		
Kickoff Meeting/Site Visit Preview of SI Planning Documents/Site Visit	Navy/Tetra Tech	09/23/19 01/07/20	09/27/19 01/09/20	---	---
Submit Internal Draft MC SAP for Navy Review (concurrent with MEC QAPP including Historical/Cultural Work Plan, and Wetlands/Threatened and Endangered Species Work Plan as appendices)	Tetra Tech	November 2019	March 2020	Internal Draft MC SAP	March 2020
Navy Review of Internal Draft MC SAP	Navy	March 2020	May 2020	---	---
Responses to and Resolution of Navy Comments	Tetra Tech	May 2020	June 2020	---	---
Submit MC SAP for Regulatory Review	Navy	June 2020	June 2020	MC SAP, Revision 0	June 2020
Regulatory Review of MC SAP	WSDE	June 2020	August 2020	---	---
Responses to and Resolution of Regulatory Comments	Tetra Tech	August 2020	August 2020	---	---
Approval of MC SAP	WSDE	August 2020	August 2020	---	---
Prepare Final MC SAP	Tetra Tech	June 2021	June 2021	---	---
Submit Final MC SAP	Navy	June 2021	June 2021	Final MC SAP	June 2021
Mobilization/Implementation of Field Effort	Tetra Tech	July 2021	March 2022	---	---
Submit Internal Draft SI Report for Navy Review	Tetra Tech	July 2022	July 2022	Internal Draft SI Report	July 2022

Activity	Organization	Dates (MM/DD/YY)		Deliverable	Deliverable Due Date
		Anticipated Date of Initiation	Anticipated Date of Completion		
Navy Review of Internal Draft SI Report	Navy	July 2022	August 2022	---	---
Responses to and Resolution of Navy Comments	Tetra Tech	August 2022	September 2022	---	---
Submit SI Report for Regulatory Review	Navy	September 2022	September 2022	SI Report, Revision 0	September 2022
Regulatory Review of SI Report	WSDE	September 2022	October 2022	---	---
Responses to and Resolution of Regulatory Comments	Tetra Tech	November 2022	November 2022	---	---
Approval of SI Report	WSDE	November 2022	November 2022	---	---
Prepare Final SI Report	Tetra Tech	November 2022	November 2022	---	---
Submit Final SI Report	Navy	December 2022	December 2022	Final SI Report	December 2022

SAP Worksheet #17: Sampling Design and Rationale

(UFP-QAPP Manual Section 3.1.1)

This section describes the MC SI sampling design and rationale in terms of the media that will be sampled (soil only at this time), analytical suite, sampling method and locations, number of samples to be collected, and sampling frequency. The MC field sampling program has been designed to determine the presence of explosives contamination in surface soil at concentrations greater than applicable screening criteria. The sample design is a biased design as described below for each specific site. Note that because of facility mission critical activities, all the sites for SI field work require night operations. Night operations will be performed in accordance with the approved APP/SSHP

The SI has two components; the MEC SI and MC SI. Only three sites identified below currently warrant MC SI sampling. Should field observations (i.e., presence of breached MEC/MPPEH, soil staining, etc.) determine the need for additional sites to be sampled, an FCR form will be completed and submitted to the Navy for review and approval. Any additional samples will be collected in accordance with the techniques and methodologies presented in this SAP.

17.1 General Field Operations

17.1.1 Composite Soil Sampling Strategy

For each site, up to six composite samples will be collected based on sampling plan described for each site in Section 11.3. Each of the composite samples will consist of 5 sample aliquots. Explosives analyses will be collected at each of the following three sites: UXO 000002 [redacted] (Site CC) (Figure 17-1); UXO 000003 [redacted] (Site D) (Figure 17-2); and UXO 000006 [redacted] (Site 22) (Figure 17-3).

For each site, each of the composite samples will consist of five discrete soil sample aliquots, with the aliquot pattern being similar to the five dots on the face of a game die. The soil samples will be biased toward areas where a breached MEC/MPPEH item has been identified and is indicative of potential MC contamination. If more than six locations are encountered in the field, the NAVFAC NW COR/RPM will be consulted and a FCR will be completed to collect additional samples, if necessary.

Prior to collecting a sample aliquot, the UXO Technician will clear the location using a Vallon all-metals detector, Schonstedt Magnetic Locator, or equivalent. Once a breached MEC/MPPEH item is identified, the munitions item will be removed by UXO Technicians (as described in the separate MEC QAPP) and the location flagged for MC sample collection. Should the detector indicate the presence of a subsurface anomaly, the MC sample location will be adjusted so it is in the same general area as the originally planned sample but clear of any subsurface anomalies. A hand auger or hand trowel will be used at the discretion of the FOL to collect each of the aliquots for the composite surface soil samples (0 to 6 inches bgs). The sample material from each aliquot will initially be placed in a 1-quart Ziploc plastic bag that will be marked with the sample identification number and aliquot identifier (i.e., A through E), corresponding to the five aliquots for a given composite soil sample. Upon collection of the five individual aliquots for a given composite sample, each sample bag will then be thoroughly mixed by shaking and kneading. The resultant composite sample will then be formed by taking an equal amount of soil from each of the five individual aliquot bags and placing it in a larger 1-gallon Ziploc plastic bag. Again, this bag will be thoroughly mixed by shaking and kneading. A portion of the homogenized sample will then be transferred to the appropriately labeled sample container, placed on ice, and shipped to the fixed-base laboratory for analysis. Unused portions of a collected sample will be returned to the location from which it was collected.

Prior to collection of aliquots for a composite sample, the hand auger or hand trowel will be decontaminated in accordance with SOP SA-7.1 (Appendix A). Decontamination of the sampling equipment is not required between collection of sample aliquots at a given sample area. Details regarding soil sampling equipment and procedures are included in Worksheet #14, field SOPs are contained in Appendix C, and field forms are contained in Appendix B. The total number of soil analyses for each analyte group is tabulated in Worksheet #18 and summarized in Worksheet #20. Field duplicates will be collected at a frequency of 1 per 10 composite samples for this investigation, and MS/MSD samples will be collected at a frequency of 1 per 20 samples collected as per Worksheet #20. Worksheet #19 presents a summary of the sample analyses, container types and volumes, preservation requirements, and holding times for the composite soil samples to be collected. Field information and visual observations pertinent to sample collection will be recorded on sample log sheets. Fieldwork implementation details are presented in Worksheet #14.

Upon collection of the individual aliquots, a GPS will be used to collect the location coordinates in accordance with the techniques described in Worksheet #14.

17.2 Investigation-Derived Waste

No hazardous IDW is expected to be generated during site sampling activities. A limited amount of nonhazardous wastewater from equipment decontamination will be generated and will be containerized in a 55-gallon (or smaller) drum and clearly marked with a label that describes the start of accumulation start date, contents, POC, and a message stating that the drum contents are on hold pending analysis. IDW will be disposed of in accordance with applicable federal, state, and local laws and regulations. All trash (e.g., nitrile gloves, plastic baggies, paper towels, etc.) generated during sampling will be bagged and disposed of in a facility trash receptacle.

SAP Worksheet #18: Location-Specific Sampling Methods/SOP Requirements Table

(UFP-QAPP Manual Section 3.1.1)

Sample Location	Sample ID(1)	Matrix	Depth (inches bgs)	Analytical Group(2)	Number of Samples(3, 4)	Sampling SOP Reference
UXO 000002-[redacted] (SITE CC)						
X2-SB01	X2-SS-C01-0006	Soil	0-6	Explosives	1	SOP-SA-1.3
X2-SB02	X2-SS-C02-0006	Soil	0-6		1 + duplicate	
X2-SB03	X2-SS-C03-0006	Soil	0-6		1	
X2-SB04	X2-SS-C04-0006	Soil	0-6		1	
X2-SB05	X2-SS-C05-0006	Soil	0-6		1	
X2-SB06	X2-SS-C06-0006	Soil	0-6		1	
UXO 000003-[redacted] (Site D)						
X3-SB01	X3-SS-C01-0006	Soil	0-6	Explosives	1	SOP-SA-1.3
X3-SB02	X3-SS-C02-0006	Soil	0-6		1	
X3-SB03	X3-SS-C03-0006	Soil	0-6		1	
X3-SB04	X3-SS-C04-0006	Soil	0-6		1	
X3-SB05	X3-SS-C05-0006	Soil	0-6		1	
X3-SB06	X3-SS-C06-0006	Soil	0-6		1	
UXO 000006-[redacted] (SITE 22)						
X6-SB01	X6-SS-C01-0006	Soil	0-6	Explosives	1 + duplicate	SOP-SA-1.3
X6-SB02	X6-SS-C02-0006	Soil	0-6		1	
X6-SB03	X6-SS-C03-0006	Soil	0-6		1	
X6-SB04	X6-SS-C04-0006	Soil	0-6		1	
X6-SB05	X6-SS-C05-0006	Soil	0-6		1	
X6-SB06	X6-SS-C06-0006	Soil	0-6		1	

Note: Field duplicates will be collected at a rate of 1 per 10 samples across all sampled sites, and MS/MSD samples will be collected at a rate of 1 per 20 samples. MS/MSD samples are not considered field QC samples and are therefore not identified in Worksheet #18. Field duplicate sample locations have been identified for collection; however, the locations may vary depending on field conditions and FOL discretion. See Worksheet #12 for QC samples and see Worksheet #27 (Section 27.1.1) for QC sample nomenclature.

1 The last four digits of a soil sample ID will indicate the depth bgs in inches. A sample collected from 0 to 6 inches bgs will be designated “-0006”.

2 The specific analyte list is presented in Worksheet #15.

3 Sample count does not include duplicate samples or MS/MSD samples. Chain-of-custody form will note where MS/MSD samples are collected.

4 The maximum number of samples shown (for example, if there are only two locations with breached MEC/MPPEH items, only two composite samples will be collected). Each of the composite samples will be comprised of five aliquots.

Example of Sample Nomenclature:
X3-SS-C04-0006

X3 = UXO 3
SB = Soil boring
SS = Surface soil
C03 = Composite sample
0006 = Sample depth of 0 to 6 inches

SAP Worksheet #19: Field Sampling Requirements Table

(addition of Nitrocellulose by APPL per MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference(1)	Containers (number, size, and type)	Sample Volume (units)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
Soil	Explosives	SW-846 8330B/ DV-LC-0002, DV-LC-0017, DV-OP-0018	One 4-ounce wide-mouth glass jar	4 grams (g)	Cool to <6°C	14 days to extraction; 40 days to analysis
	Semivolatile organic compounds (SVOCs)(2)	SW-846 8270D/DV-MS-0012, DV-OP-0007, DV-OP-0016	One 4-ounce glass jar	60 g	Cool to ≤ 6 °C	14 days to extraction; 40 days to analysis
	Nitrocellulose	Preparation Method/SOP: ~~US~~EPA 353.2 mod~~ified~~/ ANANC Analysis Method/SOP: EPA 353.2 mod/ ANANC ~~WS-WC-0050~~	One 4-ounce glass jar	~~5~~ 2 g	Cool to ≤ 6 °C	28 days to extraction~~; 48 hours to analysis~~
	Nitroguanidine	SW-846 8321B~~SW-846 8330/8330A modified~~/ DV-LC-0039~~WS-LC-0010~~	One 8-ounce glass jar with Teflon-lined lid or stainless-steel liner	10 g	Cool to ≤ 6 °C	14 days to extraction; 40 days to analysis
Aqueous QC	Explosives	SW846 8330B/ DV-LC-0002, DV-OP-0017	Two 1-liter (L) amber glass bottles	1,000 milliliters (mL)	Cool to ≤ 6 °C	7 days to extraction; 40 days to analysis
	SVOCs(2)	SW-846 8270D/DV-MS-0012, DV-OP-0007, DV-OP-0008	Two 1-L amber glass bottles	2,000 mL	Cool to ≤ 6 °C	7 days to extraction; 40 days to analysis
	~~Nitrocellulose~~	~~USEPA 353.2 modified/ WS-WC-0050~~	~~One 500-mL high-density polyethylene (HDPE) or glass bottle~~	~~280 mL~~	~~Cool to ≤ 6 °C~~	~~28 days to extraction; 48 hours to analysis~~

Matrix	Analytical Group	Analytical and Preparation Method/SOP Reference$^{(1)}$	Containers (number, size, and type)	Sample Volume (units)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation/ analysis)
	Nitroguanidine	SW-846 8321B~~SW-857 8330 modified~~/ DV-LC-0039~~WS-LC-0010~~	One 1-L amber glass bottles	1 L	Cool to ≤ 6 °C	7 days to extraction; 40 days to analysis
Aqueous IDW$^{(3)}$	Ignitability	SW-846 1010A/ DV-WC-0075	One 250-mL amber bottle	140 mL	Cool to ≤ 6 °C	NA
	Corrosivity/pH	SW-846 9040C/ DV-WC-0031	One 100-mL HDPE	25 mL	Cool to ≤ 6 °C	Immediately (within 48 hours of receipt)
	Reactive Sulfide	SW-846 9034/ DV-WC-0091	One 500-mL HDPE	100 mL	NaOH / Zn Acetate pH > 9; Cool ≤ 6 °C	7 days to analysis
	Reactive Cyanide	SW-846 9012B/ DV-WC-0083	One 250-mL HDPE	100 mL	Cool 0°C-6°C, NaOH to pH > 12	14 days to analysis
	Toxicity Characteristic Leaching Procedure (TCLP) Organics	SW-846 1311, 8260B, 8270D, 8081B, 8151A/ DV-IP-0012	Two 32-ounce glass bottles and three 40-mL vials, Teflon with Teflon-lined lids and no headspace	60 mL for 8260B and 200 mL for 8270D, 8081B, and 8151A	Cool to ≤ 6 °C	14 days to TCLP extraction; 14 days to analysis for VOC and 40 days to analysis for other analysis
	TCLP Inorganics	SW-846 1311, 6010C, 7470A/DV-IP-0012	Two 32-ounce glass bottles	100 mL	Cool to ≤ 6 °C	180 days to TCLP extraction, except mercury, which is 28 days. 180 days to analysis, except mercury, which is 28 days to analysis.

1 Accreditations for Eurofins TestAmerica Denver and ~~Eurofins TestAmerica Sacramento~~APPL including Nitrocellulose are provided in Appendix D.
2 Note that the analytical laboratory is analyzing specific explosives analytes using SVOC methodologies.
3 IDW sample analyses are presented on this worksheet for field personnel use only. QC information is not presented in any of the remaining worksheets or appendices.

SAP Worksheet #20: Field Quality Control Sample Summary Table

(UFP-QAPP Manual Section 3.1.1)

Matrix	Analytical Group	Field Samples	Field Duplicates(1,2)	Equipment Rinsate Blanks(3)	MS/MSDs(4)	Total No. of Samples to Lab(1)
Soil Samples	Explosives	18(3)	2	0	1/1	22
Aqueous (QC)	Explosives	0	0	1	0	1

1 Maximum number of samples shown.
2 Field duplicates will be collected at a frequency of 10 percent.
3 One equipment rinsate blank will be collected per non-dedicated piece of equipment per field event (e.g., hand auger and hand trowel).
4 MS/MSD samples are not typically considered field QC samples, but they are included to ensure they are accounted for in the total sample counts.
5 Up to three sites (UXO 000002, UXO 000003, and UXO 000006) with up to six composite samples each (with each composite sample consisting of five aliquots).

SAP Worksheet #21: Project Sampling SOP References Table

(UFP-QAPP Manual Section 3.1.2)

Reference Number	Title, Revision Date and/or Number	Originating Organization of Sampling SOP(1)	Equipment Type	Modified for Project Work? (Y/N)	Comments
CT-04	Sample Nomenclature (Revision 5, 11/20/2016)	Tetra Tech	NA	N	Sample identification will follow the logic outlined in Worksheet #18. Contained in Appendix C.
SA-1.3	Soil Sampling (Revision 11, 09/12/2016)	Tetra Tech	Stainless-steel auger bucket, extension rods, and T-handle	N	Contained in Appendix C.
SA-6.1	Non-Radiological Sample Handling (Revision 5, 07/15/2016)	Tetra Tech	Sample containers, coolers, and packaging materials	N	Contained in Appendix C.
SA-6.3	Field Documentation (Revision 6, 09/28/2017)	Tetra Tech	Field logbook, field sample forms, boring logs	N	Contained in Appendix C.
SA-7.1	Decontamination of Field Equipment and Management of Investigation Derived Waste (Revision 8, 07/15/2016)	Tetra Tech	Decontamination equipment, scrub brushes, 5-gallon buckets, spray bottles, phosphate-free detergent, deionized water	N	Contained in Appendix C.

SAP Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection Table

(UFP-QAPP Manual Section 3.1.2.4)

Field Equipment	Activity$^{(1)}$	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference	Comments
GPS	Positioning from known monument(s)	Beginning and end of each day used	Accuracy: sub-meter horizontal dilution of precision < 3 feet, number of satellites must be at least six	Wait for better signal, replace unit, or choose alternate location technique	FOL or Designee	Manufacturer's guidance manual	Battery pack Spare stylus and tether

SAP Worksheet #23: Analytical SOP References Table

(addition of Nitrocellulose by APPL per MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 3.2.1)

Lab SOP Number	Title, Revision Date, and/or Number(1)	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM? (Y/N)	Modified for Project Work?(1) (Y/N)
DV-OP-0018	Extraction of Nitroaromatic and Nitramine Explosive Compounds and Picric Acid from Soil Samples (SW-846 8330A & 8330B), Revision 11, 12/12/2018	Preparation	Preparation Explosives	NA	TestAmerica Denver	N	N
DV-LC-0017	Solid Phase Extraction of Nitroaromatic and Nitroamine Explosive Compounds and Picric Acid from Water Samples [SW-846 3535A], Revision 9, 12/11/2018	Preparation	Preparation Explosives	NA	TestAmerica Denver	N	N
DV-LC-0002	Nitroaromatic and Nitramine Explosive Compounds by High Performance Liquid Chromatography (HPLC) (SW846 8330A & 8330B), Revision 23, 11/04/2019	Definitive	Soil, Aqueous Explosives,	HPLC	TestAmerica Denver	N	N
DV-MS-0012	GC/MS Analysis Based on Method 8270D or 8270E, Revision 13, 02/15/2019	Definitive	Soil, Aqueous SVOCs(2)	GC/MS	TestAmerica Denver	NA	N
DV-OP-0007	Concentration and Clean-up of Organic Extracts (SW-846 3510C, 3520C, 3540C, 3546, 3550B, 3550C, 3620C, 3660B, 3665A, and EPA 600 series), Revision 13, 11/30/2018	Preparation	Preparation SVOCs(2)	NA	TestAmerica Denver	NA	N
DV-OP-0008	Extraction of Aqueous Samples by Continuous Liquid/Liquid Extraction (CLLE) by Method SW-846 3520C and Methods 625 and 627 and ASTM Method D7065-11, Revision 15, 09/19/2019	Preparation	Preparation SVOCs(2)	NA	TestAmerica Denver	NA	N
DV-OP-0016	Ultrasonic Extraction of Solid Samples [SW-846 3550B & 3550C], Revision 13, 04/25/2019	Preparation	Preparation SVOCs(2)	NA	TestAmerica Denver	NA	N

Lab SOP Number	Title, Revision Date, and/or Number$^{(1)}$	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM? (Y/N)	Modified for Project Work?$^{(1)}$ (Y/N)
~~WS-WC-0050~~	~~Preparation and Analysis of Nitrocellulose in Aqueous and Soil/Sediment Samples by Colorimetric AutoAnalyzer [Method 353.2 Modified], Revision 4.2, 02/26/2018~~	~~Definitive~~	~~Soil, Aqueous Nitrocellulose~~	~~Spectrophotometer~~	~~TestAmerica Sacramento~~	~~NA~~	~~N~~
~~WS-LC-0010~~	~~Determination of Nitroguanidine Based on Method 8330, SW-846 [Method 8330, 8330A], Revision 3.8, 04/30/2018~~	~~Definitive~~	~~Soil, Aqueous Nitroguanidine~~	~~HPLC/UV~~	~~TestAmerica Sacramento~~	~~NA~~	~~N~~
~~WS-EHS-0001~~	~~Waste Disposal, Revision 4.6, 12/07/2018~~	~~NA~~	~~NA~~	~~NA~~	~~TestAmerica Sacramento~~	~~NA~~	~~N~~
~~WS-QA-0003~~	~~Sample Receipt and Procedures, Revision 12.7, 05/15/2019~~	~~NA~~	~~NA~~	~~NA~~	~~TestAmerica Sacramento~~	~~NA~~	~~N~~
DV-LC-0039	Determination of Nitroguanidine by HPLC/MS/MS, SW-846 [Methods 8321A, 8321B], Revision 0, 05/14/2021	NA	NA	HPLC/MS/MS	NA	NA	NA
ANANC	Nitrocellulose Analysis, modified EPA Method 353.2, Revision 6, 05/31/2022	Definitive	Soil, Aqueous Nitrocellulose	Spectrophotometer	APPL	NA	N

1 SOPs are reviewed/revised on an annual schedule. The current version will be followed at the time of sample receipt.
2 T analytical laboratory is analyzing specific explosives analytes using SVOC methodologies.

SAP Worksheet #24: Analytical Instrument Calibration Table

(addition of Nitrocellulose Analyzer use by APPL per MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 3.2.2)

Eurofins TestAmerica Denver has successfully completed the laboratory evaluation process required as part of the DoD Quality Systems Manual (QSM) 5.3 (2019) and APPL~~Eurofins TestAmerica Sacramento~~ has successfully completed the laboratory evaluation process required as part of the DoD QSM 5.4 (2021)~~1.1 (2018)~~. Copies of the DoD ELAP accreditation documents are included in Appendix D.

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
High-Performance Liquid Chromatography (HPLC) – Explosives, Nitroguanidine	Initial Calibration (ICAL) for all analytes (including surrogates)	At instrument setup and after Initial Calibration Verification (ICV) or Continuing Calibration Verification (CCV) failure, prior to sample analysis. Minimum five levels for linear and six levels for quadratic.	ICAL must meet one of the three options below: Option 1: Relative Standard Deviation (RSD) for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99; Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99. No samples will be analyzed until ICAL has passed.	Correct problem then repeat ICAL. Flagging is not appropriate.	Analyst	DV-LC-0002, DV-LC-0039~~WS-LC-0010~~
HPLC – Explosives, Nitroguanidine	ICV	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analyte(s) and surrogates within ± 20% of true value. No samples will be analyzed until calibration has been verified with a second source.	Correct problem, rerun ICV. If that fails, repeat ICAL. Flagging is not appropriate.	Analyst	DV-LC-0002, DV-LC-0039~~WS-LC-0010~~
HPLC – Explosives, Nitroguanidine	CCV	Before sample analysis, after every 10 field samples, and at the end of the analysis sequence.	All reported analytes and surrogates within ± 20% of true value. Results may not be reported without a valid CCV.	Recalibrate and reanalyze all affected samples since the last acceptable CCV, or immediately analyze two additional consecutive CCVs.	Analyst	DV-LC-0002, DV-LC-0039~~WS-LC-0010~~

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
				If both pass, samples may be reported without reanalysis. If either fails, or if two consecutive CCVs cannot be run, perform CA(s) and repeat CCV and all affected samples since the last acceptable CCV. If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since the last acceptable calibration verification. Flagging is only appropriate in cases where the samples cannot be reanalyzed.		
HPLC – Explosives, Nitroguanidine	Ion Transitions (Parent-> Product)	Prior to method implementation.	The chemical derivation of the ion transitions must be documented.	NA. Flagging is not appropriate.	Analyst, Supervisor	DV-LC-0002, DV-LC-0039~~WS-LC-0010~~
Gas Chromatography/ Mass Spectrometry (GC/MS) – SVOCs	Tune Check	Prior to ICAL and prior to each 12-hour period of sample analysis.	Decafluorotriphenylphosphine (DFTPP) Tuning Criteria: Mass=51: 10 to 80% of base peak Mass=68: <2% of mass 69 Mass=70: <2% of mass 69 Mass=127: 10 to 80% of base peak Mass=197: <2% of mass 198 Mass=198: base peak, or greater than 50% of mass 442 Mass=199: 5 to 9% of mass 198 Mass=275: 10 to 60 % of base peak	Retune instrument and verify. Flagging is not appropriate.	Analyst/Supervisor	DV-MS-0012

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
			Mass=441: present but <24% of mass 442 Mass=442: base peak, or >50% of mass 198 Mass=443: 15 to 24% of mass 442 No samples will be analyzed without a valid tune.			
GC/MS – SVOCs	Performance Check (Method 8270 only) The DDT breakdown and Benzidine/ pentachlorophenol tailing factors are considered overall system checks to evaluate injector port inertness and column performance and are required regardless of the reported analyte list.	At the beginning of each 12-hour period, prior to analysis of samples.	Degradation ≤ 20% for DDT. Benzidine and pentachlorophenol will be present at their normal responses and will not exceed a tailing factor of two. No samples will be analyzed until performance check is within criteria.	Correct problem, then repeat performance checks. Flagging is not appropriate.	Analyst/Supervisor	DV-MS-0012
GC/MS – SVOCs	ICAL for all analytes (including surrogates). Minimum five levels for linear and six levels for quadratic.	At instrument setup and after ICV or CCV failure, prior to sample analysis.	Each analyte must meet one of the three options below: Option 1: RSD for each analyte ≤ 15%; Option 2: linear least squares regression for each analyte: r2 ≥ 0.99;	Correct problem then repeat ICAL. Flagging is not appropriate.	Analyst	DV-MS-0012

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
			Option 3: non-linear least squares regression (quadratic) for each analyte: r2 ≥ 0.99. No samples will be analyzed until ICAL has passed. If the specific version of method requires additional evaluation (e.g., RFs or low standard analysis and recovery criteria) these additional requirements must also be meet.			
GC/MS – SVOCs	Retention Time (RT) window position establishment	Once per ICAL and at the beginning of the analytical sequence. Calculated for each analyte and surrogate.	Position will be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	NA	Analyst	DV-MS-0012
GC/MS – SVOCs	Evaluation of Relative Retention Times (RRTs)	With each sample. After maintenance is performed which may affect RT, RRTs may be updated based on the daily CCV.	RRT of each reported analyte within ± 0.06 RRT units. RRTs will be compared with the most recently updated RRTs.	Correct problem, then rerun ICAL.	Analyst	DV-MS-0012
GC/MS – SVOCs	ICV	Once after each ICAL, analysis of a second source standard prior to sample analysis.	All reported analytes within ± 20% of true value. No samples will be analyzed until calibration has been verified with a second source.	Correct problem. Rerun ICV. If that fails, repeat ICAL. Flagging is not appropriate.	Analyst	DV-MS-0012
GC/MS – SVOCs	CCV	Daily before sample analysis, after every 12 hours of analysis time, and at the end of the analytical batch run.	All reported analytes and surrogates within ± 20% of true value. All reported analytes and surrogates within ± 50% for end of analytical batch CCV.	Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails or if two consecutive CCVs cannot be run, perform CA(s) and repeat	Analyst	DV-MS-0012

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
			If the specific version of a method requires additional evaluation (e.g., average Response Factors [RFs]) these additional requirements must also be met. Results may not be reported without valid CCVs.	CCV and all associated samples since last successful CCV. Alternately, recalibrate if necessary then reanalyze all associated samples since the last acceptable CCV. If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply Q-flag to all results for the specific analyte(s) in all samples since last acceptable calibration verification. Flagging is only appropriate in cases where the samples cannot be reanalyzed.		
~~Spectrophotometer – Nitrocellulose~~	~~Minimum five-point initial calibration for target analytes, lowest concentration standard at or near the reporting limit .~~	~~Daily calibration prior to sample analysis~~	~~Linear least squares regression: r ≥ 0.995~~	~~Evaluate standards and spectrophotometer response. If problem found with above, correct as appropriate, then repeat initial calibration.~~	~~Laboratory Manager/Analyst~~	~~WS-WC-0050~~
~~Spectrophotometer – Nitrocellulose~~	~~ICV, Second Source~~	~~Immediately following ICAL.~~	~~Calculated concentration within ± 10% of the expected value from the ICAL.~~	~~Evaluate data. If problem (e.g., concentrated standard, incorrectly prepared standard) found, correct then repeat second source verification. If still fails, repeat initial calibration.~~	~~Laboratory Manager/Analyst~~	~~WS-WC-0050~~
~~Spectrophotometer – Nitrocellulose~~	~~Calibration Blank (Initial Calibration Blank [ICB]/Continuing~~	~~Immediately following ICV (ICB) and immediately following CCV (CCB).~~	~~Result within ± Reporting Limit (RL) from zero.~~	~~Evaluate data. If problem found (e.g. contaminated cuvet or solution), correct then repeat. If still fails,~~	~~Laboratory Manager/Analyst~~	~~WS-WC-0050~~

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
	~~Calibration Blank [CCB])~~			~~investigate further and repeat initial calibration. Repeat all samples since last successful calibration blank.~~		
~~Spectrophotometer – Nitrocellulose~~	~~Daily calibration verification~~	~~After every 10 field samples, and at the end of the sequence.~~	~~Calculated concentration within ± 10% of the expected value from the ICAL.~~	~~Evaluate standard and response. If problem found with above, correct as appropriate then repeat CCV. If still fails, repeat initial calibration. Reanalyze all samples since the last successful calibration verification.~~	~~Laboratory Manager/Analyst~~	~~WS-WC-0050~~
Nitrocellulose Discrete Analyzer – Spectrophotometer[1]	ICAL (minimum three standards and a calibration blank)	Daily ICAL prior to sample analysis.	r ≥ 0.995.	Correct problem, then repeat ICAL.	Analyst	ANANC
Nitrocellulose Discrete Analyzer - Spectrophotometer[1]	Second-source calibration verification (ICV)	Before beginning a sample run.	Value of second source within ± 10% of true value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat calibration.	Analyst	ANANC
Nitrocellulose Discrete Analyzer - Spectrophotometer[1]	CCV	After every 10 field samples and at the end of the analysis sequence.	Value of CCV within ± 10% of true value	Correct problem then repeat CCV and reanalyze all samples since last successful calibration verification. or Immediately analyze two additional consecutive CCVs. If both pass, samples may be reported without reanalysis. If either fails, take corrective action(s) and re-calibrate; then reanalyze all affected samples since the last acceptable CCV.	Analyst	ANANC

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	CA	Person Responsible for CA	SOP Reference
Nitrocellulose Discrete Analyzer - Spectrophotometer[1]	CCB	Immediately after the ICV and immediately after every CCV.	The absolute values of all analytes must be < ½ LOQ or < 1/10th the amount measured in any sample.	ICB: Correct problem and repeat ICV/ICB analysis. If that fails, rerun ICAL. All samples following the last acceptable Calibration Blank must be reanalyzed. CCBs may not be reanalyzed without reanalysis of the associated samples and CCV(s).	Analyst	ANANC

[1] EPA Method 353.2Mod and DoD/DoE QSM v5.4 (2021) is the basis for specifications on this table.

SAP Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table (addition of Spectrophotometer use by APPL per MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 3.2.3)

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference
HPLC	Replace columns, Diode Array Detector (DAD) flow cell windows, and ball-valve cartridges as needed; clean/change filters; check eluent reservoirs	Sensitivity check	Instrument performance and sensitivity	Daily or as needed	CCV pass criteria	Recalibrate	Analyst	DV-LC-0002
GC/MS	Clean sources, maintain vacuum pumps	Tuning	Instrument performance and sensitivity	Service vacuum pumps twice per year, other maintenance as needed	Tune and CCV pass criteria	Recalibrate instrument	Analyst	DV-MS-0012
GC/MS	Change septum, clean injection port, change or clip column, install new liner, change trap	Response factors and chromatogram review	Instrument performance and sensitivity	As needed	Tune and CCV pass criteria	Reinspect injector port, cut additional column, reanalyze CCV, recalibrate instrument	Analyst	DV-MS-0012
~~Spectrophotometer~~	~~Replace lamp and/or fuse~~	~~Sensitivity check~~	~~Instrument performance and sensitivity~~	~~As needed~~	~~ICAL/ICB pass criteria~~	~~Recalibrate~~	~~Analyst~~	~~WS-WC-0050~~
~~Spectrophotometer~~	~~Wavelength calibration~~	~~Sensitivity check~~	~~Instrument performance and sensitivity~~	~~Annually~~	~~ICAL/ICB pass criteria~~	~~Recalibrate~~	~~Analyst~~	~~WS-WC-0050~~
~~HPLC/Ultraviolet (UV)~~	~~Replace columns as needed, check eluent reservoirs~~	~~Sensitivity check~~	~~Instrument performance and sensitivity~~	~~Daily or as needed~~	~~CCV pass criteria~~	~~Recalibrate~~	~~Analyst~~	~~WS-LC-0010~~
Spectrophotometer	Replace lamp and/or fuse	Sensitivity check	Instrument performance	As needed	ICAL/ICB pass criteria	Recalibrate	Analyst	ANANC

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference
			and sensitivity					
Spectrophotometer	Wavelength calibration	Sensitivity check	Instrument performance and sensitivity	Annually	ICAL/ICB pass criteria	Recalibrate	Analyst	ANANC

Laboratory SOPs are available upon request.

SAP Worksheet #26: Sample Handling System

(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Appendix C)

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT[1]
Sample Collection (Personnel/Organization): FOL/Tetra Tech
Sample Packaging (Personnel/Organization): FOL/Tetra Tech
Coordination of Shipment (Personnel/Organization): FOL/Tetra Tech
Type of Shipment/Carrier: Overnight courier service (FedEx)
SAMPLE RECEIPT AND ANALYSIS
Sample Receipt (Personnel/Organization): Sample Custodians/Eurofins TestAmerica Denver and ~~Eurofins TestAmerica Sacramento~~APPL
Sample Custody and Storage (Personnel/Organization): Sample Custodians/Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~
Sample Preparation (Personnel/Organization): Extraction Laboratory, Metals Preparation Laboratory/Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~
Sample Determinative Analysis (Personnel/Organization): GC Laboratory, GC/MS Laboratory, Metals Laboratory/Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~
SAMPLE ARCHIVING
Field Sample Storage (Number of days from sample collection): 60 days from receipt
Sample Extract/Digestate Storage (number of days from extraction/digestion): 3 months from sample digestion/extraction
Biological Sample Storage (Number of days from sample collection): NA
SAMPLE DISPOSAL
Personnel/Organization: Sample Custodians/Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~

[1] The samples will be shipped directly to the respective labs.

SAP Worksheet #27: Sample Custody Requirements

(UFP-QAPP Manual Section 3.3.3)

27.1 Sample Handling and Custody

The following sections describe sample handling procedures, including sample identification and labeling, documentation, chain of custody, and shipping.

27.1.1 Sample Identification

Sample labeling will be conducted in general accordance with the procedures outlined in Tetra Tech SOP CT-04 (Appendix A). The sample nomenclature includes the site being investigated and sample location number.

Sample nomenclature for the investigation is summarized in Worksheet #18. The field QC blank code "RB" will be used for equipment rinsate blanks, as detailed in Worksheet #18. Samples to be used for MS/MSD analyses will be labeled "MS/MSD" on the container label and noted on the chain-of-custody form; however, "MS/MSD" will not be part of the unique sample identifier to maintain consistency with the project database. Worksheet #18 provides anticipated sample identifiers for this project.

Example Sample Label

Company:	**Project Name and Location:**
Sampler:	**Sample ID:**
Date:	**Time:**
Analysis:	**Preservative:**

27.1.2 Sample Documentation

Documentation of field observations will be recorded in a field logbook and/or on field log sheets including daily field forms and sample collection logs. These documents will be used to record information about each sample, including the sample identification number, sample time and date, location, sample matrix, and analytical matrix. Field sample log sheets will be used to document sample collection details and other observations, and activities will be recorded in the field logbook. Instrument calibration logs will be used to record daily instrument calibrations.

For sampling and field activities, the following types of information will be recorded in the field logbook and/or on field forms as appropriate:

- Site name and location
- Date and time of logbook entries
- Personnel and their affiliations

- Weather conditions
- Activities involved with sampling
- Subcontractor activity summary
- Site observations including site entry and exit times
- Site sketches made on site
- Visitor names, affiliations, and arrival and departure times
- Health and safety issues, including personal protective equipment

27.1.3 Sample Handling, Tracking System, and Chain of Custody

The laboratories will provide clean sample containers for sample collection. Tetra Tech personnel will collect the samples, and samplers will take care not to contaminate samples through improper handling. Proper custody procedures will be followed throughout all phases of sample collection and handling.

Following collection, all samples will be immediately placed on ice in a cooler. The sample containers will be enclosed in bubble wrap to protect them during shipment. Samples will be packed with wet ice in each cooler. A temperature blank (a small polypropylene bottle or 40-mL vial filled with deionized water) will be placed in each cooler to determine the core temperature of the samples received by the laboratory technician. The cooler will be secured using packing tape along with signed custody seals. One copy of the chain-of-custody form will be placed in each cooler.

After collection, each sample will be maintained in the sampler's custody until formally transferred to another party (e.g., commercial courier). For all samples collected, chain-of-custody forms will document the date and time of sample collection, sampler's name, and names of all others who subsequently held custody of the sample. Specifications for chemical analyses will also be documented on the chain-of-custody form. Tetra Tech SOP SA-6.3 (Appendix A) provides further details on chain-of-custody procedures.

Once received by the laboratories, receipt will be documented on the chain-of-custody form, and the samples will be checked in. The samples will remain under chain of custody throughout the analysis period to ensure that their integrity is preserved. Details are provided below.

The following subsections outline the procedures that will be used by field and laboratory personnel to document project activities and sample collection procedures. All forms must be filled in as completely as possible.

Chain-of-custody protocols will be used throughout sample handling to establish the evidentiary integrity of sample containers. These protocols will be used to demonstrate that the samples were handled and transferred in a manner that prevented tampering. Samples for the laboratories will be packaged and shipped in accordance with Tetra Tech SOP SA-1.8 (Appendix A).

A sample is under custody if:

- The sample is in the physical possession of an authorized person.
- The sample is in view of an authorized person after being in his/her possession.
- The sample is placed in a secure area by an authorized person after being in his/her possession.
- The sample is in a secure area restricted to authorized personnel only.

Custody documentation is designed to provide documentation of preparation, handling, storage, and shipping of all samples collected. Each chain-of-custody form is signed and dated by the recipient of a sample or portion of a sample. The person releasing the sample and the person receiving the sample will each retain a copy of the form each time a sample transfer occurs. Chain-of-custody forms will be completed daily to manage samples and to track samples for shipment.

Integrity of the samples collected will be the responsibility of identified persons from the time the samples are collected until the samples, or their derived data, are incorporated into the final report.

The Tetra Tech FOL is responsible for the care and custody of the samples collected until they are delivered to the laboratories or are entrusted to a commercial courier. When transferring samples, the individuals relinquishing and receiving them will sign, date, and note the time on the chain-of-custody form. This record documents sample custody transfer from the sampler to the laboratory, often through another person or agency (commercial courier). Upon arrival at the laboratory, internal sample custody procedures will be followed as defined in the laboratory SOPs.

27.1.4 Sample Shipment

Samples will be prepared for shipping in accordance with Tetra Tech SOP SA-6.3 and managed under strict chain of custody (see Section 27.1.3).

27.1.5 Laboratory

Laboratory sample custody procedures (receipt of samples, archiving, and disposal) will be followed for sample management. Coolers will be received and checked for proper temperature. A sample cooler receipt form will be filled out to note conditions and any discrepancies. The chain-of-custody form will be compared to the enclosed sample containers for accuracy. Samples will be logged into the laboratory information management system and given a unique login number that can be tracked through processing. The Laboratory PM will notify the Tetra Tech FOL or PM verbally or via email upon receipt of any chain-of-custody/sample receipt variances for clarification or direction from the FOL. Discrepancies and resolutions will be documented on the sample receiving checklist.

SAP Worksheet #28: Laboratory QC Samples Table

(addition of Nitrocellulose by APPL per MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 3.4)

Matrix	Soil and Aqueous QC
Analytical Group	Explosives
Analytical Method/ SOP Reference	SW-846 8330B/DV-LC-0002

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
Aqueous sample preparation	Each sample and associated batch QC samples. The salting-out procedure is not permitted.	Solid phase extraction (SPE) using resin-based solid phase disks or cartridges are required.	NA. Flagging is not appropriate.	Analyst, Supervisor	Accuracy/Bias/ Contamination	Same as Method/SOP QC Acceptance Limits.
Internal Standards (IS)	If employed, every field sample, standard and QC sample.	RT within ± 30 seconds from RT of the midpoint standard in the ICAL; Internal standard signal (area or height) within -50% to +100% of ICAL midpoint standard. On days when ICAL is not performed, the daily initial CCV can be used.	Inspect instrumentation for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If CA fails in field samples, data must be qualified and explained in the Case Narrative. Apply Q-flag to analytes associated with the noncompliant IS. Flagging is not appropriate for failed standards.	Analyst, Supervisor	Accuracy/Bias/ Contamination	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	Explosives
Analytical Method/ SOP Reference	SW-846 8330B/DV-LC-0002

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
Method Blank (MB)	One per preparatory batch.	No analytes detected > 1/2 LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. Results may not be reported without a valid MB.	Correct problem. If required, reprepare and reanalyze MB and all QC samples and field samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst, Supervisor	Accuracy/Bias/ Contamination	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparatory batch. **For soil samples:** A solid reference material containing all reported analytes must be prepared and analyzed in exactly the same manner as a field sample when analyzing solid samples. If a laboratory uses a self-spiked Laboratory Control Sample (LCS), the fortification must be performed prior to any preparation steps performed.	Use QSM 5.3 Appendix D LCS limits for batch control. For analyte(s) is not listed in QSM 5.3 Appendix D, use the in-house limits provided in Appendix D of this SAP for batch control. Use LCS Tables 8330B for HPLC analysis. Results may not be reported without a valid LCS.	Correct problem then reprepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes, if sufficient sample material is available. If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	Explosives
Analytical Method/ SOP Reference	SW-846 8330B/DV-LC-0002

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
MS	One per preparatory batch. For matrix evaluation only. If MS results are outside the limits, the data will be evaluated to determine the source(s) of difference (i.e., matrix effect or analytical error).	Use QSM 5.3 Appendix D limits for batch control. For analyte(s) not listed in QSM 5.3 Appendix D, use in-house limits provided in Appendix D Limits of this SAP.	Examine the project-specific requirements. Contact the client as to additional measures to be taken. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the Case Narrative.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.
MSD or Matrix Duplicate (MD)	One per preparatory batch. For matrix evaluation only. If MSD results are outside the limits, the data will be evaluated to determine the source(s) of difference. For Sample/MD: %Recovery (%R) and RPD criteria only apply to analytes whose concentration in the sample is greater than or equal to the LOQ.	Use QSM 5.3 Appendix D limits for batch control. For analyte(s) not listed in QSM 5.3 Appendix D, use the in-house limits provided in Appendix D of this SAP.	Examine the project-specific requirements. Contact the client as to additional measures to be taken. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the Case Narrative.	Analyst, Supervisor	Precision/ Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	Explosives
Analytical Method/ SOP Reference	SW-846 8330B/DV-LC-0002

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
Surrogate Spike	All field and QC samples. Alternative surrogates are recommended when there is obvious chromatographic interference.	Use QSM 5.3 Appendix D limits for batch control. For analyte(s) not listed in QSM 5.3 Appendix D, use the in-house limits provided in Appendix D of this SAP.	Correct problem then reprepare and reanalyze all failed samples for all surrogates in the associated preparatory batch, if sufficient sample material is available. If obvious chromatographic interference with surrogate is present, reanalysis may not be necessary, but the client must be notified prior to reporting data, and the failures must be discussed in the Case Narrative. Apply Q-flag to all associated analytes if acceptance limits are not met and explain in the Case Narrative.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	Explosives
Analytical Method/ SOP Reference	SW-846 8330B/DV-LC-0002

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
Confirmation of positive results (second column)	All positive results must be confirmed. Use of a UV detector with a UV diode array detector or vice versa is not considered a valid confirmation technique. Secondary column – Must be capable of resolving (separating) all of the analytes of interest and must have a different RT order relative to the primary column. Use project-specific reporting requirements if available; otherwise, report from the primary column.	Calibration and QC criteria are the same for the confirmation analysis as for initial or primary column analysis. Results between primary and second column RPD ≤ 40%.	Report from both columns. Apply J-flag if RPD > 40%. Discuss in the Case Narrative.	Analyst, Supervisor	Precision/ Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	Nitroguanidine
Analytical Method/ SOP Reference	SW-846 8321B~~SW-846 8330 Modified~~/ DV-LC-0039~~WS-LC-0010~~

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
Aqueous sample preparation	Each sample and associated batch QC samples. The salting-out procedure is not permitted.	SPE using resin-based solid phase disks or cartridges are required.	NA. Flagging is not appropriate.	Analyst, Supervisor	Accuracy/Bias/ Contamination	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	Nitroguanidine
Analytical Method/ SOP Reference	SW-846 8321B~~SW-846 8330 Modified~~/ DV-LC-0039~~WS-LC-0010~~

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
MB	One per preparatory batch. For batch preparation, the Grinding Blank and MB can be one in the same.		Correct problem. If required, reprepare and reanalyze MB and all QC samples and field samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst, Supervisor	Accuracy/Bias/ Contamination	Same as Method/SOP QC Acceptance Limits.
LCS	One LCS per analytical/preparation batch, spiked with all analytes to be reported.	Laboratory statistically derived control limits in accordance with DoD QSM requirements. See Appendix D for each specific limit.	Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and reprepare and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	Nitroguanidine
Analytical Method/ SOP Reference	SW-846 8321B~~SW-846 8330 Modified~~/ DV-LC-0039~~WS-LC-0010~~

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
MS/MSD	One MS/MSD pair per preparatory batch.	Laboratory statistically derived control limits in accordance with DoD QSM requirements. See Appendix D for each specific limit.	Examine the project-specific requirements. Contact the client as to additional measures to be taken. For matrix evaluation only. If MS results are outside the limits, the data will be evaluated to determine the source(s) of difference (i.e., matrix effect or analytical error).	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.
Confirmation of Positive Results (second column)	When target analytes detected on the primary column at concentrations > LOD.	Calibration and QC criteria the same as for initial/primary analysis. Results between primary and secondary column RPD ≤ 40%.	Evaluate data, then report with flag to denote RPD > 40%. Narrate obvious matrix issues.	Analyst, Supervisor	Precision/ Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	SVOCs
Analytical Method/ SOP Reference	SW-846 8270D/DV-MS-0012

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
MB	One per preparatory batch.	No analytes detected > $^{1}/_{2}$ LOQ or > 1/10 the amount measured in any sample or 1/10 the regulatory limit, whichever is greater. Results may not be reported without a valid MB.	Correct problem. If required, reprepare and reanalyze MB and all QC samples and field samples processed with the contaminated blank. If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply B-flag to all results for the specific analyte(s) in all samples in the associated preparatory batch. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst, Supervisor	Accuracy/Bias/ Contamination	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	SVOCs
Analytical Method/ SOP Reference	SW-846 8270D/DV-MS-0012

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
LCS	One per preparatory batch.	Use QSM 5.3 Appendix D LCS limits for batch control. For analyte(s) not listed in QSM 5.3 Appendix D, use in-house LCS limits provided in Appendix D of this SAP. Must contain all surrogates and all analytes to be reported. Results may not be reported without a valid LCS.	Correct problem then reprepare and reanalyze the LCS and all samples in the associated preparatory batch for failed analytes if sufficient sample material is available. If reanalysis cannot be performed, data must be qualified and explained in the Case Narrative. Apply Q-flag to specific analyte(s) in all samples in the associated preparatory batch. Flagging is only appropriate in cases where the samples cannot be reanalyzed.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	SVOCs
Analytical Method/ SOP Reference	SW-846 8270D/DV-MS-0012

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
IS	Every field sample, standard, and QC sample.	RT within ± 10 seconds from RT of the midpoint standard in the ICAL; Extracted Ion Current Profile (EICP) area within – 50% to +100% of ICAL midpoint standard. On days when ICAL is not performed, the daily initial CCV can be used.	Inspect mass spectrometer and GC for malfunctions and correct problem. Reanalysis of samples analyzed while system was malfunctioning is mandatory. If CA fails in field samples, data must be qualified and explained in the Case Narrative. Apply Q-flag to analytes associated with the noncompliant IS. Flagging is not appropriate for failed standards.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	SVOCs
Analytical Method/ SOP Reference	SW-846 8270D/DV-MS-0012

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
MS	One per preparatory batch.	QSM 5.3 Appendix D LCS limits for batch control. For analyte(s) not listed in QSM 5.3 Appendix D, use in-house LCS limits provided in Appendix D of this SAP. Must contain all surrogates and all analytes to be reported.	Examine the project specific requirements. Contact the client as to additional measures to be taken. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the Case Narrative. For matrix evaluation only. If MS results are outside the limits, the data will be evaluated to determine the source(s) of difference, i.e., matrix effect or analytical error.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	SVOCs
Analytical Method/ SOP Reference	SW-846 8270D/DV-MS-0012

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
MSD or MD	One per preparatory batch.	QSM 5.3 Appendix D LCS limits must be used for batch control. For analyte(s) not listed in QSM 5.3 Appendix D, use in-house LCS limits provided in Appendix D of this SAP. MSD or MD: RPD of all analytes ≤ 20% (between MS and MSD or sample and MD). MSD: Must contain all surrogates and all analytes to be reported. For Sample/MD: RPD criteria only apply to analytes whose concentration in the sample is greater than or equal to the LOQ.	Examine the project-specific requirements. Contact the client as to additional measures to be taken. For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met and explain in the Case Narrative. The data will be evaluated to determine the source of difference.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

Matrix	Soil and Aqueous QC
Analytical Group	SVOCs
Analytical Method/ SOP Reference	SW-846 8270D/DV-MS-0012

QC Sample	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQIs	MPCs
Surrogate Spike	All field and QC samples. Alternative surrogates are recommended when there is obvious chromatographic interference.	QSM 5.3 Appendix D limits must be used. For analyte(s) is not listed in QSM 5.3 Appendix D, use in-house surrogate limits provided in Appendix D of this SAP	Correct problem then reprepare and reanalyze all failed samples for all surrogates in the associated preparatory batch if sufficient sample material is available. If obvious chromatographic interference is present, reanalysis may not be necessary, but the client must be notified prior to reporting data and the failures must be discussed in the Case Narrative. Apply Q-flag to all associated analytes if acceptance criteria are not met and explain in the Case Narrative.	Analyst, Supervisor	Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

~~Matrix~~	~~Soil and Aqueous QC~~
~~Analytical Group~~	~~Nitrocellulose~~
~~Analytical Method/ SOP Reference~~	~~EPA 353.2 modified / WS-WC-0050~~

~~QC Sample~~	**~~Frequency/Number~~**	**~~Method/SOP QC Acceptance Limits~~**	**~~Corrective Action (CA)~~**	**~~Person(s) Responsible for CA~~**	**~~DQIs~~**	**~~MPCs~~**
~~MB~~	~~One per batch~~	~~No target analytes ≥ ½ LOQ and > 1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise affect sample results.~~	~~Evaluate calibration blanks. If reagent issue, prepare fresh reagents then reprepare and reanalyze the MB and all samples processed with the contaminated blank.~~	~~Laboratory Manager/ Analyst~~	~~Accuracy/Bias Contamination~~	~~No target analytes ≥ 1/2 LOQ.~~
~~LCS~~	~~One LCS per preparation batch~~	~~Laboratory statistically derived control limits (26-144 for waters, 34-115 for solids, subject to change as limits are updated)~~	~~Reanalyze LCS once. If acceptable, report. Otherwise, evaluate and reprepare and reanalyze the LCS and all samples in the associated prep batch for failed analytes, if sufficient sample material is available.~~	~~Laboratory Manager/ Analyst~~	~~Precisions and Accuracy/Bias~~	~~Laboratory statistically derived control limits.~~
~~MS/MSD for all analytes~~	~~One MS/MSD pair per preparation batch~~	~~Laboratory statistically derived control limits (26-144 with RPD=45 for waters, 34-115 with RPD = 71for solids, subject to change as limits are updated)~~	~~Examine the project-specific DQOs. Evaluate the data and reprepare/reanalyze the native sample and MS/MSD pair as indicated.~~	~~Laboratory Manager/ Analyst~~	~~Precision and Accuracy/Bias~~	~~Laboratory statistically derived control limits.~~

Matrix	Soil and Aqueous QC
Analytical Group	Nitrocellulose
Analytical Method/ SOP Reference	EPA Method 353.2mod[1] / ANANC

QC Sample	**Frequency/Number**	**Method/SOP QC Acceptance Limits**	**Corrective Action (CA)**	**Person(s) Responsible for CA**	**DQIs**	**MPCs**
MB	One per preparatory batch of up to 20 samples.	No analytes detected >1/2 LOQ and >1/10 the amount measured in any sample or 1/10 the regulatory limit (whichever is greater). Blank result must not otherwise effect sample results for common laboratory contaminants no analytes>LOQ.	Correct problem, then reprepare and reanalyze the MB and all samples in the associated batch for failed analytes, except when sample results are below the LOD if sufficient material is available.	Laboratory Manager/ Analyst	Accuracy/Bias Contamination	Same as Method/SOP QC Acceptance Limits.
LCS	One per preparatory batch of up to 20 samples.	40-120%	Correct problem, then reprepare and reanalyze the LCS and all samples in the associated batch for failed analytes, if sufficient material is available.	Laboratory Manager/ Analyst	Precisions and Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.
MS/MSD for all analytes	One matrix spike per every 10 samples.	Recovery for matrix spikes will be (40-120%) of true value. Acceptance limit RPD between MS and MSD ≤ 20% RPD.	Examine the project-specific DQOs. Notify lab QA officer and project chemist as to additional measures to be taken.	Laboratory Manager/ Analyst	Precision and Accuracy/Bias	Same as Method/SOP QC Acceptance Limits.

[1] EPA Method 353.2Mod and DoD/DoE QSM v5.4 (2021) is the basis for specifications on this table.

SAP Worksheet #29: Project Documents and Records Table

(UFP-QAPP Manual Section 3.5.1)

Document	Where Maintained
Sample Collection Documents and Records: • Project Personnel Sign-Off Record • Field logbook (and sampling notes) • Field sample forms (e.g., boring logs, sample log sheets, etc.) • Chain-of-custody records • Sample shipment airbills • Equipment calibration logs • Photographs • FCR forms • SAP • Field sampling SOPs • SSHP/APP	Sample collection documents and records (may include printed copies and electronic information) will be maintained at the Tetra Tech office located at 661 Andersen Drive, Pittsburgh, Pennsylvania, 15220. Project files will be kept in a secured limited-access area and transmitted to the NAVFAC Regional Data Manager, who will subsequently forward the data to the FRC for storage, where the files will remain until 50 years after the last decision document for the facility.
Laboratory Documents and Records in the Form of Analytical Data Packages: • Sample receipt, custody, and tracking records • Standards traceability logs • Sample storage and disposal records • Sample preparation logs • Equipment calibration, maintenance, testing, and inspection logs • Sample analysis run logs • Reported results for samples, standards, QC checks, and QC samples • Data completeness checklists • Telephone logs • Extraction/clean-up records • Raw data • EDDs	Analytical results, documents, and records will be provided by the laboratory in printed and electronic formats. Project files will be kept in a secured limited-access area and transmitted to the NAVFAC Regional Data Manager, who will subsequently forward the data to the FRC for storage, where the files will remain until 50 years after the last decision document for the facility. Electronic laboratory results will also be verified, entered, and maintained in a database on a password-protected Structured Query Language server. Data qualifiers will be added to the database during data validation. After validation, the validated data files will be uploaded to the Navy's NIRIS data management system. Although available in the Administrative Record file, laboratory reports are typically filed at a separate location and are available upon request.

Document	Where Maintained
Other Documents: - All letter and email correspondence with regulatory agencies, including approvals and comments - Telephone logs - Field investigation data packages - Data Validation and Review Reports (includes tabulated data summary forms) - All versions of project reports	Personnel training records and health and safety certificates will be stored in personnel records and electronically in the Tetra Tech training database in the project file at 661 Andersen Drive, Pittsburgh, Pennsylvania, 15220. Project files will be kept in a secured limited-access area and transmitted to the NAVFAC Regional Data Manager, who will subsequently forward the data to the FRC for storage. Field Audit Checklists are not considered part of the Administrative Record file and will be stored in the Tetra Tech project file at 661 Andersen Drive, Pittsburgh, Pennsylvania, 15220, and electronically in the server library. Analytical laboratory audit checklists will be retained by the respective accreditation authorities.

Consult Worksheet #14 for a description of long-term data and records retention.

SAP Worksheet #30: Analytical Services Table

(replacement of APPL for Nitrocellulose per MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 3.5.2.3)

Note that all analytical method versions or analytes described in this SAP may not be in those accreditations/certifications. The method versions chosen for this SAP are based on TestAmerica's extensive experience analyzing samples, and the analytes in this SAP were chosen based on input from the Navy derived from historical site information.

Matrix	**Analytical Group**	**Sample Locations/ID Numbers**	**Analytical SOP**	**Data Package Turnaround Time**	**Laboratory Organization**[(1)] (name and address, contact person and telephone number)	**Backup Laboratory/ Organization** (name and address, contact person and telephone number)
Soil and aqueous QC blanks	Explosives (see detailed table below)	See Worksheet #18	See detailed table below	21 calendar days	See detailed table below	See detailed table below

1 Contact information provided is for the primary laboratory. The primary Laboratory PM is the single POC for all laboratories.

Analyte	CAS Number	Eurofins TestAmerica Denver 4955 Yarrow Street Arvada, CO 80002 Lee Ann Heathcote 916-374-4333 LeeAnn.Heathcote@testamerica.com	~~Eurofins TestAmerica Sacramento~~ ~~880 Riverside Parkway~~ ~~West Sacramento, CA 95605~~ ~~Lee Ann Heathcote~~ ~~916-374-4333~~ ~~LeeAnn.Heathcote@testamerica.com~~ APPL 908 N. Temperance Ave. Clovis, CA 93611 Greg Salata 559-862-2133 greg.salata@applinc.com
1,3,5-Trinitrobenzene	99-35-4	SW-846 8330B	---
1,3-Dinitrobenzene	99-65-0	SW-846 8330B	---
2,4,6-Trinitrotoluene	118-96-7	SW-846 8330B	---

Analyte	CAS Number	Eurofins TestAmerica Denver 4955 Yarrow Street Arvada, CO 80002 Lee Ann Heathcote 916-374-4333 LeeAnn.Heathcote@testamerica.com	~~Eurofins TestAmerica Sacramento~~ ~~880 Riverside Parkway~~ ~~West Sacramento, CA 95605~~ ~~Lee Ann Heathcote~~ ~~916-374-4333~~ ~~LeeAnn.Heathcote@testamerica.com~~ APPL 908 N. Temperance Ave. Clovis, CA 93611 Greg Salata 559-862-2133 greg.salata@applinc.com
2,4-Dinitrotoluene	121-14-2	SW-846 8330B	---
2,6-Dinitrotoluene	606-20-2	SW-846 8330B	---
2-Amino-4,6-dinitrotoluene	35572-78-2	SW-846 8330B	---
2-Nitrotoluene	88-72-2	SW-846 8330B	---
3-Nitrotoluene	99-08-1	SW-846 8330B	---
4-Amino-2,6-dinitrotoluene	19406-51-0	SW-846 8330B	---
4-Nitrotoluene	99-99-0	SW-846 8330B	---
HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	2691-41-0	SW-846 8330B	---
Nitrobenzene	98-95-3	SW-846 8330B	---
Nitrocellulose	9004-70-0	---	EPA 353.2 modified
Nitroglycerin	55-63-0	SW-846 8330B	---
Nitroguanidine	556-88-7	~~---~~SW-846 8321B	~~8330/8330A modified~~
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	121-82-4	SW-846 8330B	---
Tetryl (2,4,6-trinitrophenylmethylnitramine)	479-45-8	SW-846 8330B	---
Diphenylamine	122-39-4	SW-846 8270D	---
N-Nitrosodiphenylamine	86-30-6	SW-846 8270D	---
3,5-Dinitroaniline	618-87-1	SW-846 8330B	---
Picric Acid (2,4,6-trinitrophenol)	88-89-1	SW-846 8330B	---
2,4-Dinitrophenol	51-28-5	SW-846 8270D	---
PETN (pentaerythritol)	78-11-5	SW-846 8330B	---

Notes:
- The analytical methods shown are for soil. Aqueous QC samples will be analyzed via the same methods.
- Eurofins Test America Denver has~~Both labs have~~ ELAP and State of Washington certifications, with the exception of State of Washington accreditation for diphenylamine.

- Picramic Acid (2-amino-4,6-dinitrophenol), although a potential Bangor-related MC contaminant, is not shown. This analyte is problematic in that it is an unstable compound and so analytical laboratories cannot analyze it. Picric acid, which can be analyzed, is included as a derivative of picramic acid.
- APPL has ELAP certification for Nitrocellulose.

SAP Worksheet #31: Planned Project Assessments Table

(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP-QAPP Manual Section 4.1.1)

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (title and organizational affiliation)	Person(s) Responsible for Responding to Assessment Findings (title and organizational affiliation)	Person(s) Responsible for Identifying and Implementing CA (title and organizational affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (title and organizational affiliation)
Field Readiness Review	Before mobilization for the project and before major phases of work are initiated	Internal	Tetra Tech	Project Manager, Tetra Tech	Project Manager, Tetra Tech	Project Manager, Tetra Tech	Project QAM, Tetra Tech
Laboratory Systems Audit	Every 2 years	External	DoD ELAP Accrediting Body	DoD ELAP Accrediting Body Auditor	Laboratory QAM or Laboratory Manager, Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~	Laboratory QAM or Laboratory Manager, Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~	Laboratory QAM or Laboratory Manager, Eurofins TestAmerica Denver and APPL~~Eurofins TestAmerica Sacramento~~
Field Supervision	During fieldwork	Internal	Tetra Tech	FOL	Tetra Tech PM and QAM (if additional support is needed)	Tetra Tech PM and QAM (if additional support is needed)	Tetra Tech PM and QAM (if additional support is needed)

Eurofins TestAmerica Denver and APPL have~~has~~ successfully completed the laboratory assessment process required as part of the DoD ELAP and as described in the DoD QSM, Version 5.4~~3~~, October 2021~~May 2019; and Eurofins TestAmerica Sacramento has successfully completed the laboratory assessment process required as part of the DoD ELAP and as described in the DoD QSM, Version 5.1.1, February 2018. ~~; ~~T~~the DoD ELAP accreditation documentation for both laboratories is included in Appendix D.

SAP Worksheet #32: Assessment Findings and Corrective Action Responses Table

(UFP-QAPP Manual Section 4.1.2)

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (name, title, organization)	Time Frame of Notification	Nature of CA Response Documentation	Individual(s) Receiving CA Response (name, title, organization)	Time Frame for Response
Field Readiness Review	E-mail documentation	Project Manager, Project QAM, Field Team Lead, and Analytical Coordinator, Tetra Tech	2 days	E-mail documentation	Project Manager, Project QAM, Field Team Lead, and Analytical Coordinator, Tetra Tech	2 days
Laboratory System Audit	Written audit report	TBD	Specified by DoD ELAP accrediting body	Letter	DoD ELAP accrediting body	Specified by DoD ELAP accrediting body
Field Supervision	Site logbook and sample collection log sheets	PM, Tetra Tech; FOL, Tetra Tech	Immediately, when discovered	Entry in site logbook, potential retraining	PM, Tetra Tech; FOL, Tetra Tech	Within 24 hours

SAP Worksheet #33: Quality Assurance Management Reports Table

(addition of APPL by MC QAPP FCR-01 Rev 1 dated 12-16-2022 [see redline/strikeout blue highlights])

(UFP QAPP Manual Section 4.2)

Type of Report	Frequency	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (title and organizational affiliation)	Report Recipient(s) (title and organizational affiliation)
Data Validation Report	Per Sample Delivery Group	Within 3 weeks after receiving the data from the laboratories	Project Chemist or Data Validator, Tetra Tech	PM, Tetra Tech; project file
Major Analysis Problem Identification (Internal Memorandum)	When persistent analysis problems are detected	Immediately upon detection of problem – on the same day	QAM, Tetra Tech	PM, Tetra Tech; QAM, Tetra Tech; Program Manager, Tetra Tech; project file
Project Monthly Progress Report	Monthly for duration of the project	Monthly	PM, Tetra Tech	PM, Tetra Tech; QAM, Tetra Tech; Program Manager, Tetra Tech; NAVFAC NW COR/RPM; project file
Laboratory QA Report	When significant plan deviations result from unanticipated circumstances	Immediately upon detection of problem—on the same day	Laboratory PM, Eurofins ~~/~~TestAmerica and APPL	PM and project file, Tetra Tech

SAP Worksheets #34-36: Data Verification and Validation (Steps I and IIa/IIb) Process Table

(UFP-QAPP Manual Section 5.2.1), (UFP-QAPP Manual Section 5.2.2), (Figure 37 UFP-QAPP Manual), (Table 9 UFP-QAPP Manual)

Data Review Input	Description	Responsible for Verification (name, organization)	Step I/IIa/IIb(1)	Internal/ External
Sample Log Sheets, Chain-of-Custody Forms, SAP, and Laboratory Sample Login Documentation	The FOL will verify that samples were correctly identified, chain-of-custody records are legible, data will be traceable to the corresponding samples, all samples listed in SAP Worksheet #s 12, 18, and 20 were collected from intended locations, and the correct sampling and analytical methods/SOPs were assigned to samples listed on the chain-of-custody record. The PM will verify that the sampling plan was implemented and carried out as written and will ensure that any significant deviations are documented in the project report.	FOL and PM, Tetra Tech	I	Internal
Chain-of-Custody Forms	Verify that the chain-of-custody forms are complete and accurate and were signed and dated by the sampler relinquishing the samples and by the laboratories receiving the samples. Resolve discrepancies, if possible. Alert the Tetra Tech PM verbally or via email if discrepancies are unresolvable.	FOL, Tetra Tech	I	Internal
Chain-of-Custody Forms	Verify sample shipment completeness against the chain-of-custody record, verify proper sample preservation/integrity, sign to indicate receipt, note any discrepancies, and correct them as necessary. Notify the Tetra Tech FOL or PM of any deviations from sample shipping requirements such as damaged sample containers or inappropriate temperature or pH. Note uncorrectable discrepancies in the data package Case Narrative.	Laboratory Sample Custodian, Analytical Laboratories	I	External
Analytical Calibration Standards	Verify that standards are traceable and meet contract, method, and procedural requirements, as applicable. If discrepancies in traceability are found, bring the discrepancies to the attention of the Laboratory PM for correction.	Laboratory Analyst, Analytical Laboratories	I	Internal

Data Review Input	Description	Responsible for Verification (name, organization)	Step I/IIa/IIb(1)	Internal/ External
SAP, Analytical SOPs, and Analytical Data Packages	Verify that the correct analytical methods/SOPs were applied. Establish that all method QC samples were analyzed and in control as listed in the analytical SOPs. If method QC is not in control, the Laboratory PM will contact the Tetra Tech Project Chemist or PM verbally or via email for guidance prior to laboratory data package preparation.	Laboratory PM, Analytical Laboratories	I	Internal
Laboratory Analytical Data Package	Verify the analytical data package for completeness and accuracy. The Laboratory QAM will sign the Case Narrative for each data package.	Laboratory QAM, Analytical Laboratories	I	Internal
Laboratory Analytical Data Package	Review chain-of-custody records to ensure that the required analytical samples were collected, appropriate sample identifications were used, and correct analytical methods were applied to each sample. Verify the completeness and accuracy of the analytical data package. Obtain missing data package elements from the laboratory. Document unrecoverable elements, if any, in the data validation report submitted to the Tetra Tech PM and alert the Project Chemist or PM.	Data Validator, Tetra Tech	1/IIa	External
EDDs/Analytical Data Packages	Verify 100 percent of EDD results for accuracy and completeness against hard-copy data package and chain-of-custody records at the start of validation. If required elements are missing, obtain missing elements form the laboratory before completing the validation. If any element cannot be obtained, document the omission in the data validation report and identify the missing elements to the Tetra Tech Project Chemist or PM as early as possible.	Data Validator, Tetra Tech	1/IIa	External
Sample Shipment and Storage Conditions and Holding Times for Representativeness	Verify that sample shipping and storage conditions satisfy Worksheet #19 requirements. Document deviations from requirements in the data validation report and notify the Tetra Tech Project Chemist or PM if deviations from the SAP requirements are serious enough to warrant data rejection. Document findings in the data validation report.	Data Validator, Tetra Tech	I/IIa	External

Data Review Input	Description	Responsible for Verification (name, organization)	Step I/IIa/IIb(1)	Internal/ External
QC Samples/MPC Compliance	Ensure that the scheduled laboratory and field QC samples were submitted for analysis and that the MPCs listed in SAP Worksheet #s 12, 15, 22, 24, and 28 were met for all field samples and QC samples. Document findings in the data validation report. Evaluate sample results for laboratory contamination and qualify false detections using the laboratory method/preparation blank summaries. Qualify analyte concentrations between the DL and the LOQ as estimated ("J" qualifier). Replace laboratory qualifiers with validation qualifiers on validated data in accordance with the laboratory DV process described below and document findings in the DV report. Retain laboratory flags in the database and provide them in the DV reports to document data as received from the laboratory.	Data Validators, Tetra Tech	IIa/IIb	External
Field and Laboratory Duplicate Analyses for Precision	Verify field sampling precision by checking RPDs for field duplicate samples. Verify laboratory precision by checking RPDs or percent difference values from calibrations, laboratory duplicates, MS/MSDs, and LCS/LCS Duplicates. Ensure compliance with MPC accuracy and precision goals listed in Worksheet #s 12, 24, and 28. Document findings in the data validation report.	Data Validator, Tetra Tech	L/IIb	External
SAP/Laboratory Data Packages/EDDs	Conduct USEPA Stage 4 data validation on 10 percent of the definitive laboratory data and Stage 2B on 90 percent of the definitive laboratory data generated by the selected methods using criteria listed in Worksheet #s 12, 15, 24, and 28 and the DoD QSM 5.0 (dated 2013) DoD General Data Validation Guidelines (February 2018), and logic provided in the National Functional Guidelines (NFGs) Organic Superfund (USEPA, 2017a). If criteria are not included in the aforementioned, use the criteria and logic in the NFG for Organic Superfund (USEPA, 2017a). Document findings in the data validation report.	Data Validator, Tetra Tech	IIa/IIb	External

1 IIa=compliance with methods, procedures, and contracts (see Table 10, page 117, UFP-QAPP manual, V.1, March 2005).
IIb=comparison with measurement performance criteria in the SAP (see Table 11, page 118, UFP-QAPP manual, V.1, March 2005).

SAP Worksheet #37: Usability Assessment

(UFP-QAPP Manual Section 5.2.3)

This worksheet describes the data usability assessment processes and criteria.

Data Usability Assessment

The usability of the data generated during this project directly affects whether project objectives are achieved. The following characteristics will be evaluated at a minimum, and the results of these evaluations will be included in the project report. The characteristics will be evaluated for multiple concentration levels if the evaluator determines that this is necessary. To the extent required by the type of data being reviewed, the evaluator will consult with other technically competent individuals to render sound technical assessments of these data characteristics.

- **Completeness**

  For each matrix scheduled to be sampled, the Tetra Tech PM will designate an individual who, acting on behalf of the Project Team, will prepare a table to compare planned samples and analyses to actual samples and analyses. If deviations from the scheduled sample collection or analyses are identified, the Tetra Tech PM will determine whether the deviations compromise the ability to meet project objectives. If they do, the Tetra Tech PM will consult with the NAVFAC NW COR/RPM and other Project Team members, as necessary (determined by the NAVFAC NW COR/RPM), to develop appropriate CAs. The completeness goal for sampling and data is 90 percent. Completeness for sampling (Cs) will be expressed as the percent of samples collected divided by samples planned for collection and analytical completeness (Ca) will be computed as the percent of valid data points divided by the planned number of data points as follows:

$$\%Cs = \frac{No.of\ Valid\ Samples}{No.of\ Planned\ Samples} x100\%$$

$$\%Ca = \frac{No.of\ Valid\ Analytical\ Results}{No.of\ Planned\ Analytical\ Results} x100\%$$

- **Precision**

  The Tetra Tech Project Chemist, acting on behalf of the Project Team, will determine whether precision goals for field duplicates and laboratory duplicates were met. This will be accomplished by comparing duplicate results to precision goals identified in Worksheet #s 12 and 28. This will also include a comparison of field and laboratory precision, with the expectation that laboratory duplicate results will be no less precise than field duplicate results. If the goals are not met, or if data have been flagged as estimated (J qualifier), limitations on the use of the data will be described in the project report. RPD will computed as follows for original and duplicate pairs of results:

$$RPD = \frac{200 * \ |\mathrm{Result_A} - Result_B|}{(\mathrm{Result_A} + Result_B)}$$

- **Accuracy**

  The Tetra Tech Project Chemist, acting on behalf of the Project Team, will determine whether the accuracy/bias goals were met for project data. This will be accomplished by comparing %Rs of LCS, LCS Duplicate, MS, MSD, and surrogate compounds to accuracy goals identified in Worksheet #28. This assessment will include an evaluation of field and laboratory contamination; instrument calibration variability; and analyte recoveries for surrogates, MSs, and LCSs. If the goals are not met, limitations on the use of the data will be described in the project report. Bias of the qualified results and a description of the impact of identified non-compliances on a specific data package or on the overall project data will also be described in the project report. Accuracy will be computed as follows for MS/MSD samples:

$$\%R = \frac{\text{Amount in Spiked Sample} - \text{Amount in Sample}}{\text{Known Amount Added}} \text{ X } 100\ \%$$

The %R calculation for LCSs and surrogate spikes will be as follows:

$$\%R = \frac{\text{Experimental Concentration}}{\text{Certified or Known Concentration}} \text{ x } 100$$

- **Representativeness**
  A Tetra Tech Project Scientist, identified by the Tetra Tech PM and acting on behalf of the Project Team, will determine whether the data are adequately representative of intended populations, both spatially and temporally. This will be accomplished by verifying that samples were collected and processed for analysis in accordance with the SAP, by reviewing spatial and temporal data variations (as applicable), and by comparing these characteristics to expectations, including adherence to factors that affect sample integrity such as holding times, preservation, and storage conditions. The usability report will describe the representativeness of the data and may include matrix- or analytical fraction-specific descriptions when only subsets of the data are affected. This will not require quantitative comparisons unless professional judgment of the Project Scientist indicates that a quantitative analysis is required. If data gaps exist, they will be identified and, if appropriate, the project team will take them into consideration if additional work is required to meet project objectives.

- **Comparability**
  The Tetra Tech Project Chemist, acting on behalf of the Project Team, will determine whether the data generated under this project are sufficiently comparable to historical site data generated by different methods and for samples collected using different procedures and under different site conditions. This will be accomplished by reviewing sample collection processes and associated documentation; and by comparing overall precision and bias among data sets. This will not require quantitative comparisons unless professional judgment of the Tetra Tech Project Chemist indicates that such quantitative analysis is required. If comparability deficiencies are identified, limitations on the data will be described in the project report.

- **Sensitivity**
  The Tetra Tech Project Chemist, acting on behalf of the Project Team, will determine whether project sensitivity goals listed in Worksheet #15 were achieved. The overall sensitivity and LOQs from multiple data sets for each matrix and analysis will be compared. If sensitivity goals are not achieved, the limitations on the data will be described in the project report.

- **Project Assumptions and Data Outliers**
  The Tetra Tech PM and designated Project Team members will evaluate whether project assumptions are valid. This will typically be a qualitative evaluation but may be supported by quantitative evaluations. The type of evaluation depends on the assumption being tested. Quantitative assumptions may include those related to data distributions (e.g., normal or log-normal) and estimates of data variability. Potential data outliers will be excluded from data analyses if a review of the associated data indicates that the results have an assignable cause that renders them inconsistent with the remainder of the data. During this evaluation, the team will consider whether outliers could be indications of unanticipated site conditions.

Describe the evaluative procedures used to assess overall measurement error associated with the project:

After the completion of data validation, the data and data quality will be reviewed to determine whether sufficient data of acceptable quality are available for decision making. In addition to the evaluations described above, a series of inspections and statistical analyses will be performed to estimate these DQI characteristics. The statistical evaluations will include simple summary statistics for target analytes, such as maximum concentrations, minimum concentrations, numbers of samples with non-detected results, numbers of samples with detected results, and proportions of samples with detected and non-detected results. The Project Team members, identified by the Tetra Tech PM, will assess whether the data collectively support the attainment of project objectives. The Project Team will consider whether any missing or rejected data have compromised the ability to make decisions or to make decisions with the desired level of confidence. The data will be evaluated to determine whether missing or rejected data can be compensated for by other data.

Identify the personnel responsible for performing the usability assessment:

The Tetra Tech PM, Project Chemist, FOL, and Project Scientist will be responsible for conducting the listed data usability assessments. The data usability assessments will be reviewed with the installation POC, NAVFAC NW COR/RPM, and WSDE. If deficiencies affecting the attainment of project objectives are identified, the review will take place either in a face-to-face meeting or teleconference, depending on the extent of identified deficiencies. If no significant deficiencies are identified, the data usability assessment will simply be documented in the project report and reviewed during the normal document review cycle.

Describe the documentation that will be generated during usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

The data will be presented in tabular format, including data qualifications such as estimation (J, UJ), recommendation for rejection (X), or rejection (R). Written documentation will support the non-compliance estimated or rejected data results. The project report will identify and describe the data usability limitations and suggest resampling or other CAs, if necessary. Potential data anomalies will be investigated to determine whether they represent unanticipated site conditions or whether they are true outliers that warrant further investigation, and findings will be included in the project report.

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FIGURES

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Note: Certain features are not labeled on figure intentionally

FACILITY LOCATION MAP
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC

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DRAWN BY DATE
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H.NOLF 02/26/20
FIGURE NUMBER
10-1

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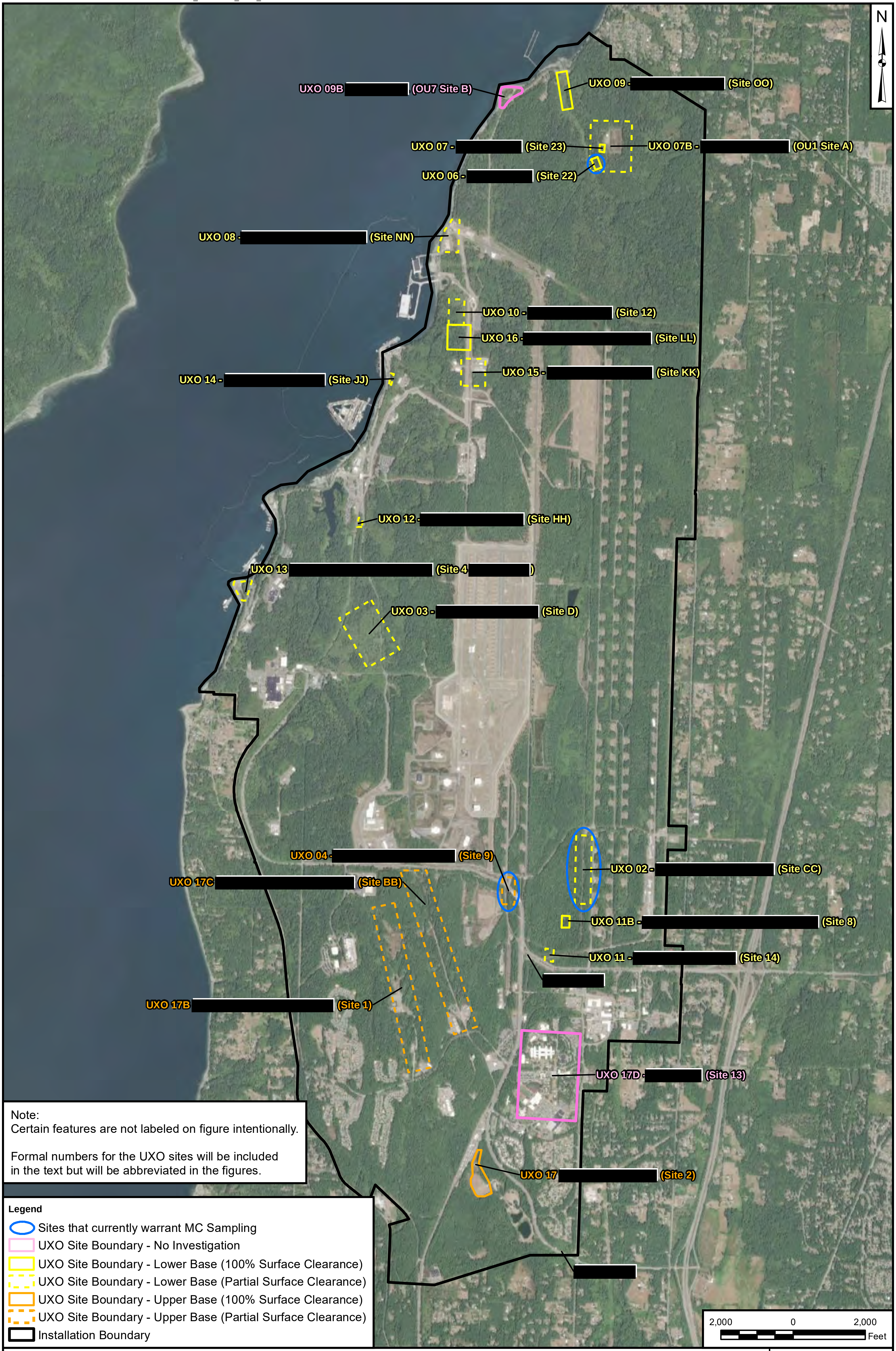

Note:
Certain features are not labeled on figure intentionally.

Formal numbers for the UXO sites will be included in the text but will be abbreviated in the figures.

Legend

- ○ Sites that currently warrant MC Sampling
- ▭ UXO Site Boundary - No Investigation
- ▭ UXO Site Boundary - Lower Base (100% Surface Clearance)
- ⬚ UXO Site Boundary - Lower Base (Partial Surface Clearance)
- ▭ UXO Site Boundary - Upper Base (100% Surface Clearance)
- ⬚ UXO Site Boundary - Upper Base (Partial Surface Clearance)
- ▭ Installation Boundary

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SITE MAP
KITSAP BANGOR
BANGOR, WASHINGTON

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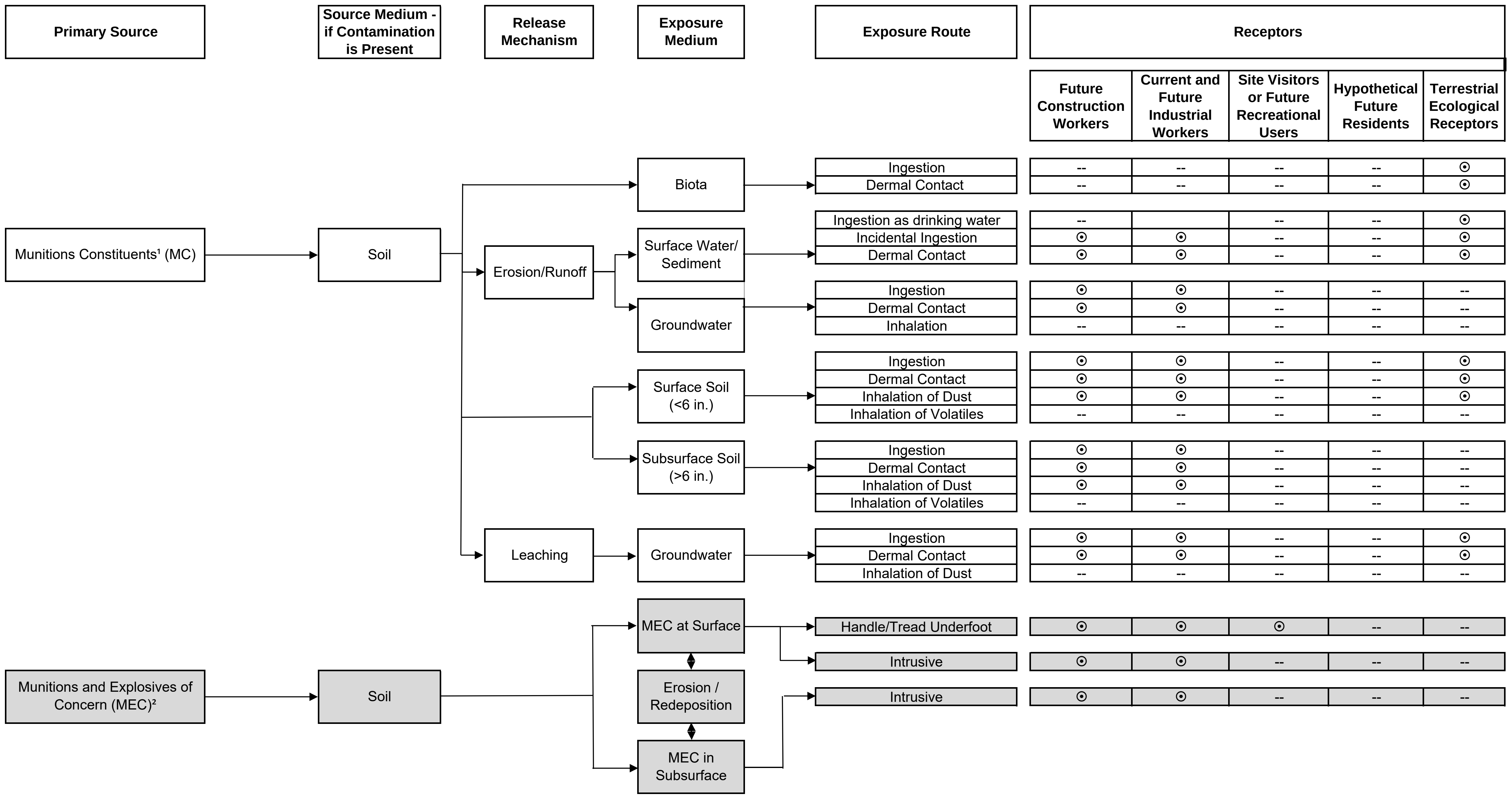
10-2	

FIGURE 10-3
CONCEPTUAL SITE MODEL FOR POTENTIAL EXPOSURE TO MUNITIONS CONSTITUENTS AND MUNITIONS AND EXPLOSIVES OF CONCERN FROM MEC/MPPEH RELEASE
NAVAL BASE KITSAP BANGOR



Primary Source	Source Medium - if Contamination is Present	Release Mechanism	Exposure Medium	Exposure Route	Receptors				
					Future Construction Workers	Current and Future Industrial Workers	Site Visitors or Future Recreational Users	Hypothetical Future Residents	Terrestrial Ecological Receptors
Munitions Constituents¹ (MC)	Soil		Biota	Ingestion	--	--	--	--	⊙
				Dermal Contact	--	--	--	--	⊙
		Erosion/Runoff	Surface Water/ Sediment	Ingestion as drinking water	--		--	--	⊙
				Incidental Ingestion	⊙	⊙	--	--	⊙
				Dermal Contact	⊙	⊙	--	--	⊙
			Groundwater	Ingestion	⊙	⊙	--	--	--
				Dermal Contact	⊙	⊙	--	--	--
				Inhalation	--	--	--	--	--
			Surface Soil (<6 in.)	Ingestion	⊙	⊙	--	--	⊙
				Dermal Contact	⊙	⊙	--	--	⊙
				Inhalation of Dust	⊙	⊙	--	--	⊙
				Inhalation of Volatiles	--	--	--	--	--
			Subsurface Soil (>6 in.)	Ingestion	⊙	⊙	--	--	--
				Dermal Contact	⊙	⊙	--	--	--
				Inhalation of Dust	⊙	⊙	--	--	--
				Inhalation of Volatiles	--	--	--	--	--
		Leaching	Groundwater	Ingestion	⊙	⊙	--	--	⊙
				Dermal Contact	⊙	⊙	--	--	⊙
				Inhalation of Dust	--	--	--	--	--
Munitions and Explosives of Concern (MEC)²	Soil		MEC at Surface	Handle/Tread Underfoot	⊙	⊙	⊙	--	--
				Intrusive	⊙	⊙	--	--	--
			Erosion / Redeposition						
			MEC in Subsurface	Intrusive	⊙	⊙	--	--	--

LEGEND
⊙ = Potentially complete exposure pathway (if MC contamination and/or MEC/MPPEH is present based on SI findings)
-- = Incomplete pathway
in. = inches

---

[1] The current CSM for MC exposure includes up to three UXO sites where MC sampling may be conducted for the SI. The sites include UXO 02 [redacted] (Site CC), UXO 03 [redacted] (Site D), and UXO 06 [redacted] (Site 22). These are the sites that either have evidence of a MEC/MPPEH release (UXO 03) or a MEC/MPPEH release is suspected but not confirmed based on the 2017 PA Report (Battelle, 2017).

[2] The potential exposure to MEC is investigated in a separate MEC QAPP and is not the subject of this MC SAP but is included for completeness.

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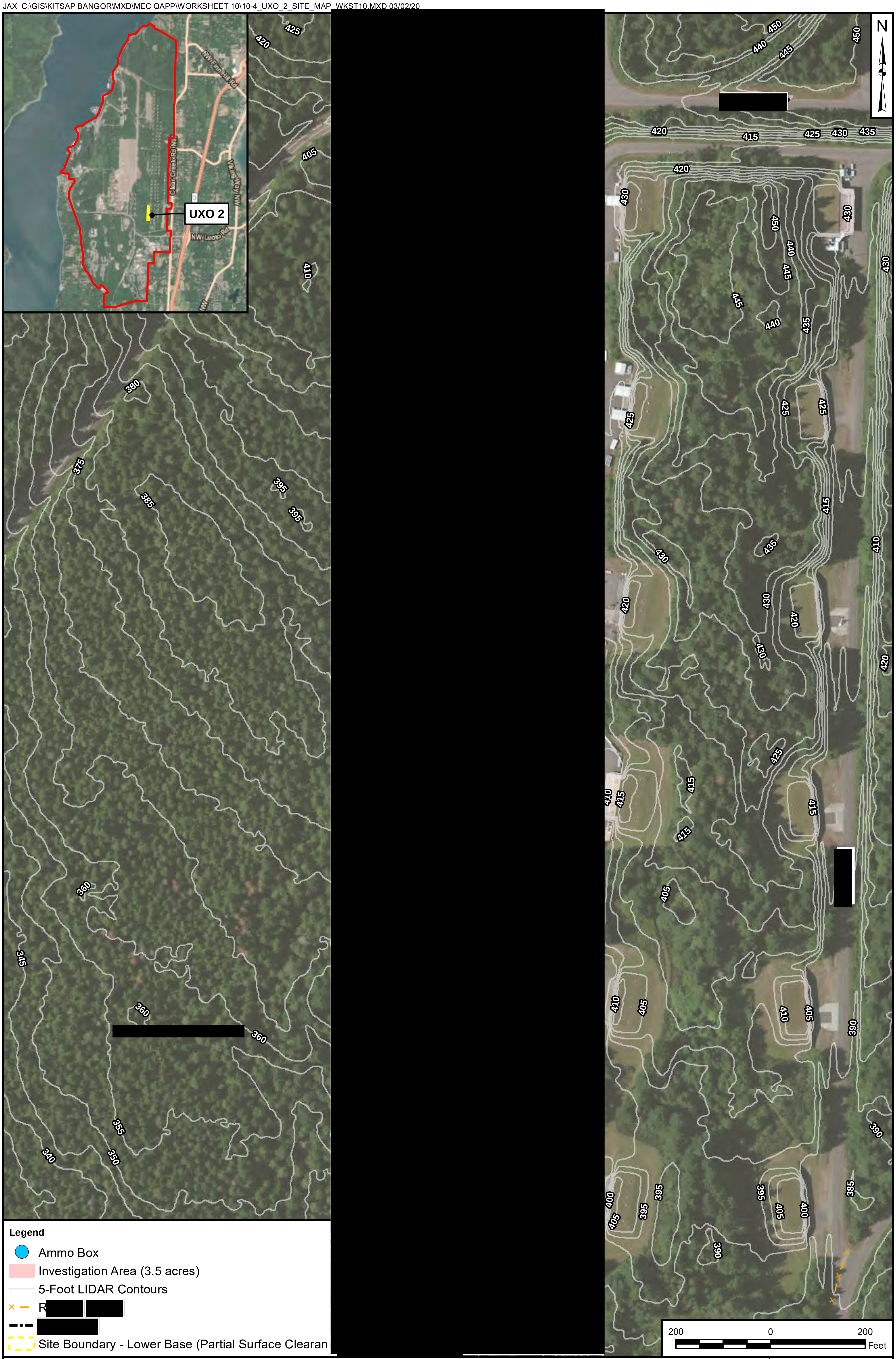

[redacted]

Legend

- ● Ammo Box
- 🟥 Investigation Area (3.5 acres)
- 5-Foot LIDAR Contours
- × — R[redacted] [redacted]
- [redacted]
- Site Boundary - Lower Base (Partial Surface Clearan

SITE LOCATION MAP

UXO 02[redacted] (SITE CC)

KITSAP BANGOR

BANGOR, WASHINGTON

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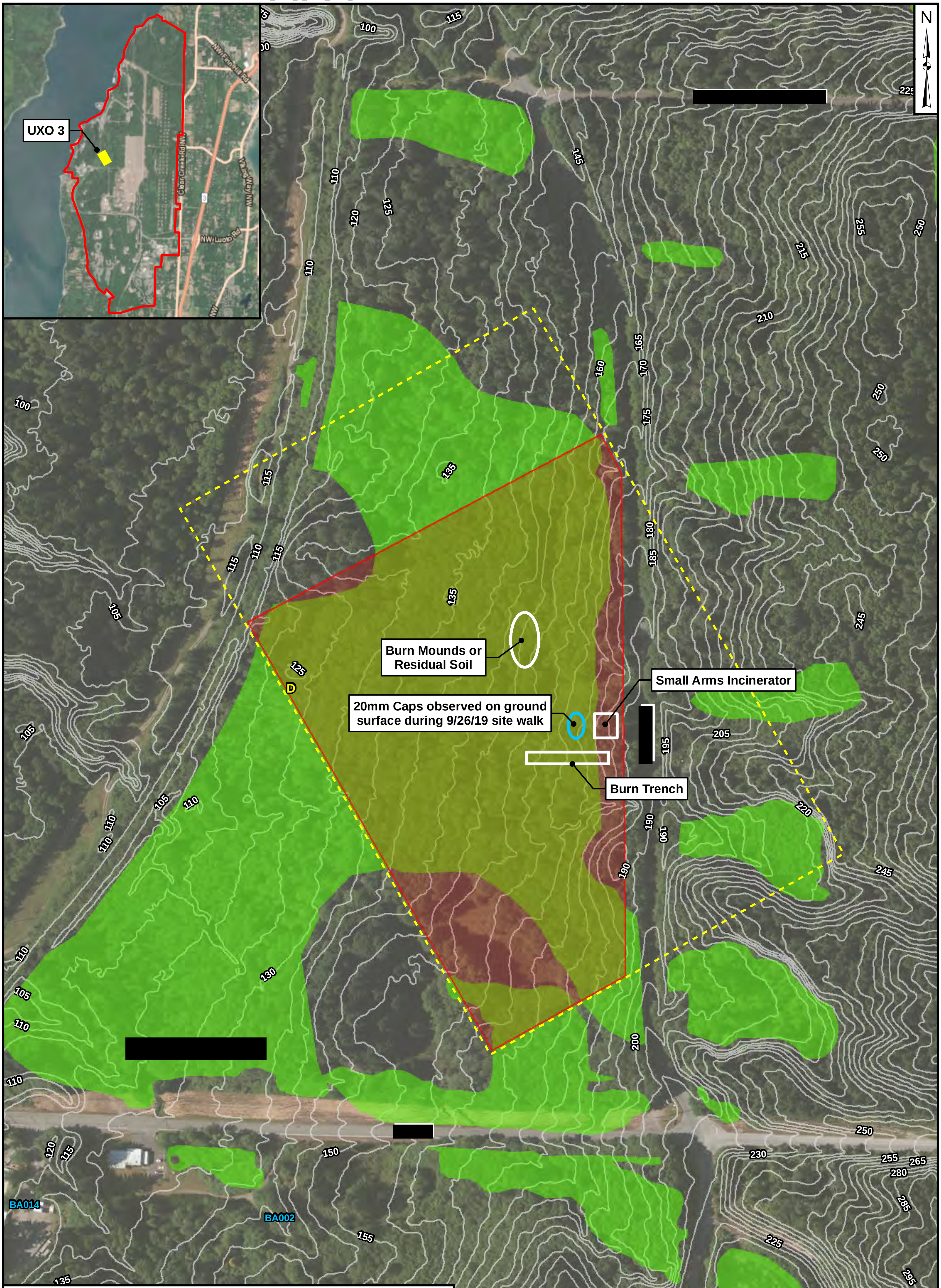

[redacted]

[redacted]

[redacted]

[redacted]

Legend

- 🟩 Wetland Area
- 🟥 Investigation Area (20 acres)
- — 5-Foot LIDAR Contours
- ▭ 20-mm Caps observed on ground surface during 9/26/19 site walk
- ⬚ Site Boundary - Lower Base (Partial Surface Clearance)

200 0 200 Feet

SITE LOCATION MAP
UXO 03 [redacted] (SITE D)
KITSAP BANGOR
BANGOR, WASHINGTON

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FIGURE NUMBER
10-5

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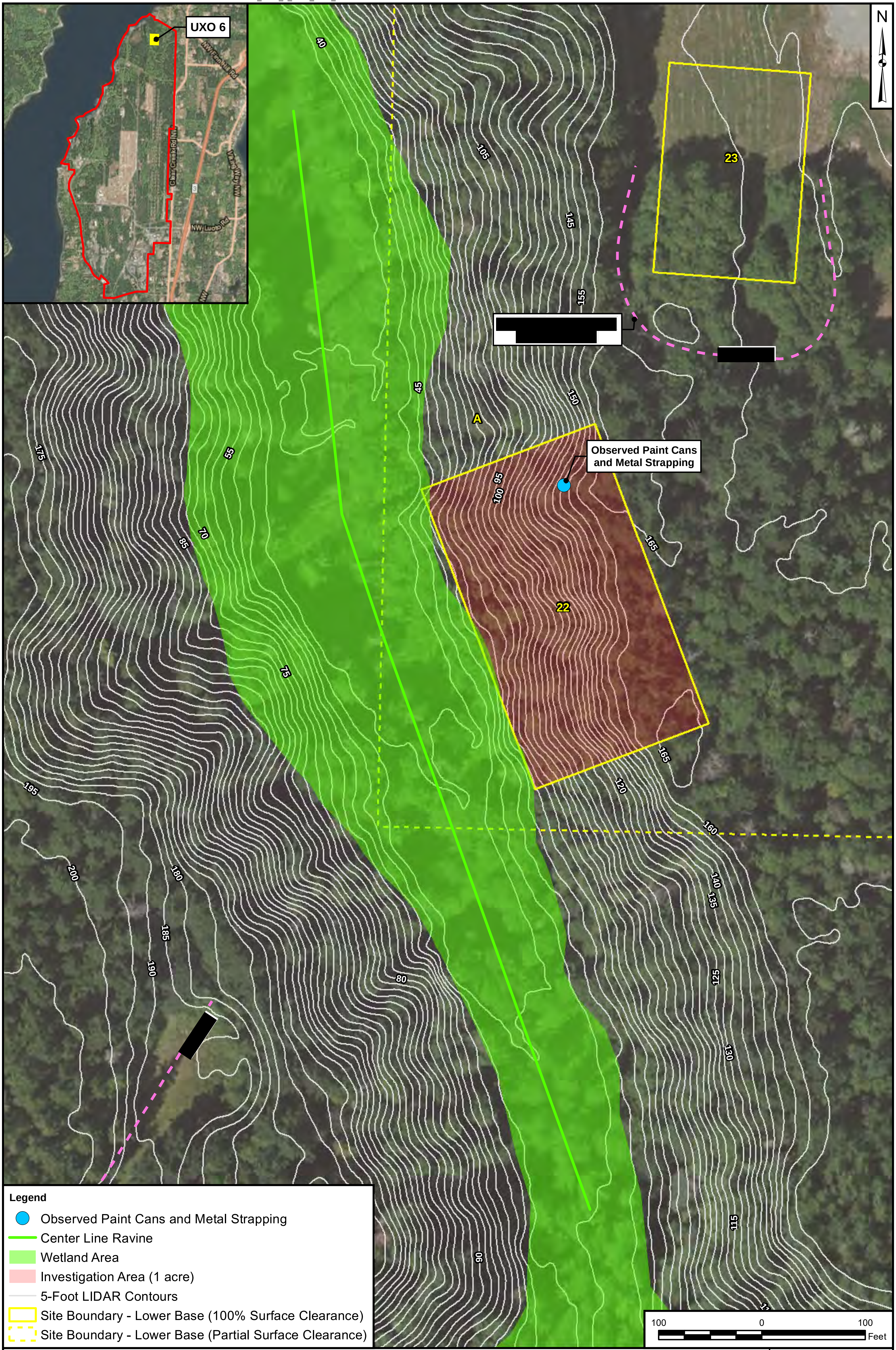

Legend

- ● Observed Paint Cans and Metal Strapping
- ━ Center Line Ravine
- 🟩 Wetland Area
- 🟥 Investigation Area (1 acre)
- ─ 5-Foot LIDAR Contours
- ☐ Site Boundary - Lower Base (100% Surface Clearance)
- ┅ Site Boundary - Lower Base (Partial Surface Clearance)

SITE LOCATION MAP
UXO 06 [redacted] (SITE 22)
KITSAP BANGOR
BANGOR, WASHINGTON

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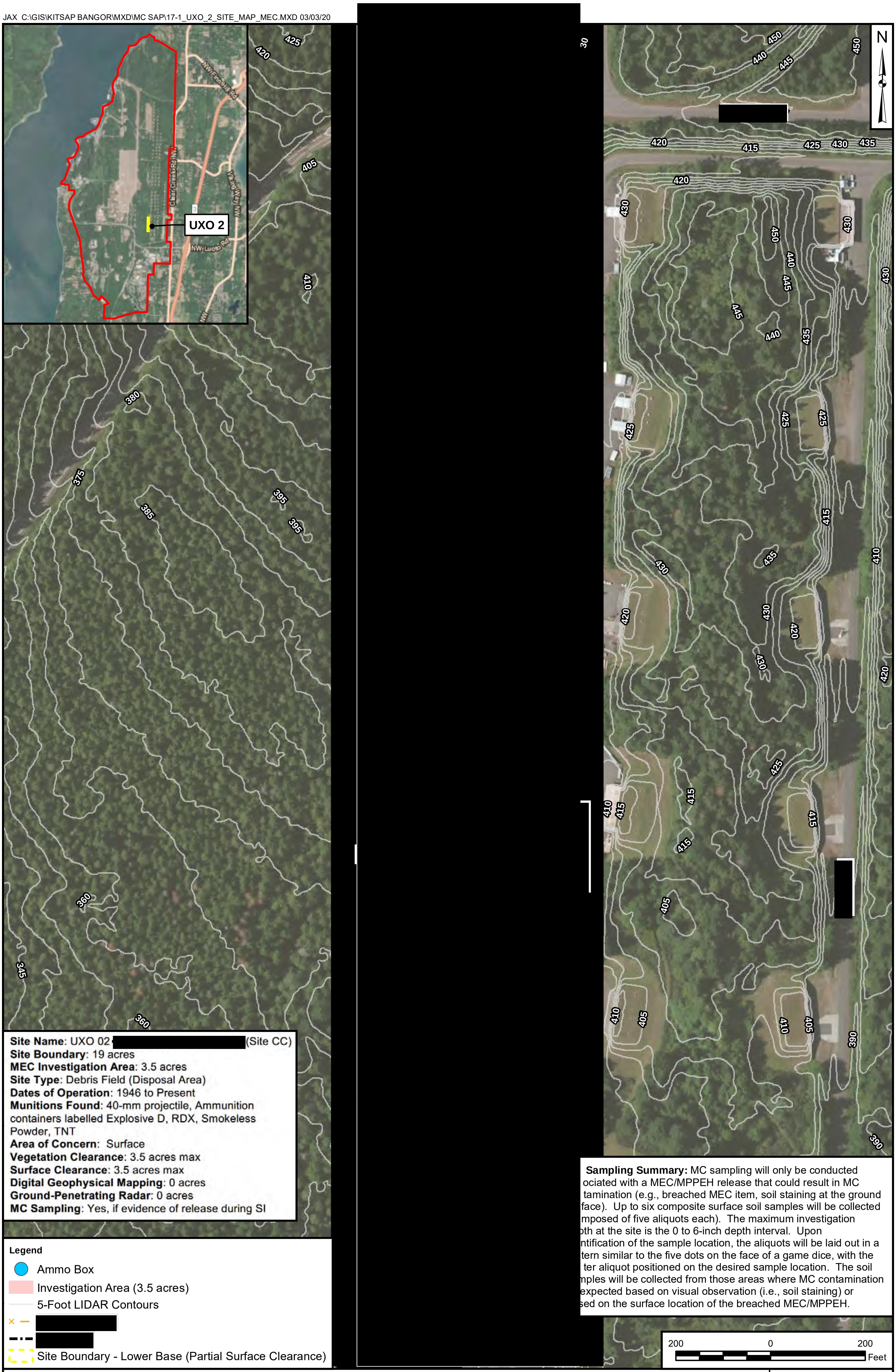
FIGURE NUMBER 10-6	

JAX C:\GIS\KITSAP BANGOR\MXD\MC SAP\17-1_UXO_2_SITE_MAP_MEC.MXD 03/03/20



[redacted]

[redacted]

[redacted]

Site Name: UXO 02 - [redacted] (Site CC)
Site Boundary: 19 acres
MEC Investigation Area: 3.5 acres
Site Type: Debris Field (Disposal Area)
Dates of Operation: 1946 to Present
Munitions Found: 40-mm projectile, Ammunition containers labelled Explosive D, RDX, Smokeless Powder, TNT
Area of Concern: Surface
Vegetation Clearance: 3.5 acres max
Surface Clearance: 3.5 acres max
Digital Geophysical Mapping: 0 acres
Ground-Penetrating Radar: 0 acres
MC Sampling: Yes, if evidence of release during SI

Sampling Summary: MC sampling will only be conducted
ociated with a MEC/MPPEH release that could result in MC
tamination (e.g., breached MEC item, soil staining at the ground
face). Up to six composite surface soil samples will be collected
mposed of five aliquots each). The maximum investigation
pth at the site is the 0 to 6-inch depth interval. Upon
ntification of the sample location, the aliquots will be laid out in a
tern similar to the five dots on the face of a game dice, with the
ter aliquot positioned on the desired sample location. The soil
mples will be collected from those areas where MC contamination
expected based on visual observation (i.e., soil staining) or
sed on the surface location of the breached MEC/MPPEH.

Legend

- ● Ammo Box
- 🟥 Investigation Area (3.5 acres)
- — 5-Foot LIDAR Contours
- × — [redacted]
- ━ · ━ [redacted]
- ⬚ Site Boundary - Lower Base (Partial Surface Clearance)

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SITE MAP FOR MC SI SAMPLING
UXO 02 - [redacted] (SITE CC)
KITSAP BANGOR
BANGOR, WASHINGTON

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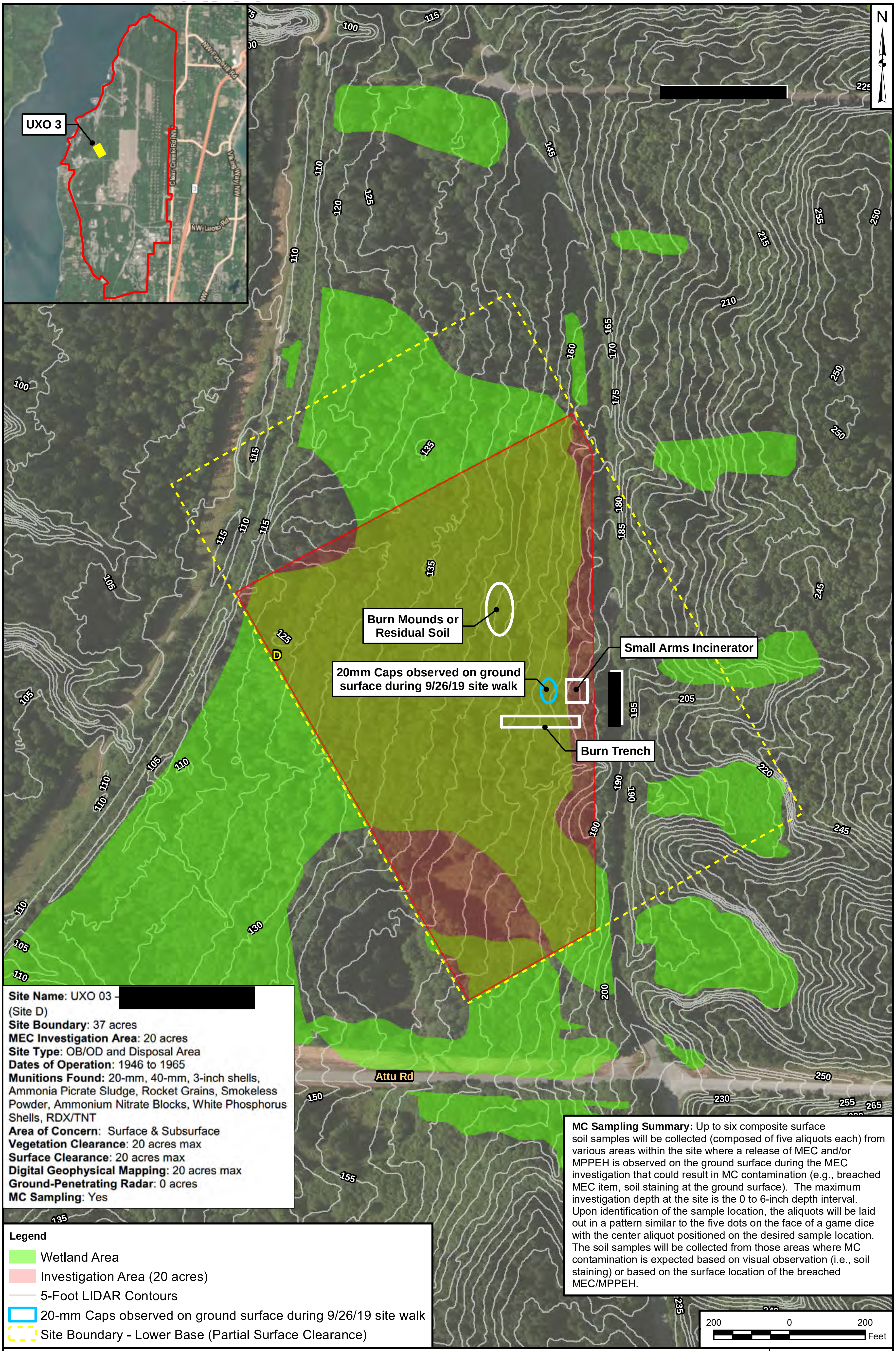
H.NOLF	03/03/20

FIGURE NUMBER
17-1



Site Name: UXO 03 - [redacted] (Site D)
Site Boundary: 37 acres
MEC Investigation Area: 20 acres
Site Type: OB/OD and Disposal Area
Dates of Operation: 1946 to 1965
Munitions Found: 20-mm, 40-mm, 3-inch shells, Ammonia Picrate Sludge, Rocket Grains, Smokeless Powder, Ammonium Nitrate Blocks, White Phosphorus Shells, RDX/TNT
Area of Concern: Surface & Subsurface
Vegetation Clearance: 20 acres max
Surface Clearance: 20 acres max
Digital Geophysical Mapping: 20 acres max
Ground-Penetrating Radar: 0 acres
MC Sampling: Yes

Legend
🟩 Wetland Area
🟥 Investigation Area (20 acres)
— 5-Foot LIDAR Contours
○ 20-mm Caps observed on ground surface during 9/26/19 site walk
▭ Site Boundary - Lower Base (Partial Surface Clearance)

MC Sampling Summary: Up to six composite surface soil samples will be collected (composed of five aliquots each) from various areas within the site where a release of MEC and/or MPPEH is observed on the ground surface during the MEC investigation that could result in MC contamination (e.g., breached MEC item, soil staining at the ground surface). The maximum investigation depth at the site is the 0 to 6-inch depth interval. Upon identification of the sample location, the aliquots will be laid out in a pattern similar to the five dots on the face of a game dice with the center aliquot positioned on the desired sample location. The soil samples will be collected from those areas where MC contamination is expected based on visual observation (i.e., soil staining) or based on the surface location of the breached MEC/MPPEH.

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SITE MAP FOR MC SI SAMPLING
UXO 03 [redacted] SITE D)
KITSAP BANGOR
BANGOR, WASHINGTON

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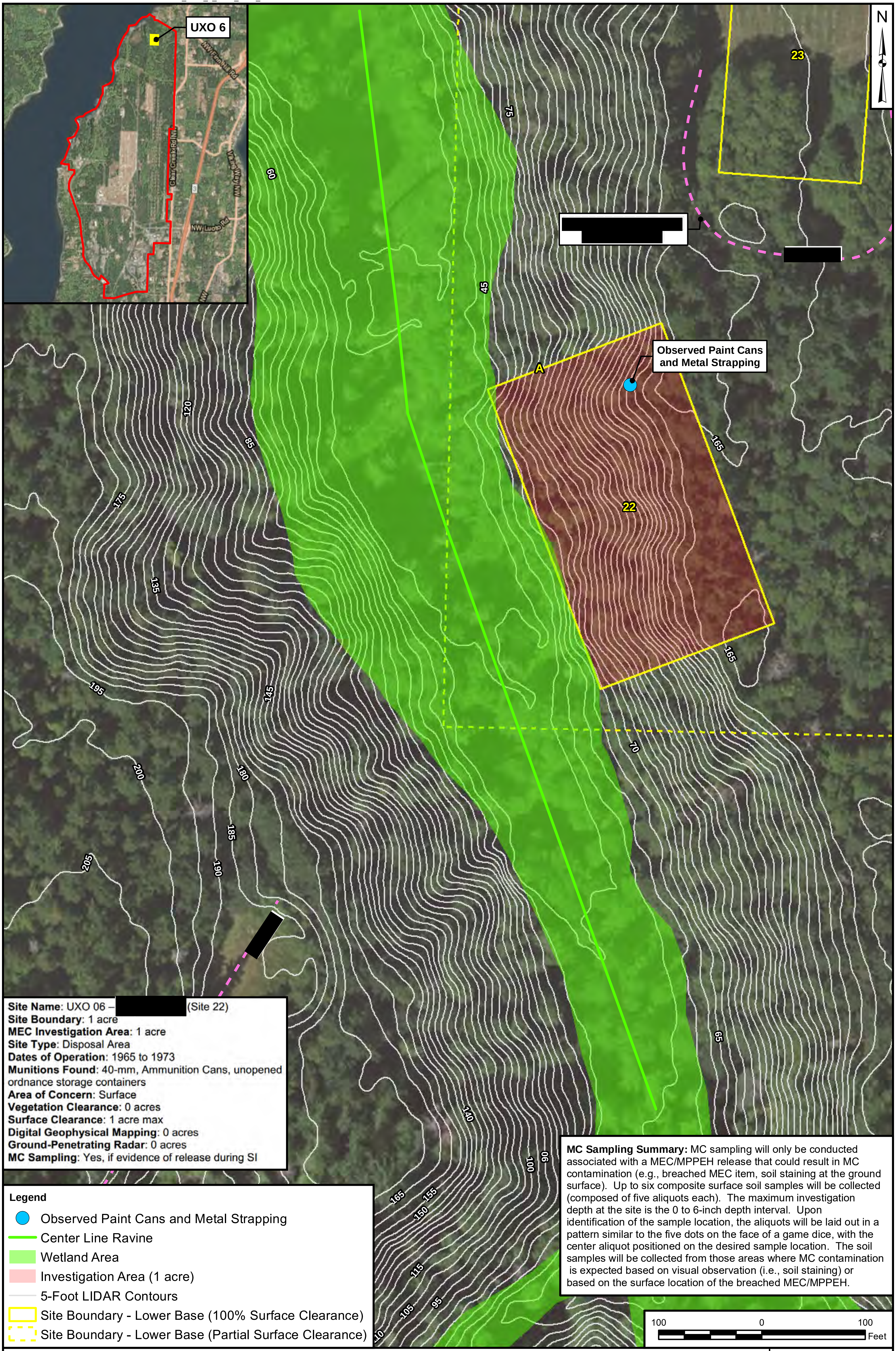

Site Name: UXO 06 – [redacted] (Site 22)
Site Boundary: 1 acre
MEC Investigation Area: 1 acre
Site Type: Disposal Area
Dates of Operation: 1965 to 1973
Munitions Found: 40-mm, Ammunition Cans, unopened ordnance storage containers
Area of Concern: Surface
Vegetation Clearance: 0 acres
Surface Clearance: 1 acre max
Digital Geophysical Mapping: 0 acres
Ground-Penetrating Radar: 0 acres
MC Sampling: Yes, if evidence of release during SI

Legend
- ● Observed Paint Cans and Metal Strapping
- Center Line Ravine
- 🟩 Wetland Area
- 🟥 Investigation Area (1 acre)
- 5-Foot LIDAR Contours
- ☐ Site Boundary - Lower Base (100% Surface Clearance)
- ☐ Site Boundary - Lower Base (Partial Surface Clearance)

MC Sampling Summary: MC sampling will only be conducted associated with a MEC/MPPEH release that could result in MC contamination (e.g., breached MEC item, soil staining at the ground surface). Up to six composite surface soil samples will be collected (composed of five aliquots each). The maximum investigation depth at the site is the 0 to 6-inch depth interval. Upon identification of the sample location, the aliquots will be laid out in a pattern similar to the five dots on the face of a game dice, with the center aliquot positioned on the desired sample location. The soil samples will be collected from those areas where MC contamination is expected based on visual observation (i.e., soil staining) or based on the surface location of the breached MEC/MPPEH.

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SITE MAP FOR MC SI SAMPLING
UXO 06 [redacted] (SITE 22)
KITSAP BANGOR
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FIGURE NUMBER 17-3	

APPENDIX A

PROJECT SCOPING SESSION MEETING MINUTES

SITE VISIT AND KICKOFF MEETING MINUTES

Purpose: Project Kickoff Meeting and Site Visit – NBK BANGOR, Washington
21 MRP Sites Site Investigation

Meeting Location: Tetra Tech Jackson Park field trailer and BANGOR UXO site locations

Dates: September 23-27, 2019 (travel days September 22 and 28, 2019)

Attendees:
Ray Kobeski – Navy COR (all days)
Linda Klink – Tetra Tech PM (all days)
Norm Piper – Tetra Tech UXO Lead (all days)
Matt Barner – Tetra Tech Geophysics Lead (9/23/2019 – 9/26/2019)
Steve Negri – Biological/ Endangered Species Lead (9/23/2019 – 9/26/2019)
Scot Wilson – Tetra Tech Project Support (9/23/2019 – 9/25/2019)
Jim Goerdt – Tetra Tech Scientist (all days)
Mitch Baron – Jackson Park Field Support (9/23/2019 – 9/27/2019)

Monday, September 23, 2019

[redacted]
Then Scot Wilson provided an orientation tour.
After, the team met the Navy COR for introductions and roles, and Navy discussion of project objectives and requirements. As per Ray Kobeski, although complications might arise as the project moves forward considering Installation security and operational conditions, the current plan is to move forward in accordance with the Navy's Statement of Work/awarded contract. Close coordination between Tetra Tech and the Navy COR is expected throughout the project.

SITE VISITS, Tuesday, September 24, 2019 through Thursday, September 26, 2019

General: Site visits occurred all day, each of three days, with 19 of the 21 sites visited. Each morning the team met at the Jackson Park trailer for a health and safety brief, to discuss the site visits of the day, and to discuss associated preparation of the planning documents. An abbreviated health and safety plan was prepared in advance to support the site visit. Many of the sites are located in heavily vegetated areas and so were difficult to access. Differing levels of Installation security were encountered. Any photography, where allowed, was collected with the Navy's approved camera pass, and photographs will be provided to Tetra Tech in the future following Base review and approval of each photograph.

In preparation of the site visit, a site mapping packet was prepared and provided to the team. Following the site visit, a summary table of UXO for each site including locational area of each site, and overall site boundary acreage and planned area of investigation acreage for each site. Original acreages are provided on the summary table as per the Navy Statement of Work/awarded contract (pre-site visit), as well as the adjusted acreages (post-site visit). The attached table summarizes the acreage adjustments per Tetra Tech comments of 10/08/19 for Navy RPM consideration (post-site visit) and Navy RPM review and response of 10/10/19, which was incorporated by Tetra Tech on the table. The updated site maps, reflective of the summary table and incorporating information research from historical aerials and mapping from the Base Technical Library, will be incorporated into the planning documents in progress.

Tuesday, September 24, 2019:

The following sites were visited in the [redacted]:

- UXO 10 [redacted]
- UXO 14 - [redacted]
- UXO 15 [redacted]
- UXO 16 [redacted]

The following sites were visited in the [redacted] Lower Base:

- UXO 6 [redacted]
- UXO 7 [redacted]
- UXO 7B [redacted]
- UXO 9 [redacted]
- UXO 9B [redacted]

Wednesday, September 25, 2019:

The following site was visited in the [redacted]:

- UXO 2 [redacted]

The following sites were visited in the Lower Base:

- UXO 4 [redacted]
- UXO 17 [redacted]
- UXO 17B [redacted]
- UXO 17C [redacted]
- UXO 17D [redacted]

Thursday, September 26, 2019:

The following sites were visited in the Lower Base:

- UXO 3 [redacted]
- UXO 11 [redacted]
- UXO 13 [redacted]

The following site was visited in the [redacted]:

- UXO 8 [redacted]

Also, returned to UXO 9 - [redacted] in the [redacted] Lower Base to collect site photographs.

Time did not allow for site visits of UXO 12 [redacted] and UXO 11B [redacted], both in the Lower Base. UXO 12 is a typical siding, viewed similarly at other sites. UXO 11B is in a heavily vegetated area and additional mapping is needed to locate. Ray Kobeski will visit these two sites and provide the team with photographs. Tetra Tech will provide GPS coordinates for the two sites.

Friday, September 27, 2019:

The team met at the Jackson Park trailer to discuss and review site information, to discuss the planning documents in progress, to discuss Tetra Tech's information research, and to plan the day's logistics.

The team met with the potential subcontractor for vegetation clearance to assess personnel and equipment capabilities.

The team visited the Technical Library on the Installation and obtained relevant drawings, which will be evaluated and incorporated into the site mapping and conceptual site model.

ACTION ITEMS:

- Linda to provide Ray with GPS coordinates for UXO 11B and UXO 12 (done 09/27/2019 and 10/04/2019, respectively).
- Ray to provide site photographs taken during the site visit, after Base review/approval for security purposes. Also, Ray will photograph UXO 11B and UXO 12.
- Tetra Tech to continue planning document preparation in accordance with the Navy Statement of Work/awarded contract. Tetra Tech is to prepare for Ray a preview of the Data Quality Objectives (DQOs) for both MEC and MC. [Ray on vacation 10/11/2019, returning 11/04/2019]
- Tetra Tech to review, evaluate, and incorporate historical aerials, and mapping obtained from the Technical Library, and update mapping accordingly (done 10/18/2019).
- Linda to prepare site visit/kickoff meeting notes.

ATTACHMENT

- Summary Table of UXO Sites Acreage Summary (10/18/2019)

UXO SITES ACREAGE SUMMARY, KITSAP BANGOR

UXO Site Number / Site Name	Area of Base	SOW		Revised Acreage - Post Site Visit		Supporting Aerials (Yes/No)	Tetra Tech Post Site Visit Comments/Observations, 10/08/19	Navy Review Comments, 10/10/19 / Resulting Changes
		Total Site Area (Acres)	Area of Investigation (Acres)	Total Site Area (Acres)	Area of Investigation (Acres)			
UXO 02 [redacted]	Keyport Annex	19	5	19	3.5	No	Refined area based on site visit information.	No Navy Comment.
UXO 03 [redacted]	Lower Base	37	20	37	20	No	No Change	No Navy Comment.
UXO 04 [redacted]	Lower Base	6	6	6	3.3	Yes	Area of Investigation changed. No investigation west of the RR tracks.	No Navy Comment.
UXO 06 [redacted]	North Lower Base	1	1	1	1	Yes	Site to be shifted slightly to the east to incorporate debris observed during site walk.	Navy commented "One last thing UXO 6 in the photo Aerial Photo package is not in the Right spot it. It shows [redacted] which isn't a part of this .. It should be on the other side of the ravine from [redacted] Mitch can show you…" / Corrected and also added centerline of ravine on the map.
UXO 07 [redacted]	North Lower Base	1	1	1	1	No	No Change	No Navy Comment.
UXO 07B [redacted]	North Lower Base	37	10	37	10	Yes	No Change	No Navy Comment.
UXO 08 [redacted]	Waterfront Restricted Area	13	13	13	9	Yes [1]	4 acres are located in the water and will not be investigated	No Navy Comment.
UXO 09 [redacted]	North Lower Base	7	7	7	7	No	No Change	No Navy Comment.
UXO 09B [redacted]	North Lower Base	6	6	6	5	Yes	Approximately 1 acre is located in the water and will not be investigated	No Navy Comment.
UXO 10 [redacted]	Waterfront Restricted Area	10	10	7	7	Yes	According to GIS, the site boundary provided is approximately 7 acres rather than 10 acres. Either the site boundary can be increased to 10 acres or the SOW can be changed to 7 acres.	No Navy comment. / The boundary was changed to 7 acres to match the GIS calculated area.
UXO 11 - [redacted]	Lower Base	2	2	2	2	Yes [1]	Site boundary to shift west to incorporate area where drums observed during site walk.	No Navy Comment. / The area of investigation was moved to incorporate the drum area.
UXO 11B [redacted]	Lower Base	2	2	2	2	Yes	No Change	No Navy Comment.
UXO 12 [redacted]	Lower Base	3	3	3	0.16	Yes	Only the inside of the Siding will be investigated.	No Navy Comment.
UXO 13 [redacted]	Lower Base	6	2.6	6	2.5	Yes	Area of Investigation less than original SOW acreage due to water and developed areas.	No Navy Comment.
UXO 14 - [redacted]	Waterfront Restricted Area	2	1	2	0.15	Yes	Only the inside of the Siding will be investigated.	No Navy Comment. / The area of investigation was recalculated inside of the siding.
UXO 15 [redacted]	Waterfront Restricted Area	12	8.5	12	6.8	Yes	The area of investigation acreage may be decreased based on development and the excluded [redacted] because nothing was found during the fence installation.	No Navy comment.
UXO 16 [redacted]	Waterfront Restricted Area	10	10	10	10	Yes	No Change.	No Navy Comment.
UXO 17 [redacted]	Lower Base	16	16	10	10	Yes	Navy RPM refined the area of investigation.	No Navy comment. / Site Boundary shifted to match the investigation area.
UXO 17B [redacted]	Lower Base	67	15	67	13.3	No	Area of Investigation changed. No investigation west of the RR tracks.	No Navy Comment.
UXO 17C [redacted]	Lower Base	62	15	71	11.8	No	[redacted] Northern most sidings are not currently included in the site boundary. Please advise if entire site boundary should be shifted north to include the northern most sidings and exclude the southern most, active sidings. Current figure includes shifting the site boundary to the north.	No Navy Comment. / The area of investigation was shifted north to include the northernmost sidings.
UXO 17D [redacted]	Lower Base	10	10	10	1	Yes	Surface storage area that is now 90% redeveloped. Buried munitions would not be expected since the surface would be cleaned out before redevelopment occurred.	No Navy Comment. / The site boundary was shifted west and tilted to encompass the historical aerial.
TOTALS:		**329**	**164.1**	**329**	**126.51**			

[1] Historical supporting aerials provided to show absence of historical activity.

PROJECT SCOPE UNDERSTANDING MEETING: MEETING, PREVIEW OF SITE INSPECTION PLANNING DOCUMENTS AND SITE VISIT

PURPOSE:	Preview of Planning Documents and Site Visits– Naval Base Kitsap (NBK) Bangor, Washington 21 Munitions Response Program (MRP) Sites Site Inspection (SI)
Meeting Location:	Tetra Tech Jackson Park field trailer and NBK Bangor
Dates:	January 7-9, 2020 (travel days January 6 and 10, 2020)
Attendees:	Ray Kobeski – Navy Remedial Project Manager (RPM) Linda Klink – Tetra Tech Project Manager (PM) Norm Piper – Tetra Tech UXO Manager Scot Wilson – Tetra Tech Project Support Mitch Baron – Jackson Park Field Support Haley Nolf – Tetra Tech Scribe

January 7, 2020

The meeting began at 0800 at the Tetra Tech (Tt) Jackson Park Field Support Trailer on January 7, 2020. Tt brought the planning documents including the Munitions and Explosives of Concern (MEC) Quality Assurance Project Plan (QAPP), Munitions Constituents (MC) Sampling and Analysis Plan (SAP), Explosives Safety Submission (ESS), Habitat/Endangered Species Survey Work Plan (Biological Survey), and Site Safety and Health Plan/Accident Prevention Plan (SSHP/APP) and the Historical and Cultural Resources Survey Work Plan (Cultural Survey) along with all the associated most recent version of the figures to the meeting in order to page through the documents and get Navy input where needed. The Navy (Ray) was in agreement but wanted to solidify the site status for the 21 UXO sites and resolve any changes to the figures before previewing the documents.

The meeting began with a review and revision of the figures. **Action Items:** Ray will confirm the formal names of each site to match the NORM site names. The Navy (Ray) requested tha the figures to include all pertinent information (i.e., site boundary, investigation area, wetland information, cultural information, MC sampling, site operational dates, type of site, etc.) listed in the legend or a text box on the figure. A note should also be added to the figures stating the cultural information is confidential and should be redacted before prior to providing the figures to anyone outside the Navy.

The following changes will be incorporated into the figures associated with the planning documents and into the conceptual site model (CSM) for each site:

Figure 10-1: The portion of the boundary of NBK Bangor in question should be removed per Navy direction. Ray noted that water bodies or the base gates do not need to be included on the figure.

Figure 10-2: Ray approved the figure with no modifications needed.

UXO 2: Ray noted that the type of site should be referred to as a debris field, the site was not a dedicated disposal area. A stream is located on one side of the site and should be identified and included as part of the wetland information.

UXO 3: Tt (Linda) asked if this site would need an individual 401 permit and Ray stated that the permit is not needed, but field work may need to be conducted under mitigation. Issues should not arise since Tt will not be digging at the site. Ray noted that the invasive grass should not be distributed. Wetlands were noted to be included within the UXO 3 site boundary and should be added to the figure. Based on the wetland information, substantial requirements may need to be followed by the Navy with the number of acres disturbed or mitigated listed in the planning documents. The site would be evaluated in the future if additional information is needed for the RI investigation. The site is included in the biological work plan and so will be walked to evaluate if the area needs to move forward to the RI. **Action Item:** Tt (Norm) is to review the MEC QAPP to ensure the wetland area investigation is explained.

The type of site was listed as a burn trench due to the possible MEC buried by demolition. The Navy (Ray) noted that the acreage for each investigation (i.e., vegetation clearance, surface clearance, Digital Geophysical Mapping (DGM) and Ground-Penetrating Radar (GPR)) should not be listed as the definite number of acres to be investigated. The text should read, “up to x number of acres should be investigated” in order to allow the Navy/Tt field team to be flexible in the field based on site conditions. MC sampling was confirmed to occur at UXO 3 and if any stained areas are present, MC sampling should occur in that area. A discussion followed on the topic of White Phosphorus which could be present in this area. If White Phosphorus is found, field work will stop. **Action Item:** Tt (Norm) will add information into the ESS concerning White Phosphorus at UXO 3 and the actions that will follow if the chemical is found.

<u>UXO 04</u>: The type of site was identified as a disposal area with the historical photos showing a surface storage area. Ray noted that a wetland may be found within the site and needs to be confirmed with the wetland information. DGM will be performed at this site due to the construction that occurred in 1973 in order to confirm MEC was not turned over into the soil. Tt (Norm) noted the use of avoidance can be used while conducting the surface surveys and Scot noted that if MEC/ material potentially presenting an explosive hazard (MPPEH) has not been found to date, avoidance can be used but if MEC/MPPEH has been found, avoidance will not be an option.

<u>UXO 6:</u> The type of site was identified as a surface disposal area with MEC (i.e., 40 mm) found. The surface clearance for the entire area was confirmed and Ray noted that fall protection will be necessary at this site. **Action Item:** Tt (Linda) will inform Tt’s Health and Safety unit that fall protection will need to be added to the SSHP/APP. There is a wetland at the bottom of the steep hill which will be included in the wetland survey for UXO 9 [redacted] rather than associated with UXO 6. **Action Item:** Tt (Linda) will add a note stating that wetlands within the UXO 6 site boundary will be included in the wetland survey for UXO 9 [redacted]. MC sampling will occur only if MEC is breached and past staining is present; otherwise, MC sampling will not occur. **Action Item:** Tt (Linda) will add the note into the MC SAP stating that MC sampling will only occur at UXO 6 if MEC is breached or past staining is present.

<u>UXO 7:</u> UXO 7 is inside a K18 arc but Ray noted that the arc is easily avoidable. Ray approved the figure with no modifications needed.

<u>UXO 7B:</u> The site was identified as an Open Burn/Open Detonation (OB/OD) area. The Navy (Ray) found an unidentified item on the northern edge of the investigation area since the time of the Kickoff Meeting and Site Visit with Tt in September 2019. Ray noted that buildings are present but unoccupied and there are no wetlands in the area. The area of investigation will need to be modified and shrunk to omit the Explosive Ordnance Disposal (EOD) Training Area/Emergency Range. **Action Item:** Tt will update the figure to omit the EOD Training Area and recalculate the acreage of the investigation area. (A geophysical investigation of the subsurface will not be conducted at Site A since the area was not included in the scope of work, and the area has a Record of Decision (ROD) with a cap and land use controls (LUCs) in place. The surface investigation is focused on finding any MEC currently present.

<u>UXO 8</u>: The site will be investigated via geophysics to identify where the old disposal area is. Ray noted that a building is present on the site along with two submarine sheds located by the water body and a stack of dirt is in the northeast corner of the site. The site boundary and investigation areas should both be shrunk to omit the water body from the site boundary. **Action Item:** Tt will shrink the site boundary and investigation area to match the figure markup per Ray’s direction and recalculate the acreage for both areas. It was asked by Tt (Linda) and confirmed by Ray that the vegetation clearance is for trees

less than 3 inches in diameter, down to the ground surface. Trees greater than 3 inches in diameter will remain in place.

UXO 9: Since this area is mitigated wetlands only a surface sweep will be completed at this site. It was noted that a cultural spot is likely located within the site and should be confirmed. The figure was approved as is.

UXO 9B: The Navy (Ray) noted that an investigation will not occur at UXO 9B since this site is included within the OU7 ROD; a cap is present and LUCs are in place. If needed, the wetland survey can be conducted but only using avoidance with no intrusive investigation. The only action will be a ROD amendment unless the Navy directs otherwise. **Action Item:** Tt will revise the figure to remove the investigation area and match the site boundary to the boundary included in the OU7 ROD. **Action Item:** The Navy (Ray) will provide Tt with the OU7 ROD. **Action Item:** Tt (Norm) will remove UXO 9B from the ESS.

UXO 10: The type of site was identified as a disposal area with the investigation occurring down to the native soil. Ray directed Tt to revise the investigation area to match the findings on the 1951 and 1957 aerial photos, as per the Tt research during the SI planning process. **Action Item:** Tt will shrink the investigation area to match the historical aerials and recalculate the acreage.

The following information was also discussed during the review of the figures:

Forensic Nuances in MEC/MPPEH Terminology Upon Demolition
Ray noted that any items recovered and determined MEC/MPPEH which are then detonated and in doing so determined to be MDAS will be recorded in the end paperwork as MDAS. Tt stated this nuance is captured in the ESS but not in the MEC QAPP. **Action Item:** Tt (Norm) will add a paragraph in the MEC QAPP explain forensics and nuances at the site and the flow diagram included in the ESS will be added to the MEC QAPP.

Navy GIS
The Navy (Ray) noted that the base specialists provided the wetland and cultural information to Tt. As of the morning of January 7th, Tt had not yet received the associated Geographic Information System (GIS) information. **Action Item:** Tt will find out if the GIS wetland information was sent by the base.

MEC Recovery
The Navy (Ray) informed Tt that security guards will be needed to guard any recovered MEC that is located outside of secure fences. The Naval Ordnance Safety and Security Activity (NOSSA) will need to be consulted to ensure these procedures are acceptable.

MC Sampling
According to the Preliminary Assessment (PA), confirmatory MC sample will need collected following MPPEH removal. Ray clarified that MC Sampling will only occur at certain locations if breached MEC is found or if staining is identified during the surface sweep. **Action Item:** Tt (Norm) will provide the language to include in the MEC QAPP stating the requirements for MC Sampling to occur.

Scheduling

The Navy (Ray) reviewed the documents and the appropriate people to review to documents. The following table depicts the chain of review:

	QAPP	Biological/Cultural Survey Work Plans	ESS
Navy	ID	ID, D, F	ID, D
Headquarters			ID, D[1]
Base	ID	ID, D, F	F
Regulators/Stakeholders	D, DF, F		F

[1] After headquarters reviews the ID/D, NOSSA will review

Internal Draft (ID)
Draft (D)
Draft Final (DF)
Final (F)

ESS Table 6-1

Scot will conduct the calculations of Table 6-1 of the ESS (during week of Jan. 13-17th) and the following week Norm will review (Jan. 20-24th) and incorporate into the ESS.

Navy Escorts During Field Work

Tt (Linda) asked if there were limitations to the numbers of Navy escorts available considering that one Navy escort per five field personnel is a requirement. Ray noted that he will obtain the personnel needed. If for some reason, he cannot find the right number of people, he will let Tt know. Tt will need to write up the escort information (i.e., the number of people in the field and the groupings) and provide to the Navy. Ray will also need to inform the Navy exactly how the vegetation clearance will occur. **Action Item:** Tt will add the sites (i.e., UXO 2, 10, 14, 15 and 16) that need Navy escorts to the MEC QAPP.

Cultural Areas
Tt (Linda) asked if there are any specific sites or areas that the Native Americans are concerned about. The Navy (Ray) noted that the reason for having the Tribe and State 106 Consult is to inform the Native American Tribes of the planned work and ask for their permission to complete the project. Ray does not anticipate any problems with approving the project.

January 8, 2020

The second day of the meeting with the Navy began at 8:00 am at the Tetra Tech Jackson Park Field Support Trailer on January 8, 2020. The discussion began with the logistics for the site visits that were to occur on Thursday, January 9th. Ray instructed Tt to meet at Building 1101 between 9:30 to 10:00 am after his morning meetings. The plan was to visit UXO 12 since time did not allow to see the siding during the Kickoff Meeting and Site Visits in September 2019. Ray also wanted to show Tt the small debris pile at UXO 7B. After the logistics were decided, the discussion resumed with the review of the figures.

The following changes will be incorporated into the figures associated with the planning documents and into the CSM for each site:

UXO 11: The Navy (Ray) noted that empty drums were found on the surface, but it is unknown what could be found at the subsurface level. Some cans are present and partially buried. Ray directed Tt to only investigate the area north of the railroad tracks. **Action Item:** Shrink the investigation area to only include the area north of the railroad tracks and recalculate the acreage.

UXO 11B: The type of site was identified as a surface disposal area with items found on the surface. The figure was approved, and no modifications were needed.

UXO 12: The siding was identified to only include surface disposal. Ray visited this site since the Kickoff Meeting and Site Visits in September 2019 and noted that the inside of the siding looks identical to UXO 14; there are small trees growing within the siding with other smaller vegetation. This site will be visited during the site visit to occur on January 9th. Ray noted that the site boundary should be modified to refine the area and the investigation area should be expanded to include the surrounding 5 feet on each outside side of the siding. **Action Item:** Tt will shrink the site boundary to match the figure markup by Ray and the area of investigation will be expanded to include 5 feet on each side of the siding; both areas will be recalculated to update the acreages. It was noted that a water body is located near the site and may be within the site boundary. For locational access purposes, a stop sign was noted to be located across the road adjacent to the siding. Per direction from the Navy (Ray) geophysics will not be conducted at UOX 12 since railroad tracks are present within the siding and the geophysical investigation would not be possible. **Action Item:** Geophysics will be removed from the ESS and MEC QAPP by Tt.

UXO 13: The site was confirmed as a spit disposal and an OB/OD for fuzes. Ray noted that the DGM investigation area should be limited to the areas of flatness and to stay away from the water body. Ray instructed Tt to update the site boundary and investigation area to omit the water body. **Action Item:** Tt will shrink the site boundary and investigation area per the markup provided by Ray and will recalculate the acreages.

UXO 14: The changes for UXO 12 will also reflect onto UXO 14 since both sites are similar sidings. **Action Item:** The site boundary will be decreased to refine the area and the investigation area will be increased to include 5 feet on each side of the siding; both acreages will also be recalculated. **Action Item:** geophysics will be removed from the ESS and MEC QAPP by Tt.

UXO 15: Ray noted that the site was only used for OB and the subsurface concerns are only in the undisturbed areas; the fenced area and building/parking lot areas are not of concern as any buried munitions would have been encountered during construction. The blue square on the figure identifying the dunnage yard should be removed along with the label per direction from Ray. A note should also be added within the fence area noting that no MEC was found during construction efforts. **Action Item:** Tt will remove the Dunnage Yard identifier from the figure and add the appropriate notes where necessary.

UXO 16: The site was confirmed as a burn site with ravines and Ray informed Tt that a Navy escort is required in the area this area due to a K18 arc. The focus of the investigation will be geophysics associated with the subsurface area since any items are expected to be found under the surface due to the former activities at the site. If breached MEC/MPPEH item staining is encountered in the field, MC Sampling can occur as long as a field change request is filled out. The figure was approved with no modifications needed.

UXO 17B: Ray noted that the sidings are filled in with depths to fill of up to 15 feet and geophysics (i.e., DGM and GPR) investigation of the subsurface will be completed. MC Sampling should be removed for this site and only be conducted upon a discovery of breached MEC or soil staining. **Action Item:** Tt will remove UXO 17B from the MC SAP. The figure was approved with no other modifications needed.

UXO 17C: Ray noted that geophysics should not be conducted at UXO 17C. All but one siding is full of fill/vegetation and the only concern is the surface. **Action Item:** Tt will remove the DGM investigation for UXO 17C in the MEC QAPP and ESS.

UXO 17D: Due to land development, as per the Tt research of historical aerials and mapping during the SI planning process, all UXO 17D field work will be omitted per direction from Ray. **Action Item:** Tt will remove UXO 17D from the ESS and MEC QAPP. If cultural or wetland surveys need conducted, the survey will be completed practicing UXO avoidance.

UXO 17: Based on the historical documents, [redacted] the figure needs updated based on instruction from Ray. **Action Item:** The western side of the site will be omitted and a portion in the southeast corner will be added per Ray's figure markup. Ray noted that DGM geophysics will most likely not extend into the inaccessible ravine area but will be conducted on the ball fields and near the landfill. Ray noted that the GPR geophysics should be limited to the upper area near the landfill and would like to determine the depth of the landfill if possible. It was noted that dirt has been pushed around the site. Per direction from the Navy (Ray), MC Sampling should not be conducted at this site unless MEC is identified as breached or if soil staining is encountered, in which case a field change request would be generated. **Action Item:** Tt will remove UXO 17 from the MC SAP. The site figure will be revised and acreages recalculated.

Items (i.e., two 40 mm, a tank, 5 inch item and 57 mm) were previously recovered from the site. Tt (Norm) asked if a MEC item is recovered, will the nearby residents need to evacuate? Ray was not sure since the distance would be based on the location of the recovered item so that information will need to be determined in the field. [redacted]

This concluded the review of the figures. The Navy was happy with Tt's progress to date and the meeting proceeded with reviewing the planning documents.

ESS:
The following questions were asked by Tt:

- Question (Q): What is max diameter of vegetation that can cut (Section 6.1)?
  - Answer (A): 3 inches
- Q: What is the estimate duration of field operations (Section 2.0)?
  - A: 24 months
- Q: Is an advanced 30-day notification needed for prior to explosive operation (Section 6.4.1)?
  - A: Yes, this information will need to be added to the MEC/MPPEH/Non-Munitions Debris Processing Flow Chart (Figure 6-1), and Ray is the person at the Navy to notify.
- Q: What information (i.e., ROD or Installation Restoration (IR) covers) does the Navy want included in the Land Use Control (LUC) Section (Section 10.1) of the ESS?
  - A: Ray will provide Tt with a write-up of information needed in the LUC section. **Action Item:** The Navy (Ray) will provide a write-up to be included in the LUC section of the ESS.
- Q: Should the two sites (UXO 9B and UXO 17D) that will not be investigated be included in the ESS?
  - A: UXO 9B should be included in the ESS since there will be anomaly avoidance associated with cultural, but UXO 17D should not be included at all.

Action Item: The answers provided by the Navy (Ray) during the Q/A section will be incorporated into the ESS and, as applicable, the MEC QAPP.

MC SAP:
The following questions were asked by Tt:

- Q: Are there any special approvals (e.g., airfield safety at other bases, nuclear considerations for Bangor?) that will be needed to be listed in Worksheet #6 Communication Pathways that Tt needs to know about?
  - A: No, the only special requirement is the 5 sites with Navy escorts.
- Q: Which meetings should Tt include in Worksheet #9, currently blank?
  - A: The September 2019 Kickoff Meeting and Site Visit meeting minutes along with the minutes from the subject meeting should be included in Worksheet #9 or as an attachment. Ray noted the purpose of including the minutes is to document all decisions made and to maintain information for historical purposes. The regulators involvement in the planning process will be via comments on the documents and the Navy/Tt's responses, which will be included as an attachment. **Action Item:** Scot will provide Linda with an example from one of Ray's other projects of preparing Worksheet #9.
- Q: If MEC is recovered, what is the exact chain of events that the Navy wants Tt to follow?
  - A: If MEC is recovered, the item should be documented and the information should be sent to Ray with the statement, "The MEC item(s) is stored safely in/guarded throughout the night/will be stored (location)." Ray will then notify Explosive Ordnance Disposal (EOD), Public works officers, and Public Affairs Office (PAO) to update them of the finding. **Action Item:** Ray will send Tt an example of notifying the Navy (Ray) if/when MEC is recovered.
- Q: Should mercury be sampled for as an explosive at UXO 17B based on the site history?
  - A: Mercury is not a chemical of concern (COC) based on the IR site decision; therefore, mercury should not be included as an analyte for MC sampling. Per the UXO 17B figure discussion, no MC sampling is now planned at the site unless MEC/MPPEH is breached or soil staining is present.

- Q: Should any additional sampling needs discovered during field be collected as part of this SI or be postponed until the MC sampling occurs for the future Remedial Investigation (RI)?
    - A: If additional samples are needed, fill out a Field Change Request (FCR) form and conduct the sampling.
- Q: How should FCRs be provided to the Navy?
    - A: Ray instructed Tt that for every FCR filled out, the associated document cover should be updated with the correct number and a redline strike out (RLSO) version of the pages that changes should be created. If more than one change is made to a given page, multiple colors will identify the changes by date in the RLSO. The FCR and RLSO changes should be provided to the field personnel to save. Tt (Linda) asked which Navy personnel should sign the FCR and Ray responded, only the Navy personnel to sign the FCR is Ray.
- Q: What is the priority for the planning documents?
    - A: The cultural and biological surveys along with the SSHP/APP need completed first. Note: See section below on document priorities for more information.
- Q: Tt asked Ray to review the Decision Rule in Worksheet # 11.
    - A: Ray reviewed the Decision Rule and would like Tt to add the following bolded text: "*If the laboratory measured concentration of any target in any composite soil sample is greater than the respective PSL in Worksheet #15, then recommend further investigation of the site* ***under a remedial investigation*** *to fully delineate* ***the nature and extent of*** ***~~the~~*** *contamination and conduct human health and ecological risk assessments; otherwise, recommend no further action (NFA) for MC in soil for that particular site considering that the sampling locations are expected to be biased high in concentration since the sample aliquots will be collected in MPPEH locations."*

Action Item: The answers provided by the Navy (Ray) during the Q/A section will be incorporated into the MC SAP.

<u>Historical and Cultural Resources Survey:</u> Tt noted that once the GIS data is received from the Navy, the document will be reviewed, and the cultural information will be added to the figures associated with the planning documents.

<u>MEC QAPP:</u>
The following questions were asked by Tt:

- Q: Is the Navy in agreement with the standard text on communication drivers with the regulatory agency in Worksheet #6:
    - A: No, the Navy will join forces with Tt (Norm) and the field operations leader to talk with the regulators via telecon or meeting in person to discuss any questions or concerns during field work. If MEC is recovered, the regulators will be notified by close of business once the item is identified. Note: MDAS will not be reported to the regulators. **Action Item:** Ray will fill out this section on Worksheet #6 to ensure that all information needed is captured.
- Q: Tt asked Navy about text that was used in the PA and carried over to the MEC QAPP (i.e., Section 10.4.1, that now seems to be not current: "The Keyport Annex at NBK Bangor containers numerous ordnance magazines, the majority of which are currently empty (Battelle, 2017).")
    - A: **Action Item:** Ray will rewrite this section based on what is on the NBK Website.
- Q: Will cut vegetation be mulched onsite and spread across the ground surface (Section 17.1.6) currently says (Page 60): cut vegetation will be mulched on site and spread out, **Action Item:** Ray will need to check with the Forester about spreading mulch
    - A: Ray will confirm with the Forester. If mulch cannot be spread across the ground surface, an alternative can be listed as: the mulch will be deposited into a truck". **Action Item:** Ray will confirm with the Forester if much can be spread across the ground surface.
- Q: Tt wanted to confirm that a 30-day notification with ESO and PAO was needed prior to detonations.
    - A: Yes, Tt will notify Ray who will notify the necessary people.

- Q: What should Ray's title (COR or RPM) be in the planning documents?
    - A: In the ESS and QAPP, Ray should be listed as the RPM. For any technical letters Tt receives from Ray, he will be listed as a COR NTR.

Action Item: The answers provided by the Navy (Ray) during the Q/A section will be incorporated into the MEC QAPP.

Following the questions asked by Tt on the planning documents, the priority/schedule of documents was discussed.

<u>Document Priority:</u>
The documents should be prioritized as follows:

1) SSHP/APP: The SSHP/APP should be submitted first. The Navy's Health and Safety officer is soon retiring, and format may be changing. The document will need submitted ASAP.
2) ESS: The ESS should be submitted second. Tt asked if anomaly avoidance will occur. The Navy (Ray) responded that a third party quality assurance (QA) will be completed in February. Ray noted that the point of QA is to ensure all information is correct and documented. The Third Party QA will review all the of the necessary paperwork. It was noted that EODTECHDIV is the Third Party QA and Tom Douglas will work with Tt (Norm) to review the ESS and will review certain sections of the QAPP. **Action Item:** Tt can add Tom Douglas to the communication table in Worksheet # 6 of the MEC QAPP/Section 7 of the ESS and Ray will include Tom on all future emails concerning the QAPP and ESS. The earliest EODTECHDIV will be available is March 1st.
3) Habitat/Endangered Species Survey and Historical and Cultural Resources Survey: These two surveys should be submitted third. The base will conduct that Tribe and State 106 Consultation. These surveys will take place with the use of UXO avoidance.
4) MC SAP and MEC QAPP: These two documents will be submitted last.

It was noted that Scot will review all of the planning documents.

<u>K18 Arcs</u>
It was noted that UXO sites located within K18 arcs may result in an increased requirement for field work to occur.

<u>January 9, 2020</u>

A site visit was conducted on January 9, 2019. Since all sites but two where visited during the Site Kickoff meeting in September 2019, only two sites, UXO 12 and UXO 7, were visited.

<u>UXO 12</u>: The first site, UXO 12[redacted] [redacted] Ray noted that the site looks identical to UXO 14 with vegetation filling the inside of the siding as per his visit to the site after the September 2019 Kickoff Meeting and Site Visit. [redacted] Ray noted that the siding will need the brush cleared off and the moss washed off the siding before the investigation takes place. It was noted again that five feet surrounding the outside of the siding should also be investigated and added to the investigation area.

<u>UXO 7B:</u> At UXO 7Ba small debris pile was viewed on the northern edge of the investigation area which will be assessed during field work.

This concluded the site visit since the rest of the sites were viewed during the September 2019 Kickoff Meeting and Site Visits.

ACTION ITEMS:

<u>Figure Updates</u>:

- The site names will be checked against the NORM Names and the list will be forwarded to Tt (Ray)

- Tt will add a note to the figure for UXO 6 stating that wetlands are within the UXO 6 site boundary but will be included in the wetland survey for UXO 9 but omitted from the investigation at UXO 6.
- Tt will update the figure for UXO 7B to remove the EOD Training area from the site and recalculate the acreage.
- Tt will update the site boundary of UXO 8, and the overall area of investigation will be resized; the acreages will be recalculated.
- Tt will refine the UXO 9B figure to match the OU7 ROD boundary and recalculate the acreage.
- Tt will shrink the area of investigation to match the 1951/1957 aerials for UXO 10 and recalculate the acreage.
- Tt will shrink the Investigation Area for UXO 11 and recalculate the acreage.
- Tt will shrink the Site Boundary for UXO 12 and recalculate the acreage.
- Tt will shrink the Site Boundary for UXO 13 and recalculate the acreage.
- Tt will shrink the Site Boundary for UXO 14 and recalculate the acreage.
- Tt will remove the blue square/label (for Dunnage Area) for UXO 15 and add a note stating that MEC was not found during construction efforts within the fenced area.
- Tt will adjust the Site Boundary for UXO 17 to include the two boundary changes (i.e., removal of a portion of the site on the western edge of the site and add a portion of the site in the southeast corner)

MEC QAPP:
- Tt will add paragraph into the QAPP with the flow diagram to explain the forensics and nuances at the site and the flow diagram included in the ESS will be added to the MEC QAPP. (Norm)
- Tt will add information to the QAPP explaining the MC Sampling. (Norm)
- Tt will review the MEC QAPP to ensure wetland area investigation information (i.e., The site will be walked to evaluated if the area needs to move forward to the RI) is explained in the QAPP. (Norm)
- Tt will add information concerning the sites that will need escorts (UXO 2, 10, 14, 15 and 16) in the MEC QAPP. (Norm)
- The DGM and GRP information will be removed for UXO 12. (Tt)
- The GPR information will be removed for UXO 14. (Tt)
- The DGM information will be removed for UXO 17C. (Tt)
- UXO 17D will be removed from the MEC QAPP (UXO 17D will only be a historical research investigation). (Tt)
- Tom Douglass will be added to the communication lines in Worksheet # 6. (Tt)
- The Navy will compose the section for the LUCs included in each site. (Ray)
- The Navy will send Tt an example of notifying the Navy (Ray) if/when MEC is recovered. (Ray)
- The Navy will fill out Worksheet # 6 on how to communicate with the Regulators. (Ray)
- The Navy will rewrite the Section 10.4.1 on Worksheet #10 based on what is included on the NBK Website. (Ray)
- The Navy will check with the Forester about spreading mulch on the ground surface. (Ray)
- The answers provided by the Navy (Ray) during the Q/A section will be incorporated into the MEC QAPP. (Tt)
-

ESS:
- Information concerning finding White Phosphorus and what will happen if work stops will be added to the ESS. (Norm)
- UXO 9B will be removed from the ESS. (Norm)
- The DGM and GRP information will be removed for UXO 12. (Norm)
- The GPR information will be removed for UXO 14. (Norm)
- The DGM information will be removed for UXO 17C. (Norm)
- Tom Douglas will be added in Section 7 for Third Party QA. (Norm)
- Ray will start to cc Tom Douglas on all emails concerning the ESS. (Ray)
- UXO 17D will be removed from the ESS (UXO 17D will only be a historical research investigation). (Norm)

- The answers provided by the Navy (Ray) during the Q/A section will be incorporated into the ESS. (Norm)

MC SAP:

- Tt will provide the language to include in the MC SAP stating the requirements for MC Sampling to occur. (Norm)
- Scot will provide Tt an example of Worksheet #9. (Scot)
- MC Sampling will be eliminated for UXO 6. (Tt)
- MC Sampling will be eliminated for UXO 17B. (Tt)
- MC Sampling will be eliminated for UXO 17. (Tt)
- The answers provided by the Navy (Ray) during the Q/A section will be incorporated into the MC SAP. (Tt)

Historical and Cultural Resources Survey

- Tt to find out if the GIS wetland information was sent to Tt by the base. (Linda) – **Done, 01/07**
- The GIS wetland information will be added to the necessary figures. (Tt)

HASP:

- Tt will information the Tt Health and Safety Unit that Fall protection needs added into the SSHP/APP. (Linda)

Miscellaneous Items:

- Navy will send the OU7 ROD for UXO 9B to Tt. (Ray)
- Tt will ensure Ray has all previous meeting minutes for review. (Linda)

APPENDIX B

FIELD FORMS

TETRA TECH

CONTAINER SAMPLE & INSPECTION SHEET

Page_____ of _____

Project Site Name: ________________
Project Number: ________________
Site Identification: ________________
Container Number(s): ______________
Sample Type: ☐ Grab
☐ Composite

Sample ID No. ____________________
Sampled By: ____________________
C.O.C. No.: ____________________
Concentration: ☐ High
☐ Medium
☐ Low

CONTAINER SOURCE

DRUM:
- ☐ Bung Top
- ☐ Lever Lock
- ☐ Bolted Ring
- ☐ Other ______________

TANK:
- ☐ Plastic
- ☐ Metal
- ☐ Other ______________

OTHER: ________________

CONTAINER DESCRIPTION

COLOR: __________________________

CONDITION: _______________________

MARKINGS: ________________________

VOL. OF CONTENTS: ________________

OTHER: ___________________________

CONTAINER DISPOSITION

SAMPLED: _________________

OPENED BUT NOT SAMPLED:
Reason ____________________
____

NOT OPENED:
Reason ____________________
____

CONTENTS DESCRIPTION

SINGLE PHASED: ________________________
____

MULTIPHASE :

	Layer 1	**Layer 2**	**Layer 3**
Phase (Sol. or Liq.)	______	______	______
Color	______	______	______
Viscosity	L, M or H	L, M or H	L, M orH
% of Total Volume	______	______	______

MONITOR READING:

SAMPLE and /or INSPECTION DATE & TIME:

______________________________**HRS.**

METHOD:______________________________

SAMPLER(S) and / or INSPECTOR(S) SIGNATURE:

ANALYSIS:

Tetra Tech

PROJECT: ____ **JOB #:** ____________________________
LOCATION: ____ **DATE:** ____________________________
PROJECT MANAGER: ____________________________ **FOL:** ______________________________________

DAILY ACTIVITIES CHECKLIST

Startup Checklist

Activity	Yes	No	N/A
Pertinent site activities/information entered into site logbook	☐	☐	☐
All onsite personnel listed in logbook	☐	☐	☐
Required medical information onsite for all workers (Tetra Tech and Subcontractors)	☐	☐	☐
Required MSDS's onsite	☐	☐	☐
Proper equipment calibrations performed (list equipment)	☐	☐	☐
1 ________________________________	☐	☐	☐
2 ________________________________	☐	☐	☐
3 ________________________________	☐	☐	☐
4 ________________________________	☐	☐	☐
Calibration logs filled out	☐	☐	☐
Tailgate H&S meeting held prior to beginning field activities	☐	☐	☐
Required work permits filled out/signed	☐	☐	☐
Required utility clearances obtained	☐	☐	☐
Required PPE onsite and in use	☐	☐	☐
Information required to be posted is in place	☐	☐	☐
(OSHA poster, hospital route, key phone numbers, etc.)	☐	☐	☐

Exit Checklist

Activity	Yes	No	N/A
Logbooks completely and comprehensively filled out	☐	☐	☐
Field forms complete and accounted for/properly filed	☐	☐	☐
Samples properly packaged/shipped	☐	☐	☐
COCs faxed to appropriate in-house personnel	☐	☐	☐
All equipment accounted for, on charge if needed, and properly secured	☐	☐	☐
All personnel accounted for	☐	☐	☐
Arrangements made for upcoming work (permits, clearances, equipment, etc.)	☐	☐	☐
Site properly secured	☐	☐	☐

Note - not all items listed apply to every job, and some additional requirements may apply on a job-specific basis.

TETRA TECH

DAILY ACTIVITIES RECORD

PROJECT NAME:

PROJECT NUMBER:

CLIENT:

LOCATION:

DATE:

ARRIVAL TIME:

TETRA TECH PERSONNEL:

DEPARTURE TIME:

SUBCONTRACTOR:

DRILLER:

ITEM	QUANTITY ESTIMATE	QUANTITY TODAY	PREVIOUS TOTAL QUANTITY	CUMULATIVE QUANTITY TO DATE

COMMENTS:

APPROVED BY:

TETRA TECH REPRESENTATIVE

SUBCONTRACTOR

TETRA TECH

SITE PHOTOGRAPHIC LOG

Date:	**View:**	**Photographer:**

Date:	**View:**	**Photographer:**

Date:	**View:**	**Photographer:**

Date:	**View:**	**Photographer:**

TETRA TECH

Tetra Tech

PROJECT: ______________________________ **LOCATION:** ______________________________
JOB & CTO #: ______________________________ **MOBILIZATION DATE:** ______________________
PROJECT MANAGER: ______________________ **RETURN DATE:** ______________________________

FIELD PROJECT PRE-MOBILIZATION CHECKLIST

TRAVEL

___ Airline reservations
___ Hotel reservations/BOQs
___ Vehicle rental
___ Itinerary
___ Phone/pager number

DRILLING/DPT/SURVEY

Subcontractor
___ POC phone #/address
___ Drill Specification RFP
___ Contact (time & place to meet)
___ Confirm subcontract w/ TtNUS Procurement
___ Health and Safety documentation for all personnel on site
___ Copy of Drillers license
___ Well / boring permits

Utilities (2 weeks lead time)
___ Contact Site POC (Date:____________)
___ Contact Local "Call Before You Dig"
___ Utility Clearance Form

Forms
___ Boring logs / Test Pit logs
___ Well construction / development forms
___ Daily activity forms
___ IDW inventory
___ IDW drum labels
___ Chemical Inventory
___ MSDS's

EQUIPMENT MOBILIZATION

___ Equipment Requisition form completed / equipment ordered
___ 3rd Party rental / misc. equipment ordered
___ Equipment calibration forms
___ Span / calibration gas and regulator

SAMPLING

Forms
___ Sample log sheets
___ Low-flow purge data sheets
___ COC records
___ COC seals
___ Sample labels (from database group)

Laboratory
___ POC address/phone#
___ Order bottles / preservatives
___ Shipping address, also check Sat. address
___ Bottle & preservation req'ts from lab
___ ______________________________

MISCELLANEOUS

Schedule
___ Plan field operations w/ Project manager

Documents for Field Program
___ Logbook(s)
___ Field Sampling plan
___ Health & Safety plan
___ Maps
___ H & S Guidance Manual

Authorization
___ Kick-off meeting held
___ Gov't rate letter
___ H&S/OSHA 40-hour certifcate
___ 8-Hour Refresher Training Certificate
___ Medical Clearance Letter
___ Supervisory Training Certificate
___ Health & Safety Clearance Letter
___ Full-size OSHA Poster

HYDROGEOLOGY EQUIPMENT

___ Slug test/pumping test forms
___ Groundwater elevation data sheets
___ Graph paper
___ Data Logger/transducer/data cable
___ Existing well construction & water level data
___ M-Scope, slug

SHIPPING

Forms
___ FedEx Airbills, local dropoff location & hours
___ FedEx Gov. Acct# (1771-8058-0)
___ Lab Shipping Labels
___ Warehouse Shipping Labels
___ Blank Labels

Supplies
___ Tape
___ Packing materials
___ Baggies, Large garbage bags

OTHER

___ Site POC name/phone #
___ Personnel information to POC
___ Mobilization schedule to POC
___ Site access authorizations
___ Field office / trailer arrangements made
___ Electric, phone hookups arranged
___ Steel-toed boots, safety glasses, & hard hat
___ First aid equipment
___ Insect repellent
___ ______________________________
___ ______________________________

Note - not all items listed apply to every job, and some additional requirements may apply on a job-specific basis.

SOIL & SEDIMENT SAMPLE LOG SHEET

TETRA TECH

Event:

Project Site Name:

Project No.:

Sample ID No.:

Sample Location:

QA/QC Duplicate ID:

Sampled By:

Sample Date:

MS/MSD Collected: YES NO

MATRIX / CONCENTRATION:

[ ] Surface Soil

[ ] Subsurface Soil

[ ] Sediment

[ ] Low Concentration

[ ] High Concentration

GRAB SAMPLE DATA:

Time:

Method:

Monitor Reading (ppm):

Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

MULTIPLE / COMPOSITE SAMPLE DATA:

Method:

PID Readings (Range in ppm):

Sample ID	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Method	Preservative	Number	Vol.	Bottle Type	Collected

OBSERVATIONS / NOTES:

MAP:

Coordinates:	N	E	

Signature(s):

FIELD CHANGE REQUEST FORM

Date:	**Department:**	**Name:**
Change or Revision:	**Plan/Procedure/SOP Name or #:**	

Site Location:

Preliminary Information

Current Document	Check All That Apply	Supporting Documentation (List document, page, para. etc.)	Submitted By (Initials)	Reviewed By (Initials)
Change or Revision Due To:				
1. Regulatory Update	☐			
2. Contract Requirement	☐			
3. Equipment Change	☐			
4. Newly Identified				
a) Safety Hazard	☐			
b) QC Measure	☐			
c) Operational Issue	☐			
5. Other:	☐			

Summary of Change or Revision:

Change or Revision Requested: (Identify page, para, figure, table, etc. that is changed or revised)
See attached Revision History

Requestor's Signature: ______________________	
Change or Revision: ☐ Accepted ☐ Rejected **Reason for Rejection –**	**Reviewer's Signature:** ________________________ **Safety/QC Signature:** _________________________
Corporate: ☐ Concurrence ☐ Non-Concurrence	**Corporate Approval Signature:** ___________________________________
Navy RPM Acknowledgment (Name)	**Navy RPM Signature:** _________________________

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Technical Paper 18 1 September 2016

DDESB

Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities

CLEARED
For Open Publication

Mar 09, 2018

Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

Department of Defense Explosives Safety Board

Alexandria, Virginia

FOREWORD

Effective 1 September 2016, Technical Paper (TP) 18, "Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities," supersedes previous versions of TP-18. Existing contracts will continue to apply the provisions of TP-18 dated December 2004 or 1 September 2015 (whichever document was in effect at the initiation of the contract) until completion of the current contract; with exception of options which will use the current effective TP-18 at the time.

Department of Defense Explosives Safety Board (DDESB) TP-18 provides the minimum qualification standards for personnel conducting munitions and explosives of concern (MEC)-related activities in support of the Department of Defense. This TP does not preclude licensing, permitting, training or other defined requirements (e.g., federal, state, local, environmental, etc.).

This document will be updated as necessary.

Thierry L. Chiapello
Executive Director,
Department of Defense Explosives Safety Board

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CHAPTER 1

INTRODUCTION

1.1. GENERAL

a. This technical paper (TP) provides minimum qualification standards, established by the DoD Explosives Safety Board (DDESB), for personnel who:

(1) Support munitions and explosives of concern (MEC)-related activities:

(a) Support workers (SW).

(b) Sweep personnel (SP).

(2) Conduct or supervise MEC-related activities:

(a) Unexploded ordnance technicians (UXOTs).

(b) UXO qualified personnel (UXOQP).

b. MEC-related activities include, but may not be limited to:

(1) Munitions responses to MEC.

(2) Operational range clearance-related activities.

(3) Similar operations that involve the intentional physical contact with MEC including:

(a) Chemical military munitions and chemical agents (CAs) in other than a munitions configuration (collectively referred to as “chemical warfare materiel (CWM)”).

(b) Ground-disturbing or other intrusive activities in areas known or suspected to contain MEC.

(4) Performance of escort duties, construction support and anomaly avoidance.

c. During MEC-related activities, personnel may be exposed to explosive or CA hazards (collectively referred to as “explosive hazards”) posed by MEC (e.g., UXO, discarded military munitions (DMM)) and associated material potentially presenting an explosive hazard (MPPEH).

d. Personnel must, commensurate with their duties, meet the minimum qualification standards of this TP when:

(1) Performing or supervising operations when intentional physical contact with MEC is planned or will occur.

(2) Conducting ground-disturbing or other intrusive activities in areas known or suspected to contain MEC.

e. Personnel who support, conduct, or supervise MEC-related activities who do not meet the minimum qualification standards of Tables 4.1, 4.2, or 4.3 must not have direct contact with MEC or MPPEH encountered during MEC-related activities until the material has been evaluated and determined not to pose an explosive hazard.

1.2. APPLICABILITY

a. These requirements apply to:

(1) DoD personnel who perform MEC-related activities.

(2) Contractors who perform MEC-related activities under:

(a) DoD contracts.

(b) State and other federal contracts, when the application of these requirements were stipulated or agreed on in property transfer documents (e.g., Finding of Suitability for Early Transfer) and/or agreements (e.g., Environmental Services Cooperative Agreements) between DoD and a State or other federal agency.

(3) DoD personnel or contractors who conduct ground-disturbing or other intrusive activities funded by the DoD in areas known or suspected to contain MEC, and activities involving the intentional physical contact with MEC, except as specified in Paragraph 1.2.b.

b. These requirements do not apply to:

(1) Military explosive ordnance disposal (EOD) personnel or operations.

(2) Personnel performing functions directly related to their assigned duties when conducting research, development, test, and evaluation (RDT&E); munitions management logistics functions (to include: storage, manufacturing, transportation, assembly, testing, inspection, maintenance and demilitarization); munitions operating facility demolition, renovation or maintenance; quality assurance (QA) surveillance testing; and other non-MEC related activities.

(3) Personnel working in support of operational and former ranges, where based on physical or historical evidence, the only munitions-related activities that occurred on the range were ones that involved live-fire training or testing with small arms ammunition. However, such personnel will at a minimum be provided explosives safety education (e.g., DoD recognize,

retreat, report (3Rs) explosives safety education training), including recognition of military munitions.

(4) Other personnel (e.g., commercial developers, contractors) performing MEC-related activities under contract with a State or other federal entities. However, the DDESB recommends the State or federal entity require the application of TP-18 requirements.

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CHAPTER 2

MEC-RELATED ACTIVITIES PERSONNEL – POSITION TITLES, DUTIES AND RESPONSIBILITIES

2.1. GENERAL

a. Training levels and work experience of the following personnel must be documented and verifiable:

(1) MEC-Related Activities Support Personnel

(a) SW

(b) SP (see 29495 in the appendix to this chapter)

(2) Unexploded Ordnance Technicians (UXOT)

(a) UXO-Technician I (UXO-TI) (see 29491 in the appendix to this chapter)

(b) UXO-Technician II (UXO-TII) (by definition are also UXOQP) (see 29492 in the appendix to this chapter)

(c) UXO-Technician III (UXO-TIII) (by definition are also UXOQP) (see 29493 in the appendix to this chapter)

(3) Unexploded Ordnance Qualified Personnel (UXOQP)

(a) UXO Quality Control Specialist (UXOQCS)

(b) UXO Safety Officer (UXOSO)

(c) Senior UXO Supervisor (SUXOS)

(4) Dive-Qualified Personnel

b. DoD activities and DoD contractors performing MEC-related activities are responsible for ensuring personnel employed meet the qualifications specified in this TP.

c. Personnel assigned to support MEC-related activities that are only responsible for supervising (e.g., dive master) or supporting (e.g., dive tender) dive operations from the surface are not required to be a UXOT or meet the criteria of UXOQP. When performing MEC-related activities, such personnel must also meet the qualification criteria for the task performed.

d. Under certain circumstances, the duties of a UXOSO and UXOQCS may be filled by a single individual who meets the training and experience requirements for both positions. If not explicitly specified in the contracting documents or applicable Service guidance, site-specific decisions allowing performance of the duties by a single individual will be provided in writing by the government contracting officer's representative on advice of government explosives safety personnel and in coordination with the contractor.

e. UXOTs and UXOQP must meet the applicable requirements of 18 United States Code (U.S.C.) 842 as amended by the Bureau of Alcohol, Tobacco, Firearms and Explosives in 27 Code of Federal Regulations (CFR) 555.26 and State requirements. Personnel who do not meet these requirements will not be provided access to explosives.

f. Personnel supporting or conducting MEC-related activities may be required to possess specific or specialized licenses (e.g., a commercial or specialized vehicle driver's license, state blasters license), hazardous material endorsements, or be included in a medical monitoring program. (See 29 CFR 1910.120.)

g. Personnel who are working at a hazardous waste site must successfully complete hazardous waste operations and emergency response (HAZWOPER) training per 29 CFR 1910.120.

2.2. DUTIES AND RESPONSIBILITIES. This chapter identifies and describes positions by title and outlines the duties and responsibilities of each position. Although this chapter addresses some qualifications, Chapters 3 and 4 present detailed qualifications and training requirements.

a. MEC-Related Activities Support. Personnel who are not UXOTs or UXOQP, but support MEC-related activities, perform a variety of tasks (e.g., brush-cutting, operating heavy equipment, surveying, site security, dive tenders) required to support the safe conduct of MEC-related activities.

(1) Support Workers (SW)

(a) Must be provided general and site-specific training. At a minimum, this must include:

1. General and site-specific safety. Such training includes, but may not be limited to the proper use of equipment and personal protective equipment (PPE); physical, biological, and chemical hazards; and the potential hazards associated with the tasks they are to perform.

2. Explosives safety training. Recognition of munitions; raw, possibly weathered explosives (e.g., trinitrotoluene (TNT), propellants); and chemical agent identification sets (CAIS) and the actions that should be taken should a suspect munition be encountered (e.g., 3Rs).

(b) SW will:

1. Be protected or escorted when conducting activities (e.g., ground disturbing) that could result in physical contact with MEC, including CWM, CAIS, or MPPEH.

2. Be protected from the potential explosive hazards associated with MEC known or suspected to be present within the site (e.g., shielding heavy equipment operators) when determined necessary by a risk assessment,

3. Be escorted by a UXOQP or a UXOT under the supervision of a UXOQP within areas known or suspected to contain MEC. (Note: Although escort by a UXO-TI is typically performed under the supervision of a UXOQP, the responsible commander or authority may approve UXO-TI personnel to perform escort duties without supervision. Such approval must be based on an approved risk assessment and implementation of methods to mitigate potential exposures). Escorts will help ensure MEC on the surface, and subsurface anomalies are avoided. Support activities performed by SW who may require escort include:

a. Conducting geophysical surveys and similar activities.

b. Clearing vegetation from areas where surface MEC is known or suspected to be present.

c. Operating heavy equipment.

d. Performing site or area security functions requiring access to areas where surface MEC is known or suspected to be present or MEC-related operations are being conducted.

(2) Sweep personnel (SP). The SP must:

(a) Assist UXOT and UXOQP in the performance of MEC-related activities but are not involved in explosive operations.

(b) Be provided general and site-specific training. At a minimum, this must include:

1. General and site-specific safety. Such training includes, but may not be limited to the proper use of equipment and PPE; physical, biological, and chemical hazards; and the potential hazards associated with the tasks they are to perform.

2. Explosives safety training. Recognition of military munitions; raw, potentially weathered explosives (e.g., TNT, propellants); and CAIS and actions that should be taken should a munition or suspect munition be encountered (e.g., 3Rs).

(c) Not be allowed to conduct activities that could result in physical contact with MEC, including CWM or CAIS; material documented as an explosive hazard (MDEH); and

MPPEH, unless the MPPEH has received an initial inspection by UXOQP who determined the material does not pose an explosive hazard.

(d) Be supervised or, if required, escorted by a UXOT (see Paragraph 2.2.b.(1)(k)) or UXOQP within areas known or suspected to contain MEC. The need for an escort is determined by a risk assessment that considers the support or tasks to be performed. Escorts will help ensure MEC and MPPEH on the surface, and subsurface anomalies are avoided.

(e) Be supervised by a UXO-TIII or above when performing activities in areas where there is a medium to high probability that MEC will be encountered, as determined by a risk assessment. Activities that may be performed by SP include:

1. Conducting visual or technology-aided sweeps for surface MEC.

2. Conducting geophysical surveys for subsurface anomalies.

3. Performing, when necessary, field maintenance and/or function checks on geophysical instruments and related equipment within an area known or suspected to contain MEC.

4. Moving MPPEH (e.g., munitions debris and range-related debris) that has received an initial inspection by UXOQP who determined the material does not pose an explosive hazard and is acceptable for further inspection or processing per approved DDESB procedures.

b. UXOT. These personnel perform a variety of MEC-related activities.

(1) UXO-TI. When directed or supervised by a UXOQP, must be able to:

(a) Investigate for and identify MEC and MPPEH, including explosive residues in media (soil, oil, etc.), buildings and installed equipment.

(b) Identify different types of military munitions, including identifying whether a military munition’s fuze is armed or unarmed.

(c) Excavate subsurface anomalies for identification.

(d) Move (e.g., consolidate) MEC and MPPEH, within a munitions response site (MRS) or on an operational range after the UXOSO and SUXOS have jointly evaluated and determined the risk of movement to be acceptable.

(e) Operate vehicles transporting explosives, MPPEH or MDEH on site. (Individuals must be appropriately licensed for the class of vehicle being operated.)

(f) Transport military munitions, commercial explosives, and/or MDEH that meets the above criteria that has been determined safe for transport over public traffic routes (PTR).

Such munitions and explosives must be packaged in a manner that allows their safe transport and complies with Department of Transportation (DOT) and other applicable federal and State laws, and DoD policies. (Note: Only UXO determined to be safe for transport by EOD personnel may be transported over a PTR.)

(g) Prepare electric and non-electric firing systems.

(h) Set up decontamination stations and decontaminate CA-contaminated personnel, military munitions and other material of interest (e.g., munitions debris, glass vials) per approved plans. The performance of these functions may require additional training.

(i) Assist UXOQP in documenting the explosives safety status of MPPEH.

(j) Construct engineering controls (protective works).

(k) Escort personnel who are not directly involved in MEC-related activities (e.g., SW, SP, visitors to cultural sites) on property known or suspected to contain MEC, but have an operational requirement and authorization to access such property. Although escort by a UXO-TI is typically performed under the supervision of a UXOQP, the responsible commander or authority may approve UXO-TI personnel to perform escort duties without supervision. Such approval must be based on an approved risk assessment and implementation of methods to mitigate potential exposures.

(2) UXO-TII. Must be able to:

(a) Meet the criteria for and perform the functions of a UXO-TI.

(b) Store explosive materials per applicable guidance, including preparing on-site holding areas to temporarily store and secure MEC or MPPEH, and other explosives (e.g., donor charges).

(c) Determine, using a variety of techniques (e.g., global positioning equipment, land navigation techniques), and record the location of subsurface anomalies, surface MEC and other material of interest in a field environment.

(d) Perform field-collection and -testing procedures to identify explosives-contaminated media or material (e.g., equipment used for the load-assemble-pack of military munitions).

(e) Inspect and document the explosives safety status of MPPEH.

(f) Supervise, as required, SW, SP, and UXO-TI.

(3) UXO-TIII. Must be able to:

(a) Meet the criteria for and perform the functions of a UXO-TI and UXO-TII.

(b) Ensure compliance with a DoD Military Service- and / or DDESB-approved site plans.

(c) Supervise and perform on-site destruction or demilitarization of MEC in place or at a consolidated detonation site. This includes determining where and when it is safe to initiate destruction and when engineering controls are required to mitigate the effects of a detonation.

(d) Implement an explosives storage plan per applicable guidance.

(e) Prepare administrative reports required for munitions responses (e.g., daily UXO team report), operational range clearance activities and similar operations.

(f) Develop and implement standard operating procedures and work plans for munitions responses and operational range clearance activities.

(g) Assist in the preparation of risk and hazard analyses.

(h) Conduct daily site safety briefings.

(i) Supervise the conduct of the different types of MEC-related activities performed at a site.

(j) Determine if MDEH, which is not known or suspected to be UXO, is safe to ship and properly documented for transport over PTR per Technical Bulletin 700-2, Naval Sea Systems Command Instruction 8020.8C, Technical Order 11A-1-47.

(k) Package military munitions, commercial explosives, and MDEH that has been determined safe for transport over PTR.

(l) Serve as UXO team leader.

c. UXOQP. These personnel conduct, manage or oversee MEC-related activities (e.g., reacquire and investigate anomalies, document explosives safety status of materials) required during munitions responses and operational range clearance activities and/or verify the completion of such responses and activities safely and per applicable requirements and approved plans. By definition, UXO-TII and UXO-TIII are considered both UXOTs and UXOQP.

(1) UXOQCS. Must be able to:

(a) Meet the criteria for and perform the functions of a UXO-TIII.

(b) Develop and, upon approval, implement the project’s quality control (QC) plan for MEC-related activities per applicable requirements.

(c) Conduct and document QC audits of MEC-related activities for compliance with applicable requirements.

(d) Identify, document, report and ensure completion of corrective actions to ensure MEC-related activities comply with applicable requirements.

(e) Ensure compliance with a DoD Military Service – and/or DDESB-approved site plans.

(f) Prepare QC reports.

(2) UXOSO. Must be able to:

(a) Meet the criteria for and perform the functions of UXO-TIII.

(b) Develop and, upon approval, implement explosives and health and safety plans and programs per applicable DoD, federal, State, and local requirements.

(c) Ensure compliance with a DoD Military Service- and/or DDESB-approved site plans.

(d) Analyze the potential risks (e.g., operational, explosives safety, general safety) associated with MEC-related activities and develop and implement required, mitigating measures.

(e) Establish and ensure compliance with site-specific explosives safety requirements, including, but not limited to:

1. Enforcing personnel limits and explosives safety quantity distance (ESQD) arcs for explosive-related operations.

2. Conducting, documenting, and reporting the results of safety inspections and ensuring implementation of corrective actions.

3. Ensuring protective works and safety equipment within an exclusion zone are used, when required; and operated per manufacturer’s specifications, applicable DDESB approvals, DoD policy, and federal, State, or local statutes, regulations, and codes.

(f) Ensure that air-monitoring equipment is operated and maintained properly at sites with known or potential airborne contaminants (e.g., CWM sites).

(g) Evaluate the risk of movement (e.g., consolidation) of MEC within an MRS or on an operational range with the SUXOS, and provide approval for movement by UXOT when the risk of movement is determined to be acceptable.

(3) SUXOS. Must be able to:

(a) Meet the criteria for and perform the functions of a UXO-TIII, UXOQCS, and UXOSO.

(b) Ensure compliance with a DoD Military Service- and/or DDESB-approved site plans.

(c) Plan, coordinate, and supervise all on-site munitions response and operational range clearance activities.

(d) Supervise up to ten UXO teams.

(e) Assist in development of required plans (e.g., health and safety plans).

(f) Review all field reports (e.g., daily reports, audits) and approve UXO team reports.

(g) Evaluate the risk of movement of UXO or DMM within an MRS or operational range with the UXOSO, and provide approval for movement by UXOT when the risk of movement is determined to be acceptable.

d. Dive-Qualified Personnel. Some MEC-related activities require personnel also be dive-qualified. Divers who are performing the duties of a UXOT or UXOQP must meet this TP's criteria for the duties performed and possess the dive-related certifications required for the tasks they are to perform or supervise. An SUXOS, UXOSO, or UXO-TIII providing supervision of MEC-related activities from the surface do not need to possess diver certification.

(1) Dive-qualified personnel will meet the requirements of 29 CFR 1910, Subpart T, and:

(a) Possess dive-related certifications (e.g., dive master, surface-supplied air diver, surface supplied mixed-gas diver), as required for the tasks they are to perform or supervise, from an Association of Commercial Diving Educators (ACDE)-accredited school whose curriculum meets the America National Standards Institute (ANSI) Standard ANSI/ACDE-01;

(b) Have a training certificate with a valid Association of Diving Contractors (ADC) Commercial Diver Certification Card for the appropriate training level; **or**

(c) Completed the underwater portion of NAVSCOLEOD (or foreign equivalent) training.

(2) Divers who are performing MEC-related activities underwater must at a minimum meet the qualifications for a UXO-T1. Such divers must be provided guidance from a SUXOS, UXOSO, or UXO-TIII on the surface. This requires the individual providing the guidance have real-time voice communication with the diver and real-time visual or imaging for confirmation of the material (e.g., military munitions, munitions debris) the diver is encountering. An SUXOS, UXOSO, or UXO-TIII providing supervision of MEC-related activities from the surface do not need to possess diver certification.

APPENDIX

DEPARTMENT OF LABOR, SERVICE CONTRACT ACT DIRECTORY OF OCCUPATIONS - UXO POSITION DESCRIPTIONS[1]

A.1. 29491 UXO-TI

a. Assists in:

(1) Performing reconnaissance and classification of UXO.

(2) Identifying U.S. and foreign guided missiles, bombs and bomb fuzes, projectiles and projectile fuzes, grenades and grenade fuzes, rockets and rocket fuzes, land mines and associated components, pyrotechnic items, military explosives, and demolition materials.

b. Performs location of subsurface UXO using military and/or civilian magnetometers.

(1) Assists in performing excavation procedures on buried UXO.

(2) Performs operator maintenance of military and/or civilian magnetometers.

(3) Locates surface UXO using visual means.

(4) Assists in transporting and storing UXO and demolition materials.

c. Assists in:

(1) Preparing non-electric firing system for a UXO disposal operation.

(2) Preparing electric firing system for a UXO disposal operation disposing of ammunition/ explosives by burning; disposing of ammunition/explosives by detonation.

(3) Operating a personnel decontamination station. Dons and doffs appropriate personal protective equipment in contaminated areas. Assists in the inspection of salvage UXO-related material and erection of UXO-related protective works.

A.2. 29492 UXO-TII

a. Performs reconnaissance and classification of UXO. Identifies U.S. and foreign guided missiles, bombs and bomb fuzes, projectiles and projectile fuzes, grenades and grenades fuzes rockets and rocket fuzes, land mines and associated components, pyrotechnics, military explosives, and demolition materials.

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[1] Refer to http://www.dol.gov/whd/regs/compliance/wage/ for the current versions of these descriptions.

b. Locates subsurface UXO using military and/or civilian magnetometers.

(1) Performs excavation procedures on buried UXO by manual means; mechanical means.

(2) Performs operator maintenance of military and/or civilian magnetometers.

(3) Locates surface UXO using visual means. Operates motor vehicle transporting UXO.

(4) Prepares an on-site safe holding area for UXO.

(5) Performs storage of UXO and demolition materials.

(6) Prepares a UXO disposal site.

(7) Prepares non-electric firing system for a UXO disposal operation, electric firing system for a UXO disposal operation, and a detonating cord firing system.

(8) Disposes of UXO/explosives by burning or detonation.

(9) Operates a personnel decontamination station.

(10) Dons and doffs appropriate personal protective equipment in contaminated areas.

c. Inspects salvage UXO-related material.

(1) Erects UXO-related protective works.

(2) Determines a magnetic azimuth using a lensatic compass.

(3) Performs field expedient identification procedures to ID explosive-contaminated soil.

(4) Performs emergency leak seal and packaging of chemical warfare material.

(5) Uses radiographic (x-ray) equipment.

A.3. 29493 UXO-TIII

a. Performs reconnaissance and classification of UXO. Identifies U.S. and foreign guided missiles, bombs and bomb fuzes, projectiles and projectile fuzes, grenades and grenade fuzes, rockets and rocket fuzes, land mines and associated components, pyrotechnic items, military explosives, and demolition materials.

b. Supervises the location of subsurface UXO using military and/or civilian magnetometers.
(1) Supervises the:

(a) Excavation and recovery of subsurface UXO.

(b) Construction of UXO-related protective works.

(c) Location of surface UXO by visual means.

(d) Transporting and storing UXO assuring compliance with federal, State, and local laws.

(e) Disposal of UXO by burning/detonation.

(f) Preparation of a UXO disposal site.

(g) Preparation of an on-site safe holding area for UXO.

(2) Determines UXO-related storage compatibility.

(3) Prepares an explosives storage plan.

(4) Supervises donning and doffing of personal protective equipment, operation of a personnel decontamination station, and maintenance and operator checks on all team equipment.

(5) Prepares UXO-related administrative reports and standard operating procedures.

(6) Conducts daily team safety briefing.

c. Supervises segregation of UXO-related scrap from non-UXO-related scrap, safe-handling procedures, team preventive medicine, and field sanitation procedures.

(1) Performs risk hazard analysis; interpret x-ray of UXO.

(2) Supervises field expedient identification procedures to ID explosives contaminated soil, the determining of a magnetic azimuth using a lensatic compass, emergency leak sealing. and packaging of chemical warfare materiel.

A.4. 29494 UXO SAFETY ESCORT

a. Responsible for the safe escort of non-UXOQP who are not directly involved in specific UXO clearance site work, but have activities to perform within restricted/exclusion areas. Such personnel may include, but are not limited to, contractor personnel involved in the UXO cleanup, cultural visitors, surveying personnel, equipment operators, archaeologists, conservationists, geologists, news media, visiting government personnel, and other personnel as directed.

b. Ensures safety during the transit of persons being escorted by scanning visually in the immediate path of the escorted party, and redirecting the party as necessary to avoid unexploded ordnance and other hazards.

c. Is involved with hazard recognition and avoidance only, not the execution of UXO search or clearance actions.

d. Must have UXO training qualifications.

A.5. 29495 SP

a. Assist UXO personnel in the clearance of UXO, operating only under the direct working supervision of qualified UXO specialist and/or UXO supervisory personnel.

b. Conduct visual and/or instrumented UXO search activities in the field and operate ordnance detection instruments and similar equipment.

c. Remove UXO fuze remnants, fragments and related debris only after such items have been positively identified, inspected and verified as safe to handle by a qualified UXO specialist.

d. Are not involved in the execution of explosives operations.

e. Must have site and job specific contractor training, but does not require UXO qualifications.

CHAPTER 3

UXO-TI TRAINING STANDARDS

3.1. MINIMUM TRAINING STANDARDS FOR UXO-TI

a. This chapter outlines the minimum training standards for a UXO-TI. Personnel who are trained as a UXO-TI must demonstrate the requisite knowledge and ability to perform required tasks in compliance with applicable operational and explosives safety requirements. Candidates for a UXO-TI position must successfully complete:

(1) 200 hours of explosives safety training as described in Paragraph 3.2. or a comprehensive assessment of the individual’s ability to successfully perform as a UXO-TI. The course content must convey the information and skills needed to conduct MEC-related activities per applicable requirements. Both the course and comprehensive assessment must include practical exercises evaluating the skills required.

(2) 40 hours of HAZWOPER training per 29 CFR 1910.120.

b. An institution of higher education must provide this training or conduct this assessment and:

(1) Certify successful completion of the course requirements or a comprehensive assessment through written exams and practical exercises.

(2) Have programmatic accreditation by a U.S. Secretary of Education nationally recognized college or university educational accrediting agency, be a component member of a nationally recognized university's system, or be designated by statute as an agency of higher education and have a demonstrated history of providing quality training programs.

c. Before being employed as a UXO-TI, an applicant must provide the perspective employer documentation of successful course completion or successful completion of a comprehensive assessment from an institution of higher education that meets the above criteria. The employer must verify that the individual was trained by the training institution and the institution meets the above requirements.

3.2. CURRICULUM AND TRAINING OBJECTIVES FOR UXO-TI

a. Munitions Responses to MEC

(1) **Description.** Understand the purpose, requirements, and procedures for a munitions response to MEC. This training includes explosives safety and environmental requirements applicable to the conduct of munitions responses to MEC.

(2) **Objectives**

(a) Define terms and identify abbreviations.

(b) Describe the purpose for munitions responses.

(c) Describe planning, safety, and environmental requirements for conducting munitions responses.

(d) Identify the documents (e.g., work plan, accident prevention plan) that should be available for review by field team members.

(e) Describe the typical field tasks of a munitions response and their purpose.

(f) Describe the required process to inspect and document the explosives safety status of MPPEH as either material documented as safe (MDAS) or as MDEH.

(g) Discuss how to and the importance of maintaining a chain of custody for MDAS and MDEH.

(h) Describe the consequences of losing the chain of custody for MDAS and MDEH.

(i) Discuss potential liability concerns associated with evaluating MPPEH and documenting its explosives safety status as MDAS or MDEH.

(j) Describe the proper assembly of protective works.

(k) Describe the general operation of soil sifting, magnetic, and eddy current equipment as a method to separate MEC and munitions debris from soil.

(l) Describe documentation required from a field team conducting MEC activities.

b. Operational Range Clearance Activities and Similar Operations

(1) **Description.** Understand the purpose, requirements, and procedures for the conduct of operational range clearance activities and similar operations. This training includes explosives safety and environmental requirements applicable to the conduct of operational range clearance activities and similar operations.

(2) **Objectives**

(a) Describe the purpose of operational range clearance activities and similar operations and how they differ from munitions responses to MEC.

(b) Describe how operational ranges are designed (e.g., impact areas, safety buffer zones) and used.

(c) Describe planning, safety, and environmental requirements for conducting operational range clearance activities.

(d) Describe the typical field tasks for the conduct of operational range clearance activities and how they differ from munitions responses to MEC.

(e) Describe the potential hazards associated with operational range clearance activities.

(f) Describe documentation required from a field team conducting operational range clearance activities.

(g) Describe the required process to inspect and document the explosives safety status of MPPEH as either MDAS or as MDEH.

(h) Discuss the importance of properly processing and managing MPPEH, MDAS, and MDEH, including the importance of maintaining the chain of custody.

(i) Describe the consequences of losing the chain of custody.

(j) Discuss potential liability concerns associated with evaluating MPPEH and documenting its explosives safety status as MDAS or MDEH.

c. Measurements and Mathematical Computations

(1) Description. Understand the methods for conversion between the U.S. customary and metric systems of measurements and basic mathematical computations.

(2) Objectives

(a) Identify metric prefixes.

(b) Describe mathematical conversions within the metric system.

(c) Convert units from U.S. customary to metric and metric to U.S. customary.

d. Electricity

(1) Description. Understand the basics of electricity and circuitry as applied to MEC-related activities.

(2) Objectives

(a) Define terms and identify abbreviations and symbols.

(b) Describe electrical conductivity and its characteristics in different materials.

(c) Describe types of cells and batteries, their construction features, and process used to generate electro-motive force.

(d) Describe current flow, factors that affect current flow (including switches) and units of measurement of current flow.

(e) Describe electrical resistance and the factors that affect resistance.

(f) Describe the operation of a series direct current (DC) circuit with respect to Ohm's Law.

(g) Describe the operation of basic parallel DC circuits with respect to the determination of equivalent resistance.

(h) Describe capacitance in terms of charging and discharging a capacitor.

(i) Diagram a basic circuit such as may be used in electric firing system.

e. Physics

(1) Description. Understand the basic physics as applied to MEC-related activities.

(2) Objectives

(a) Define terms and identify abbreviations and symbols.

(b) Describe forces and how they are graphically represented.

(c) Describe Newton's first and third laws of motion.

(d) Describe the difference between weight and mass.

(e) Describe hydrostatics with respect to fluid pressure.

(f) Describe properties of matter.

(g) Define motion, work, and energy.

(h) Describe measures of and forces affecting motion.

(i) Identify the physical laws affecting gases.

(j) Define magnetism.

f. Military Munitions - Explosives and Explosive Effects

(1) Description. Understand the basics of explosives and explosive effects.

(2) Objectives

(a) Define terms and identify abbreviations and symbols.

(b) Summarize the history of explosives.

(c) Define propellants, explosives, and pyrotechnics.

(d) Describe characteristics of military munitions (i.e., explosives, propellants, and pyrotechnics).

(e) Identify the types of high explosives groups (primary, secondary, main charge).

(f) Identify forms and classes of propellants and black powder, pyrotechnic, and tracer compositions.

(g) Describe the functioning of an explosive train.

(h) Define explosion and describe types of explosions (detonations, low order detonations, deflagrations).

(i) Describe forms of energy produced by explosions.

(j) Describe effects of an explosion (pressure wave, fragments, debris, thermal, ground shock).

g. Military Munitions - Fuze Functioning

(1) Description. Understand how fuzes function.

(2) Objectives

(a) Define terms and identify abbreviations.

(b) Describe fuze forces.

(c) Describe fundamental principles of fuzes, fuze arming, and firing principles.

(d) Describe fuze components.

(e) Describe methods of employment and uses of fuzes.

(f) Describe typical arming/functioning of fuzes.

(g) Describe fuze types.

h. Explosives Safety Precautions

(1) Description. Understand explosives safety precautions as they apply to the conduct of MEC-related activities, including:

(a) The different categories of MEC (i.e., UXO, DMM, or munitions constituents (MC) that are explosives and in concentration high enough to pose an explosive hazard), and MPPEH and MDEH.

(b) The use of hazards of electromagnetic radiation to ordnance (HERO) safe equipment.

(2) Objectives

(a) Define terms and identify abbreviations and symbols.

(b) Describe the purpose of explosives safety precautions.

(c) Describe safety considerations that apply by categories of MEC and MPPEH and MDEH.

(d) Describe basic safety precautions for:

1. Explosive-loaded munitions.

2. Submunitions.

3. Toxic chemical-loaded munitions.

4. Pyrotechnic and incendiary munitions.

5. Smoke-loaded munitions.

6. Fuzing systems.

7. Small arms ammunition.

8. Training military munitions.

9. Practice military munitions.

10. Underwater munitions.

i. Military Munitions Identification

(1) Description. Provide a detailed description (e.g., family, group, type) and identify military munition, and applicable specific safety precautions based on type. (See Ammunition Terms.)

(a) Surface-fired, launched, or placed munitions:

1. Projectiles (gun, mortar, howitzer).

2. Small arms ammunition.

3. Land mines and associated components.

4. Infantry rockets and rocket fuzes.

5. Grenade and grenade fuzes.

(b) Air launched or fired munitions:

1. Bombs and bomb fuzes.

2. Guided missiles and missile fuzes.

3. Large rockets and rocket fuzes.

4. Submunitions.

(c) CWM (i.e., chemical munitions and CA in other than munitions configurations).

(d) CAIS.

(e) Smokes and pyrotechnics.

(2) Objectives

(a) Define terms and identify abbreviations and symbols.

(b) Provide a detailed description and identify military munition, and applicable specific safety precautions based on type.

(c) Demonstrate comprehension and detailed knowledge of live, training, and practice munitions.

(d) Recognize munitions’ color codes and markings.

(e) Describe the basic safety precautions for explosive-initiating components.

(f) Describe the safety precautions for munitions by category or group.

j. Underwater Munitions Identification

(1) Description. Understand underwater munitions.

(2) Objectives

(a) Define terms and identify abbreviations and symbols.

(b) Provide a detailed description and identify military munition, and applicable specific safety precautions based on type.

(c) Demonstrate comprehension and detailed knowledge of live training and practice underwater munitions by category and specific safety precautions based on type.

(d) Recognize munitions’ color codes and markings.

(e) Describe the basic safety precautions for explosive-initiating components.

(f) Describe the safety precautions for underwater munitions.

k. Detection Equipment

(1) Description. Understand general, physical, functional, operational, and maintenance of detection equipment for:

(a) Location of subsurface anomalies using various technologies during the conduct of geophysical surveys.

(b) Detection of subsurface anomalies.

(c) Basic geophysical investigation (e.g., anomaly identification, mapping, target discrimination, QC processes).

(2) Objectives

(a) Describe the purpose of geophysical survey equipment; operational characteristics, and capabilities.

(b) Describe the theory of geophysical surveys.

(c) Describe data analysis including the advanced geophysical classification process.

(d) Describe all major and associated components including displays, controls, and indicators.

(e) Describe the purpose of a geophysical system verification and the various tasks involved.

(f) Describe operational tasks and preventive maintenance procedures.

(g) Understand how to inventory and maintain equipment.

(h) Understand typical instrument outputs and their use in munitions responses.

l. PPE

(1) Description. Understand all relevant PPE.

(2) Objectives

(a) Identify where PPE requirements for MEC-related activities are specified and who is responsible for determining whether PPE is required and changing PPE requirements at a site.

(b) Understand the capabilities and limitations of PPE, given the hazards that may be present.

(c) Understand the requirements for employing PPE safely.

(d) Describe the requirements and process for performing decontamination.

m. Demolition Materials

(1) Description. Understand demolition materials and their use including:

(a) Military and commercial explosives (U.S. and foreign).

(b) Initiating components and systems.

(2) Objectives

(a) Define terms and identify abbreviations and symbols.

(b) Describe military explosives, commercial explosives, and demolition materials and when each might be used.

(c) Describe the purpose of demolition materials and specialized explosive techniques.

(d) Describe tools and equipment used during demolition operations.

(e) Describe demolition accessories.

(f) Describe electric power sources and test sets used with demolition firing circuits.

(g) Describe demolition charge initiators.

(h) Describe demolition charges, charge kits, and assemblies.

(i) Describe safety precautions for preparation and firing of demolition materials.

n. Firing Systems

(1) Description. Understand firing systems and their use.

(2) Objectives

(a) Describe detonating cord demolition procedures.

(b) Describe electric and non-electric firing systems.

(c) Describe safety precautions for preparation and firing of demolition materials, including HERO and static discharge precautions for electric initiators.

(d) Prepare firing systems (both electric and non-electric) for detonation operations.

(e) Describe misfire safety precautions.

(f) Describe hang fire safety precautions.

o. Destruction and Demilitarization

(1) Description. Understand the relationship between destruction (i.e., detonation, burning) and demilitarization requirements, and procedures for the destruction of conventional military munitions.

(2) Objectives

(a) Define terms and identify abbreviations and symbols.

(b) Describe the requirements for and purpose for destruction of conventional munitions.

(c) Describe destruction procedures, including the technologies available for the conduct of contained or controlled destruction.

(d) Describe the authorized destruction methods for different types of military munitions.

(e) Describe requirements and safety precautions for destruction operations.

(f) Describe destruction of conventional explosives and related hazardous materials.

(g) Describe the requirements for demilitarization of military materiel before disposal or recycling.

p. Storage, Handling, and Transportation of Explosives (Military and Commercial)

(1) Description. Understand storage, handling, and transportation of explosives.

(2) Objectives

(a) Describe the purpose for proper storage, handling, and transportation of explosives.

(b) Identify relevant regulations governing storage, handling, and transportation of explosives.

(c) Describe the hazard classification system.

(d) Discuss storage compatibility groups.

(e) Discuss safety requirements.

(f) Discuss ESQD and minimum separation distance requirements.

(g) Discuss transportation requirements for munitions and commercial explosives.

q. Skills Requirements

(1) Description. Demonstrate knowledge of policies, requirements, and procedures in the safe performance of MEC- and MPPEH-related duties.

(2) Objectives. Demonstrate, during a practical exercise, knowledge and comprehension of policies and procedures in safely:

(a) Planning and establishing a standard (100’ x 100’) UXO search grid.

(b) Operating detection equipment used during geophysical surveys within areas known or suspected to contain MEC.

(c) Detecting and determining the coordinates of anomalies.

(d) Reacquiring and investigating (e.g., excavating) an anomaly.

(e) Providing a detailed description of military munitions and identifying specific safety and applicable storage, handling and transportation precautions.

(f) Designing and constructing various types of firing systems (single, dual prime series, dual prime parallel), both electric and non-electric.

(g) Designing, constructing, and detonating a firing system to initiate a complete explosive charge using a line main and/or a ring main.

CHAPTER 4

MINIMUM QUALIFICATION STANDARDS

4.1. Minimum qualification standards for UXOQP, UXOT, and SP and SW are shown in Tables 4.1, 4.2, and 4.3, respectively.

4.2. UXOTs and UXOQP must meet the applicable requirements of 18 United States Code (U.S.C.) 842 as amended by the Bureau of Alcohol, Tobacco, Firearms and Explosives in 27 Code of Federal Regulations (CFR) 555.26 and State requirements. Personnel who do not meet these requirements will not be provided access to explosives.

4.3. Individuals preparing materials for transport or transporting hazardous materials must complete a DOT-compliant (49 CFR 172.704) hazardous materials course.

4.4. Personnel working as UXOTs and UXOQP may have significant breaks between jobs. Only the time personnel have spent working under a contract that is performing MEC-related activities, per Section 1.1, counts towards advancement, with 1880 hours considered a 1-year full-time equivalent. The accumulation of time towards advancement is not limited to time involved in the intentional physical contact with MEC or the conduct of ground-disturbing or other intrusive activities in areas known or suspected to contain MEC, but includes activities in support of a MEC-related contract such as report generation, on–the-job training, equipment maintenance and other activities required to support a contract's requirements.

4.5. A company’s initial assessment of civilian work history or military work experience (e.g.., DD214 and other official records) can be used as the basis for the initial assessment of cumulative MEC related work experience for the logbook.

4.6. UXOTs and UXOQP are responsible for maintaining a logbook of their hours, and should be able to provide reasonable documentation that supports the hours logged. Logbooks should include:

a. Number of work hours

b. Number of MEC-related work hours

c. Type of activity

d. Certification of work hours by authorized supervisor

e. Supervisor and contact information

4.7. UXO-TIs with a 36-month continuous break in the performances of MEC-related activities requires requalification as a UXO-TI based on a comprehensive assessment or supervised on-the-job training. Requalification must be accomplished by attending a UXO-TI requalification training course or completion of a comprehensive assessment provided by a training organization as outlined in Paragraph 3.1.2.; or by supervised on-the-job training that the employer documents. For other personnel with a 36-month continuous break in the performances of MEC-related activities, when appropriate, provide supervised on-the-job training that is documented by the employer.

4.8. Personnel whose EOD status was terminated for gross negligence in the performance of assigned EOD duties, a flagrant violation of EOD safety procedure or regulation,, or who are not discharged under honorable conditions will not be considered EOD qualified and will not be considered a military EOD School graduate. To obtain employment, such personnel must complete the training required for a UXO-TI.

Table 4.1. Minimum Qualifications for UXOQP[1, 2, 3, 4]

Position Description	Training Required	Minimum MEC-related Experience	Minimum MEC-Supervisory Experience	Minimum Total EOD/MEC Experience
SUXOS	Notes 5, 7, 8, 9, 10, and 11	2 years	1 year	10 years
	Notes 6, 7, 8, 9, 10, and 11	10 years	5 years	13 years
UXOSO	Notes 5, 7, 8, and 9	1 year	0.5 year	8 years
	Notes 6, 7, 8, and 9	8 years	2 years	10 years
UXOQCS	Notes 5, 7, 8, 10, and 11	1 year	0.5 year	8 years
	Notes 6, 7, 8, 10, and 11	8 years	2 years	10 years
Dive Qualified	Note 12	As indicated above for the position description.		

Notes:

1. By definition, UXO-TII and UXO-TIII are UXOQP (minimum qualifications for UXO-T are provided on Table 4.2.
2. Graduate of an Occupational Safety and Health Administration (OSHA)-compliant (29 CFR 1910.120) 40-hour HAZWOPER course.
3. Limited to performance of MEC-related activities as a UXOT or UXOQP or similar civilian government service (e.g., Ordnance and Explosives Safety Specialist (OESS)). Conduct of activities performed as an SP or SW are not considered MEC-related experience and are not counted toward the experiential requirements for UXOQP.
4. Limited to experience in UXO supervisory positions (i.e., UXO-TIII, UXOQCS, UXOSO, OESS).
5. Graduate of a military EOD School of the United States, Canada, Great Britain, Germany, or Australia. (See Paragraph 4.8) for EOD personnel who were terminated for gross negligence in the performance of assigned duties, a flagrant violation of EOD safety procedure or regulation or who are not discharged under honorable conditions will not be considered EOD qualified and will not be considered a military EOD School graduate. To obtain employment, such personnel must complete the training required for a UXO-TI.
6. Graduate of a UXO-TI Course (see Chapter 3), the EOD assistant's course or pass a comprehensive assessment.
7. Graduate of an OSHA-compliant (29 CFR 1910.120(e)(4)) 8-hour Management and Supervisor Training course, if supervising other personnel.
8. Possesses an understanding of applicable explosives safety criteria and experience in the various phases of a munitions response to MEC or the conduct of range clearance activities, as appropriate for the operations to be performed.
9. Must have completed a 10-hour OSHA Construction Safety and Health Training and earned a Department of Labor Construction Safety Course Completion Card.
10. UXOQCS must have either:
    a. Successfully completed training as a quality professional (i.e., International Standards Organization 9001 internal auditor, American Society of Quality Certified quality auditor);
    b. Possess a quality-professional certification by a recognized organization (e.g., U.S. Army the Corps of Engineers and Naval Facility Engineering Command Training Course Construction Quality Management for Contractors; or
    c. Receive company- and project-specific QC training and work under the supervision of a certified quality professional.
11. UXOQCS must demonstrate an understanding of QC and QA practices associated with MEC-related activities and managing and processing MPPEH, including documentation of its explosives safety status.

12 Divers who are independently performing the duties of a UXOT or UXOQP must:
    a. Meet this TP's criteria for the duties performed and the requirements of 29 CFR 1910, Subpart T.
    b. Possess the dive-related certifications required for the tasks they are to perform or supervise. (Note: Certifications (dive or training) must be from an accredited school and meet the requirements contained in ANSI/ACDE Standard-01; be documented as valid by an ADC Commercial Diver Certification Card for the appropriate training level; and/or have documentation of successful completion of an appropriate level of training from an ACDE accredited school or have completed the underwater portion of NAVSCOLEOD (or foreign equivalent) training.)

Table 4.2. Minimum Qualifications for UXOT[1, 2, 3]

Position Description	Training Required	Minimum MEC-related Experience	Minimum Total EOD/MEC Experience
UXO-TIII	Notes 4, 6, and 7	1 years	8 years
	Notes 5, 6, and 7	8 years	8 years
UXO-TII	Notes 4 and 7	0 years	1.5years
	Notes 5 and 7	3 years	3 years
UXO-TI	Notes 4 and 7	0 years	0 years
	Notes 5 and 7	0 years	0 years
Dive Qualified	Note 8	As indicated above for the position description.	

Notes:

1. By definition, UXO-TII and UXO-TIII are also UXOQP.
2. Graduate of an OSHA-compliant (29 CFR 1910.120) 40-hour HAZWOPER course.
3. Limited to performance of MEC-related activities as a UXOT or UXOQP or similar civilian government service (e.g., OESS). Conduct of activities performed as an SP or SW are not considered MEC-related experience and are not counted toward the experiential requirements for UXOQP.
4. Graduate of a military EOD School of the United States, Canada, Great Britain, Germany, or Australia. (See Paragraph 4.8. for EOD personnel who were terminated for gross negligence in the performance of assigned duties, a flagrant violation of EOD safety procedure or regulation or who are not discharged under honorable conditions will not be considered EOD qualified and will not be considered a military EOD School graduate. To obtain employment, such personnel must complete the training required for a UXO-TI.
5. Graduate of a UXO-TI Course (see Chapter 3), the EOD assistant’s course or pass a comprehensive assessment.
6. Graduate of an OSHA-compliant (29 CFR 1910.120(e)(4)) 8-hour Management and Supervisor Training course.
7. On-the-job training including, but not limited to familiarity with the process, procedures, and equipment (e.g., geophysical) used for conducting MEC-related activities.
8. Divers who are independently performing the duties of a UXOT or UXOQP must:
   a. Meet this TP’s criteria for the duties performed and the requirements of 29 CFR 1910, Subpart T.
   b. Possess the dive-related certifications required for the tasks they are to perform or supervise. (Note: Certifications (dive or training) must be from an accredited school and meet the requirements contained in ANSI/ACDE-01; be documented as valid by an ADC Commercial Diver Certification Card for the appropriate training level; and/or have documentation of successful completion of an appropriate level of training from an ACDE accredited school, or have completed the underwater portion of NAVSCOLEOD (or foreign equivalent) training.)

Table 4.3. Minimum Qualifications for SP and SW[1]

Position Description	Training Required	Minimum MEC-related Experience[3, 4]
SP	Note 2	0 years
SW	Note 2	0 years

Notes:

1. Job- and site-specific training including, but not limited to, general and site specific safety (e.g., proper use of equipment and PPE, physical, biological, and chemical hazards); explosives safety training (e.g., recognition of military munitions, 3Rs
2. Personnel who are working at a hazardous waste site require successful completion of an OSHA-compliant (29 CFR 1910.120) HAZWOPER course.
3. Experience as an SP or SW is not required for UXO-TI certification.
4. Activities performed as an SP or SW are not counted toward the experiential requirements for a UXOT or UXOQP.

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GLOSSARY

G.1. ACRONYMS

3Rs	recognize, retreat, report
ACDE	Association of Commercial Diving Educators
ADC	Association of Diving Contractors
ANSI	America National Standards Institute
CA	chemical agent
CAIS	chemical agent identification sets
CFR	Code of Federal Regulations
CWM	chemical warfare materiel
DC	direct current
DDESB	Department of Defense Explosives Safety Board
DMM	discarded military munitions
DOT	Department of Transportation
EOD	explosive ordnance disposal
ESQD	explosive safety quantity distance
HAZWOPER	hazardous waste operations and emergency response
HERO	hazards of electromagnetic radiation to ordnance
MC	munitions constituents
MDAS	material documented as safe
MDEH	material documented as an explosive hazard
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
MRS	munitions response site
OESS	Ordnance and Explosives Safety Specialist
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
PTR	public traffic route
QA	quality assurance
QC	quality control
RDT&E	research, development, test and evaluation
RSP	render-safe procedures

SP	sweep personnel
SUXOS	Senior UXO Supervisor
SW	support worker
TNT	trinitrotoluene
TP	technical paper
U.S.C.	United States Code
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOQP	UXO Qualified Personnel
UXOSO	UXO Safety Officer
UXOT	UXO Technician
UXO-TI	UXO Technician I
UXO-TII	UXO Technician II
UXO-TIII	UXO Technician III

G.2. DEFINITIONS

Ammunition Terms. The below provide general meanings for the terms listed. Based on use, certain terms may have a different meanings.

- Family - weapon system munitions which provide a similar capability (e.g., tank, artillery, bombs)
- Group - family broken into more specific category usually by weapon system (e.g., M1 Abrams 120mm, 105mm)
- Type - denotes payload or capability delivery (e.g., high explosive, armor piercing)
- Category:

    - Operational, combat, training, or testing
    - Storage category
    - MEC category (i.e., UXO, DMM or MC (explosive))

- Groups - sensitivity of storage compatibility, munitions with similar explosive characteristics relating to means of detonation, blast considerations, and special containment requirements (e.g., sensitivity to heat, friction, percussion)

DMM. Defined in 10 U.S.C. 2710(e)(2).

explosive. Defined in DoD 6055.09-M, Volume 8.

explosive hazard. Defined in DoD 6055.09-M, Volume 8.

EOD. Defined in DoD 6055.09-M, Volume 8.

EOD personnel. Uniformed military personnel who have graduated from the Naval School, Explosive Ordnance Disposal; are assigned to a military unit with a Service-defined EOD mission; and meet Service and assigned unit requirements to perform EOD duties. EOD personnel have received specialized training to address explosive and certain CA hazards during both peacetime and wartime. EOD personnel are trained and equipped to perform render safe procedures (RSP) on nuclear, biological, chemical, and conventional munitions, and on improvised explosive devices.

explosives or munitions emergency response. Defined in 40 CFR 260.10.

MC. Defined in 10 U.S.C. 2710 (e)(3).

MDAS. Defined in DoD Instruction 4140.62.

MDEH. Defined in DoD Instruction 4140.62.

MEC. Specific categories of military munitions that may pose unique explosives safety risks when present in high enough concentrations to pose an explosive hazard:

Unexploded Ordnance (UXO), as defined in 10 U.S.C. 101(e)(5)

Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2)

MC (e.g., TNT, cyclotrimethylenetrinitramine) as defined in 10 U.S.C. 2710(e)(3),

military munitions. All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the Coast Guard, the Department of Energy, and the National Guard.

Includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof.

Does not include wholly inert items, improvised explosives devices and nuclear weapons, nuclear devices, and nuclear components, but does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 *et seq.*) have been completed. (See 10 U.S.C. 101(e) (4).)

MPPEH. Material owned or controlled by the DoD that, before determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris) or potentially contains a high enough concentration of explosives that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are:

Military munitions and military munitions-related materials, including wholly inert components (e.g., fins, launch tubes, containers, packaging material), that are to be used or reused for their intended purpose and are within a DoD Component-established munitions management system.

Non-munitions-related material (e.g., horseshoes, rebar, other solid objects) and munitions debris that are solid metal fragments that do not realistically present an explosive hazard.

Other items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions. (See DoDI 4140.62.)

MRS. Defined in DoD 6055.09-M, Volume 8.

munitions debris. Defined in DoD 6055.09-M, Volume 8.

munitions response. Defined in DoD 6055.09-M, Volume 8.

munitions response area. Defined in DoD 6055.09-M, Volume 8.

range clearance. Defined in DoD 6055.09-M, Volume 8.

range-related debris. Defined in DoD 6055.09-M, Volume 8.

UXO. Defined in 10 U.S.C. 101(e)(5)(A) through (C).

UXOQP. Defined in DoD 6055.09-M, Volume 8.

UXOT. Defined in DoD 6055.09-M, Volume 8.

REFERENCES

American National Standards Institute, Association of Commercial Diving Educators-01, “National Standard for Divers – Commercial Diver Training – Minimum Standard,” current edition

Code of Federal Regulations, Title 27, Section 555.26

Code of Federal Regulations, Title 29

Code of Federal Regulations, Title 40, Section 260.10

Code of Federal Regulations, Title 49, Section 172.704

DoD 6055.09-M, Volume 8, “DoD Ammunition and Explosives Safety Standards: Glossary,” February 29, 2008, as amended

DoD Instruction 4140.62 “Material Potentially Presenting an Explosive Hazard,” November 24, 2008, as amended

International Standards Organization 9001, “Quality management systems – Requirements,” current edition

Technical Bulletin 700-2, Naval Sea Systems Command Instruction 8020.8C, Technical Order 11A-1-47, “Department of Defense Ammunition and Explosives Hazard Classification Procedures,” July 30, 2012

United States Code, Title 10

United States Code, Title 18, Section 842

United States Code, Title 42, Section 2011 *et seq.*

APPENDIX C

FIELD STANDARD OPERATING PROCEDURES

TETRA TECH

STANDARD OPERATING PROCEDURE

(GUIDANCE)

Number CT-04	Page 1 of 7
Effective Date 11/20/2016	Revision 5
Applicability Tetra Tech, Inc., NUS Operating Unit	
Prepared Earth Sciences Department	

Subject
SAMPLE NOMENCLATURE

Approved
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1.0 PURPOSE

This document specifies a consistent sample nomenclature system that facilitates subsequent data management in a cost-effective manner. The sample nomenclature system has been devised such that the following objectives can be attained:

- Sorting of data by matrix
- Sorting of data by depth
- Maintenance of consistency (field, laboratory, and database sample numbers)
- Accommodation of all project-specific requirements
- Accommodation of laboratory sample number length constraints (maximum of 20 characters)

2.0 SCOPE AND APPLICABILITY

The methods described in this document are designed to be used consistently for all projects requiring electronic data. Other contract- or project-specific sample nomenclature requirements may also be applicable. If project-specific requirements dictate the use of a different system of nomenclature than what is described in this guidance, the objectives identified above must be borne in mind when developing the alternate nomenclature. Consultation with the NUS Operating Unit database group is advisable in those cases. The database group will help ensure that sample nomenclature is compatible with the affected databases.

3.0 GLOSSARY

None.

4.0 RESPONSIBILITIES AND PERSONNEL QUALIFICATIONS

Program Manager - The Program Managers (or their designees) are responsible for informing contract-specific Project Managers (PMs) of the existence and requirements of this document. Program Manager qualifications are described in the current NUS Operating Unit Quality Assurance Program Manual available on the intranet Quality Assurance link.

Project Manager - Project Managers (PMs) determine the applicability of this document based on: (1) program-specific requirements and (2) project size and objectives. PMs (or their designees) ensure that sample nomenclature requirements are thoroughly specified in the relevant project planning document (e.g., sampling and analysis plan) and are consistent with this document, if relevant. PMs ensure that the Field Operations Leader (FOL) is familiar with the sample nomenclature system. Program Managers appoint PMs based on their experience and past performance and qualifications as described in the current NUS Operating Unit Quality Assurance Program Manual, which is available on the intranet Quality Assurance link.

Field Operations Leader - The FOL ensures that all field technicians or sampling personnel are thoroughly familiar with this document and the project-specific sample nomenclature system and that they implement the nomenclature system in accordance with this document.

General personnel qualifications for sample nomenclature activities in the field include the following:

- Capability of performing field work under the expected physical and environmental (i.e., weather) conditions.

- Familiarity with appropriate procedures for field documentation, sample handling, packaging, and shipping.

5.0 PROCEDURES

5.1 INTRODUCTION

The sample identification (ID) system may consist of as few as eight but not more than 20 distinct alpha-numeric characters. The sample ID will be provided to the laboratory on the sample labels and chain-of-custody forms. The basic sample ID provided to the laboratory has three segments and shall be as follows, where "A" indicates "alpha," and "N" indicates "numeric":

A or N **3 or 4 Characters**	**AAA** **2 or 3 Characters**	**A or N** **3 to 6 Characters**
Site Identifier	Sample Type	Sample Location

Additional segments may be added as needed. For example:

(1) Soil and sediment sample ID

A or N **3 or 4 Characters**	**AAA** **2 or 3 Characters**	**A or N** **3 to 6 Characters**	**NNNN** **4 Characters**
Site identifier	Sample type	Sample location	Sample depth

(2) Aqueous (groundwater or surface water) sample ID

A or N **3 or 4 Characters**	**AAA** **2 or 3 Characters**	**A or N** **3 to 6 Characters**	**NN** **2 Characters**	**A** **1 Character**
Site identifier	Sample type	Sample location	Round number	Filtered sample only

Note 1: Sampling dates may be used in place of round numbers.

Note 2: The “-F” may be omitted from the sample ID if there is another way to definitively indicate on chain of custody forms and in the NUS Operating Unit database which portion of a samples is designated for total species analysis (unfiltered samples) and which is designated for dissolved species analysis (filtered samples).

(3) Biota sample ID

A or N **3 or 4 Characters**	**AAA** **2 or 3 Characters**	**A or N** **3 to 6 Characters**	**AA** **2 Characters**	**NNN** **3 Characters**
Site identifier	Sample type	Sample location	Species identifier	Sample group number

5.2 SAMPLE IDENTIFICATION FIELD REQUIREMENTS

The various fields in the sample ID include but are not limited to the following:

- Site identifier
- Sample type
- Sample location
- Sample depth
- Sampling round number
- Filtered
- Species identifier
- Sample group number

The site identifier must be a three- or four-character field (numeric characters, alpha characters, or a mixture of alpha and numeric characters may be used). A site number is necessary because many facilities/sites have multiple individual sites, Solid Waste Management Units (SWMUs), Operable Units (OUs), etc. Several examples are presented in Section 5.3.

The sample type must be a two- or three-character alpha field. Suggested codes are provided in Section 5.3.

The sample location must be at least a three-character field but may have up to six characters (alpha, numeric, or a mixture). The six characters may be useful in identifying a monitoring well to be sampled or describing a grid location.

The sample depth field is used to note the depth below ground surface (bgs) in units of feet at which a soil sample is collected; and the depth in units of inches bgs at which a sediment sample was collected. The first two numbers of the four-number code specify the top interval, and the third and fourth specify the bottom interval in feet bgs of the sample. If the sample depth is equal to or greater than 100, then only the top interval would be represented and the sampling depth would be truncated to three characters. The depths will be noted in whole numbers only; further detail, if needed, will be recorded on the sample log sheet or boring log, in the logbook, etc.

A two-digit round number will be used to track the number of aqueous samples collected from a particular aqueous sample location. The first sample collected from a location will be assigned the round identifier 01, the second 02, etc. This applies to both existing and proposed monitoring wells and surface water locations.

Aqueous samples that are field filtered (dissolved analysis) will be identified with an "-F" in the last field segment. No entry in this segment signifies an unfiltered (total) sample.

Note: If samples are filtered in the field, the results will be segregated in the NUS Operating Unit database according to whether they represent the unfiltered sample or filtered sample. The chain of custody form must be marked to indicate which portion of a sample is filtered. This may be accomplished by appending “-F” to the end of the sample number or by otherwise indicating on the chain of custody form which sample portion is filtered (for dissolved species analysis) as opposed to unfiltered (for total species analysis).

The species identifier must be a two-character alpha field. Several suggested codes are provided in Section 5.3.

The three-digit sample group number will be used to track the number of biota sample groups (a particular group size may be determined by sample technique, media type, the number of individuals caught, weight issues, time, etc.) by species and location. The first sample group of a particular species collected from a given location will be assigned the sample group number 001, and the second sample group of the same species collected from the same location will be assigned the sample group number 002.

5.3 EXAMPLE SAMPLE FIELD DESIGNATIONS

Examples of each of the fields are as follows:

Site identifier - Examples of site numbers/designations are as follows:

A01 - Area of Concern (AOC) 1
125 - SWMU 125
000 - Base- or facility-wide sample (e.g., upgradient well)
BBG - Base background

The examples cited are only suggestions. Each PM (or designee) must designate appropriate (and consistent) site designations for their individual project.

Sample type - Examples of sample types are as follows:

AH - Ash Sample
AS - Air Sample
BM - Building Material Sample
BSB - Biota Sample Full Body
BSF - Biota Sample Fillet
CP - Composite Sample
CS - Chip Sample
DS - Drum Sample
DU - Dust Sample
FP - Free Product
IDW - Investigation-Derived Waste Sample
LT - Leachate Sample
MW - Monitoring Well Groundwater Sample
OF - Outfall Sample
RW - Residential Well Sample
SB - Soil Boring Sample
SD - Sediment Sample
SC - Scrape Sample
SG - Soil Gas Sample
SL - Sludge Sample
SP - Seep Sample
SS - Surface Soil Sample
ST - Storm Sewer Water Sample
SW - Surface Water Sample
TP - Test Pit Sample
TW - Temporary Well Sample
WC - Well Construction Material Sample
WP - Wipe Sample
WS - Waste/Solid Sample
WW - Wastewater Sample

Sample location - Examples of the location field are as follows:

001 - Monitoring Well 1
N32E92 - Grid location 32 North and 92 East
D096 - Investigation-derived waste drum number 96

Species identifier - Examples of species identifier are as follows:

BC - Blue Crab
GB - Blue Gill
CO - Corn
SB - Soybean

5.4 EXAMPLES OF SAMPLE NOMENCLATURE

A first round monitoring well groundwater sample collected from existing monitoring well 001 at SWMU 16 for a filtered sample would be designated as 016MW00101-F (or without the “-F” if otherwise indicated as to which portion of sample is filtered and which is unfiltered)..

The second round monitoring well groundwater sample collected from existing monitoring well C20P2 at Site 23 for an unfiltered sample would be designated as 023MWC20P202.

The second surface water sample collected from point 01 at SWMU 130 for an unfiltered sample would be designated as 130SW00102.

A surface soil sample collected from grid location 32 North and 92 East at Site 32 at the 0- to 2-foot interval would be designated as 032SSN32E920002.

A subsurface soil sample from soil boring 03 at SWMU 32 at an interval of 4 to 5 feet bgs would be designated as 032SB0030405.

A sediment sample collected at SWMU 19 from 0 to 6 inches at location 14 would be designated as 019SD0140006. The sample data sheet would reflect the precise depth at which this sample was collected.

During biota sampling for full-body analysis, the first time a minnow trap was checked at grid location A25 of SWMU 1415, three small blue gills were captured, collected, and designated with the sample ID of 1415BSBA25BG001. The second time blue gill were collected at the same location (grid location A25 at SWMU 1415), the sample ID would be 1415BSBA25BG002.

Note: No dash (-) or spacing is used between the segments with the exception of the filtered segment. The "F" used for a filtered aqueous sample is preceded by a dash (-F).

Note: It may be more useful for project staff to use feet bgs instead of inches bgs to indicate sediment sampling depths. Whichever units of measure are used for sampling of any matrix, the units must be clearly documented to ensure there is no confusion. Consistency with previous sample nomenclature also will reduce any chance of confusion.

5.5 FIELD QA/QC SAMPLE NOMENCLATURE

Field Quality Assurance (QA)/Quality Control (QC) samples are designated using a different coding system. The QC code will consist of a three- to four-segment alpha-numeric code that identifies the sample QC type, the date the sample was collected, and the number of this type of QC sample collected on that date.

AA	NNNNNN	NN	-F
QC type	Date	Sequence number (per day)	Filtered (aqueous only, if needed)

Note: The “-F” may be omitted from the sample ID if there is another way to definitively indicate on chain of custody forms which portion of a samples is designated for total species analysis (unfiltered samples) and which is designated for dissolved species analysis (filtered samples).

The QC types are identified as:

TB = Trip Blank
RB = Rinsate Blank (Equipment Blank)
FD = Field Duplicate
AB = Ambient Conditions Blank
WB = Source Water Blank

The sampling time recorded on the chain-of-custody form, labels, and tags for duplicate samples will be 0000 so that the samples are "blind" to the laboratory. Notes detailing the sample number, time, date, and type will be recorded on the routine sample log sheets and will document the location of the duplicate sample (sample log sheets are not provided to the laboratory). Documentation for all other QC types (TB, RB, AB, and WB) will be recorded on the QC Sample Log Sheet (see SOP SA-6.3, Field Documentation).

5.6 EXAMPLES OF FIELD QA/QC SAMPLE NOMENCLATURE

The first duplicate of the day for a filtered groundwater sample collected on June 3, 2016, would be designated as FD06031601-F (or without the “-F” if otherwise indicated on the chain of custody form as to which portion of sample is filtered and which is unfiltered).

The third duplicate of the day taken of a subsurface soil sample collected on November 17, 2016, would be designated as FD11171603.

The first trip blank associated with samples collected on October 12, 2016, would be designated as TB10121601.

The only rinsate blank collected on November 17, 2016, would be designated as RB11171601.

6.0 DEVIATIONS

Deviations from instructions specified in this document are allowed but sufficiently accurate and precise descriptions of sample nomenclature must be described in the site-specific planning documents to prevent confusion over sample identification.

TETRA TECH

STANDARD OPERATING PROCEDURE

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Tetra Tech, Inc., NUS Operating Unit

Prepared
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Subject
SOIL SAMPLING

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1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures to be used to collect surface, near-surface, and subsurface soil samples. Additionally, it describes the methods for sampling of test pits and trenches to determine subsurface soil and rock conditions and for recovery of small-volume or bulk samples from pits.

2.0 SCOPE AND APPLICABILITTY

This document applies to the collection of surface, near-surface, and subsurface soil samples obtained through hand digging, hand augering, drilling, or machine excavating at sites for which laboratory testing, onsite visual examination, and onsite testing is required.

WARNING:

Sample containers can be contaminated during storage if nearby volatile substances infiltrate the surrounding air and migrate into the containers. This can occur even when containers are capped. Therefore, containers that have been stored on site for longer than 6 months should not be used.

NOTE: Whereas most air-borne contamination is likely to be associated with organic substances, inorganic substances such as hydrochloric acid (muriatic acid) can emit inorganic vapors that infiltrate sample containers.

3.0 GLOSSARY

Composite Sample - A composite sample is a combination of more than one grab sample from various locations and/or depths and times that is homogenized and treated as one sample. This type of sample is usually collected when determination of an average waste concentration for a specific area is required. Composite samples shall not be collected for volatile organics analysis.

Confined Space - As stipulated in 29 Code of Federal Regulations (CFR) 1910.146, a confined space means a space that: (1) is large enough and so configured that an employee can bodily enter and perform assigned work; (2) has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, pits, and excavations); and (3) is not designed for continuous employee occupancy. Tetra Tech considers all confined space as permit-required confined spaces.

Grab Sample - One sample collected at one location and at one specific time.

Hand Auger - A sampling device used to extract soil from the ground.

Representativeness – A qualitative description of the degree to which an individual sample accurately reflects population characteristics or parameter variations at a sampling point. It is therefore an important characteristic not only of assessment and quantification of environmental threats posed by the site, but also for providing information for engineering design and construction. Proper sample location selection and proper sample collection methods are important to ensure that a truly representative sample has been collected.

Sample for Non-Volatile Analyses - Includes all chemical parameters other than volatile organics (e.g., semivolatiles, pesticides/PCBs, metals, etc.) and those engineering parameters that do not require undisturbed soil for their analysis.

Split-Barrel Sampler - A steel tube, split in half lengthwise, with the halves held together by threaded collars at either end of the tube. Also called a split-spoon sampler, this device can be driven into resistant materials using a drive weight mounted in the drilling string. A standard split-barrel sampler is typically available in two common lengths, providing either 20-inch or 26-inch longitudinal clearance for obtaining 18-inch or 24-inch-long samples, respectively. These split-barrel samplers commonly range in size from 2 to 3.5 inches outside diameter (OD). The larger sizes are commonly used when a larger volume of sample material is required (see Attachment B).

Test Pit and Trench - Open, shallow excavations, typically rectangular (if a test pit) or longitudinal (if a trench), excavated to determine shallow subsurface conditions for engineering, geological, and soil chemistry exploration and/or sampling purposes. These pits are excavated manually or by machine (e.g., backhoe, clamshell, trencher, excavator, or bulldozer).
Thin-Walled Tube Sampler - A thin-walled metal tube (also called a Shelby tube) used to recover relatively undisturbed soil samples. These tubes are available in various sizes, ranging from 2 to 5 inches OD and from 18 to 54 inches in length.

4.0 RESPONSIBILITIES AND PERSONNEL QUALIFICATIONS

Project Manager - The Project Manager, who is qualified by having completed project management training and by being appointed as the program or office manager, is responsible for determining the sampling objectives, selecting planned sampling locations, and selecting field procedures used in the collection of soil samples. Additionally, in consultation with other project personnel (geologist, hydrogeologist, etc.), the Project Manager establishes the need for test pits or trenches and determines their approximate locations and dimensions.

Site Safety Officer (SSO) - The SSO (or a qualified designee) is responsible for providing the technical support necessary to implement the project Health and Safety Plan (HASP) or equivalent. This will include (but not be limited to) performing air quality monitoring during sampling, boring, and excavation activities and to ensure that workers and off-site (downwind) individuals are not exposed to hazardous levels of airborne contaminants. The SSO/designee may also be required to advise the Field Operations Leader (FOL) on other safety-related matters regarding boring, excavation, and sampling, such as mitigative measures to address potential hazards from unstable trench walls, puncturing of drums or other hazardous objects, etc.

Field Operations Leader (FOL) - This individual is primarily responsible for the execution of the planning document containing the Sampling and Analysis Plan (SAP). This is accomplished through management of a field sampling team for the proper acquisition of samples. He or she is responsible for and qualified to execute the supervision of onsite analyses; ensuring proper instrument calibration, care, and maintenance; sample collection and handling; the completion and accuracy of all field documentation; and making sure that custody of all samples obtained is maintained according to proper procedures. When appropriate and as directed by the FOL, such responsibilities may be performed by other qualified personnel (e.g., field technicians) where credentials and time permit. The FOL is responsible for finalizing the locations for collection of surface, near-surface, and subsurface (hand and machine borings, test pits/trenches) soil samples. He/she is ultimately responsible for the sampling and backfilling of boreholes, test pits, and trenches and for adherence to Occupational Safety and Health Administration (OSHA) regulations during these operations through self-acquisition or through the management of a field team of samplers.

Project Geologist/Sampler - The Project Geologist/sampler is responsible for the proper acquisition of samples in accordance with this SOP and/or other project-specific documents. In addition, this individual is responsible for the completion of all required paperwork (e.g., sample log sheets, field notebook, boring logs, test pit logs, container labels, custody seals, and chain-of-custody forms) associated with the collection of those samples.

Competent Person - A Competent Person, as defined in 29 CFR 1929.650 of Subpart P - Excavations, means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

General personnel qualifications for groundwater sample collection and onsite water quality testing include the following:

- OSHA 40-hour and applicable refresher training.
- Capability of performing field work under the expected physical and environmental (i.e., weather) conditions.
- Familiarity with appropriate procedures for sample documentation, handling, packaging, and shipping.

5.0 HEALTH AND SAFETY

Health and safety precautions are identified for individual sample collection procedures throughout this SOP. In addition to those precautions, the following general hazards may be incurred during sampling activities:

- Knee injuries from kneeling on hard or uneven surfaces
- Slips, trips, and falls
- Cuts and lacerations
- Traffic hazards associated with sampling in parking areas, along railroads, roadways and highways.

Methods of avoiding these hazards are provided below.

Knee injuries – If kneeling is required during soil sampling, this could result in knee injuries from stones/foreign objects and general damage due to stress on the joints. To minimize this hazard:

- Clear any foreign objects from the work area.
- Wear hard-sided knee pads.
- Stretch ligaments, tendons and muscles before, during and after. Take breaks as frequently as necessary.
- Report pre-existing conditions to the SSO if you feel this activity will aggravate an existing condition.

Slips, Trips, and Falls – These hazards exist while traversing varying terrains carrying equipment to sample locations. To minimize these hazards:

- Pre-survey sampling locations. Eliminate, barricade, or otherwise mark physical hazards leading to the locations.
- Carry small loads that do not restrict the field of vision.
- Travel the safest and clearest route (not necessarily the shortest).

Cuts and Lacerations - To prevent cuts and lacerations associated with soil sampling, the following provisions are required:

- Always cut away from yourself and others when cutting tubing or rope. This will prevent injury to yourself and others if the knife slips.
- Do not place items to be cut in your hand or on your knee.
- Change blades as necessary to maintain a sharp cutting edge. Many accidents result from struggling with dull cutting attachments.
- Whenever practical, wear cut-resistant gloves (e.g., leather or heavy cotton work gloves) at least on the hand not using the knife.
- Keep cutting surfaces clean and smooth.
- Secure items to be cut – do not hold them against the opposing hand, a leg, or other body part.
- When transporting glassware, keep it in a hard-sided container such as a cooler so that if there is a fall, you will be less likely to get cut by broken glass.
- DO NOT throw broken sample jars or glass ampoules into garbage bags. Place broken glass and glass ampoules in hard-sided containers such as a cardboard box or directly into a dumpster. DO NOT reach into garbage bags to retrieve any item accidentally thrown away. Empty the contents onto a flat surface to avoid punctures and lacerations from reaching where you cannot see.

Vehicular and Foot Traffic Hazards – When sampling along the roadway or near traffic patterns, follow the following precautions:

- Motorists may be distracted by onsite activities – ASSUME THEY DO NOT SEE YOU OR MEMBERS OF YOUR FIELD CREW.
- DO NOT place obstructions (such as vehicles) along the sides of the road that may cause site personnel to move into the flow of traffic to avoid your activities or equipment or that will create a blind spot.
- **Provide a required free space of travel**. Maintain at least 6 feet of space between you and moving traffic. Where this is not possible, use flaggers and/or signs to warn oncoming traffic of activities near or within the travel lanes.
- Face Traffic. Whenever feasible, if you must move within the 6 feet of the required free space or into traffic, attempt to face moving traffic at all times. Always leave yourself an escape route.
- Wear high-visibility vests to increase visual recognition by motorists.
- Do not rely on the vehicle operator’s visibility, judgment, or ability. Make eye contact with the driver. Carefully and deliberately use hand signals so they will not startle or confuse motorists or be mistaken for a flagger’s direction before moving into traffic.
- Your movements may startle a motorist and cause an accident, so move deliberately. Do not make sudden movements that might confuse a motorist.
- When working along active rail lines, notify the proper organization to ensure they are aware that you are in the area and that working schedules can be determined.

Sample Containers - Sample containers shall conform to the guidelines in SOP SA-6.1.

6.0 PROCEDURES

The following procedures address surface and subsurface sampling. Equipment lists specific to each type of sampling are provided in the applicable sections below.

If documentation such as a Certificate of Analysis is provided with sample containers to demonstrate their cleanliness, submit the documentation to the Project Manager for inclusion in the project file.

Section 6.1 provides an overview of the sampling processes. The procedures described In Section 6.2 begin with transferring sample material from a sampling device or directly from the ground surface into a sample container. Beginning with Section 6.3, various sample collection techniques and processes that are used for collecting surface or subsurface soil samples prior to transferring to sample containers are described.

CAUTION

Each situation must be evaluated individually to determine the applicability and necessity for obtaining a utility clearance ticket/dig permit. Common sense dictates, prior to digging or boring with power equipment, no matter what the depth, or digging by hand in a manner that could damage unprotected underground utilities, that a dig permit is required. See SOP HS-1.0, Utility Locating and Excavation Clearance, for additional clarification. If you do not know or are unsure as to whether a ticket is necessary – **Get the Ticket**.

6.1 Overview

Soil sampling is an important adjunct to groundwater monitoring. Sampling of the soil horizons above the groundwater table can detect contaminants before they migrate to the water table, and can establish the amount of contamination absorbed or adsorbed on aquifer solids that have the potential of contributing to groundwater contamination.

Soil types can vary considerably on a site. These variations, along with vegetation, can affect the rate of contaminant migration through the soil. It is important, therefore, that a detailed record be maintained during sampling operations, particularly noting sampling locations, depths, and such characteristics as grain size, color, and odor. Subsurface conditions are often stable on a daily basis and may demonstrate only slight seasonal variation especially with respect to temperature, available oxygen and light penetration. Changes in any of these conditions can radically alter the rate of chemical reactions or the associated microbiological community, thus further altering specific site conditions. Certain vegetation species can create degradation products that can alter contaminant concentrations in soil. This is why vegetation types and extent of degradation of this foliage must be recorded. To prevent degradation, samples must be kept at their at-depth temperature or lower, protected from direct light, sealed tightly in approved glass containers, and be analyzed as soon as possible after collection. In addition, to the extent possible, vegetation should be removed from the sample.

The physical properties of the soil, its grain size, cohesiveness, associated moisture, and such factors as depth to bedrock and water table, will limit the depth from which samples can be collected and the method required to collect them. It is the intent of this document to present the most commonly employed soil sampling methods used at environmental investigation sites.

6.2 Soil Sample Collection

6.2.1 Procedure for Preserving and Collecting Soil Samples for Volatile Organic Compound Analysis

Samples collected using traditional methods such as collection in a jar with no preservation have been known to yield non-representative samples due to loss of volatile organic compounds (VOCs). To prevent such losses, preservation of samples with methanol or sodium bisulfate may be used to minimize volatilization and biodegradation. This preservation may be performed either in the field or laboratory, depending on the sampling methodology employed. Because of the large number of sampling methods and associated equipment required, careful coordination between field and laboratory personnel is needed.

Soil samples to be preserved by the laboratory and analyzed for VOCs may be collected using Method SW-846, 5035. Encore™ or equivalent samplers are used for this. For samples preserved in the field, laboratories are currently performing low-level analyses (sodium bisulfate preservation) and high- to medium-level analyses (methanol preservation) depending on the needs of the end user.

The following procedures outline the necessary steps for collecting soil samples to be preserved at the laboratory, and for collecting soil samples to be preserved in the field with methanol or sodium bisulfate.

6.2.1.1 Soil Samples to be Preserved at the Laboratory

Soil samples collected for volatile organic analysis that are to be preserved at the laboratory shall be obtained using a hermetically sealed sample vial such as an EnCore™ sampler. Each sample shall be obtained using a reusable sampling handle (T-handle) that can be provided with the EnCore™ sampler when requested and purchased. Collect the sample in the following manner for each EnCore™ sampler:

1. Scene Safety - Evaluate the area where sampling will occur. Ensure that the area is safe from physical, chemical, and natural hazards. Clear or barricade those hazards that have been identified.

2. Wear the appropriate personal protective equipment (PPE). This will include, at a minimum, safety glasses and nitrile surgeon's gloves. If you must kneel on the ground or place equipment on the surface being sampled, cover the ground surface with plastic to minimize surface contamination of your equipment and clothing. Wear knee pads to protect your knees from kneeling on hard or uneven surfaces.

3. Load the Encore™ sampler into the T-handle with the plunger fully depressed.

4. Expose the area to be sampled using a hand trowel or similar device to remove surface debris.

5. Press the T-handle against the freshly exposed soil surface, forcing soil into the sampler. The plunger will be forced upward as the cavity fills with soil.

6. When the sampler is full, rotate the plunger and lock it into place. If the plunger does not lock, the sampler is not full. This method ensures there is no headspace. Soft soil may require several plunges or forcing soil against a hard surface such as a sample trowel to ensure that headspace is eliminated.

7. Use a paper towel to remove soil from the side of the sampler so a tight seal can be made between the sample cap and the rubber O-ring.

8. With soil slightly piled above the rim of the sampler, force the cap on until the catches hook the side of the sampler.

9. Remove any surface soil from the outside of the sampler and place in the foil bag provided with the sampler. Good work hygiene practices and diligent decontamination procedures prevents the spread of contamination even on the outside of the containers.

10. Label the bag with appropriate information in accordance with SOP SA-6.3.

11. Place the full sampler inside a lined cooler with ice and cool to <6˚C. Make sure any required trip blanks and temperature blanks are also in the cooler. Secure custody of the cooler in accordance with SOP SA-6.3.

12. Typically, collect three Encore™ samplers at each location. Consult the SAP or laboratory to determine the required number of Encore™ samplers to be collected.

13. The T-handle shall be decontaminated before moving to the next interval or location using a soap and water wash and rinse, and where applicable, the selected solvent as defined in the project planning documents.

Using this type of sampling device eliminates the need for field preservation and the shipping restrictions associated with preservatives. A complete set of instructions is included with each Encore™ sampler.

After the Encore™ samples are collected, they should be placed on ice immediately and delivered to the laboratory within 48 hours (following the chain-of-custody and documentation procedures outlined in SOP SA-6.1). Samples must be preserved by the laboratory within 48 hours of sample collection.

6.2.1.2 Soil Samples to be Preserved in the Field

Soil samples preserved in the field may be prepared for analyses using both the low-level (sodium bisulfate preservation) and high- to medium-level (methanol preservation) methods.

Safety Reminder

When using chemicals in the field to preserve samples, the FOL and/or SSO must ensure that Safety Data Sheets (SDSs) have been provided with the chemicals to be used. They also must ensure that these chemicals have been added to the Chemical Inventory List contained within the Hazard Communication section of the HASP or equivalent. Lastly, but most importantly, the FOL and/or SSO must review the hazards with personnel using these chemicals and ensure that provisions are available for recommended PPE and emergency measures (e.g., eyewash, etc.).

Methanol Preservation (High to Medium Level):

Bottles may be pre-spiked with methanol in the laboratory or prepared in the field. Soil samples to be preserved in the field with methanol shall utilize 40 to 60 mL glass vials with septum-lined lids. Each sample bottle shall be filled with 25 mL of demonstrated analyte-free purge-and-trap grade methanol. The preferred method for adding methanol to the sample bottle is by removing the lid and using a pipette or scaled syringe to add the methanol directly to the bottle.

CAUTION

NEVER attempt to pipette by mouth

In situations where personnel are required to spike the septum using a hypodermic needle, the following provisions for handling sharps must be in place:

- Training of personnel regarding methods for handling of sharps
- Hard-sided containers for the disposal of sharps
- Provisions for treatment in cases where persons have received a puncture wound

Soil shall be collected with the use of a decontaminated (or disposable), small-diameter coring device such as a disposable tube/plunger-type syringe with the tip cut off. The outside diameter of the coring device must be smaller than the inside diameter (ID) of the sample bottle neck.

A small electronic balance or manual scale will be necessary for measuring the volume of soil to be added to the methanol-preserved sample bottle. Calibration of the scale shall be performed prior to use and intermittently throughout the day according to the manufacturer's requirements.

The sample should be collected as follows:

1. Weigh the unused syringe and plunger to the nearest 0.01 gram.
2. Pull the plunger back and insert the syringe into the soil to be sampled.
3. Collect 8 to 12 grams of soil by pushing the syringe barrel into the soil.
4. Weigh the sample and adjust until obtaining the required amount of sample.
5. Record the sample weight to the nearest 0.01 gram in the field logbook and/or on the sample log sheet.
6. Extrude the weighed soil sample into the methanol-preserved sample bottle taking care not to contact the sample container with the syringe.
7. If dirty, wipe soil particles from the threads of the bottle and cap. Cap the bottle tightly.
8. After capping the bottle, swirl the sample (do not shake) in the methanol and break up the soil such that all of the soil is covered with methanol.
9. Place the sample on ice immediately and prepare for shipment to the laboratory as described in SOP SA-6.1.

Sodium Bisulfate Preservation (Low Level):

CAUTION

Care should be taken when adding the soil to sodium bisulfate solution. A chemical reaction of soil containing carbonates (limestone) may cause the sample to effervesce or the vial to possibly explode. To avoid this hazard or hazards of this type, a small sample aliquot should be subjected to the sample preservative. If it effervesces in an open air environment, utilize an alternative method such as Encore™ or 2-ounce jar.

Bottles may be prepared in the laboratory or in the field with sodium bisulfate solution. When collecting samples in vials that are pre-preserved with sodium bisulfate, collect the samples as described above for methanol-preserved samples.

1. Samples to be preserved in the field using the sodium bisulfate method are to be prepared and collected as follows:
   a) Add 1 gram of sodium bisulfate to 5 mL of laboratory-grade deionized water in a 40 to 60 mL glass vial with septum-lined lid.

   b) Collect the soil sample and record the sample weight to the nearest 0.01 gram in the field logbook or on the sample log sheet as described for methanol preservation.

   c) Add the weighed sample to the sample vial.

   d) Collect duplicate samples using the methanol preservation method on a one-for-one sample basis because it is necessary for the laboratory to perform both low-level and medium-level analyses.

   e) Place the samples on ice immediately and prepare for shipment to the laboratory as described in SOP SA-6.1.

NOTE

If lower detection limits are necessary, an option to field preserving with sodium bisulfate may be to collect EnCore™ samplers at a given sample location. Consult the planning documents to determine whether this is required. If it is, collect samples in accordance with the Encore™ sampling procedure above and then send all samplers to the laboratory to perform the required preservation and analyses.

6.2.2 Procedure for Collecting Soil Samples for Non-Volatile Analyses

Samples collected for non-volatile analyses may be collected as either grab or composite samples as follows:

1. To ensure collection of a representative sample, use a stainless steel trowel or other approved tool, to transfer the entire depth interval of the soil to be sampled to a stainless steel bowl, re-sealable plastic bag, or disposable inert plastic tray.

NOTE: Contact with plastic materials, especially if the contact is prolonged, may cause contamination of samples with phthalates and other contaminants contained in the plastic. Loss of analytes due to adsorption or reaction with plastics also is possible. When in doubt about contamination potential, or potential loss of analyte due to adsorption/reaction, consult the Project Manager or use non-plastic bowls or other equipment to the extent possible when mixing samples.

2. Remove roots, vegetation, sticks, and stones larger than the size of a green pea.

3. Thoroughly mix the soil to obtain as uniform a texture and color as practicable. The soil type, moisture content, amount of vegetation, and other factors may affect the amount of time required to obtain a properly mixed sample. In some cases, it may be impossible to obtain a uniform sample appearance. Use the field logbook to describe any significant difficulties encountered in obtaining a uniform mixture.

4. Transfer a portion of the mixed soil to the appropriate sample containers and close the containers.

5. Label the sample containers in accordance with SOP SA-6.3.

6. Place the containers in a cooler of ice as soon after collection as possible.

7. Prepare the sample shipment and ship the samples in accordance with SOP SA-6.1.

NOTE

Cooling may not be required for some samples depending on the scheduled analyses. Consult the planning documents if in doubt regarding correct sample preservation conditions. When in doubt – Cool to <6˚C.

NOTE

Head space is permitted in soil sample containers for non-volatile analyses to allow for sample expansion.

6.2.3 Procedure for Collecting Undisturbed Soil Samples

NOTE

Use of thin-walled undisturbed tube samplers is restricted by the consistency of the soil to be sampled. Often, very loose and/or wet samples cannot be retrieved by the samplers, and soil with a consistency in excess of very stiff cannot be penetrated by the sampler. Devices such as Dennison or Pitcher core samplers can be used to obtain undisturbed samples of stiff soil. Using these devices normally increases sampling costs, and therefore their use should be weighed against the need for acquiring an undisturbed sample. These devices are not discussed in this SOP because they are not commonly used.

When it is necessary to acquire undisturbed samples of soil for purposes of engineering parameter analysis (e.g., permeability), a thin-walled, seamless tube sampler (Shelby tube) shall be employed using the following collection procedure:

1. In preparation for sampling utilizing a drill rig, field personnel must complete the following activities:

   - Ensure that all subsurface drilling activities are preceded by a utility clearance for the area to be investigated. This includes activities described in SOP HS-1.0, Utility Location and Excavation Clearance, as well as any location-specific procedures that may apply.

   REMEMBER

   If you are digging near a marked utility (within the diameter of an underground utility that has been marked plus 18 inches), you must first locate the utility through vacuum extraction or hand digging to ensure that your activities will not damage the utility.

   - Complete an Equipment Inspection Checklist for the drill rig or direct-push technology (DPT) rig. This checklist will be provided in the HASP.

   - Review the Safe Work Permit prior to conducting the activity.

   - Review the activity to be conducted.

2. Remove all surface debris (e.g., vegetation, roots, twigs, etc.) from the specific sampling location and drill and/or clean out the borehole to the desired sampling depth. Be careful to minimize potential disturbance of the material to be sampled. In saturated material, withdraw the drill bit slowly to prevent loosening of the soil around the borehole and to maintain the water level in the hole at or above groundwater level.

CAUTION

The use of bottom-discharge bits or jetting through an open-tube sampler to clean out the borehole shall not be allowed. Only the use of side-discharge bits is permitted.

3. Determine whether a stationary piston-type sampler is required to limit sample disturbance and aid in retaining the sample. Either the hydraulically operated or control rod activated-type of stationary piston sampler may be used.

4. Prior to inserting the tube sampler into the borehole, check to ensure that the sampler head contains a check valve. The check valve is necessary to keep water in the rods from pushing the sample out the tube sampler during sample withdrawal. In addition, the check valve maintains a positive suction within the tube to help retain the sample.

5. A stainless steel tube sampler is typically used to minimize chemical reaction between the sample and the sampling tube.

6. Remove the plastic end caps from the sampling tube and, with the sampling tube resting on the bottom of the hole and the water level in the boring at groundwater level or above, push the tube into the soil with a continuous and rapid motion, without impacting or twisting. If the soil is too hard to penetrate by pushing alone, careful hammering may be used by minimizing drop distance (tapping) of the hammer. Before pulling the tube, turn it at least one revolution to shear the sample off at the bottom. In no case shall the tube be pushed farther than the length provided for the soil sample. Allow about 3 inches in the tube for cuttings and sludge.

7. Upon removal of the sampling tube from the hole, measure the length of sample in the tube and also the length penetrated.

8. Remove disturbed material in the upper end of the tube and measure the length of sample again.

9. After removing at least 1 inch of soil from the lower end, place enough packing material (clean inert material such as paper or cloth) tightly in each end of the Shelby tube and then pour melted wax into each end to make at least a ½-inch wax plug and then add more packing material to fill the voids at both ends.

10. Place plastic caps on the ends, tape the caps in place, and dip the ends in wax to prevent loss of soil.

11. Affix label(s) to the tube as required and record sample number, depth, penetration, and recovery length on the label.

12. Mark the "up" direction on the side and upper end of the tube with indelible ink.

13. Complete a chain-of-custody form (see SOP SA-6.3) and other required forms (including Attachment A of this SOP).

14. Ship samples protected with suitable resilient packing material to reduce shock, vibration, and disturbance.

CAUTION

To preserve sample integrity do not allow tubes to freeze, and store the samples vertically with the same orientation they had in the ground, (i.e., top of sample is up) in a cool place out of the sun at all times.

CAUTION

A primary concern in the preparation of the wax plugs is the potential for the heat source and melted wax to cause a fire and/or burns. Follow the directions below to prevent injury or fire.

Electrical Heating

Using hot plates to melt the wax is acceptable. In an outdoor setting, make sure a Ground Fault Circuit Interrupter (GFCI) is employed within the electrical circuit. If a portable generator is used, ensure that the generator is an adequate distance from the sampling operation (at least 50 feet). Ensure that the extension cord is rated for the intended load and for outdoor use and is free from recognizable damage. Ensure flammable preservatives are not employed or stored near the hot plate. Although a Hot Work Permit is not required, scene safety evaluation by site personnel of the above elements is. As always, if a fire potential exists, the provisions for extinguishing must be immediately accessible as well as any provisions for first aid measures.

Open Flame

If an open flame is used, the following provisions are necessary:

- Complete a Hot Work Permit and any local permit required for elevated temperature applications. The Hot Work Permit, provided in your HASP, will aid the FOL and/or the SSO in ensuring that fire protection provisions (extinguishers, fire watches, etc.) are in place as well as ensuring that local requirements have been addressed.

- Ensure that water is available to address any wax splashes or contact. If possible, immerse the contacted area. Where this is not possible, run water over the area and apply cold compresses. The need for medical attention or first aid shall be determined on site under the direction of the SSO.

6.3 Surface Soil Sampling

The simplest, most direct method of collecting surface soil samples for subsequent analysis is by use of a stainless steel shovel, hand auger, soil corer, or stainless steel or disposable plastic trowel.

NOTE

Multiple depth intervals are used to describe surface soil. Sometimes surface soil is defined as soil from 0 to 2 inches below ground surface (bgs), and sometimes it is defined as soil from other depths such as 0 to 2 feet bgs. Ensure that the definition of surface soil depth is clear before collecting surface soil samples.

For the purposes of instruction, the terms “surface soil” and “near-surface soil” are used in this SOP as follows:

- Surface soil - 0 to 6 inches bgs
- Near-surface soil - 6 to 18 inches bgs

If these intervals are defined differently in the planning documents, substitute the appropriate depth ranges.

In general, the following equipment is necessary for obtaining surface soil samples:

- Stainless steel or pre-cleaned disposable trowel.
- Stainless steel hand auger, soil corer, or shovel.
- Real-time air monitoring instrument (e.g., photoionization or flame ionization detector [PID], [FID]) as directed in project planning document.
- Required PPE.
  - Nitrile surgeon's or latex gloves may be used, layered as necessary.
  - Safety glasses.
  - Other – Items identified on the Safe Work Permit may be required based on location-specific requirements such as hearing protection, steel-toed work boots, and a hard hat when working near a drill rig. These provisions will be listed in the HASP or directed by the FOL and/or SSO.

Safety Reminder

The use of latex products may elicit an allergic reaction in some people. Should this occur, remove the latex gloves, treat for an allergic reaction, and seek medical attention as necessary.

- Required paperwork (see SOP SA-6.3 and Attachment A of this SOP).
- Required decontamination equipment.
- Required sample container(s).
- Wooden stakes or pin flags.
- Re-sealable plastic bags.
- Heavy duty cooler.
- Ice.
- Chain-of-custody records and custody seals.

When acquiring surface soil samples, use the following procedure:

1. Place padding or use knee pads when kneeling near the sample location. If necessary, place plastic sheeting to provide a clean surface for sample equipment to avoid possible cross- contamination.
2. Carefully remove vegetation, roots, twigs, litter, etc. to expose an adequate soil surface area to accommodate sample volume requirements.
3. Using a pre-cleaned syringe or EnCore^{TM} samplers, follow the procedure in Section 6.2.1 for collecting surface soil samples for volatile analysis. Surface soil samples for volatile organic analysis should be collected deeper than 6 inches bgs because shallower material has usually lost most of the volatiles

through evaporation. Ensure that the appropriate surface soil depth is being analyzed in accordance with the planning document.

4. Using decontaminated sampling tools, thoroughly mix in place a sufficient amount of soil to fill the remaining sample containers. See Section 6.5 of this procedure for hand auger instruction, as needed.

5. Transfer the sample into those containers utilizing a stainless steel trowel.

6. Cap and securely tighten all sample containers.

7. Affix a sample label to each container. Be sure to fill out each label carefully and clearly, addressing all the categories described in SOP SA-6.3.

8. Proceed with the handling and processing of each sample container as described in SOP SA-6.1.

9. Site restoration – Whenever removing sample materials, always restore the surface. It is our intent to leave the area better than we found it. Do NOT create trip hazards in areas where pedestrian traffic may exist.

6.4 Near-Surface Soil Sampling

Collection of samples from near the surface (depth of 6 to 18 inches) can be accomplished with tools such as shovels, hand auger, soil corers, and stainless steel or pre-cleaned disposable trowels and the equipment listed under Section 6.5 of this procedure.

To obtain near-surface soil samples, the following protocol shall be used:

1. With a clean shovel, make a series of vertical cuts in the soil to the depth required to form a square approximately 1 foot by 1 foot.

2. Lever out the formed plug and scrape the bottom of the freshly dug hole with a decontaminated stainless steel or pre-cleaned disposable trowel to remove any loose soil.

3. Follow steps 1 through 9 of Section 6.3.

6.5 Subsurface Soil Sampling With Hand Augers and Soil Corers

Hand augering and Use of Soil Corers are similar. Hand augering requires turning the auger while it advances whereas soil corers are not necessarily turned during advancement.

6.5.1 Hand Augering

A hand augering system generally consists of a variety of stainless steel bucket bits (approximately 6.5 inches long and 2, 2.75, 3.25, and 4 inches in diameter), series of extension rods (available in 2-, 3-, 4- and 5-foot lengths), and a T-handle connected to extension rods and to the auger bucket. A larger diameter bucket bit is commonly used to bore a hole to the desired sampling depth and then it is withdrawn. The larger-diameter bit is then replaced with a smaller-diameter bit, lowered down the hole, and slowly turned into the soil to the completion depth (approximately 6 inches). The apparatus is then withdrawn and the soil sample collected.

The hand auger can be used in a wide variety of soil conditions. It can be used to sample soil either from the surface, or to depths in excess of 12 feet. However, the presence of subsurface rocks and landfill material and collapse of the borehole normally limit sampling depth.

To accomplish soil sampling using a hand augering system, the following equipment is required:

- Complete hand auger assembly (variety of bucket bit sizes).
- Stainless steel mixing bowls or re-sealable plastic bags.
- The equipment listed in Section 6.3.
- Miscellaneous hand tools as required to assemble and disassemble the hand auger units.

CAUTION

Potential hazards associated with hand augering include:

- Muscle strain and sprain due to over twisting and/or over compromising yourself.
- Equipment failure due to excessive stress on the T-handle or rods through twisting. Failure of any of these components will result in a sudden release and potential injury due to that failure.

As in all situations, any intrusive activities that could damage underground utilities shall be proceeded by a Dig/Excavation permit/ticket. Call the Utility Locating service in the area or your Site Safety Officer for more information. When in doubt – **Get the Ticket!**

To obtain soil samples using a hand auger, use the following procedure:

1. Wearing designated PPE, attach a properly decontaminated bucket bit to a clean extension rod and attach the T-handle to the extension rod.
2. Clear the area to be sampled of any surface debris (vegetation, twigs, rocks, litter, etc.).
3. Twist the bucket into the ground while pushing vertically downward on the auger. The cutting shoes fill the bucket as it is advanced into the ground.
4. As the auger bucket fills with soil, periodically remove any unneeded soil.
5. Add rod extensions as necessary to extend the reach of the auger. Also, note (in a field notebook, boring log, and/or on a standardized data sheet) any changes in the color, texture or odor of the soil as a function of depth. The project-specific planning document (SAP, HASP, etc.) describe requirements for scanning the soil with a real-time air monitoring instrument (e.g., PID, FID, etc.) and recording the measurements.
6. After reaching the desired depth (e.g., the top of the interval to be sampled), slowly and carefully withdraw the apparatus from the borehole to prevent or minimize movement of soil from shallower intervals to the bottom of the hole.
7. Remove the soiled bucket bit from the rod extension and replace it with another properly decontaminated bucket bit. The bucket bit used for sampling is to be smaller in diameter than the bucket bit employed to initiate the borehole.
8. Carefully lower the apparatus down the borehole. Care must be taken to avoid scraping the borehole sides.

9. Slowly turn the apparatus until the bucket bit is advanced approximately 6 inches.

10. Discard the top of the core (approximately 1 inch), which represents any loose material collected by the bucket bit before penetrating the sample material.

11. Using a pre-cleaned syringe or EnCore^{TM} sampler, follow the procedure in Section 6.2.1 for collecting a soil sample for volatile compound analysis directly from the bucket bit.

12. Utilizing a properly decontaminated stainless steel trowel or dedicated disposable trowel, remove the remaining sample material from the bucket bit and place into a properly decontaminated stainless steel mixing bowl or re-sealable plastic bag.

13. Homogenize the sample material as thoroughly as practicable then fill the remaining sample containers. Refer to Section 6.2.2.

14. Follow steps 4 through 7 listed in Section 6.3.

6.5.2 Sampling Using Stainless Steel Soil Corers

A soil corer is a stainless steel tube equipped with a cutting shoe and sample window in the side. The soil corer is advanced into the soil by applying downward pressure (body weight). The soil is unloaded by then forcing a ram towards the cutting shoe, which results in the discharge of the soil core through a window in the sleeve.

Use, application, and sample protocol is the same as for hand augering provided above, but without necessarily rotating the corer while advancing it.

<u>SAFETY REMINDER</u>

Hand augering and soil corer sampling can be physically demanding based on the type of geology and subsurface encumbrances encountered. Soil coring has some added hazards such the corer collapsing under your weight. To reduce the potential for muscle strain and damage, the following measures will be incorporated:

- Stretch and limber your muscles before heavy exertion. This hazard becomes more predominant in the early morning hours (prior to muscles becoming limber) and later in the day (as a result of fatigue).

- Job rotation – Share the duties so that repetitive actions do not result in fatigue and injury.

- Increase break frequencies as needed, especially as ambient conditions of heat and/or cold stress may dictate.

- Do not force the hand tools or use cheater pipes or similar devices to bypass an obstruction. Move to another location near the sampling point. Exerting additional forces on the sampling devices can result in damage and/or failure that could potentially injure someone in the immediate vicinity.

- Do not over compromise yourself when applying force to the soil corer or hand auger. If there is a sudden release, it could result in a fall or muscle injury due to strain.

6.6 Subsurface Soil Sampling with a Split-Barrel Sampler

A split-barrel (split-spoon) sampler consists of a heavy carbon steel or stainless steel sampling tube that can be split into two equal halves to reveal the soil sample (see Attachment B). A drive head is attached to the upper end of the tube and serves as a point of attachment for the drill rod. A removable tapered nosepiece/drive shoe attaches to the lower end of the tube and facilitates cutting. A basket-like sample retainer can be fitted to the lower end of the split tube to hold loose, dry soil samples in the tube when the sampler is removed from the drill hole. This split-barrel sampler is made to be attached to a drill rod and forced into the ground by means of a 140-pound or larger casing driver.

Safety Reminder

It is intended through the Equipment Inspection for Drill Rigs form provided in the HASP that the hammer and hemp rope, where applicable, associated with this activity will be inspected (no physical damage is obvious), properly attached to the hammer (suitable knots or sufficient mechanical devices), and is in overall good condition.

Split-barrel samplers are used to collect soil samples from a wide variety of soil types and from depths greater than those attainable with other soil sampling equipment.

The following equipment is used for obtaining split-barrel samples:

- Drilling equipment (provided by subcontractor).
- Split-barrel samplers (2-inch OD, 1-3/8-inch ID, either 20 inches or 26 inches long); Larger OD samplers are available if a larger volume of sample is needed.
- Drive weight assembly, 140-pound weight, driving head, and guide permitting free fall of 30 inches.
- Stainless steel mixing bowls or re-sealable plastic bags.
- Equipment listed in Section 6.3.

The following steps shall be followed to obtain split-barrel samples (Steps 1 through 4 are typically performed by the drilling subcontractor):

1. Attach the split-barrel sampler to the sampling rods.
2. Lower the sampler into the borehole inside the hollow stem auger bits.
3. Advance the split-barrel sampler by hammering the length (typically 18 or 24 inches) of the split-barrel sampler into the soil using 140-pound or larger hammer.
4. When the desired depth is achieved, extract the drill rods and sampler from the augers and/or borehole.
5. Detach the sampler from the drill rods.
6. Place the sampler securely in a vise so it can be opened using pipe wrenches.

CAUTION

Pipe wrenches are used to separate the split spoon into several components. The driller's helper should not apply excessive force through the use of cheater pipes or push or pull in the direction where, if the wrench slips, hands or fingers will be trapped against an immovable object.

7. Remove the drive head and nosepiece with the wrenches, and open the sampler to reveal the soil sample.

8. Immediately scan the sample core with a real-time air monitoring instrument (e.g., FID, PID, etc.) (as project-specific planning documents dictate). Carefully separate (or cut) the soil core, with a decontaminated stainless steel knife or trowel, at about 6-inch intervals while scanning the center of the core for elevated readings. Also scan stained soil, soil lenses, and anomalies (if present), and record readings.

9. If elevated vapor readings were observed, collect the sample scheduled for volatile analysis from the center of the core where elevated readings occurred. If no elevated readings where encountered, the sample material should be collected from the core's center (this area represents the least disturbed area with minimal atmospheric contact) (refer to Section 6.2.1).

10. Using the same trowel, remove remaining sample material from the split-barrel sampler (except for the small portion of disturbed soil usually found at the top of the core sample) and place the soil into a decontaminated stainless steel mixing bowl or re-sealable plastic bag.

11. Homogenize the sample material as thoroughly as practicable then fill the remaining sample containers (refer to Section 6.2.2).

12. Follow steps 4 through 7 in Section 6.3.

6.7 Subsurface Soil Sampling Using Direct-Push Technology

Subsurface soil samples can be collected to depths of 40+ feet using DPT. DPT equipment, responsibilities, and procedures are described in SOP SA-2.5.

6.8 Excavation and Sampling of Test Pits and Trenches

6.8.1 Applicability

This subsection presents routine test pit or trench excavation techniques and specialized techniques that are applicable under certain conditions.

CAUTION

During the excavation of trenches or pits, several health and safety concerns arise from the method of excavation. No personnel shall enter any test pit or excavation over 4 feet deep except as a last resort, and then only under direct supervision of a Competent Person (as defined in 29 CFR 1929.650 of Subpart P - Excavations). Whenever possible, all required chemical and lithological samples should be collected using the excavator bucket or other remote sampling apparatus. If entrance is required, all test pits or excavations must be stabilized by bracing the pit sides using specifically designed wooden, steel, or aluminum support structures or through sloping and benching. Personnel entering the excavation may be exposed to toxic or explosive gases and oxygen-deficient environments; therefore, monitoring will be conducted by the Competent Person to determine if it is safe to enter. Any entry into a trench greater than 4 feet deep will constitute a Confined Space Entry and must be conducted in conformance with OSHA standard 29 CFR 1910.146. In all cases involving entry, substantial air monitoring, before entry, appropriate respiratory gear and protective clothing determination, and rescue provisions are mandatory. There must be at least three people present at the immediate site before entry by one of the field team members. This minimum number of people will increase based on the potential hazards or complexity of the work to be performed. The reader shall refer to OSHA regulations 29 CFR 1926.650, 29 CFR 1910.120, 29 CFR 1910.134, and 29 CFR 1910.146. High-hazard entries such as this will be supported by members of the Health Sciences Group professionally trained in these activities.

Excavations are generally not practical where a depth of more than about 15 to 20-feet is desired, and they are usually limited to a few feet below the water table. In some cases, a pumping system may be required to control water levels within the pit, providing that pumped water can be adequately stored or disposed. If soil data at depths greater than 15-feet are required, the data are usually obtained through test borings instead of test pits.

In addition, hazardous wastes may be brought to the surface by excavation equipment. This material, whether removed from the site or returned to the subsurface, must be properly handled according to any and all applicable federal, state, and local regulations.

6.8.2 Test Pit and Trench Excavation

Test pits or trench excavations are constructed with the intent that they will provide an open view of subsurface lithology and/or disposal conditions that a boring will not provide. These procedures describe the methods for excavating and logging test pits and trenches installed to determine subsurface soil and rock conditions. Test pit operations shall be logged and documented (see Attachment C).

Test pits and trenches may be excavated by hand or power equipment to permit detailed descriptions of the nature and contamination of the in-situ materials. The size of the excavation will depend primarily on the following:

- The purpose and extent of the exploration.
- The space required for efficient excavation.
- The chemicals of concern.
- The economics and efficiency of available equipment.

Test pits normally have a cross section that is 4 to 10 feet square; test trenches are usually 3 to 6 feet wide and may be extended for any length required to reveal conditions along a specific line. The following table provides guidelines for design consideration based on equipment efficiencies.

Equipment	Typical Widths, in Feet
Trenching machine	0.25 to 1.0
Backhoe/Track Hoe	2 to 6

The lateral limits of excavation of trenches and the position of test pits shall be carefully marked on area base maps. If precise positioning is required to indicate the location of highly hazardous materials, nearby utilities, or dangerous conditions, the limits of the excavation shall be surveyed. Also, if precise determination of the depth of buried materials is needed for design or environmental assessment purposes, the elevation of the ground surface at the test pit or trench location shall also be determined by survey. If the test pit/trench will not be surveyed immediately, it shall be backfilled and its position identified with stakes placed in the ground at the margin of the excavation for later surveying.

The construction of test pits and trenches shall be planned and designed in advance as much as possible. However, the following field conditions may necessitate revisions to the initial plans:

- Subsurface utilities.

- Surface and subsurface encumbrances.

- Vehicle and pedestrian traffic patterns.

- Purpose for excavation (e.g., the excavation of potential ordnance items).

The final depth and construction method shall be collectively determined by the FOL and designated Competent Person. The actual layout of each test pit, temporary staging area, and spoils pile may further be predicated based on site conditions and wind direction at the time the test pit is excavated. Prior to excavation, the area may be surveyed by magnetometer or metal detector or other passive methods specified in SOP HS1.0, Utility Location and Excavation Clearance, to identify the presence of underground utilities or drums. Where possible, the excavator should be positioned upwind and preferably within an enclosed cab.

No personnel shall enter any test pit or excavation except as a last resort, and then only under direct supervision of a Competent Person. If entrance is required, OSHA requirements must be met (e.g., walls must be braced with wooden or steel braces, ladders must be placed for every 25 feet of lateral travel and extended 3 feet above ground surface). A temporary guard rail or vehicle stop must be placed along the surface of the hole before entry in situations where the excavation may be approached by traffic. Spoils will be stockpiled no closer than 2 feet from the sidewall of the excavation. The excavation equipment operator shall be careful not to undercut sidewalls and will, where necessary, bench back to increase stability. The top cover, when considered clean, will be placed separately from the subsurface materials to permit clean cover. It is emphasized that the project data needs should be structured such that required samples can be collected without requiring entrance into the excavation. For example, samples of leachate, groundwater, or sidewall soil can be collected with telescoping poles or similar equipment.

Dewatering and watering may be required to ensure the stability of the side walls, to prevent the bottom of the pit from heaving, and to keep the excavation stable. This is an important consideration for excavations in cohesionless material below the groundwater table and for excavations left open greater than a day. Liquids removed as a result of dewatering operations must be handled as potentially contaminated materials. Procedures for the collection and disposal of such materials should be discussed in the site-specific project plans.

Where possible, excavations and test pits shall be opened and closed within the same working day. Where this is not possible, the following engineering controls shall be put in place to control access:

- Trench covers/street plates.

- Fences encompassing the entire excavation intended to control access.

- Warning signs warning personnel of the hazards.

- Amber flashing lights to demarcate boundaries of the excavation at night.

Excavations left open will have emergency means to exit should someone accidentally enter.

6.8.3 Sampling in Test Pits and Trenches

6.8.3.1 General

Log test pits and trenches as they are excavated in accordance with the Test Pit Log presented in Attachment C. These records include plan and profile sketches of the test pit/trench showing materials encountered, their depth and distribution in the pit/trench, and sample locations. These records also include safety and sample screening information.

Entry of test pits by personnel is extremely dangerous, shall be avoided unless absolutely necessary, and can occur only after all applicable health and safety and OSHA requirements have been met as stated above. These provisions will be reiterated as appropriate in the project-specific HASP.

The final depth and type of samples obtained from each test pit will be determined at the time the test pit is excavated. Sufficient samples are usually obtained and analyzed to quantify contaminant distribution as a function of depth for each test pit. Additional samples of each waste phase and any fluids encountered in each test pit may also be collected.

In some cases, samples of soil may be extracted from the test pit for reasons other than waste sampling and chemical analysis, for instance, to obtain geotechnical information. Such information includes soil types, stratigraphy, strength, etc., and could therefore entail the collection of disturbed (grab or bulk) or relatively undisturbed (hand-carved or pushed/driven) samples that can be tested for geotechnical properties. The purposes of such explorations are very similar to those of shallow exploratory or test borings, but often test pits offer a faster, more cost-effective method of sampling than installing borings.

6.8.3.2 Sampling Equipment

The following equipment is needed for obtaining samples for chemical or geotechnical analysis from test pits and trenches:

- Backhoe or other excavating machinery.

- Shovels, picks, hand augers, and stainless steel trowels/disposable trowels.

- Sample container - bucket with locking lid for large samples; appropriate bottle ware for chemical or geotechnical analysis samples.

- Polyethylene bags for enclosing sample containers; buckets.

- Remote sampler consisting of 10-foot sections of steel conduit (1-inch-diameter), hose clamps, and right angle adapter for conduit (see Attachment D).

6.8.3.3 Sampling Methods

The methods discussed in this section refer to test pit sampling from grade level. If test pit entry is required, see Section 6.8.3.4.

- Excavate the trench or pit in several 0.5- to 1.0-foot depth increments. Where soil types support the use of a sand bar cutting plate, use of this device is recommended to avoid potentially snagging utilities with the excavator teeth. It is recommended that soil probes or similar devices be employed where buried items or utilities may be encountered. This permits the trench floor to be probed prior to the next cut.
- After each increment:

  - The operator shall wait while the sampler inspects the test pit from grade level.

  - The sampler shall probe the next interval where this is considered necessary. Practical depth increments for lithological evaluations may range from 2 to 4 feet or where lithological changes are noted.

- The backhoe operator, who will have the best view of the test pit, shall immediately cease digging if:

  - Any fluid phase, including groundwater seepage, is encountered in the test pit.

  - Any drums, other potential waste containers, obstructions, or utility lines are encountered.

  - Distinct changes of material being excavated are encountered.

This action is necessary to permit proper sampling of the test pit and to prevent a breach of safety protocol. Depending on the conditions encountered, it may be required to excavate more slowly and carefully with the backhoe.

For obtaining test pit samples from grade level, the following procedure shall be followed:

- Use the backhoe to remove loose material from the excavation walls and floor to the greatest extent possible.

- Secure the walls of the pit, if necessary. (There is seldom any need to enter a pit or trench that would justify the expense of shoring the walls. All observations and samples should be taken from the ground surface.)

- Samples of the test pit material are to be obtained either directly from the backhoe bucket or from the material after it has been deposited on the ground, as follows:

  a. The sampler or FOL shall direct the backhoe operator to remove material from the selected depth or location within the test pit/trench.

  b. The backhoe operator shall bring the bucket over to a designated location on the sidewall a sufficient distance from the pit (at least 5 feet) to allow the sampler to work around the bucket.

  c. After the bucket has been set on the ground, the backhoe operator shall either disengage the controls or shut the machine down.

  d. When signaled by the operator that it is safe to do, the sampler will approach the bucket.

  e. The soil shall be monitored with a PID or FID as directed in the project-specific planning documents.

f. The sampler shall collect the sample from the center of the bucket or pile in accordance with surface soil sampling procedures of Section 6.3 or 6.4, as applicable. Collecting samples from the center of a pile or bucket eliminates cross-contamination from the bucket or other depth intervals.

- If a composite sample is desired, several depths or locations within the pit/trench will be selected, and the bucket will be filled from each area. It is preferable to send individual sample bottles filled from each bucket to the laboratory for compositing under the more controlled laboratory conditions. However, if compositing in the field is required, each sample container shall be filled from materials that have been transferred into a mixing bucket or re-sealable plastic bag and homogenized. Note that homogenization/compositing is not applicable for samples to be subjected to volatile organic analysis.

CAUTION

Care must be exercised when using the remote sampler described in the next step because of potential instability of trench walls. In situations where someone must move closer than 2 feet to the excavation edge, a board or platform should be used to displace the sampler's weight to minimize the chance of collapse of the excavation edge. Fall protection should also be employed when working near the edges or trenches greater than 6 feet deep. An immediate means to extract people who have fallen into the trench will be immediately available. These means may include ladders or rope anchor points.

- Using the remote sampler shown in Attachment D, samples can be taken at the desired depth from the sidewall or bottom of the pit as follows:

  a. Scrape the face of the pit/trench using a long-handled shovel or hoe to remove the smeared zone that has contacted the backhoe bucket.

  b. Collect the sample directly into the sample jar, by scraping with the jar edge, eliminating the need for sample handling equipment and minimizing the likelihood of cross-contamination.

  c. Cap the sample jar, remove it from the remote sampler assembly, and package the sample for shipment in accordance with SOP SA-6.3.

- Complete documentation as described in SOP SA-6.3 and Attachment C of this SOP.

6.8.3.4 In-Pit Sampling

Under rare conditions, personnel may be required to enter the test pit/trench. This is necessary only when soil conditions preclude obtaining suitable samples from the backhoe bucket (e.g., excessive mixing of soil or wastes within the test pit/trench) or when samples from relatively small discrete zones within the test pit are required. This approach may also be necessary to sample any seepage occurring at discrete levels or zones in the test pit that are not accessible with remote samplers.

In general, personnel shall sample and log pits and trenches from the ground surface, except as provided for by the following criteria:

- There are no practical alternative means of obtaining such data.

- The SSO and Competent Person determine that such action can be accomplished without breaching site safety protocol. This determination will be based on actual monitoring of the pit/trench after it is dug (including, at a minimum, measurements of oxygen concentration, flammable gases, and toxic compounds, in that order). Action levels will be provided in project-specific planning documents.

- A company-designated Competent Person determines that the pit/trench is stable through soil classification evaluation/inspections or is made stable (by cutting/grading the sidewalls or using shoring) prior to entrance of any personnel. OSHA requirements shall be strictly observed.

If these conditions are satisfied, only one person may enter the pit/trench. On potentially hazardous waste sites, this individual shall be dressed in selected PPE as required by the conditions in the pit. He/she shall be affixed to a harness and lifeline and continuously monitored while in the pit.

A second and possible third individual shall be fully dressed in protective clothing including a self-contained breathing device and on standby during all pit entry operations to support self-rescue or assisted self-rescue. The individual entering the pit shall remain therein for as brief a period as practical, commensurate with performance of his/her work. After removing the smeared zone, samples shall be obtained with a decontaminated trowel or spoon.

6.8.3.5 Geotechnical Sampling

In addition to the equipment described in Section 6.8.3.2, the following equipment is needed for geotechnical sampling:

- Soil sampling equipment, similar to that used in shallow drilled boring (i.e., thin-walled tube samplers), that can be pushed or driven into the floor of the test pit.

- Suitable driving (e.g., sledge hammer) or pushing (e.g., backhoe bucket) equipment used to advance the sampler into the soil.

- Knives, spatulas, and other suitable devices for trimming hand-carved samples.

- Suitable containers (bags, jars, tubes, boxes, etc.), labels, wax, etc. for holding and safely transporting collected soil samples.

- Geotechnical equipment (pocket penetrometer, torvane, etc.) for field testing collected soil samples for classification and strength properties.

Disturbed grab or bulk geotechnical soil samples may be collected for most soil in the same manner as comparable soil samples for chemical analysis. These collected samples may be stored in jars or plastic-lined sacks (larger samples), which will preserve their moisture content. Smaller samples of this type are usually tested for their index properties to aid in soil identification and classification: larger bulk samples are usually required to perform compaction tests.

Relatively undisturbed samples are usually extracted in cohesive soil using thin-walled tube samplers, and such samples are then tested in a geotechnical laboratory for their strength, permeability, and/or compressibility. The techniques for extracting and preserving such samples are similar to those used in performing Shelby tube sampling in borings, except that the sampler is advanced by hand or backhoe, rather than by a drill rig. Also, the sampler may be extracted from the test pit by excavation around the tube when it is difficult to pull it out of the ground. If this excavation requires entry of the test pit, the requirements described in Section 6.8.3.4 shall be followed. The thin-walled tube sampler shall be pushed or driven vertically into the floor or steps excavated in the test pit at the desired sampling elevations. Extracting tube samples horizontally from the walls of the test pit is not appropriate because the sample will not have the correct orientation.

A sledge hammer or backhoe may be used to drive or push the tube into the ground. Place a piece of wood over the top of the sampler or sampling tube to prevent damage during driving/pushing of the sample. Pushing the sampler with a constant thrust is always preferable to driving it with repeated blows, thus minimizing disturbance to the sample. When using a sledge hammer, it is recommended that the sampler be stabilized using a rope/strap wrench or pipe wrench to replace the person's hands holding the sampler from the strike zone. If the sample cannot be extracted by rotating it at least two revolutions (to shear off the sample at the bottom), hook the sampler to the excavator or backhoe and extract. This means an alternative head will be used as a connection point or that multiple choke hitches will be applied to extract the sampler. If this fails and the excavator can dig deeper without potentially impacting subsurface utilities, excavate the sampler. If this fails or if the excavator cannot be used due to subsurface utilities, hand-excavate to remove the soil from around the sides of the sampler. If hand-excavation requires entry into the test pit, the requirements in Section 6.8.3.4 must be followed. Prepare the sample as described in Steps 9 through 13 in Section 6.2.3, and label, pack and transport the sample in the required manner, as described in SOPs SA-6.3 and SA-6.1.

6.8.4 Backfilling of Trenches and Test Pits

All test pits and excavations must be either backfilled, covered, or otherwise protected at the end of each day. No excavations shall remain open during non-working hours unless adequately covered or otherwise protected.

Before backfilling, the onsite crew may photograph, if required by the project-specific work plan, all significant features exposed by the test pit and trench and shall include in the photograph a scale to show dimensions. Photographs of test pits shall be marked to include site number, test pit number, depth, description of feature, and date of photograph. In addition, a geologic description of each photograph shall be entered in the site logbook. All photographs shall be indexed and maintained as part of the project file for future reference.

After inspection, backfill material shall be returned to the pit under the direction of the FOL. Backfill should be returned to the trench or test pit in 6-inch to 1-foot lifts and compacted with the bucket. Remote controlled tampers or rollers may be lowered into the trench and operated from top side. This procedure will continue to the grade surface. It is recommended that the trench be tracked or rolled in. During excavation, clean soil from the top 2 feet may have been separated to be used to cover the last segments. Where these materials are not clean, it is recommended that clean fill be used for the top cover.

If a low-permeability layer is penetrated (resulting in groundwater flow from an upper contaminated flow zone into a lower uncontaminated flow zone), backfill material must represent original conditions or be impermeable. Backfill could consist of a soil-bentonite mix prepared in a proportion specified by the FOL (representing a permeability equal to or less than original conditions). Backfill can be covered by "clean" soil and graded to the original land contour. Revegetation of the disturbed area may also be required.

6.9 Records

The appropriate sample log sheet (see Attachment A of this SOP) must be completed by the site geologist/sampler for all samples collected. All soil sampling locations should be documented by tying in the location of two or more nearby permanent landmarks (building, telephone pole, fence, etc.) or obtaining global positioning system (GPS) coordinates; and shall be noted on the appropriate sample log sheet, site map, or field notebook. Surveying may also be necessary, depending on the project requirements.

Test pit logs (see Attachment C of this SOP) shall contain a sketch of pit conditions. If the project-specific work plan requires photographs, at least one photograph with a scale for comparison shall be taken of each pit. Included in the photograph shall be a card showing the test pit number. Boreholes, test pits, and trenches shall be logged by the field geologist in accordance with SOP GH-1.5.
Other data to be recorded in the field logbook include the following:

- Name and location of job

- Date of boring and excavation
- Approximate surface elevation
- Total depth of boring and excavation
- Dimensions of pit
- Method of sample acquisition
- Type and size of samples
- Soil and rock descriptions
- Photographs, if required
- Groundwater levels
- PID/FID/LEL/O_2 meter readings
- Other pertinent information, such as waste material encountered

In addition, site-specific documentation to be maintained by the SSO and/or Competent Person will be required including:

- Calibration logs
- Excavation inspection checklists
- Soil type classification

7.0 REFERENCES

American Society for Testing and Materials, 1987. ASTM Standards D1587-83 and D1586-84. ASTM Annual Book of Standards. ASTM. Philadelphia, Pennsylvania. Volume 4.08.

NUS Corporation, 1986. Hazardous Material Handling Training Manual.

NUS Corporation and CH2M Hill, August, 1987. Compendium of Field Operation Methods. Prepared for the U.S. EPA.

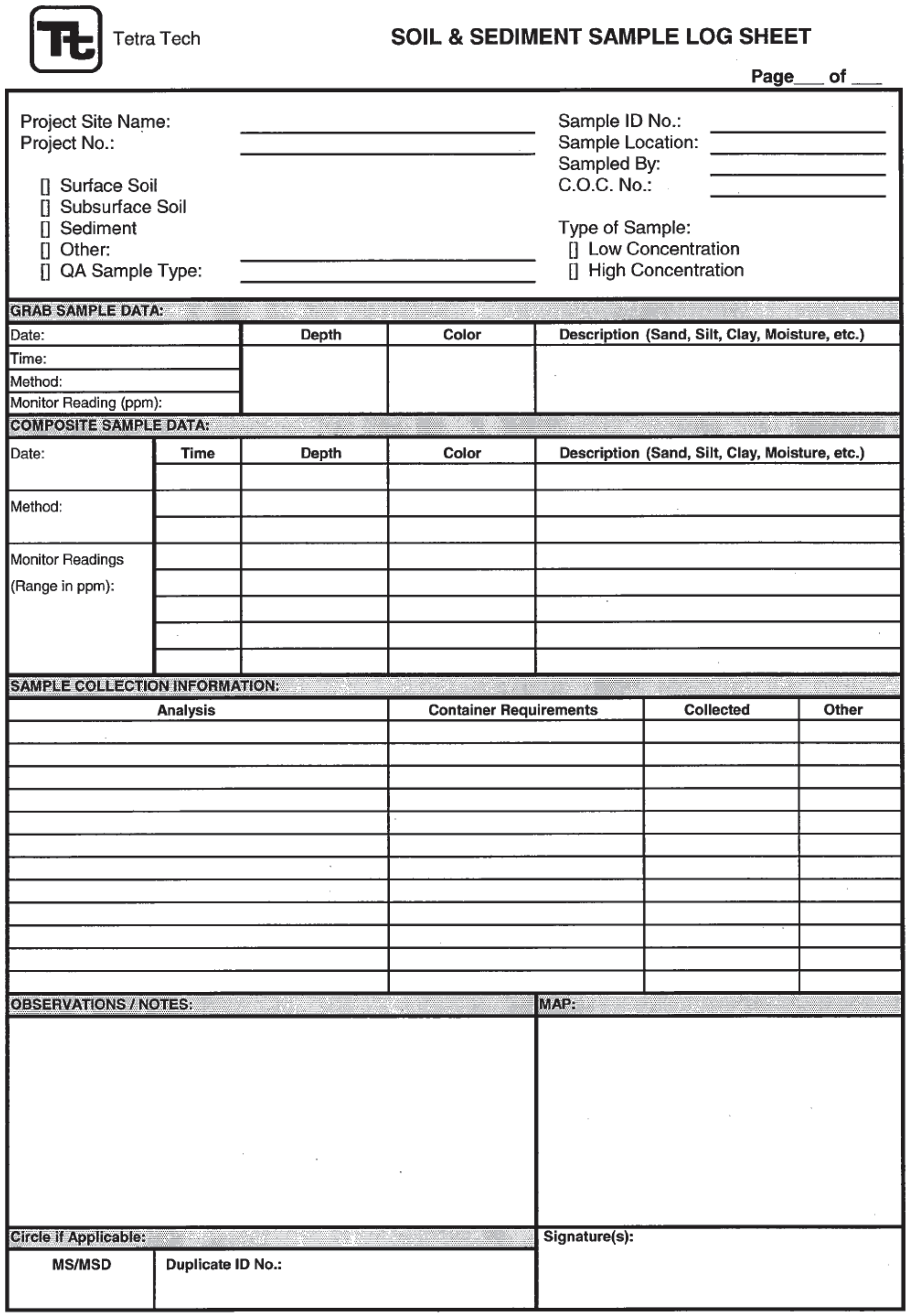
OSHA, Excavation, Trenching and Shoring 29 CFR 1926.650-653.

OSHA, Confined Space Entry 29 CFR 1910.146.

U.S. EPA, 1992. Specifications and Guidance for Contaminant-Free Sample Containers. EPA-540/R-93/051.

USEPA, November 2001. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual.

ATTACHMENT A
SOIL & SEDIMENT SAMPLE LOG SHEET (EXAMPLE)



Tetra Tech

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: ______________
Project No.: ______________

☐ Surface Soil
☐ Subsurface Soil
☐ Sediment
☐ Other: ______________
☐ QA Sample Type: ______________

Sample ID No.: ______________
Sample Location: ______________
Sampled By: ______________
C.O.C. No.: ______________

Type of Sample:
☐ Low Concentration
☐ High Concentration

GRAB SAMPLE DATA:

Date:	**Depth**	**Color**	**Description (Sand, Silt, Clay, Moisture, etc.)**
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

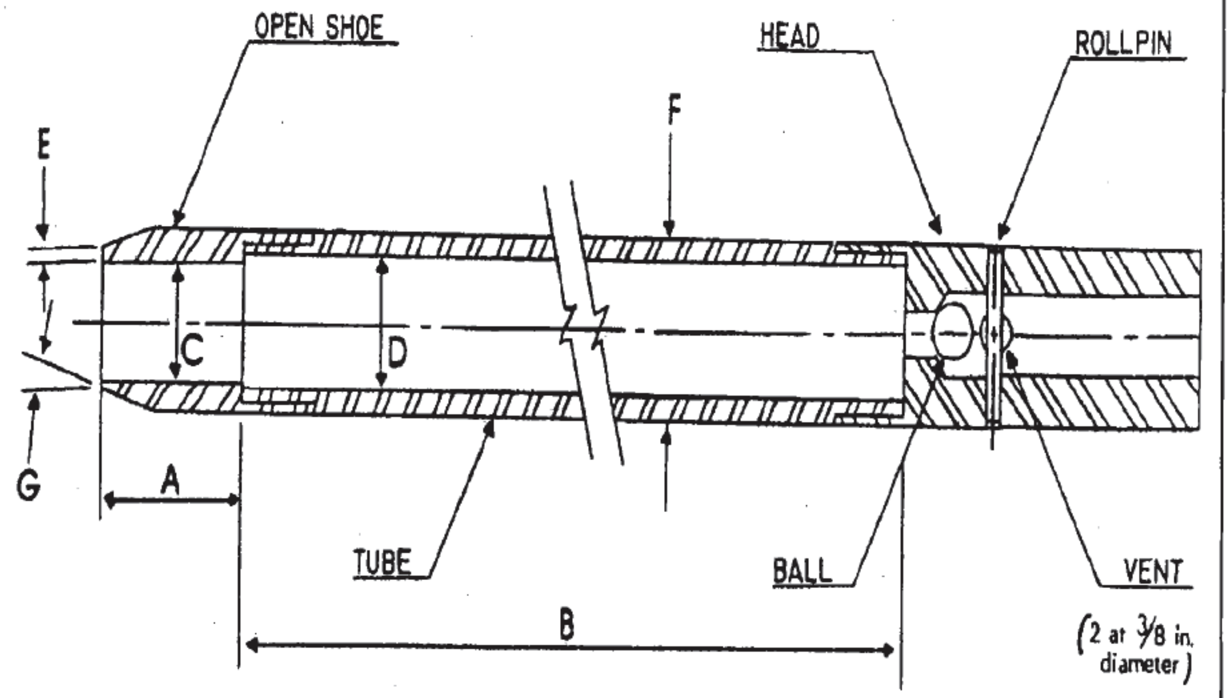
Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

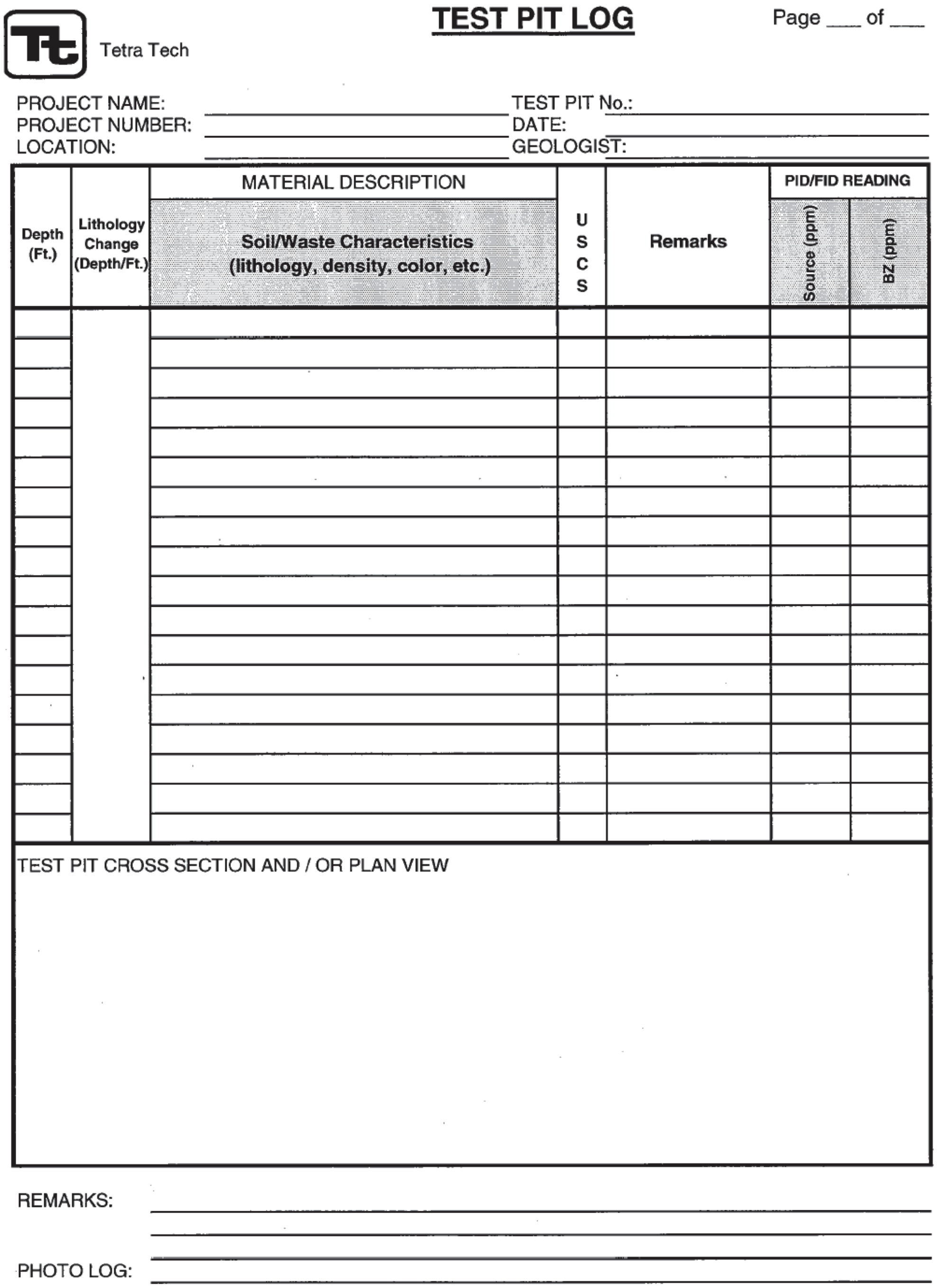
ATTACHMENT B
SPLIT-SPOON SAMPLER (EXAMPLE)



A = 1.0 to 2.0 in. (25 to 50 mm)
B = 18.0 to 30.0 in. (0.457 to 0.762 m)
C = 1.375 ± 0.005 in. (34.93 ± 0.13 mm)
D = 1.50 ± 0.05 – 0.00 in. (38.1 ± 1.3 – 0.0 mm)
E = 0.10 ± 0.02 in. (2.54 ± 0.25 mm)
F = 2.00 ± 0.05 – 0.00 in. (50.8 ± 1.3 – 0.0 mm)
G = 16.0° to 23.0°

The 1½ in. (38 mm) inside diameter split barrel may be used with a 16-gage wall thickness split liner. The penetrating end of the drive shoe may be slightly rounded. Metal or plastic retainers may be used to retain soil samples.

ATTACHMENT C
TEST PIT LOG (EXAMPLE)



Tetra Tech

TEST PIT LOG

Page ___ of ___

PROJECT NAME: ____________________ TEST PIT No.: ____________________
PROJECT NUMBER: ____________________ DATE: ____________________
LOCATION: ____________________ GEOLOGIST: ____________________

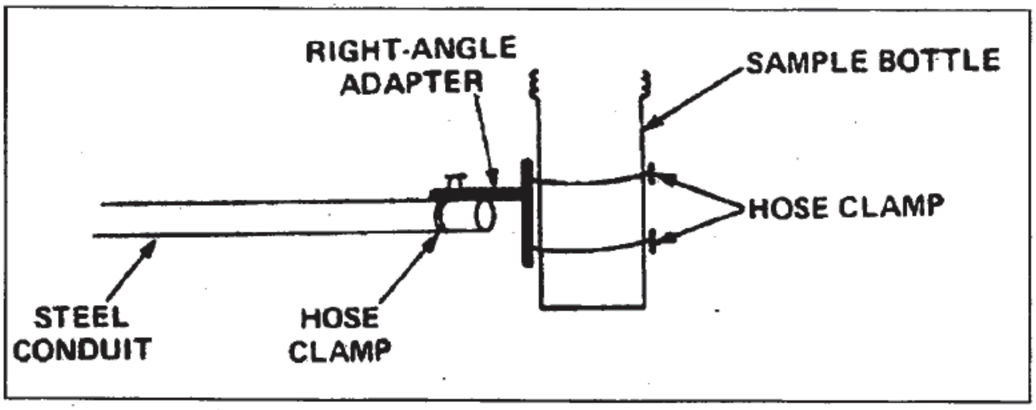
Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION	USCS	Remarks	PID/FID READING	
		Soil/Waste Characteristics (lithology, density, color, etc.)			Source (ppm)	BZ (ppm)

TEST PIT CROSS SECTION AND / OR PLAN VIEW

REMARKS: ____________________
____
____

PHOTO LOG: ____________________

ATTACHMENT D
REMOTE SAMPLE HOLDER FOR TEST PIT/TRENCH SAMPLING (EXAMPLE)



TETRA TECH

STANDARD OPERATING PROCEDURE

Number SA-6.1	Page 1 of 7
Effective Date 07/15//2016	Revision 5
Applicability Tetra Tech, Inc., NUS Operating Unit	
Prepared Earth Sciences Department	

Subject
NON-RADIOLOGICAL SAMPLE HANDLING

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1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide information on sample preservation, packaging, and shipping procedures to be used in handling environmental samples submitted for chemical constituent, biological, or geotechnical analysis. Sample chain-of-custody procedures and other aspects of field documentation are addressed in SOP SA-6.3. Sample identification is addressed in SOP CT-04.

2.0 SCOPE

This procedure describes the appropriate containers to be used for samples depending on the analyses to be performed, and the steps necessary to preserve the samples when shipped off site for chemical analysis.

3.0 GLOSSARY

Hazardous Material - A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated. Under 49 CFR, the term includes hazardous substances, hazardous wastes, marine pollutants, and elevated temperature materials, as well as materials designated as hazardous under the provisions of §172.101 and §172.102 and materials that meet the defining criteria for hazard classes and divisions in Part 173. With slight modifications, IATA has adopted DOT "hazardous materials" as IATA "Dangerous Goods."

Hazardous Waste - Any substance listed in 40 CFR, Subpart D (§261.30 et seq.), or otherwise characterized as ignitable, corrosive, reactive, or toxic (as defined by Toxicity Characteristic Leaching Procedure, TCLP, analysis) as specified under 40 CFR, Subpart C (§261.20 et seq.), that would be subject to manifest requirements specified in 40 CFR 262. Such substances are defined and regulated by EPA.

Marking - A descriptive name, identification number, instructions, cautions, weight, specification or UN marks, or combination thereof required on outer packaging of hazardous materials.

n.o.i - Not otherwise indicated (may be used interchangeably with n.o.s.).

n.o.s. - Not otherwise specified.

Packaging - A receptacle and any other components or materials necessary for compliance with the minimum packaging requirements of 49 CFR 174, including containers (other than freight containers or overpacks), portable tanks, cargo tanks, tank cars, and multi-unit tank-car tanks to perform a containment function in conformance with the minimum packaging requirements of 49 CFR 173.24(a) & (b).

Placard - Color-coded, pictorial sign which depicts the hazard class symbol and name and which is placed on the side of a vehicle transporting certain hazardous materials.

Common Preservatives:
- Hydrochloric Acid - HCl
- Sulfuric Acid - H_2SO_4
- Nitric Acid - HNO_3
- Sodium Hydroxide - NaOH

Other Preservatives
- Zinc Acetate
- Sodium Thiosulfate - $Na_2S_2O_3$

Normality (N) - Concentration of a solution expressed as equivalent per liter, an equivalent being the amount of a substance containing 1 gram-atom of replaceable hydrogen or its equivalent.

Reportable Quantity (RQ) - For the purposes of this SOP, means the quantity specified in column 3 of the Appendix to DOT 49 CFR §172.101 for any material identified in column 1 of the appendix. A spill greater than the amount specified must be reported to the National Response Center.

Sample - A sample is physical evidence collected from a facility or the environment, which is representative of conditions at the location and time of collection.

4.0 RESPONSIBILITIES

Field Operations Leader - Directly responsible for the bottling, preservation, labeling, packaging, shipping, and custody of samples up to and including release to the shipper.

Field Samplers - Responsible for initiating the Chain-of-Custody Record (per SOP SA-6.3), implementing the packaging and shipping requirements, and maintaining custody of samples until they are relinquished to another custodian or to the shipper.

5.0 PROCEDURES

Sample identification, labeling, documentation, and chain-of-custody are addressed by SOP SA-6.3.

5.1 Sample Containers

Different types of chemicals react differently with sample containers made of various materials. For example, trace metals adsorb more strongly to glass than to plastic, whereas many organic chemicals may dissolve various types of plastic containers. Proper sample containers, sample volumes, preservation methods such as chemical preservatives/cooling requirements, and holding times should be provided in the project-specific work plan. Some of these requirements may be laboratory-specific and should be arranged during the laboratory procurement phase of a project. In general, the sample container shall allow approximately 5-10 percent air space ("ullage") to allow for expansion/vaporization if the sample warms during transport. However, for collection of volatile organic compounds, head space shall be omitted.

The analytical laboratory will generally provide certified-clean containers for samples to be analyzed for chemical constituents. These containers shall be pre-cleaned to meet or exceed requirements of the latest U.S. Environmental Protection Agency (EPA) "Specifications and Guidance for Contaminant-Free Sample Containers." I-Chem 200 and 300 Series containers meet these requirements; other certifications may be available that also meet these requirements. Each case of 300 Series containers comes with a "Certificate of Analysis," and every container bears a similar bar-coded label for traceability. I-Chem Series 200 containers do not come with a Certificate of Analysis but a certificate may be accessed upon request to the supplier. Shelby tubes or other sample containers are generally provided by the driller for samples requiring geotechnical analysis. Sufficient lead time shall be allowed for a delivery of sample container orders. Therefore, it is critical to use the correct container to maintain the integrity of the sample prior to analysis.

Upon being opened, the container must be used at once for collection/storage of a particular sample. Unused but opened containers are to be considered contaminated and must be discarded. Because of the potential for introduction of contamination, they cannot be reclosed and saved for later use. Likewise, any unused containers which appear contaminated upon receipt, or which are found to have loose caps or a missing Teflon liner (if required for the container), shall be discarded.

Sample containers can be contaminated during storage if nearby volatile substances infiltrate the surrounding air and migrate into the containers. This can occur even when containers are capped.

Therefore, containers should not be stored on site but if on site storage is necessary, sample containers that have been stored on site for longer than 6 months should not be used.

Note: Whereas most air-borne contamination is likely to be associated with organic substances, inorganic substances such as hydrochloric acid (muriatic acid) can emit inorganic vapors that infiltrate sample containers.

5.2 Sample Preservation

Many water and soil samples are unstable and therefore require preservation to prevent changes in either the concentration or the physical condition of the constituent(s) requiring analysis. Although complete and irreversible preservation of samples is not possible, preservation does retard the chemical and biological changes that inevitably take place after the sample is collected. Preservation techniques are usually limited to pH control, chemical addition(s), and refrigeration/ freezing (certain biological samples only).

5.2.1 Overview

Reagents required for sample preservation will either be added to the sample containers by the laboratory prior to their shipment to the field or be added in the field (in a clean environment). Only high purity reagents shall be used for preservation and field preservation of samples is discouraged for reasons of potential cross-contamination of samples and worker safety. Most samples require cooling to <6°C and the project-specific planning documents should be consulted for detailed preservation and storage requirements.

The following subsections describe the procedures for preparing and adding chemical preservatives.

The FOL is responsible for ensuring that an accurate Chemical Inventory is created and maintained for all hazardous chemicals brought to the work site. Furthermore, the FOL must ensure that a corresponding Safety Data Sheet (SDS) is collected for every substance entered on the site Chemical Inventory, and that all persons using/handling/ disposing of these substances review the appropriate SDS for substances they will work with. The Chemical Inventory and the SDSs must be maintained at each work site in a location and manner where they are readily-accessible to all personnel.

5.2.2 Preparation and Addition of Reagents

Addition of the following acids or bases may be specified for sample preservation; these reagents shall be analytical reagent (AR) grade or purer and shall be diluted to the required concentration with deionized water before field sampling commences. To avoid uncontrolled reactions, be sure to Add Acid to water (not vice versa). A dilutions guide is provided below.

Acid/Base	Dilution	Concentration	Estimated Amount Required for Preservation
Hydrochloric Acid (HCl)	1 part concentrated HCl: 1 part double-distilled, deionized water	6N	5 to 10 mL
Sulfuric Acid (H_2SO_4)	1 part concentrated H_2SO_4: 1 part double-distilled, deionized water	18N	2 to 5 mL
Nitric Acid (HNO_3)	Undiluted concentrated HNO_3	16N	2 to 5 mL
Sodium Hydroxide ($NaOH$)	400 grams solid $NaOH$ dissolved in 870 mL double-distilled, deionized water; yields 1 liter of solution	10N	2 mL

The amounts required for preservation shown in the above table assumes proper preparation of the preservative and addition of the preservative to one liter of aqueous sample. This assumes that the sample is initially at pH 7, is poorly buffered, and does not contain particulate matter; as these conditions vary, more preservative may be required. Consequently, the final sample pH must be checked using narrow-range pH paper, as described in the generalized procedure detailed below:

- Pour off 5 to 10 mL of sample into a dedicated, clean container. Use some of this sample to check the initial sample pH using wide range (0-14) pH paper. Never dip the pH paper into the sample; always apply a drop of sample to the pH paper using a clean stirring rod or pipette.

- Add about one-half of the estimated preservative required to the original sample bottle. Cap and invert gently several times to mix. Check pH (as described above) using medium range pH paper (pH 0-6 or pH 7.5-14, as applicable).

- Cap sample bottle and seal securely.

Additional considerations are discussed below:

- To test if ascorbic acid must be used to remove oxidizing agents present in the sample before it can be properly preserved, place a drop of sample on KI-starch paper. A blue color indicates the need for ascorbic acid addition.

  If required, add a few crystals of ascorbic acid to the sample and retest with the KI-starch paper. Repeat until a drop of sample produces no color on the KI-starch paper. Then add an additional 0.6 grams of ascorbic acid per each liter of sample volume.

  Continue with proper base preservation of the sample as described above.

- Samples for sulfide analysis must be treated by the addition of 4 drops (0.2 mL) of 2N zinc acetate solution per 100 mL of sample.

  The 2N zinc acetate solution is made by dissolving 220 grams of zinc acetate in 870 mL of double-distilled, deionized water to make 1 liter of solution.

  The sample pH is then raised to 9 using the NaOH preservative.

- Sodium thiosulfate must be added to remove residual chlorine from a sample. To test the sample for residual chlorine use a field test kit specially made for this purpose.

  If residual chlorine is present, add 0.08 grams of sodium thiosulfate per liter of sample to remove the residual chlorine.

  Continue with proper acidification of the sample as described above.

For biological samples, 10% buffered formalin or isopropanol may also be required for preservation. Questions regarding preservation requirements should be resolved through communication with the laboratory before sampling begins.

5.3 Field Filtration

At times, field-filtration may be required to provide for the analysis of dissolved chemical constituents. Field-filtration must be performed prior to the preservation of samples as described above. General procedures for field filtration are described below:

- The sample shall be filtered through a non-metallic, 0.45-micron membrane filter, immediately after collection. The filtration system shall consist of dedicated filter canister, dedicated tubing, and a peristaltic pump with pressure or vacuum pumping squeeze action (since the sample is filtered by mechanical peristalsis, the sample travels only through the tubing) or hand pump.

- To perform filtration, thread the tubing through the peristaltic pump head. Attach the filter canister to the discharge end of the silicon tubing (note flow direction arrow); attach the aqueous sample container to the intake end of the silicon tubing. Turn the peristaltic pump on and perform filtration. Run approximately 100 mL of sample through the filter and discard prior to sample collection.

- Continue by preserving the filtrate (contained in the filter canister), as applicable and generally described above.

5.4 Sample Packaging and Shipping

Only employees who have successfully completed the corporate “Shipping Hazardous Materials” training course are authorized to package and ship hazardous substances. These trained individuals are responsible for performing shipping duties in accordance with this training.

Samples collected for shipment from a site shall be classified as either environmental or hazardous material samples. Samples from drums containing materials other than Investigative Derived Waste (IDW) and samples obtained from waste piles or bulk storage tanks are generally shipped as hazardous materials. A distinction must be made between the two types of samples in order to:

- Determine appropriate procedures for transportation of samples (if there is any doubt, a sample shall be considered hazardous and shipped accordingly.)

- Protect the health and safety of transport and laboratory personnel receiving the samples (special precautions are used by the shipper and at laboratories when hazardous materials are received.)

Detailed procedures for packaging environmental samples are outlined in the remainder of this section.

5.4.1 Environmental Samples

Environmental samples are packaged as follows:

- Place properly identified and labeled sample container, with lid securely fastened, in a plastic bag (e.g. Ziploc baggie), and seal the bag.

- Place sample in a cooler constructed of sturdy material which has been lined with a large, plastic bag (e.g. "garbage" bag). Drain plugs on coolers must be taped shut.

- Pack with enough cushioning materials such as bubble wrap (shoulders of bottles must be iced if required) to minimize the possibility of the container breaking. Glass bottles should be individually wrapped in bubblewrap.

- If cooling is required (see Attachments A and B), place ice around sample container shoulders, and on top of packing material (minimum of 8 pounds of ice for a medium-size cooler).

- Seal (i.e., tape or tie top in knot) large liner bag.

- The original (top, signed copy) of the COC form shall be placed inside a large Ziploc-type bag and taped inside the lid of the shipping cooler. If multiple coolers are sent but are included on one COC form, the COC form should be sent with the cooler containing the vials for VOC analysis. The COC form should then state how many coolers are included with that shipment.

- Close and seal outside of cooler as described in SOP SA-6.3. Signed custody seals must be used.

Coolers must be marked as containing "Environmental Samples." The appropriate side of the container must be marked "This End Up" and arrows placed appropriately. No DOT marking or labeling is required; there are no DOT restrictions on mode of transportation.

6.0 REFERENCES

American Public Health Association, 1998. Standard Methods for the Examination of Water and Wastewater, 20th Edition. APHA, Washington, D.C.

International Air Transport Association (latest issue). Dangerous Goods Regulations, Montreal, Quebec, Canada.

U.S. Department of Transportation (latest issue). Hazardous Materials Regulations, 49 CFR 171-177.

U.S. EPA, 1992. Specifications and Guidance for Contaminant-Free Sample Containers. EPA-540/R-93/051.

US EPA (U.S. Environmental Protection Agency), 2015. Test Methods for Evaluating Solid Waste (SW-846, Third Edition), Physical/Chemical Methods, as amended by Updates I, II, IIA, IIB, III, IIIA, IIIB, IVA, IVB, and V, August.

TETRA TECH

STANDARD OPERATING PROCEDURE

Number SA-6.3	Page 1 of 14
Effective Date 9/28/2017	Revision 6
Applicability Tetra Tech, Inc., NUS Operating Unit	
Prepared Earth Sciences Department	
Approved T. Johnston	tom. johnston @tetratech.com Digitally signed by: tom. johnston@tetratech.com DN: CN = tom. johnston@tetratech.com Date: 2017.09.28 13:35:13 -05'00'

Subject
FIELD DOCUMENTATION

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1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to identify and designate the field data record forms, logs, and reports generally initiated and maintained for documenting NUS Operating Unit field activities.

2.0 SCOPE AND APPLICABILITY

Documents presented within this SOP (and related sampling SOPs) shall be used for all NUS Operating Unit field activities, as applicable. All personnel are encouraged to review the information contained herein to facilitate planning of the field sampling and documentation effort. The techniques described shall be followed whenever applicable, noting that site-specific conditions or project-specific plans may require modifications to methodology. Other or additional documents may be required by specific client contracts or project planning documents.

3.0 GLOSSARY

None.

4.0 RESPONSIBILITIES AND PERSONNEL QUALIFICATIONS

Project Manager (PM) - The PM is responsible for obtaining hardbound controlled-distribution logbooks (from the appropriate source), as needed. In addition, the PM is responsible for placing all field documentation used in site activities (i.e., records, field reports, sample data sheets, field notebooks, and the site logbook) in the project's central file upon the completion of field work.

Field Operations Leader (FOL) - The FOL is responsible for ensuring that the site logbook, notebooks, and all appropriate and current forms and field reports included in this SOP (and any additional forms required by the contract) are correctly used, accurately filled out, and completed in the required time frame.

Site Safety Officer (SSO) - The SSO (or a qualified designee) is responsible for providing the technical support necessary to implement the project Health and Safety Plan (HASP) (or equivalent).

Project Geologist/Sampler - The Project Geologist/Sampler is responsible for the proper documentation of field activities in accordance with this SOP and/or other project-specific documents.

General personnel qualifications for field documentation activities include the following:

- Occupational Safety and Health Administration (OSHA) 40-hour and applicable refresher training.
- Capability of performing field work under the expected physical and environmental (i.e., weather) conditions.
- Familiarity with appropriate procedures for documentation, handling, packaging, and shipping.

5.0 PROCEDURES

5.1 SITE LOGBOOK

5.1.1 General

The site logbook is a hard-bound, paginated, controlled-distribution record book in which all major on-site activities are documented. At a minimum, record or reference the following activities/events (daily) in the site logbook:

- All field personnel present
- Arrival/departure times and names of site visitors
- Times and dates of health and safety training
- Arrival/departure times of equipment
- Times and dates of equipment calibration
- Start and/or completion of borehole, trench, monitoring well installation activities, etc.
- Daily on-site activities
- Sample pickup information
- Health and safety issues (level of protection, personal protective equipment [PPE], etc.)
- Weather conditions

Maintain a site logbook for each project and initiate it at the start of the first on-site activity (e.g., site visit or initial reconnaissance survey). Make entries every day that on-site activities take place involving NUS Operating Unit or subcontractor personnel. Upon completion of the fieldwork, provide the site logbook to the PM (or qualified designee) for inclusion in the project's central file.

Record the following information on the cover of each site logbook:

- Project name
- NUS Operating Unit project number
- Sequential book number
- Start date
- End date

Information recorded daily in the site logbook need not be duplicated in other field notebooks (see Section 5.2) but must summarize the contents of these other notebooks and refer to specific page locations in these notebooks for detailed information (where applicable). An example of a typical site logbook entry is shown in Attachment A.

If measurements are made at any location, either record the measurements and equipment used in the site logbook or reference the field notebook in which the measurements are recorded (see Attachment A).

Make all logbook, notebook, and log sheet entries in indelible ink (black pen is preferred). No erasures are permitted. If an incorrect entry is made, cross out the entry with a single strike mark, initial, and date it. At the completion of entries by any individual, the logbook pages used must be signed and dated by the person making the entries. The site logbook must also be signed by the FOL at the end of each day.

5.1.2 Photographs and Other Images

Permission to take photographs, make movies, or otherwise record visual representations of site features, activities, or facility personnel on certain properties such as military installations is a temporary privilege bestowed upon a person (i.e., the photographer) by the property owner and the particular facility at which the photographs are taken. In the case of U.S. military installations, the U.S. Government and Installation Command bestow this privilege. For the remainder of this section the term “image” is intended to represent all visual forms of documentation of site features, activities, or personnel, such as film and digital still images and movies.

It may be illegal to record images without proper authorization and the photographer may be criminally liable for their actions. This is especially true on or near U.S. Government property. A particular image alone may not constitute an act of espionage or a national security threat; however, nefarious persons and organizations could conceivably combine information from multiple sources to create a national security threat. Therefore, the photographer must comply with any and all restrictions imposed on them by authorized facility personnel.
The instructions below apply to formal and casual photography sessions conducted, for example, during on-site meetings, walkovers, and other visits. Persons recording images should be aware that images recorded on or near military installations, and possibly at other installations, may be subject to censorship and clearance, e.g., through Public Affairs or Public Relations Offices.

CAUTION

Fieldwork-specific SOPs establish safety precautions for the fieldwork that they govern. When recording images, adhere to all safety precautions associated with fieldwork described in those SOPs. Pay attention to your surroundings. Avoid unsafe locations and positions. Avoid walking or turning your body while looking through the lens or viewfinder of a camera unless the path of movement has been cleared in advance and the movements will be made safely. Be especially alert to trip and fall hazards. Dress appropriately for the weather, topography, and the flora and fauna. Stay hydrated, and be aware of the effects of heat and cold stress on the body. Consult the SSO if in doubt about your safety or the safety of others while recording images.

5.1.2.1 Prior to and during photography sessions, follow these steps:

Note: In general, avoidance of specialty photographic equipment reduces the amount of work required of the photographer. The photographer is not required to record aperture, shutter speed, ISO rating, or other camera settings within automatic exposure ranges available on digital cameras; however use of special lenses (e.g., tilt-and-shift), filters (e.g., neutral density, warming, and polarizing filters), and other image enhancement equipment or techniques must be noted in the logbook/notebook. If possible, use of such equipment items or special techniques should be avoided because they can adversely affect the accuracy of recorded images.

- By communicating with the facility point of contact prior to recording images, obtain permission directly from, or on behalf of, the property owner and/or operator to record the images. In the case of U.S. Government military installations, the point of contact typically represents the Installation Command or a higher authority. The actual point of contact is frequently a Public Works or Environmental Department staff member.

- Request from the facility point of contact a written pass that allows permission to record images (hereafter referred to as a photography pass) but do not insist on obtaining one if the facility declines to issue such a pass.

- If the facility does not issue a written photography pass, either do not record images or verify via written communication with the facility point of contact that image making will be permitted while on the Installation property.

  Note: The intent of these permissions and communications is to ensure that the photographer clearly communicates his or her intentions to the facility and to avoid disputes regarding appropriateness of images, ownership of images or property depicted in the images, violation of privacy, etc. During communication with the facility point of contact, ensure that they understand the types of scenes, activities, equipment, features, processes, etc., to be recorded visually and under what conditions the images will be made.

- If the facility issues a written photography pass:
    - Prior to recording images, verify that the photography pass is valid for the time period during which images will be made.
    - Carry the written photography pass in your possession when recording images.
    - Be prepared to produce the photography pass as proof of permission to record images.

- Prior to recording images, if using a digital recording medium, enable automatic collection of Exchangeable Image File (EXIF) data. Doing so will provide automatic documentation of the camera settings (ISO rating, shutter speed, aperture, focal length, etc.) used during image capture. Most digital cameras will record this information by default; but the use of special filters or other attachments to the image capture device is not recorded because such equipment is not an integral part of the device.

- While recording images, enter the name of the photographer, date, time, site location, and site description in the logbook/notebook and update this information as necessary to document important changes. Include other pertinent information such as weather conditions, if such information will support interpretation of the images.

- When orientation of the camera is important to interpreting the contents of the images, record the camera angles and positions for each image. This may be done by drawing an arrow on a site figure that points in the same direction the camera was pointed when the image was recorded. Alternatively, some digital cameras may automatically record the geographical coordinates and orientation angle during image capture.

- Sequentially number images of a site or monitoring location to correspond to logbook/notebook entries. Digital still image media typically provide automatic numbering of images. If desired, the image numbers may be altered later (e.g., during download to a computer) but it may be desirable to retain the original file name in the EXIF data for traceability.

5.1.2.2 After recording images follow these steps:

- Verify that the name of the photographer, date, time, site location, site description, and other pertinent notes were correctly entered in the logbook/notebook.

- Compile the images and associated information that will be necessary to interpret them in a manner suitable for the associated project. For example, consecutively number still images and label them according to the logbook/notebook descriptions. If camera angle, camera position, or camera settings are important, record this important information with the images. For moving images, edit and compile the images a manner consistent with the intended use.

- Docket the images and associated film negatives or digital files to the central project file and/or compact disk. If EXIF data were captured and are needed for the project, ensure the EXIF data are transferred along with the image to the final storage location. This final storage location may be a project file or a report compiled to document site conditions.

- If multiple versions of image files are generated (e.g., high resolution and low resolution), arrange for proper storage and management of all versions of files for ready retrieval and safe storage.

5.2 FIELD NOTEBOOKS

Key field team personnel may maintain a separate dedicated field notebook to document the pertinent field activities conducted directly under their supervision. For example, on large projects with multiple investigative sites and varying operating conditions, the SSO may elect to maintain a separate field notebook. Where several drill rigs are in operation simultaneously, each Project Geologist/Sampler assigned to oversee a rig must maintain a field notebook.

5.3 FIELD FORMS

Field forms (see list in Section 6.0 of this SOP) can be found on the NUS Operating Unit intranet site under "Field Log Sheets." Forms may be altered or revised for project-specific needs, subject to client approval. Care must be taken to ensure that all essential information can be documented. Guidelines for completing these forms can be found in the related sampling SOPs.

5.3.1 Sample Collection, Labeling, Shipment, Request for Analysis, and Field Test Results

5.3.1.1 Sample Log Sheet

Sample log sheets are used to record specified types of data while sampling. The data recorded on these sheets are useful in describing the sample as well as pointing out any problems, difficulties, or irregularities encountered during sampling. Complete a sample log sheet for each sample obtained, including field quality assurance (QA) samples.

5.3.1.2 Sample Label

A typical sample label is illustrated in Attachment B. Complete the required information on the adhesive labels and apply them to every sample container. Obtain sample labels from the appropriate program/project source, request that they be electronically generated in house, or request them from the laboratory subcontractor.

CAUTION

Some labels (e.g., paper labels) may become soaked with water from melted ice or condensation during shipping. This soaking could render the labels illegible or cause them to fall off of their containers. Therefore, all paper labels and other labels subject to such deterioration should be covered with clear protective tape (e.g., packing tape) to keep them dry during shipment. Avoid wrinkles in the tape that could directly interfere with legibility of the label or allow contact with water. **Covering all hand-written sample container labels (paper or otherwise) with protective tape in this manner is an absolute requirement when collecting samples in support of United States Environmental Protection Agency (USEPA) Contract Laboratory Program (CLP) projects.**

5.3.1.3 Chain-of-Custody Record

The chain-of-custody record is a multi-part form that is initiated as samples are acquired and accompanies a sample (or group of samples) as they are transferred from person to person. This form must be used as follows for any samples collected for chemical or geotechnical analysis whether the analyses are performed on-site or off-site:

- Retain one carbonless copy of the completed chain-of-custody form in the field.
- Send one copy to the PM (or qualified designee).
- Send the original (top, signed copy) to the laboratory with the associated samples. Place the original chain-of-custody copy inside a large Ziploc®-type bag taped inside the lid of the shipping cooler. If

multiple coolers are sent, but are included on one chain-of-custody form, send the form with the cooler containing vials for volatile organic compounds (VOCs) analysis or the cooler with the air bill attached. Indicate on the air bill how many coolers are included with that shipment.

An example of a chain-of-custody form is provided as Attachment C. After the samples are received at the laboratory, the sample cooler and contents are checked and any problems are noted on the enclosed chain-of-custody form (any discrepancies between the sample labels and chain-of-custody form and any other problems that are noted are resolved through communication between the laboratory point-of-contact and the PM or qualified designee). The chain-of-custody form is signed and copied. The laboratory will retain the copy, and the original becomes part of the samples' corresponding analytical data package.

5.3.1.4 Custody Seal

Attachment D is an example of a custody seal. The custody seal is an adhesive-backed label that is part of a chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field and sealed in coolers for transport to the laboratory. Sign and date custody seals and affix them across the lid and body of each cooler (front and back of opposite sides) containing environmental samples (see SOP SA-6.1). Obtain custody seals from the laboratory (if available) or purchase them from a supplier.

5.3.1.5 Geochemical Parameters Log Sheets

Complete Field Analytical Log Sheets to record geochemical and/or natural attenuation field test results.

5.3.2 Hydrogeological and Geotechnical Forms

5.3.2.1 Groundwater Level Measurement Sheet

Complete a Groundwater Level Measurement Sheet for each round of water level measurements made at a site.

5.3.2.2 Data Sheet for Pumping Test

During the performance of a pumping test (or an in-situ hydraulic conductivity test), a large amount of data must be recorded, often within a short time period. Use a Pumping Test Data Sheet to facilitate this task by standardizing the data collection format for the pumping well and observation wells, and allowing the time interval for collection to be established in advance.

5.3.2.3 Packer Test Report Form

Complete a Packer Test Report Form for each well at which a packer test is conducted.

5.3.2.4 Boring Log

Complete a Summary Log of Boring, or Boring Log for each soil boring performed to document the materials encountered, operation and driving of casing, and locations/depths of samples collected. In addition, if volatile organic vapors are monitored on cores, samples, cuttings from the borehole, or breathing zone, (using a photoionization detector [PID] or flame ionization detector [FID]), enter these readings on the boring log at the appropriate depth. When they become available, enter the laboratory sample number, concentrations of key contaminants, or other pertinent information in the "Remarks" column. This feature allows direct comparison of contaminant concentrations with soil characteristics.

5.3.2.5 Monitoring Well Construction Details Form

Complete a Monitoring Well Construction Details Form for every monitoring well, piezometer, or temporary well point installed. This form contains specific information on length and type of well riser pipe and screen, backfill, filter pack, annular seal and grout characteristics, and surface seal characteristics. This information is important in evaluating the performance of the monitoring well, particularly in areas where water levels show temporal variation or where there are multiple (immiscible) phases of contaminants. Depending on the type of monitoring well (in overburden or bedrock, stick-up or flush mount), different forms are used.

5.3.2.6 Test Pit Log

When a test pit or trench is constructed for investigative or sampling purposes, a Test Pit Log must be filled out by the responsible Project Geologist/Sampler.

5.3.2.7 Miscellaneous Monitoring Well Forms

Miscellaneous monitoring well forms that may be required on a project-specific basis include the Monitoring Well Materials Certificate of Conformance and Monitoring Well Development Record. Use a Monitoring Well Materials Certificate of Conformance to document all materials utilized during each monitoring well installation. Use a Monitoring Well Development Record to document all well development activities.

5.3.2.8 Miscellaneous Field Forms – Quality Assurance and Checklists

Miscellaneous field forms/checklists that may be required on a project-specific basis include the following:

- Container Sample and Inspection Sheet – use this form when a container (drum, tank, etc.) is sampled and/or inspected.
- QA Sample Log Sheet – use this form when a QA sample such as an equipment rinsate blank, source blank, etc. is collected.
- Field Task Modification Request (FTMR) – use this form to document deviations from the project planning document(s). The FOL is responsible for initiating the FTMRs. Maintain copies of all FTMRs with the on-site planning documents, and place originals in the final evidence file.
- Field Project Daily Activities Checklist and Field Project Pre-Mobilization Checklist – use these during both the planning and field effort to ensure that all necessary tasks are planned for and completed. These two forms are not requirements, but are useful tools for most field work.

5.3.3 Equipment Calibration and Maintenance Form

The calibration or standardization of monitoring, measuring, or test equipment is necessary to ensure the proper operation and response of the equipment, to document the accuracy, precision, or sensitivity of the measurements, and to determine if correction should be applied to the readings. Some items of equipment require frequent calibration, others infrequent. Some are calibrated by the manufacturer, others by the user.

Each instrument requiring calibration has its own Equipment Calibration Log, which documents that the manufacturer's instructions were followed for calibration of the equipment, including frequency and type of standard or calibration device. Maintain an Equipment Calibration Log for each electronic measuring device used in the field; make entries for each day the equipment is used or in accordance with manufacturer recommendations.

5.4 FIELD REPORTS

The primary means of recording on-site activities is the site logbook. Other field notebooks may also be maintained. These logbooks and notebooks (and supporting forms) contain detailed information required for data interpretation or documentation but are not easily used for tracking and reporting of progress. Furthermore, the field logbook/notebooks remain on site for extended periods of time and are thus not accessible for timely review by project management. Other reports useful for tracking and reporting the progress of field activities are described below.

5.4.1 Daily Activities Report

To provide timely oversight of on-site contractors, complete and submit Daily Activities Reports (DARs) as described below.

5.4.1.1 Description

The DAR documents the activities and progress for each day's field work. Complete this report on a daily basis whenever there are drilling, test pitting, well construction, or other related activities occurring that involve subcontractor personnel. These sheets summarize the work performed and form the basis of payment to subcontractors. The DAR form can be found on the NUS Operating Unit intranet site.

5.4.1.2 Responsibilities

It is the responsibility of the rig geologist to complete the DAR and obtain the driller's signature acknowledging that the times and quantities of material entered are correct.

5.4.1.3 Submittal and Approval

At the end of the shift, the rig geologist must submit the DAR to the FOL for review and filing. The DAR is not a formal report and thus requires no further approval. The DARs are retained by the FOL for use in preparing the site logbook and in preparing weekly status reports for submission to the PM.

5.4.2 Weekly Status Reports

To facilitate timely review by project management, photocopies of logbook/notebook entries may be made for internal use.

In addition to those described herein, other summary reports may also be contractually required.
Field forms can be found on the NUS Operating Unit intranet site.

6.0 LISTING OF FIELD FORMS ON THE NUS OPERATING UNIT INTRANET SITE

- Boring Log
- Container Sample and Inspection Sheet
- Daily Activities Checklist
- Daily Activities Record
- Equipment Calibration Log
- Field Task Modification Request Form
- Field Analytical Log Sheet - Geochemical Parameters
- Groundwater Level Measurement Sheet
- Groundwater Sample Log Sheet
- Hydraulic Conductivity Testing Data Sheet
- Low Flow Purge Data Sheet

- Bedrock Monitoring Well Construction (Stick Up)
- Bedrock Monitoring Well Construction (Flush Mount)
- Bedrock Monitoring Well Construction (Open Hole)
- Confining Layer Monitoring Well Construction
- Monitoring Well Development Record
- Monitoring Well Materials Certificate of Conformance
- Overburden Monitoring Well Construction (Flush Mount)
- Overburden Monitoring Well Construction (Stick Up)
- Packer Test Report Form
- Pumping Test Data Sheet
- QA Sample Log Sheet
- Soil & Sediment Sample Log Sheet
- Surface Water Sample Log Sheet
- Test Pit Log
- Field Project Pre-Mobilization Checklist

7.0 REFERENCES

USEPA, 2016.Sampler's Guide, Contract Laboratory Program Guidance for Filed Samplers, Office of Superfund Remediation and Technology Transfer, OSWER 9200.2-147, EPA-540-R-014-013, October.

ATTACHMENT A

TYPICAL SITE LOGBOOK ENTRY

START TIME: ______________________________ DATE: ______________________________

SITE LEADER: ____
PERSONNEL:

NUS	DRILLER	SITE VISITORS
________________________	________________________	________________________
________________________	________________________	________________________
________________________	________________________	________________________

WEATHER: Clear, 68°F, 2-5 mph wind from SE

ACTIVITIES:

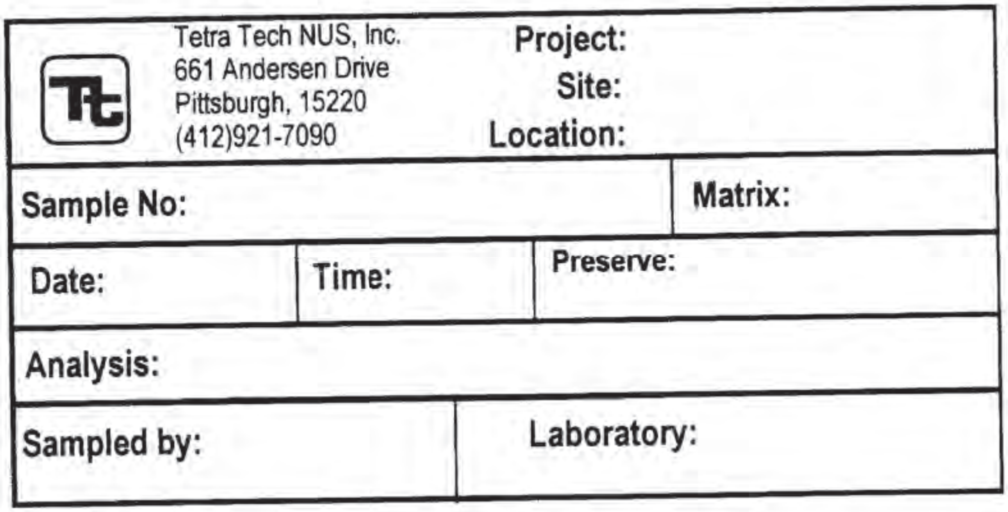
1. Steam jenney and fire hoses were set up.
2. Drilling activities at well ____ resumes. Rig geologist was ______________. See Geologist's Notebook, No. 1, page 29-30, for details of drilling activity. Sample No. 123-21-S4 collected; see sample logbook, page 42. Drilling activities completed at 11:50 and a 4-inch stainless steel well installed. See Geologist's Notebook, No. 1, page 31, and well construction details for well ______.
3. Drilling rig No. 2 steam-cleaned at decontamination pit. Then set up at location of well _______.
4. Well ______ drilled. Rig geologist was ____________________. See Geologist's Notebook, No. 2, page ____ for details of drilling activities. Sample numbers 123-22-S1, 123-22-S2, and 123-22-S3 collected; see sample logbook, pages 43, 44, and 45.
5. Well _____ was developed. Seven 55-gallon drums were filled in the flushing stage. The well was then pumped using the pitcher pump for 1 hour. At the end of the hour, water pumped from well was "sand free."
6. EPA remedial project manager arrives on site at 14:25 hours.
7. Large dump truck arrives at 14:45 and is steam-cleaned. Backhoe and dump truck set up over test pit _________.
8. Test pit _______ dug with cuttings placed in dump truck. Rig geologist was _______________. See Geologist's Notebook, No. 1, page 32, for details of test pit activities. Test pit subsequently filled. No samples taken for chemical analysis. Due to shallow groundwater table, filling in of test pit ___ resulted in a very soft and wet area. A mound was developed and the area roped off.
9. Express carrier picked up samples (see Sample Logbook, pages 42 through 45) at 17:50 hours. Site activities terminated at 18:22 hours. All personnel off site, gate locked.

____

Field Operations Leader

ATTACHMENT B

SAMPLE LABEL (EXAMPLE)



Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh, 15220
(412)921-7090

Project:
Site:
Location:

Sample No:
Matrix:

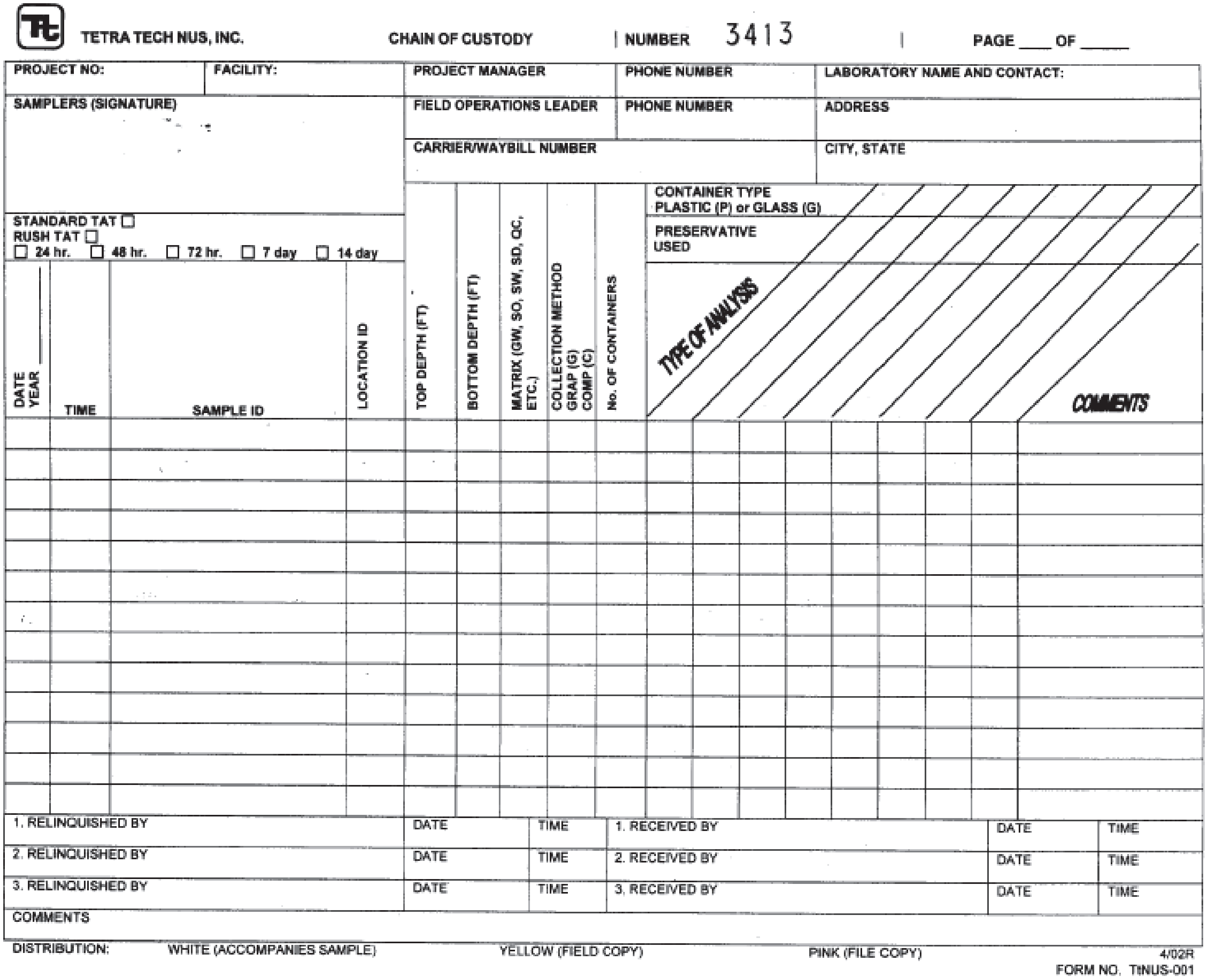
Date:
Time:
Preserve:

Analysis:

Sampled by:
Laboratory:

ATTACHMENT C

CHAIN-OF-CUSTODY FORM (EXAMPLE)



TETRA TECH NUS, INC. **CHAIN OF CUSTODY** | **NUMBER** 3413 | **PAGE ____ OF _____**

PROJECT NO:	FACILITY:	PROJECT MANAGER	PHONE NUMBER	LABORATORY NAME AND CONTACT:
SAMPLERS (SIGNATURE)		FIELD OPERATIONS LEADER	PHONE NUMBER	ADDRESS
		CARRIER/WAYBILL NUMBER		CITY, STATE

STANDARD TAT ☐
RUSH TAT ☐
☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 7 day ☐ 14 day

CONTAINER TYPE PLASTIC (P) or GLASS (G)

PRESERVATIVE USED

DATE YEAR ____	TIME	SAMPLE ID	LOCATION ID	TOP DEPTH (FT)	BOTTOM DEPTH (FT)	MATRIX (GW, SO, SW, SD, QC, ETC.)	COLLECTION METHOD GRAP (G) COMP (C)	No. OF CONTAINERS	TYPE OF ANALYSIS								COMMENTS

1. RELINQUISHED BY	DATE	TIME	1. RECEIVED BY	DATE	TIME
2. RELINQUISHED BY	DATE	TIME	2. RECEIVED BY	DATE	TIME
3. RELINQUISHED BY	DATE	TIME	3. RECEIVED BY	DATE	TIME
COMMENTS					

DISTRIBUTION: WHITE (ACCOMPANIES SAMPLE) YELLOW (FIELD COPY) PINK (FILE COPY)

4/02R
FORM NO. TtNUS-001

ATTACHMENT D

CHAIN-OF-CUSTODY SEAL (EXAMPLE)

CUSTODY SEAL

Date ________________

Signature ________________

TETRA TECH

STANDARD OPERATING PROCEDURE

Number SA-7.1	Page 1 of 17
Effective Date 7/15/2016	Revision 8

Applicability
Tetra Tech, Inc., NUS Operating Unit

Prepared
Earth Sciences Department

Subject
DECONTAMINATION OF FIELD EQUIPMENT AND MANAGEMENT OF INVESTIGATION DERIVED WASTE

Approved
T. Johnston

tom. johnston @tetratech.com

Digitally signed by: tom. johnston@tetratech.com
DN: CN = tom. johnston@tetratech.com
Date: 2016.07.14 10:21:43 -05'00'

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1.0 PURPOSE

Decontamination is the process of removing, or neutralizing contaminants that have contacted and/or accumulated on equipment and/or personnel. The purpose of this Standard Operating Procedure (SOP) is to protect site personnel, the general public, and the environment while preserving or maintaining sample integrity. It is further intended through this procedure to describe the steps necessary for proper decontamination to prevent either direct or indirect contamination of drilling equipment, earth-moving equipment, chemical sampling equipment, and analytical equipment. It is also intended through the application of these principles to prevent cross-contamination of the environment.

2.0 SCOPE AND APPLICABILITY

This procedure applies to all equipment used to provide access to/acquire environmental samples that may have become contaminated through direct contact with contaminated media including air, water, and soil. This equipment includes drilling and heavy equipment and chemical sampling and field analytical equipment. Where technologically and economically feasible, single-use sealed disposable equipment will be employed to minimize the potential for cross-contamination. This SOP also provides general reference information on the control of contaminated materials.

Decontamination methods and equipment requirements may differ from one project to another. General equipment items are specified in Section 6.0, but project-specific equipment must be obtained to address the project-specific decontamination procedures presented in Section 7.0 and applicable subsections.

3.0 GLOSSARY

Alconox/Liquinox - A brand of phosphate-free laboratory-grade detergent.

Chemical/Hygienic/Sanitizing wipes – These types of devices offer a portable solution when there are no sources of water and soap to allow hands, face, or equipment to be cleaned of gross contamination. Some of these wipes and solution based detergents are chemical specific such as D-Lead or D-Wipes are used to remove lead and other heavy metals from hands and face.

Decontamination Solution - A solution selected/identified in the Health and Safety Plan (HASP), Project-Specific Quality Assurance Project Plan (QAPP), or other governing document. The solution is selected and employed as directed by the project chemist/health and safety professional as it has been shown to be most effective in the removal, neutralization, and/or stabilization of the contaminants in question without creating unwanted byproducts.

Deionized Water (DI) – This is water that has been treated by passing it through a deionizing resin column. This water may also pass through additional filtering media to attain various levels of analyte-free status. The DI water should meet College of American Pathologists (CAP) and National Committee for Clinical Laboratory Standards (NCCLS) specifications for reagent-grade Type I water.

Dry decontamination – This method physically removes contaminates from the surface through the use of High Efficiency Particulate Filter vacuums employed for lead and asbestos operations.

Potable Water - Tap water from any municipal water treatment system. Use of an untreated potable water supply is not an acceptable substitute for tap water.

Pressure Washing - Process employing a high-pressure pump and nozzle configuration to create a high-pressure spray of potable water. High-pressure spray is employed to remove solids from the surface of equipment. This process can be coupled with wash solutions or used solely as a pressure washer to physically remove surface artifacts.

Solvent – A solvent is a liquid that is able to dissolve other substances, or solutes, (gases, liquids and/or solids) to form a solution. A solution is a homogeneous mixture of solvent and solute. Water is often referred to as a universal solvent because of its ability to dissolve many different types of substances. The category "solvent" includes but is not limited to pesticide-grade isopropanol; methanol; acetone; and hexane. These solvents may be required for particular projects or for a particular purpose (e.g., removal of concentrated waste) and must be justified in the project planning documents. For example, it may be necessary to use hexane when analyzing for trace levels of pesticides, polychlorinated biphenyls (PCBs), or fuels. In addition, because many of these solvents are not miscible in water, the equipment should be air dried prior to use. Solvents should not be used on polyvinyl chloride (PVC) equipment or well construction materials. Acidic and caustic materials may also serve as solutes and when mixed with water may be used for the purpose of decontamination.

Steam Pressure Washing - A cleaning method employing a high-pressure spray of heated potable water (steam) to remove various organic/inorganic chemicals from equipment. This method is useful for removing organic substances such as pesticides, PCBs, oils, and fuels.

4.0 RESPONSIBILITIES AND PERSONNEL QUALIFICATIONS

Project Manager (PM) - Responsible for ensuring that all field activities are conducted in accordance with approved project plan(s) requirements.

Decontamination Personnel - Individuals assigned the task of decontamination. It is the responsibility of these individuals to understand the use and application of the decontamination process, including:

- A working knowledge of the use of all equipment involved (pressure washers, steam cleaners, etc.).
- Hazards associated with the solutions used for this purpose.
- The monitoring of the decontamination process to ensure that it is working properly. This is accomplished through:
    - Visual evaluation (i.e., answering the question: "Does it appear to be clean?"),
    - Employing monitoring instruments and scanning of decontaminated items do determine if off-gassing indicates the presence of contaminants , and/or
    - Through the collection of equipment rinsate blanks to verify contaminant removal.
    - Focusing on tools that contact sampled media as well as areas on those tools that trap dirt and contaminated water.
    - Diligent use of PPE and self-decontamination to minimize the potential for cross contamination.
- Replace wash waters often to minimize the collection of contaminants.

Field Operations Leader (FOL) - Responsible for the implementation of project-specific planning documents. This includes on-site verification that all field activities are performed in compliance with approved SOPs or as otherwise dictated by the approved project plan(s). The FOL is also responsible for the completion and accuracy of all field documentation as well as assigning or evaluating the decontamination process. Additionally, through concurrence with the PM, the FOL may:

- Initiate site investigation/remediation efforts in the area where the least amount of contamination is reported thereby minimizing the potential for cross contamination.

- Use disposable devices to collect sample aliquots to minimize cross contamination that might otherwise occur through the use of reusable items.

Site Safety and Health Officer (SSHO) - Exercises shared responsibility with the FOL concerning decontamination effectiveness. All equipment arriving on site (as part of the equipment inspection), leaving the site, and moving between locations is required to go through a decontamination process and evaluation. This is accomplished through visual examination and/or instrument screening, where contaminants can be detected to determine the effectiveness of the decontamination process. Improper or incomplete decontamination is sufficient to restrict equipment from entering the site, exiting the site, or moving to a new location on the site until the objectives are successfully completed.

General personnel qualifications for decontamination activities include the following:

- Occupational Safety and Health Administration (OSHA) 40-hour General Site Worker and/or applicable 8-Hour General Site Worker Refresher training.

- Capability of performing field work under the expected physical (heavy lifting and moving auger flights and drill rods) and environmental (i.e., weather – heat and/or cold extremes) conditions.

- Familiarity with appropriate decontamination procedures. Throughout this SOP, the procedures remove gross contamination from top down, outside in, then moving to what may be described as “polishing stages” where solvents including laboratory grade isopropanol and deionized water are used to remove residual levels of contaminants.

5.0 HEALTH AND SAFETY

In addition to the health and safety issues and reminders specified in subsections of this SOP, the following considerations and requirements must be observed as SOPs for field equipment decontamination activities:

- If any solvents or hazardous chemicals (e.g., isopropyl alcohol) are to be used in equipment decontamination activities, the FOL must first obtain the manufacturer’s/supplier’s Safety Data Sheet (SDS) and assure that it is reviewed by all users (prior to its use), added to the site Hazardous Chemical Inventory, and maintained on site as part of the project Hazard Communication Program.

- Review and observe specific health and safety requirements (e.g., personal protective equipment [PPE]) specified in the project-specific HASP (or equivalent) for this activity.

6.0 EQUIPMENT LIST

- Wood for decontamination pad construction, when applicable (see Section 7.1).

- Tools for constructing decontamination pad frame, when applicable (see Section 7.1).

- Plastic sheeting or comparable material to cover decontamination pad frame, when applicable (see Section 7.1).

- Wash/drying racks for auger flights and drill/drive rods, when applicable (see Section 7.2).

- PPE as specified in the project HASP (or equivalent).

- Soap and water for physical washing and rinsing.

- Deionized water for final rinsing.

- Solvents (e.g., pesticide-grade isopropanol) for rinsing (see applicable portions of Section 7.2).

- Tubs, buckets, etc. for containerizing rinse water (see applicable portions of Section 7.2).

- Sample bottles for collecting equipment rinsate blanks (see Section 7.2).

- Calibrated photoionization detector (PID) or flame ionization detector (FID) to monitor decontaminated equipment for organic vapors generated through the existence of residual contamination or the presence of decontamination solvent remaining after the piece was rinsed.

- Aluminum foil or clear clean plastic bag for covering cleaned equipment (see applicable portions of Section 7.2).

- Paper towels or cloths for wiping.

- Brushes, scrapers, or other hand tools useful for removing solid materials from equipment.

- Clear plastic wrap for covering or wrapping large decontaminated equipment items (see Section 7.2.2).

- Drum-moving equipment for moving filled waste drums (optional) (see Section 7.3).

- Drum labels for waste drums (see Attachment A).

7.0 PROCEDURES

The process of decontamination is accomplished through the removal of contaminants or neutralization of contaminants. To accomplish this activity, preparation is required including site preparation, equipment selection, and evaluation of the decontamination requirements and processes. Site contaminant types, concentrations, and media types are primary drivers in the selection of the types of decontamination and where it will be conducted. For purposes of this SOP, discussion is limited to decontamination procedures for general environmental investigations.

Decontamination processes will be performed at the location(s) specified in project-specific planning documents. Typical decontamination locations include the following:

- Temporary decontamination pads/facilities
- Sample locations
- Centralized decontamination pad/facilities
- Combination of some or all of the above

The following discussion includes general considerations for the decontamination process. Specific construction and implementation procedures will be as specified in the project-specific planning documents and/or may be as dictated by site-specific conditions as long as the intent of the requirements in the planning documents is met. This intent is to contain any residual fluids and solids generated through the decontamination process.

7.1 Decontamination Pad Design/Construction Considerations

7.1.1 Temporary Decontamination Pads

Temporary decontamination pads may be constructed at satellite locations within the site area in support of temporary work areas. These structures are generally constructed to support the decontamination of heavy equipment such as drill rigs and earth-moving equipment but can be and are generally employed for smaller articles (auger flights, drill rods, split spoons, etc.).

The purpose of the decontamination pad is to contain wash waters and potentially contaminated soil generated during decontamination procedures. Therefore, construction of these pads should take into account the following considerations:

- Site location – Establish the decontamination site far enough from the work site to maximize decontamination effectiveness while minimizing travel distance. The location of the decontamination site shall be selected to provide, in the judgment of the FOL or his/her designee, compliance with as many of the following characteristics as practicable:
  - Away from pedestrian/vehicle thoroughfares.
  - Avoidance of areas where control/custody cannot be maintained.
  - Avoidance of areas where potential releases of contaminated media or decontamination fluids may be compounded through access to storm water transport systems, streams, or other potentially sensitive areas.
  - Avoidance of potentially contaminated areas.
  - Avoidance of areas too close to the ongoing operation, where cross-contamination may occur.

The selected decontamination site should include the following, where possible:

- Areas where potable water and electricity are provided.

Safety Reminder

When utilizing electrical power sources, either hard-wired or portable-generated sources, ensure that:

- All power is routed through a Ground Fault Circuit Interrupter (GFCI).

- All power cords are in good condition (no physical damage), rated for the intended energy load, and designated for outdoor use.

In situations where accomplishing these elements are not possible, it will be necessary to implement a site electrical grounding program.

- Areas where support activities such as removing decontamination waters, soil, and sediment are possible without entering an active exclusion zone.

- Areas that offer sufficient size to carry out the specific decontamination sequence.

- Decontamination pad (decon pad) – Construct the decontamination pad to meet the following characteristics:

  - Size – The size of the pad should be sufficient to accept the equipment to be decontaminated as well as permitting free movement around the equipment by the personnel conducting the decontamination. The size of the decontamination pad should permit these movements utilizing pressure/steam washer wands and hoses and minimizing splash due to work in close quarters.

  - Slope – An adequate slope should be constructed to permit the collection of water and potentially contaminated soil within a trough or sump constructed at one end. The collection point for wash waters should be of adequate distance that the decontamination workers do not have to walk through the wash waters while completing their tasks. Because the pad will be sloped, place a light coating of sand over the plastic to minimize potential slips and falls. See the text about liners below. When preparing the pad, remove sticks, roots, stones, and debris that could puncture the liner. The area should be lightly graded and possibly covered with sand to minimize the possibility of puncture.

  - Sidewalls – The sidewalls shall be at least 6 inches in height (or as high as possible if 6 inches is not achievable) to provide adequate containment for wash waters and soil. If splash represents a potential problem, splash guards should be constructed to control overspray. Sidewalls may be constructed of wood, inflatables, sand bags, etc. to permit containment. Splash guards are typically wood frames with plastic sheeting to control overspray.

  - Liner – Depending on the types of equipment and decontamination method to be used, the liner should be of sufficient thickness to provide a puncture-resistant barrier between the decontamination operation and the unprotected environment. Care should be taken to examine the surface area prior to placing the liner to remove sharp articles (sticks, stones, debris) that could puncture the liner. Liners are intended to form an impermeable barrier. The thickness may vary from a minimum recommended thickness of 10 mil to 30 mil. The desired thickness may be achieved through layering materials of lighter construction. It should be noted that various materials (rubber, polyethylene sheeting) become slippery when wet. To minimize this potential hazard associated with a sloped liner, a light coating of sand shall be applied to provide traction as necessary.

  - Wash/drying racks – Auger flights, drill/drive rods, and similar equipment require racks positioned off of the ground to permit these articles to be washed, drained, and dried while secured from falling during this process.

For decontamination of direct-push technology (DPT) equipment, the pad may be as simple as a mortar tub containing buckets of soapy water for washing and an empty bucket to capture rinse waters. Decontamination may be conducted at the rear of the rig to permit rapid tool exchange, because dual tube or Macro-Core Samplers and drive rods require little space for decontamination

- Maintenance – Maintain the decontamination area by:

  - Periodically clearing the work area of standing water, soil, and debris, and coiling hoses to aid in eliminating slip, trip, and fall hazards. In addition, these articles will reduce potential backsplash and cross-contamination.

  - Regularly changing the decontamination fluids to ensure proper cleaning and prevent cross-contamination.

  - PPE – Periodically evaluate the condition of, and maintain the decontamination equipment, including regular cleaning of face shields and safety glasses. This is critical to ensuring the safety of decontamination personnel and the integrity of the decontamination process, and it will ensure that equipment is functioning properly.

7.1.2 Decontamination Activities at Drill Rigs/DPT Units

7.1.2.1 During subsurface sampling activities including drilling and DPT activities, conduct decontamination of drive rods, Macro Core Samplers, split spoons, etc. at an area adjacent to the operation. Decontamination is generally accomplished using a soap/water wash and rinse utilizing buckets and brushes. This area requires sufficient preparation to accomplish the decontamination objectives.

7.1.2.2 Place buckets within mortar tubs or similar secondary containment tubs to prevent splash and spills from reaching unprotected environmental media.

7.1.2.3 Use drying racks where possible to permit parts to dry and be evaluated prior to use/reuse. Methodology regarding this activity is provided in Section 7.2.

7.1.3 Decontamination Activities at Remote Sample Locations

7.1.3.1 When sampling at remote locations, evacuate sampling equipment such as trowels and pumps/tubing of potentially contaminated media to the extent possible.

7.1.3.2 Wrap this equipment in plastic for transport to the temporary/centralized decontamination location for final cleaning and disposition.

7.1.3.3 Flush and clean single-use equipment such as disposable trowels, tubing, and surgeon’s gloves to allow disposal of this equipment after visible soil and water remnants have been removed.

7.2 Equipment Decontamination Procedures

The following represents procedures to be employed for the decontamination of equipment that may have contacted and/or accumulated contamination through site investigation activities.

7.2.1 Monitoring Well Sampling Equipment

7.2.1.1 Groundwater sampling equipment – This includes pumps inserted into monitoring wells such as bladder pumps, Whale pumps, and Redi-Flo pumps and reusable bailers, etc.

1. Evacuate to the extent possible, any purge water within the pump/bailer.

2. Scrub the external components using soap and water and/or steam clean* the outside of the pump/bailer and, if applicable, the pump tubing.

3. Insert the pump and tubing/bailer into a clean container of soapy water. Pump/run a sufficient amount of soapy water through the pump/bailer to flush out any residual well water. After the pump is flushed, circulate soapy water through the pump to ensure that the internal components are thoroughly flushed.

4. Remove the pump and tubing/bailer from the container.

5. Rinse external pump components using tap water.

6. Insert the pump and tubing/bailer into a clean container of tap water. Pump/run a sufficient amount of tap water through the pump/bailer to evacuate all of the soapy water (until clear).

> ***CAUTION***
>
> Do not rinse polyethylene (PE), PVC, and associated tubing with solvents – These are considered single use items and can be removed and disposed of after use. Use the procedures defined in the project-specific planning documents. If they are not defined, contact the FOL for guidance. The solvent rinse described in Step 7 should be omitted and tubing or plastic components replaced.

7. If groundwater contains or is suspected to contain oil, grease, PAHs, PCBs, or other hard to remove organic materials, rinse the equipment to be cleaned with pesticide-grade isopropanol. If groundwater contains these contaminants employ single use sampling apparatus that can be wash, rinsed, and disposed of after use.

8. Pass deionized water through the hose to flush out the tap water and solvent residue as applicable.

9. Drain residual deionized water to the extent possible.

10. Allow components of the equipment to air dry.

11. For bladder pumps, disassemble the pump and wash the internal components with soap and water, then rinse with tap water, isopropanol, and deionized water and allow to dry. After the parts are dry, conduct a visual inspection and a monitoring instrument scan to ensure that potential contaminants and all decontamination solvent have been removed. Collect an equipment rinsate blank in accordance with the project-specific planning documents to ensure that the decontamination process is functioning as intended. The typical frequency of collection for equipment rinsate blanks is 1 per 20 field samples. In addition, wipe samples or field tests such as ultraviolet light may be used.

12. Wrap pump/bailer in aluminum foil or a clear clean plastic bag for storage.

> ***SAFETY REMINDER***
>
> Remember when handling powered equipment to disconnect the power source and render the equipment to a zero energy state (both potential and kinetic) before opening valves, disconnecting lines, etc.

7.2.1.2 Electronic Water Level Indicators/Sounders/Tapes

During water level measurements, rinsing the extracted tape and probe with deionized water and wiping the surface of the extracted tape between locations is acceptable. However, periodic full decontamination should be conducted as follows:

1. Wash with soap and water
2. Rinse with tap water
3. Rinse with deionized water

NOTE

In situations where oil, grease, free product, other hard to remove materials are encountered, probes and exposed tapes should be washed in hot soapy water. If probes or tapes cannot be satisfactorily decontaminated (they are still stained, discolored, etc.), they should be removed from service.

7.2.1.3 Miscellaneous Equipment

Miscellaneous equipment including analytical equipment (water quality testing equipment) shall be cleaned per manufacturers' instructions. This generally includes wiping the sensor housing and rinsing with tap and deionized water.

Coolers/shipping containers employed to ship samples are received from the laboratory in a variety of conditions including marginal to extremely poor. Coolers shall be evaluated prior to use for the following:

- Structural integrity – Coolers missing handles or having breaks in the outer housing should be removed and not used. Notify the laboratory that the risk of shipping samples in the cooler(s) provided is too great and request a replacement unit.

- Cleanliness – As per protocol, only volatile organic samples are accompanied by a trip blank. If a cooler's cleanliness is in question (visibly dirty/stained) or if there are noticeable odors, the cooler should be decontaminated prior to use as follows:

  1. Wash with soap and water
  2. Rinse with tap water
  3. Dry

If these measures fail to clean the cooler to an acceptable level, remove the unit from use as a shipping container and ask the cooler provider (e.g., the analytical laboratory) to provide a replacement unit.

7.2.2 Downhole Drilling Equipment

This includes any portion of the drill rig that is over the borehole, including auger flights, drill stems, rods, and associated tooling that would extend over the borehole. The following procedure is to be employed prior to initiating the drilling/sampling activity, then between locations:

CAUTION

Exercise care when using scrapers to remove soil and debris from downhole drilling equipment. Inadvertent slips of scrapers have resulted in cuts, scrapes, and injured knuckles, so use scrapers carefully when removing soil from these items.

1. Remove loose soil using shovels, scrapers, etc.

2. Through a combination of scrubbing using soap and water and/or steam cleaning or pressure washing, remove visible dirt/soil from the equipment being decontaminated.

CAUTION

In Step 3, do not rinse PE, PVC, and associated tubing with solvents. The appropriate procedures should be defined within the project-specific planning documents. If they are not defined, contact the FOL for guidance. The solvent rinse described in Step 4 may be omitted if groundwater does not contain oil, grease, PAHs, PCBs, or other hard to remove organic materials.

3. Rinse the equipment with tap water, where applicable (steam cleaning and pressure washing incorporate rinsing as part of the process).

4. If the equipment has directly or indirectly contacted contaminated sample media and is known or suspected of being contaminated with oil, grease, PAHs, PCBs, or other hard to remove organic materials, rinse equipment with pesticide-grade isopropanol

   ✎***Note:*** *Steam cleaning does the best job removing contaminants especially the more volatile components. Not only is the water pressure sufficient to remove caked on soils, the heat associated with the steam is very effective in removing contaminants (even those more stubborn ones such as PAHs and PCBs). Steam cleaning units, however, are more dangerous to use due to pressurized steam and water. Care must be taken to avoid thermal burns by ensuring all guards are in place and gloves are employed. When using steam, the items that have been washed dry relatively quickly because heated water and steam are applied.*

5. To the extent possible, allow components to air dry.

6. If the decontaminated equipment is to be used immediately after decontamination, screen it with a calibrated photoionization detector (PID)/flame ionization detector (FID) to ensure that all contaminants and possible decontamination solvents (if they were used) have been adequately removed.

7. Wrap or cover equipment in clear plastic until it is time to be used.

SAFETY REMINDER

Even when equipment is disconnected from power sources, dangers such as the following may persist:

Falls - An auger flight standing on its end may fall and injure someone. Secure all loose articles to prevent heavy articles from falling onto people or equipment.

Burns - Steam cleaner water is heated to more than 212 ˚F and exhibits thermal energy that can cause burns. Prevent contact of skin with hot water or surfaces.

High water pressure - Pressure washer discharge can have 2,000 to 4,000 psi of water pressure. Water under this amount of pressure can rupture skin and other human tissues. Water at 4,000 psi exiting a 0˚ tip can be dangerous because of its relatively high cutting power. The exit velocity and cutting power of the water are reduced when exiting a 15-25˚ fan tip, but damage to soft tissues is still possible.

In general, follow the rules below to avoid injury, equipment damage, or incomplete decontamination:

1. Read the operating manual and follow the manufacturers' recommended safety practices before operating pressure washers and steam cleaners.

2. Never point the pressure washer or steam cleaner at another person or use to clean your boots or other parts of your body. Water lacerations and burns may appear to be minor at first but can be life threatening. Do not attempt to hold small parts in your hand while washing them with high- temperature or high-pressure water.

3. Always wear PPE as specified in the HASP (or equivalent) such as:

   - Hard hat, safety glasses, splash shield, impermeable apron or splash suit, and hearing protection. Remember that excessive noise is a hazard when operating gas-powered engines and electrically driven pressure washers. PPE will be identified in your project specific planning documents.

4. Inspect each device before use. An inspection checklist will be provided in the project-specific planning documents. If it is a rented device, safety measures are typically provided by the vendor. In all cases, if you are not familiar with the operation of a pressure washer/steam cleaner, do not operate it until you obtain and thoroughly review operating instructions and recommended safety practices.

5. Do not modify equipment unless the manufacturer has approved the modifications.

7.2.3 Soil/Sediment Sampling Equipment

This section applies to soil sampling equipment including but not limited to hand augers, stainless steel trowels/spoons, bowls, dredges, scoops, split spoons, Macro Core samplers, etc.

1. Remove all loose soil from the equipment through manual means.

2. Through a combination of scrubbing using soap and water and/or steam cleaning or pressure washing, remove visible dirt/soil from the equipment.

3. Rinse the equipment with tap water.

4. If the equipment is contaminated or suspected to be contaminated with oil, grease, PAHs, PCBs, or other hard to remove organic materials, rinse the equipment with pesticide-grade isopropanol followed by steam cleaning. Where cleanliness is considered suspect, dispose and replace the suspect item.

5. Rinse the equipment with deionized water.

6. To the extent possible, allow components to air dry.

7. If the equipment is to be used immediately after decontamination, screen it with a calibrated PID/FID to ensure that all solvents (if they were used) and trace contaminants have been adequately removed.

8. After the equipment has dried, wrap it in aluminum foil for storage until use.

Dredges employed in sediment sampling are typically decontaminated as follows:

- Remove the sediment sample from the sampling device. If sufficient surface water exists remove visible sediments by dunking within the water from where the sediment sample was obtained. Because of this always work from downstream to upstream

- Extract the dredge and wash it in soap and water per the project-specific planning documents.

CAUTION

When handling dredges, the primary safety concern is trapping fingers or extremities in the larger dredge samplers within the jaws or pinch points of the mechanical jaws. Keep hands, fingers, and extremities away from these pinch and compression points. Either handle the device by the rope or preferably lock the jaws in place to control the potential for closing during maintenance and/or cleaning.

☞***Note:*** *In all cases when cleaning stainless steel sampling equipment minimize if not eliminate the use of acids as this will leach certain metals (e.g., chromium, nickel, iron, and antimony) and may result in sample contamination. Use soap and water wash and rinse and, where necessary, steam clean to remove stubborn contaminants.*

7.3 Contact Waste/Materials

During the course of field investigations, disposable/single-use equipment becomes contaminated. These items include tubing, trowels, PPE (gloves, overboots, splash suits, etc.), and broken sample containers.

With the exception of the broken glass, single-use articles should be cleaned (washed and rinsed) of visible materials and disposed as normal refuse. The exception to this rule is that extremely soiled materials that cannot be cleaned shall be containerized for disposal in accordance with project planning documents.

NOTE

Requirements for waste storage may differ from one facility to the next. Facility-specific directions for waste storage areas will be provided in project-specific documents, or separate direction will be provided by the Project Manager.

1. Assume that all investigation-derived waste (IDW) generated from decontamination activities contains the hazardous chemicals associated with the site unless there are analytical or other data to the contrary. Waste solution volumes could vary from a few gallons to several hundred gallons in cases where large equipment required cleaning.

2. Where possible, use filtering systems to extend the use of water within a closed system wash unit to recycle water and to reduce possible waste amounts.

NOTE

Containerized waste rinse solutions are best stored in 55-gallon drums (or equivalent containers); frac tanks, or tankers that can be sealed until ultimate disposal at an approved facility.

3. Properly label waste storage containers (see Attachment A).

4. Ensure that the IDW storage area is configured to meet the following specifications to permit access to the containers and to conduct spill/leak monitoring, sampling, and extraction when the disposal route is determined:

   - Enclose areas accessible by the general public using construction fencing and signs.
   - Store materials in 55-gallon drums on pallets with four (or fewer) drums per pallet.
   - Maintain the retaining bolt and label on the outside of storage containers where readily visible.

- Provide at least 4 feet of room between each row of pallets to allow access to containers for sampling, drum removal, and spill response.

- As directed in project-specific planning documents, maintain an IDW Inventory List and provide the list to the site Point of Contact at the termination of each shift.

- Maintain spill response equipment at the IDW storage area in case it is required for immediate access.

- Where possible, use equipment for moving containers. Where not possible, obtain help to manipulate containers.

-

CAUTION

Each container of water can weigh up to 490 pounds. Each 55-gallon drum of wet soil can weigh more than 750 pounds. These heavy objects may constitute a safety hazard. To minimize hazards such as this, limit the filling of drums and temporary containers to 80 percent capacity to minimize spill and handling difficulties, and to allow for expansion caused by freezing. Use powered equipment as the preferred method for moving staging and disposal of IDW. Where this is not possible, use drum carts to move partially filled drums.

Where drums have to be manually handled:
Get help
Secure the drum to the cart
Clear the pathway to the staging area.
Employ safe lifting techniques.
Consult the Project Planning Documents, most importantly, the Activity Hazard Analysis for additional direction.
.

When placing drums, keep your fingers out of pinch and smash points such as between the drums. In some cases such as well development and/or purge water, you can place the drums to be filled on the pallet and transport materials in smaller easier to handle containers.

Airborne Contaminant Exposure
To minimize potential airborne contaminant exposure close and seal all containers transported them inside the sampling support vehicle.
Periodically decontaminate temporary portable containers to minimize off-gassing inside the vehicle. When working at the well or storage container always work from an upwind position.

7.4 Decontamination Evaluation

Upon decontamination of equipment, determine the effectiveness of the decontamination process in the following manner:

- Visual evaluation – A visual evaluation will be conducted to ensure the removal of particulate matter. This shall be done to ensure that the washing/rinsing process is working as intended. Pay particular attention to points where soils and sediments may become trapped including threads cutting shoes to body, etc. It is often necessary to combine these types of decontamination methods to ensure the adequacy is sufficient to pass chemical rinsate.

- Instrument Screening – A properly calibrated PID/FID should be used to evaluate the presence of site contaminants and solvents used in the cleaning process. The air intake of the instrument shall be passed over the article to be evaluated. Avoid placing the instrument probe into residual waters. A PID/FID reading greater than the daily established background level requires a repeat of the decontamination process, followed by rescreening with the PID/FID. This sequence must be repeated until no instrument readings greater than the daily established background level are observed. It should be noted that the instrument scan is only viable if the contaminants are detectable within the instrument's capabilities.

NOTE

When required by project-specific planning documents, collection of equipment rinsate blanks (see next step) shall be completed without exception unless approval to not collect these samples is obtained from the Project Manager.

- Collection of Equipment Rinsate Blanks – It is recommended that equipment rinsate blank samples be collected to:

  - Evaluate the decontamination procedure representing different equipment applications (pumps versus drilling equipment) and different decontamination applications.

  - Single-use disposable equipment – The number of samples should represent different types of equipment as well as different lot numbers of single-use articles.

  - The collection and the frequency of equipment rinsate blank samples are as follows unless specified differently in the project-specific planning documents:
    - Per decontamination method.
    - Per disposable article/batch number of disposable articles

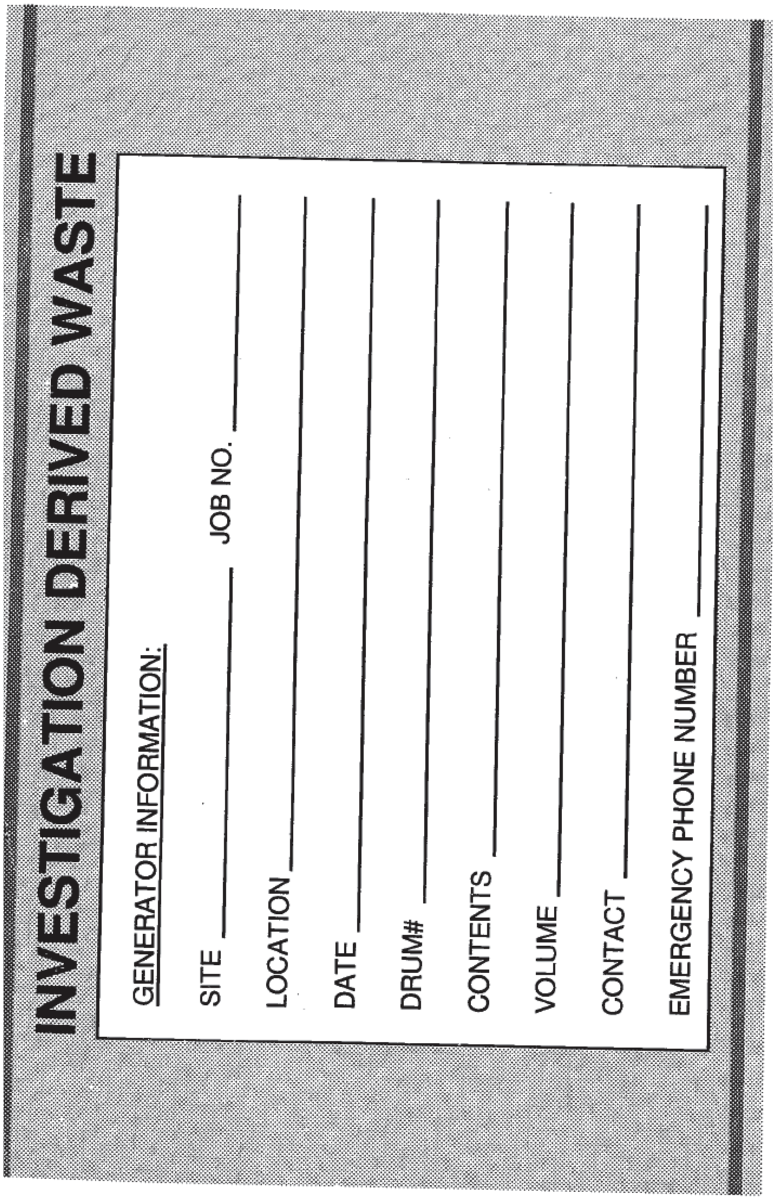
NOTE

It is recommended that an initial equipment rinsate blank sample be collected early in the project to ensure that the decontamination process is functioning properly and to avoid using a contaminated batch of single-use articles. It is recommended that a follow-up sample be collected later during the execution of the project to ensure that those conditions do not change.

Equipment rinsate blank sample collection may be driven by types of and/or levels of contaminant. Difficult to remove contaminants, oils/greases, some PAHs/PCBs, etc. may also support the collection of additional equipment rinsate blank samples due to the obvious challenges to the decontamination process. This is a field consideration to be determined by the FOL supporting and/or resigning not to collect.

ATTACHMENT A

IDW LABEL (EXAMPLE)



INVESTIGATION DERIVED WASTE

GENERATOR INFORMATION:

SITE ______ JOB NO. ______

LOCATION ______

DATE ______

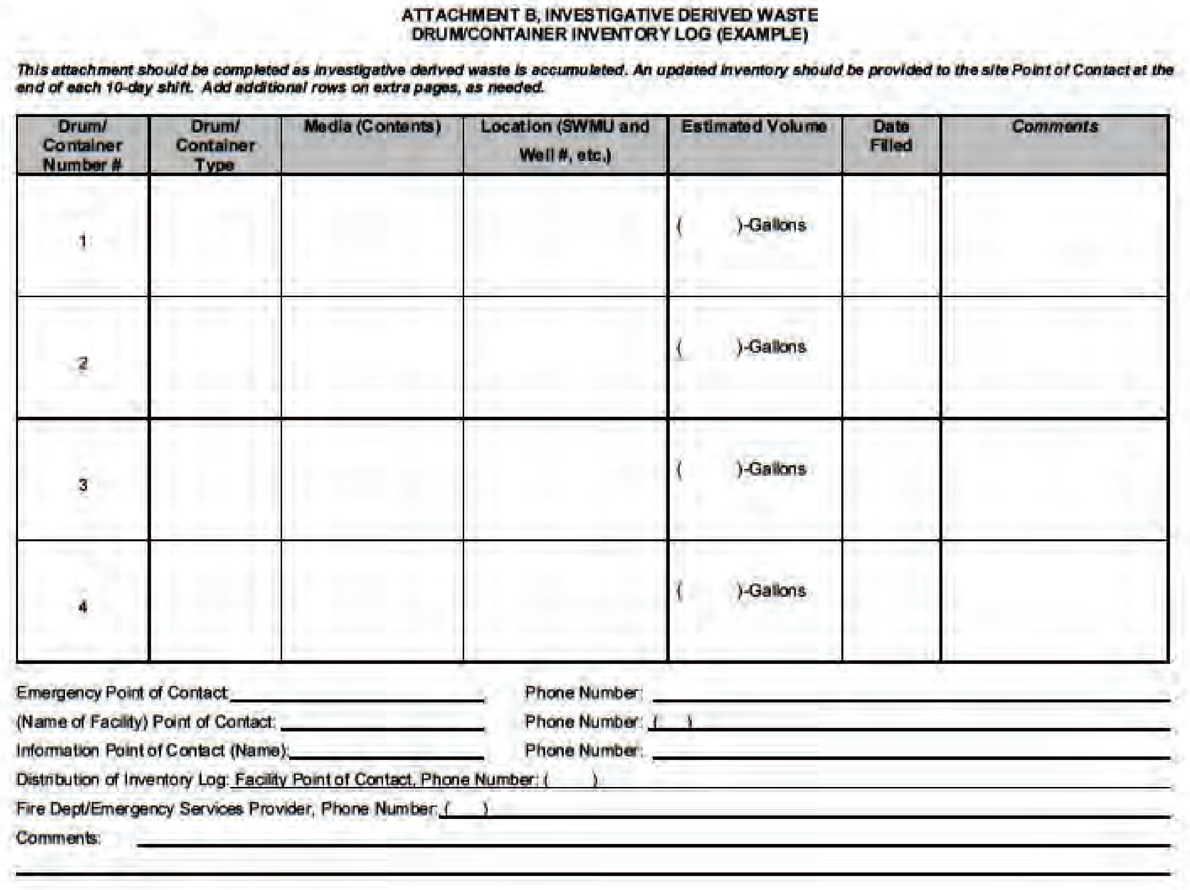
DRUM# ______

CONTENTS ______

VOLUME ______

CONTACT ______

EMERGENCY PHONE NUMBER ______



ATTACHMENT B, INVESTIGATIVE DERIVED WASTE
DRUM/CONTAINER INVENTORY LOG (EXAMPLE)

This attachment should be completed as investigative derived waste is accumulated. An updated inventory should be provided to the site Point of Contact at the end of each 10-day shift. Add additional rows on extra pages, as needed.

Drum/ Container Number #	Drum/ Container Type	Media (Contents)	Location (SWMU and Well #, etc.)	Estimated Volume	Date Filled	*Comments*
1				( )-Gallons		
2				( )-Gallons		
3				( )-Gallons		
4				( )-Gallons		

Emergency Point of Contact:__________ Phone Number: __________

(Name of Facility) Point of Contact: __________ Phone Number: (   ) __________

Information Point of Contact (Name):__________ Phone Number: __________

Distribution of Inventory Log: Facility Point of Contact, Phone Number: (   ) __________

Fire Dept/Emergency Services Provider, Phone Number: (   ) __________

Comments: __________

APPENDIX D

LABORATORY, ACCREDITATIONS, AND IN-HOUSE LABORATORY CONTROL SAMPLE LIMITS

(Addition of APPL Accreditations per MC QAPP FCR-01 Rev 1 dated 12/16/2022,
Replacement of updated Laboratory Accreditations for Eurofins TestAmerica Denver)

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES, INC. (APPL, INC.)
908 N. Temperance Ave.
Clovis, CA 93611
Paula McCartney Phone: 559-275-2175

ENVIRONMENTAL

Valid To: June 30, 2023 Certificate Number: 4064.01

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with the 2009 TNI Environmental Testing Laboratory Standard andthe requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.4 of the DoD/DOE Quality Systems Manual for Environmental Laboratories) accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

High Resolution Gas Chromatography/Mass Spectrometry, ICP-OES, ICP-Mass Spectrometry, Atomic Absorption Spectrometry, Gas Chromatography/ECD/FID, Liquid Chromatography- Mass Spectrometry, High Performance Liquid Chromatography, Ion Chromatography, Titrimetry

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
Metals			
Aluminum	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Antimony	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Arsenic	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Barium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Beryllium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Boron	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Cadmium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Calcium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Chromium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
Cobalt	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Copper	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Iron	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Lead	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Magnesium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Manganese	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Mercury	EPA 245.1 EPA 7470A	EPA 7470A	EPA 7471A/7471B
Molybdenum	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Nickel	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Potassium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Selenium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Silver	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Sodium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Strontium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Thallium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Tin	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Titanium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Total Phosphorus	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Vanadium	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Zinc	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Pesticides/Herbicides/PCBs/TPH/Fumigants			
1,2,3-Trichloropropane	EPA 8011	--------------------------	--------------------------
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8011	--------------------------	--------------------------
1,2-Dibromomethane (EDB, Ethylene dibromide)	EPA 8011	--------------------------	--------------------------
DRO (Diesel Range Organics), C10-C28	EPA 8015B/8015C/8015D	EPA 8015B/8015C/8015D	EPA 8015B/8015C/8015D

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
RRO (Residual Range Organics), C25-C36	EPA 8015B/8015C/8015D	EPA 8015B/8015C/8015D	EPA 8015B/8015C/8015D
DRO (Diesel Range Organics), C10-C25	AK102	AK102	AK102
RRO (Residual Range Organics), C25-C36	AK103	AK103	AK103
MRH (Mid-range Hydrocarbons), C9-C18	KS-MRH/HRH	KS-MRH/HRH	KS-MRH/HRH
HRH (High-range Hydrocarbons), C19-C35	KS-MRH/HRH	KS-MRH/HRH	KS-MRH/HRH
DRO (Diesel Range Organics)	WA-NWTPH-Dx	WA-NWTPH-Dx	WA-NWTPH-Dx
RRO (Residual Range Organics)	WA-NWTPH-Dx	WA-NWTPH-Dx	WA-NWTPH-Dx
GRO (Gasoline Range Organics), C6-C10	EPA 8015B/8015C/ 8015D	EPA 8015B/8015C/8015D	EPA 8015B/8015C/8015D
GRO (Gasoline Range Organics), C6-C10	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
GRO (Gasoline Range Organics), C6-C10	AK101-MS	AK101-MS	AK101-MS
LRH (Low-Range Hydrocarbons), C5-C8	KS-LRH	KS-LRH	KS-LRH
GRO (Gasoline Range Organics)	WA-NWTPH-Gx	WA-NWTPH-Gx	WA-NWTPH-Gx
Methane	RSK-175	RSK-175	------------------------
Ethane	RSK-175	RSK-175	------------------------
Ethene	RSK-175	RSK-175	------------------------
4,4'-DDD	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
4,4'-DDE	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
4,4'-DDT	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
a-BHC	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
a-Chlordane	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Aldrin	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
b-BHC	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Chlordane	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
d-BHC	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Dieldrin	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Endosulfan I	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Endosulfan II	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Endosulfan sulfate	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Endrin	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Endrin aldehyde	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Endrin ketone	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
g-BHC (Lindane)	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
g-Chlordane	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Heptachlor	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Heptachlor epoxide	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Hexachlorobenzene	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Methoxychlor	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Toxaphene	EPA 8081A/8081B	EPA 8081A/8081B	EPA 8081A/8081B
Aroclor-1016/1242	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
Aroclor-1016 (PCB-1016)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Aroclor-1221 (PCB-1221)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Aroclor-1232 (PCB-1232)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Aroclor-1242 (PCB-1242)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Aroclor-1248 (PCB-1248)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Aroclor-1254 (PCB-1254)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Aroclor-1260 (PCB-1260)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Aroclor-1262 (PCB-1262)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Aroclor-1268 (PCB-1268)	EPA 8082/8082A	EPA 8082/8082A	EPA 8082/8082A
Dalapon	-------------------------------	EPA 8151/8151A	-------------------------------
Dicamba	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
Dichlorprop (2,4-DP)	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
Dinoseb	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
2,4-D	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
2,4-DB	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
MCPA	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
MCPP	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
Pentachlorophenol	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
Silvex (2,4,5-TP)	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
2,4,5-T	EPA 8151/8151A	EPA 8151/8151A	EPA 8151/8151A
Purgeable Organics (Volatiles-VOC)			
1,1,1,2-Tetrachloroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1,1-Trichloroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1,2,2-Tetrachloroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1,2-Trichloroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1,2-Trichlorotrifluoroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1-Dichloroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1-Dichloroethene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1-Dichloropropene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2,3-Trichlorobenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2,3-Trichloropropane	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM
1,2,4-Trichlorobenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2,4-Trimethylbenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dibromo-3-chloropropane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dibromoethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dichlorobenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dichloroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dichloropropane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,3,5-Trimethylbenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,3-Dichlorobenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,3-Dichloropropane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,4-Dichlorobenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,4-Dioxane	EPA 8260B/8260C/8260D/ EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D/ EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D/ EPA 8260B/8260C/8260D SIM

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
2,2-Dichloropropane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Butanone (Methyl ethyl ketone)	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Chloroethyl vinyl ether	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Chlorotoluene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Hexanone	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
4-Chlorotoluene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
4-methyl-2-pentanone	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Acetone	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Acetonitrile	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Acrolein	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Acrylonitrile	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Benzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromobenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromochloromethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromodichloromethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromoform	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromomethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Carbon disulfide	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Carbon tetrachloride	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Chlorobenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Chloroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Chloroform	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Chloromethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
cis-1,2-Dichloroethene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
cis-1,3-Dichloropropene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Cyclohexane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Dibromochloromethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Dibromomethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Dichlorodifluoromethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Ethyl benzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Ethyl tert-butyl ether (ETBE)	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Hexachlorobutadiene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Hexachloroethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Iodomethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Isopropyl ether (DIPE)	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Isopropylbenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
m+p-Xylene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Methylacetate	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Methylcyclohexane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Methyl tert-butyl ether (MTBE)	--------------------------------	--------------------------------	--------------------------------
Methylene chloride (Dichloromethane)	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Naphthalene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
n-Butyl benzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
n-Propylbenzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
o-Xylene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
p-isopropyl toluene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
sec-Butyl benzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
Styrene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
tert-Amyl methyl ether (TAME)	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
tert-Butyl Alcohol (t-Butanol)	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
tert-Butyl Benzene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
tert-Butyl Ethyl Ether (ETBE)	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Tetrachloroethene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Toluene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Total Xylenes	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
trans-1,2-Dichloroethene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
trans-1,3-Dichloropropene	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Trichloroethene	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM
Trichlorofluoromethane	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Vinyl Acetate	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Vinyl Chloride	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM
Extractable Organics (Semivolatiles-SVOC)			
1,1'-Biphenyl	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
1-Methylnaphthalene	EPA 8270D/8270E SIM	EPA 8270D/8270E SIM	EPA 8270D/8270E SIM
1,2,4,5-Tetrachlorobenzene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
1,2,4-Trichlorbenzene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
1,2-Dichlorobenzene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
1,3-Dichlorobenzene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
1,4-Dichlorobenzene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
1,4-Dioxane	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM /8270E	EPA 8270D/8270E EPA 8270D/8270E SIM
2-Methylnaphthalene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
2-(2-Methoxyethoxy)-ethanol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,3,4,6-Tetrachlorophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,4,5-Trichlorophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,4,6-Trichlorophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,4-Dichlorophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,4-Dimethylphenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,4-Dinitrophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,6-Dichlorophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2-Chloronaphthalene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2-Chlorophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2-Methyl-4,6-Dinitrophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2-Methylnaphthalene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2-Methylphenol (o-Cresol)	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
2-Nitroaniline	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
2-Nitrophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
3, 4-Methylphenol (m+p-Cresol)	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
3,3'-Dichlorobenzidine	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
3-Nitroaniline	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
4-Bromophenyl phenyl ether	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
4-Chloro-3-methylphenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
4-Chloroaniline	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
4-Chlorophenyl phenylether	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
4-Methylphenol (p-Cresol)	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
4-Nitroaniline	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
4-Nitrophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Acenaphthene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Acenaphthylene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Acetophenone	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Aniline	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Anthracene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Atrazine	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Benzaldehyde	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Benzidine	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Benzo(a)anthracene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Benzo(a)pyrene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Benzo(b)fluoranthene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Benzo(b+k)fluoranthene	EPA 8270D/8270E SIM	EPA 8270D/8270E SIM	EPA 8270D/8270E SIM
Benzo(g,h,i)perylene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Benzo(k)fluoranthene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Benzoic acid	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Benzyl alcohol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Benzyl butyl phthalate	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Biphenyl	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
bis(2-Chloroethoxy) methane	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
bis(2-Chloroethyl) ether	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
bis(2-Chloroisopropyl) ether	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Butyl benzyl phthalate	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Caprolactam	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Carbazole	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Chrysene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Dibenz(a,h)anthracene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
Dibenzofuran	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Diethyl phthalate	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Dimethyl phthalate	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Di-n-butyl phthalate	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Di-n-octyl phthalate	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Fluoranthene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Fluorene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Hexachlorobenzene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Hexachlorobutadiene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Hexachlorocyclopentadiene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Hexachloroehane	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Indeno(1,2,3-cd) pyrene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Isophorone	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Naphthalene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Nitrobenzene	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
N-nitrosodimethylamine	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
N-nitrosodi-n-propylamine	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
N-nitrosodiphenylamine	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Pentachlorophenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Phenanthrene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Phenol	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Pyrene	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM	EPA 8270D/8270E EPA 8270D/8270E SIM
Pyridine	EPA 8270D/8270E	EPA 8270D/8270E	EPA 8270D/8270E
Dioxins/Furans			
1,2,3,4,6,7,8,9-OCDD	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,4,6,7,8,9-OCDF	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,4,6,7,8-Hpcdd	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,4,6,7,8-Hpcdf	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,4,7,8,9-Hpcdf	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,4,7,8-Hxcdd	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,4,7,8-Hxcdf	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,6,7,8-Hxcdd	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,6,7,8-Hxcdf	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,7,8,9-Hxcdd	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,7,8,9-Hxcdf	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,7,8-Pecdd	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
1,2,3,7,8-Pecdf	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
2,3,4,6,7,8-Hxcdf	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
2,3,4,7,8-Pecdf	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
2,3,7,8-TCDD	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
2,3,7,8-TCDF	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
Hpcdd, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
Hpcdf, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
Hxcdd, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
Hxcdf, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
PCDD + PCDF, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
PCDD, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
PCDF, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
Pecdd, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
Pecdf, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
TCDD, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A
TCDF, total	EPA 8290/8290A	EPA 8290/8290A	EPA 8290/8290A

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**		**AFFF**
		Aqueous	**Solid/Chemical**	
Per- & Polyfluoroalkyl Substances (PFAS)				
FTS 4:2	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
FTS 6:2	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
FTS 8:2	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
N-EtFOSAA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
N-MeFOSAA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFBA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFBS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFDA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFDoA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFDS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFHpA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFHpS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**		**AFFF**
		Aqueous	**Solid/Chemical**	
PFHxA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFHxS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFNA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFNS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFOA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFOS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFOSA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFPeA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFPeS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFTeDA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFTrDA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFUdA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
HFPO-DA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
9-Cl-PF30NS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
11-Cl-PF30UdS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
ADONA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
N-EtFOSE	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
N-EtFOSA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**		**AFFF**
		Aqueous	**Solid/Chemical**	
N-MeFOSE	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
N-MeFOSA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFDoS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
3:3 FTA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
5:3 FTA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
7:3 FTA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
10:2 FTS	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFMPA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFMBA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
NFDHA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15
PFEESA	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15	PFAS by LCMSMS Compliant with DoD QSM 5.4 Table B-15

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solids**
4:2 FTS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
6:2 FTS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
8:2 FTS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
NEtFOSAA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
NMeFOSAA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFBA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFBS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFDA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFDoA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFDS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFHpA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFHpS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFHxA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFHxS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFNA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solids**
PFNS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFOA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFOS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFOSA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFPeA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFPeS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFTeDA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFTrDA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFUnA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
HFPO-DA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
9Cl-PF3ONS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
11Cl-PF3OUdS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
ADONA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
NEtFOSE	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
NEtFOSA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
NMeFOSE	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
NMeFOSA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFDoS	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
3:3 FTCA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
5:3 FTCA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
7:3 FTCA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFMPA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFMBA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
NFDHA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633
PFEESA	EPA DRAFT Method 1633	EPA DRAFT Method 1633	EPA DRAFT Method 1633

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
Energetics			
Nitroguanidine	EPA 8321A/8321B Mod.	EPA 8321A/8321B Mod.	EPA 8321A/8321B Mod.
Guanidine Nitrate	EPA 8321A/8321B Mod.	EPA 8321A/8321B Mod.	EPA 8321A/8321B Mod.
Perchlorate	EPA 6850	EPA 6850	EPA 6850
1,3,5-Trinitrobenzene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
1,3-Dinitrobenzene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
2,4,6-Trinitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
2,4-Dinitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
2,6-Dinitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
2-Amino-4,6-dinitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
2-Nitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
2-Amino-4,6-dinitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
2-Nitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
3-Nitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
3,5 Dinitroaniline	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
4-Amino-2,6-dinitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
4-Nitrotoluene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
HMX (Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
Nitrobenzene	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
Nitroglycerin	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
Pentaerythritoltetranitrate (PETN)	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
Tetryl (Methyl-2,4,6-trinitrophenylnitramine)	EPA 8330A/8330B	EPA 8330A/8330B	EPA 8330A/8330B
Picric Acid	EPA 8321A/8321B	EPA 8321A/8321B	EPA 8321A/8321B
Inorganics			
Ignitability	--------------------------	--------------------------	EPA 1030
pH / Corrosivity	EPA 9040C	EPA 9040C	EPA 9045C/D
Chromium VI	EPA 218.6/218.7	--------------------------	--------------------------
Chromium VI	EPA 7199	EPA 7199	EPA 7199
Chromium VI	--------------------------	--------------------------	EPA 7196A
Bromide	EPA 300.0	EPA 300.0	EPA 300.0
Chloride	EPA 300.0	EPA 300.0	EPA 300.0
Fluoride	EPA 300.0	EPA 300.0	EPA 300.0
Nitrate as N	EPA 300.0	EPA 300.0	EPA 300.0
Nitrite + Nitrate as N	EPA 300.0	EPA 300.0	EPA 300.0
Nitrite as N	EPA 300.0	EPA 300.0	EPA 300.0
Orthophosphate as P	EPA 300.0	EPA 300.0	EPA 300.0
Phosphate and Orthophosphate - as P	EPA 300.0	EPA 300.0	EPA 300.0
Sulfate	EPA 300.0	EPA 300.0	EPA 300.0
Bromide	EPA 9056/9056A	EPA 9056/9056A	EPA 9056/9056A
Chloride	EPA 9056/9056A	EPA 9056/9056A	EPA 9056/9056A
Fluoride	EPA 9056/9056A	EPA 9056/9056A	EPA 9056/9056A
Nitrate as N ($NO3^{-}$ as N)	EPA 9056/9056A	EPA 9056/9056A	EPA 9056/9056A
Nitrite + Nitrate as N	EPA 9056/9056A	EPA 9056/9056A	EPA 9056/9056A
Nitrite as N	EPA 9056/9056A	EPA 9056/9056A	EPA 9056/9056A
Sulfate	EPA 9056/9056A	EPA 9056/9056A	EPA 9056/9056A
Phosphate and Orthophosphate - as P	EPA 9056/9056A	EPA 9056/9056A	EPA 9056/9056A
Phosphate/Orthophosphate/Total Phosphorus	----------------------	SM 4500 PE	SM 4500 PE
Cyanide, Total and Amenable	EPA 9014 SM 4500CN B,C, G	EPA 9010C EPA 9014 SM 4500CN B,C,E,G	EPA 9010C EPA 9014 SM 4500CN B,C,E,G
Ammonia as N	EPA 350.1	EPA 350.1	EPA 350.1
Total Kheldahl Nitrogen	EPA 351.2	EPA 351.2	EPA 351.2
Nitrate as N	EPA 353.2	EPA 353.2	EPA 353.2
Nitriate + Nitrate as N	EPA 353.2	EPA 353.2	EPA 353.2

Parameter/Analyte	**Non-potable Water**	**Solid Hazardous Waste**	
		Aqueous	**Solid/Chemical**
Nitrite as N	EPA 353.2	EPA 353.2	EPA 353.2
Nitrocellulose	EPA 353.2 Mod	EPA 353.2 Mod	EPA 353.2 Mod
Bicarbonate	SM 2320B	SM 2320B	SM 2320B
Carbonate	SM 2320B	SM 2320B	SM 2320B
Hydroxide	SM 2320B	SM 2320B	SM 2320B
Total Alkalinity (CaCO3)	SM 2320B	SM 2320B	SM 2320B
Specific Conductance, Conductivity (25°C)	SM 2510B	SM 2510B	SM 2510B
Total Dissolved Solids (TDS)	EPA 160.1 SM 2540C	EPA 160.1 SM 2540C	EPA 160.1 SM 2540C
Non-Filterable Residue (TSS)	SM 2540D	SM 2540D	SM 2540D
Ferrous Iron	SM 3500-Fe Bc	SM 3500-Fe Bc	--------------------------
Sulfide	SM 4500-S_2F	SM 4500-S_2F	SM 4500-S_2F
Total Organic Carbon (TOC)	EPA 9060A SM 5310C	--------------------------	WALKLEY-BLACK
Redox Potential (ORP)	SM 2580B	SM 2580B	--------------------------
Sample Preparation			
TCLP Extraction	--------------------------	EPA 1311	EPA 1311
SPLP Extraction	--------------------------	EPA 1312	EPA 1312
Acid Digestion for Metals Analysis	EPA 3010A	EPA 3010A	--------------------------
Acid Digestion for Metals Analysis	--------------------------	EPA 3050B	EPA 3050B
Alkaline Digestion for Hexavalent Chromium	--------------------------	EPA 3060A	EPA 3060A
Separatory Funnel Extraction	EPA 3510C	EPA 3510C	--------------------------
Liquid-Liquid Extraction	EPA 3520C	EPA 3520C	--------------------------
Soxhlet Extraction	--------------------------	EPA 3540C	EPA 3540C
SPE Extraction for Explosives	EPA 3535A	EPA 3535A	--------------------------
Ultrasonic Extraction	--------------------------	EPA 3550B Mod.	EPA 3550B Mod.
Silica Gel Cleanup	EPA 3630C	EPA 3630C	EPA 3630C
Sulfur Cleanup	EPA 3660B	EPA 3660B	EPA 3660B
Sulfuric Acid - Permanganate Cleanup	EPA 3665A Mod.	EPA 3665A Mod.	EPA 3665A Mod.
Purge and Trap	EPA 5030B/5030C	EPA 5030B/5030C	EPA 5030B/5030C
Closed-System Purge and Trap Extraction	EPA 5035/5035A	EPA 5035/5035A	EPA 5035/5035A
Mercury Digestion	EPA 7470A	EPA 7470A	EPA 7471A/7471B
Incremental Sampling	--------------------------	EPA 8330B, Appendix A	EPA 8330B, Appendix A
Waste Extraction Test (WET) (STLC)	--------------------------	CCR Chapter 11, Article 5, Appendix II	CCR Chapter 11, Article 5, Appendix II
Organic Microwave Extractor	EPA 3546	EPA 3546	EPA 3546

Parameter/Analyte	**Potable Water**
Metals	
Mercury	EPA 245.1
Inorganics	
Chromium VI	EPA 218.6/218.7
Bromide	EPA 300.0
Chloride	EPA 300.0
Fluoride	EPA 300.0
Nitrate as N	EPA 300.0
Nitrite + Nitrate as N	EPA 300.0
Nitrite as N	EPA 300.0
Orthophosphate as P	EPA 300.0
Phosphate	EPA 300.0
Sulfate	EPA 300.0
Phosphate/Orthophosphate/Total Phosphorus	SM 4500 PE
Cyanide, total and Amenable	SM 4500CN B, C, E, G
Ammonia as N	EPA 350.1
Total Kheldahl Nitrogen	EPA 351.2
Nitrate as N	EPA 353.2
Nitriate + Nitrate as N	------------------
Nitrite as N	EPA 353.2
Nitrocellulose	EPA 353.2 Mod.
Bicarbonate	SM 2320B
Carbonate	SM 2320B
Hydroxide	SM 2320B
Total Alkalinity (CaCO3)	SM 2320B
Specific Conductance, Conductivity (25C)	SM 2510B
Total Dissolved Solids (TDS)	EPA 160.1
Ferrous Iron	SM 3500-Fe Bc
Sulfide	SM 4500-S_2F
Total Organic Carbon (TOC)	SM 5310C
Dissolved Organic Carbon (DOC)	SM 5310C
Per- & Polyfluoroalkyl Substances (PFAS)	
N-EtFOSAA	EPA 537.1
N-MeFOSAA	EPA 537.1
PFBS	EPA 537.1
PFDA	EPA 537.1
PFDoA	EPA 537.1
PFHpA	EPA 537.1
PFHxA	EPA 537.1
PFHxS	EPA 537.1
PFNA	EPA 537.1
PFOA	EPA 537.1
PFOS	EPA 537.1
PFTeDA	EPA 537.1
PFTrDA	EPA 537.1
PFUdA	EPA 537.1
HFPO-DA	EPA 537.1
9-Cl-PF30NS	EPA 537.1

Parameter/Analyte	**Potable Water**
11-Cl-PF30UdS	EPA 537.1
ADONA	EPA 537.1
PFBA	EPA 533
PFPeA	EPA 533
PFHxA	EPA 533
PFHpA	EPA 533
PFOA	EPA 533
PFNA	EPA 533
PFDA	EPA 533
PFUnA	EPA 533
PFDoA	EPA 533
PFBS	EPA 533
PFPeS	EPA 533
PFHxS	EPA 533
PFHpS	EPA 533
PFOS	EPA 533
4:2FTS	EPA 533
6:2FTS	EPA 533
8:2FTS	EPA 533
PFMPA	EPA 533
PFMBA	EPA 533
NFDHA	EPA 533
HFPO-DA	EPA 533
ADONA	EPA 533
PFEESA	EPA 533
9Cl-PF3ONS	EPA 533
11 Cl-PF3OUdS	EPA 533
Sample Preparation	
Mercury digestion	EPA 245.1
PFAS SPE	EPA 537.1

Accredited Laboratory

A2LA has accredited

AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES, INC.
(APPL, INC.)

Clovis, CA

for technical competence in the field of

Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2017, the 2009 TNI Environmental Testing Laboratory Standard, and the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP) as detailed in version 5.3 of the DoD/DOE Quality System Manual for Environmental Laboratories (QSM), accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated *April 2017*).

Presented this 28th day of July 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 4064.01
Valid to June 30, 2023

For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

The State of Washington
Department of Ecology

1889

Eurofins TestAmerica Denver

Arvada, CO

has complied with provisions set forth in Chapter 173-50 WAC and is hereby recognized by the Department of Ecology as an ACCREDITED LABORATORY for the analytical parameters listed on the accompanying Scope of Accreditation. This certificate is effective August 4, 2022 and shall expire August 3, 2023.

Witnessed under my hand on September 16, 2022

Rebecca Wood
Lab Accreditation Unit Supervisor

Laboratory ID
C583

WASHINGTON STATE DEPARTMENT OF ECOLOGY

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM

SCOPE OF ACCREDITATION

Eurofins TestAmerica Denver

Arvada, CO

is accredited for the analytes listed below using the methods indicated. Full accreditation is granted unless stated otherwise in a note. EPA is the U.S. Environmental Protection Agency. SM is "Standard Methods for the Examination of Water and Wastewater." SM refers to EPA approved method versions. ASTM is the American Society for Testing and Materials. USGS is the U.S. Geological Survey. AOAC is the Association of Official Analytical Chemists. Other references are described in notes.

Matrix/Analyte	Method	Notes
Non-Potable Water		
non-Polar Extractable Material (TPH)	EPA 1664B (SGT-HEM)	1
n-Hexane Extractable Material (O&G)	EPA 1664B -10 (HEM)	1
Turbidity	EPA 180.1_2_1993	1
Bromide	EPA 300.0_2.1_1993	1
Chloride	EPA 300.0_2.1_1993	1
Fluoride	EPA 300.0_2.1_1993	1
Nitrate	EPA 300.0_2.1_1993	1
Nitrate + Nitrite	EPA 300.0_2.1_1993	1
Nitrite	EPA 300.0_2.1_1993	1
Orthophosphate	EPA 300.0_2.1_1993	1,4
Sulfate	EPA 300.0_2.1_1993	1
Cyanide, Total	EPA 335.4_1_1993	1
Ammonia	EPA 350.1_2_1993	1
Nitrogen, Total Kjeldahl	EPA 351.2_2_1993	1
Organic Nitrogen	EPA 351.2_2_1993	1
Nitrate	EPA 353.2_2_1993	1
Nitrate + Nitrite	EPA 353.2_2_1993	1
Orthophosphate	EPA 365.1_2_1993	1
Phosphorus, total	EPA 365.1_2_1993	1
Chemical Oxygen Demand (COD)	EPA 410.4_2_1993	1
Phenolics, Total	EPA 420.4_1_1993	1
Color	SM 2120 B-2011	1
Alkalinity	SM 2320 B-2011	1
Hardness (calc.)	SM 2340 B-2011	1
Hardness, Calcium (as CaCO3)	SM 2340 B-2011	1
Hardness, Total (as CaCO3)	SM 2340 C-2011	1

Matrix/Analyte	Method	Notes
Non-Potable Water		
Specific Conductance	SM 2510 B-2011	1
Solids, Total	SM 2540 B-2011	1
Solids, Total Dissolved	SM 2540 C-2011	1
Solids, Total Suspended	SM 2540 D-2011	1
Chromium, Hexavalent	SM 3500-Cr B-2011	1
Iron, Ferrous	SM 3500-Fe B-2011	1
Cyanide, Weak Acid Dissociable	SM 4500 CN¯I-2011	1
Chloride	SM 4500-Cl¯ E-2011	1
Cyanide, Total	SM 4500-CN¯ E-2011	1
Cyanides, Amenable to Chlorination	SM 4500-CN¯ G-2011	1
pH	SM 4500-H+ B-2011	1,2
Nitrite	SM 4500-NO2¯ B-2011	1
Sulfide	SM 4500-S2¯ D-2011	1
Sulfide	SM 4500-S2¯ F-2011	1
Sulfite	SM 4500-SO3¯ B-2011	1
Sulfate	SM 4500-SO4¯ E-2011	1
Biochemical Oxygen Demand (BOD)	SM 5210 B-2011	1
Dissolved Organic Carbon	SM 5310 B-2011	1
Total Organic Carbon	SM 5310 B-2011	1
Aluminum	EPA 200.7_4.4_1994	1
Antimony	EPA 200.7_4.4_1994	1
Arsenic	EPA 200.7_4.4_1994	1
Barium	EPA 200.7_4.4_1994	1
Beryllium	EPA 200.7_4.4_1994	1
Boron	EPA 200.7_4.4_1994	1
Cadmium	EPA 200.7_4.4_1994	1
Calcium	EPA 200.7_4.4_1994	1
Chromium	EPA 200.7_4.4_1994	1
Cobalt	EPA 200.7_4.4_1994	1
Copper	EPA 200.7_4.4_1994	1
Hardness (calc.)	EPA 200.7_4.4_1994	1
Iron	EPA 200.7_4.4_1994	1
Lead	EPA 200.7_4.4_1994	1
Lithium	EPA 200.7_4.4_1994	1
Magnesium	EPA 200.7_4.4_1994	1
Manganese	EPA 200.7_4.4_1994	1
Molybdenum	EPA 200.7_4.4_1994	1

Matrix/Analyte	Method	Notes
Non-Potable Water		
Nickel	EPA 200.7_4.4_1994	1
Phosphorus, total	EPA 200.7_4.4_1994	1
Potassium	EPA 200.7_4.4_1994	1
Selenium	EPA 200.7_4.4_1994	1
Silica	EPA 200.7_4.4_1994	1
Silicon	EPA 200.7_4.4_1994	1
Silver	EPA 200.7_4.4_1994	1
Sodium	EPA 200.7_4.4_1994	1
Strontium	EPA 200.7_4.4_1994	1
Sulfur	EPA 200.7_4.4_1994	1
Thallium	EPA 200.7_4.4_1994	1
Tin	EPA 200.7_4.4_1994	1
Titanium	EPA 200.7_4.4_1994	1
Vanadium	EPA 200.7_4.4_1994	1
Zinc	EPA 200.7_4.4_1994	1
Antimony	EPA 200.8_5.4_1994	1
Arsenic	EPA 200.8_5.4_1994	1
Barium	EPA 200.8_5.4_1994	1
Beryllium	EPA 200.8_5.4_1994	1
Cadmium	EPA 200.8_5.4_1994	1
Chromium	EPA 200.8_5.4_1994	1
Cobalt	EPA 200.8_5.4_1994	1
Copper	EPA 200.8_5.4_1994	1
Lead	EPA 200.8_5.4_1994	1
Manganese	EPA 200.8_5.4_1994	1
Molybdenum	EPA 200.8_5.4_1994	1
Nickel	EPA 200.8_5.4_1994	1
Selenium	EPA 200.8_5.4_1994	1
Silver	EPA 200.8_5.4_1994	1
Thallium	EPA 200.8_5.4_1994	1
Thorium	EPA 200.8_5.4_1994	1
Tin	EPA 200.8_5.4_1994	1
Total Uranium	EPA 200.8_5.4_1994	1
Vanadium	EPA 200.8_5.4_1994	1
Zinc	EPA 200.8_5.4_1994	1
Mercury	EPA 245.1_3_1994	1
4,4'-DDD	EPA 608.3	1

Matrix/Analyte	Method	Notes
Non-Potable Water		
4,4'-DDE	EPA 608.3	1
4,4'-DDT	EPA 608.3	1
Aldrin	EPA 608.3	1
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608.3	1
alpha-Chlordane	EPA 608.3	1
Aroclor-1016 (PCB-1016)	EPA 608.3	1
Aroclor-1221 (PCB-1221)	EPA 608.3	1
Aroclor-1232 (PCB-1232)	EPA 608.3	1
Aroclor-1242 (PCB-1242)	EPA 608.3	1
Aroclor-1248 (PCB-1248)	EPA 608.3	1
Aroclor-1254 (PCB-1254)	EPA 608.3	1
Aroclor-1260 (PCB-1260)	EPA 608.3	1
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608.3	1
Chlordane (tech.)	EPA 608.3	1
delta-BHC	EPA 608.3	1
Dieldrin	EPA 608.3	1
Endosulfan I	EPA 608.3	1
Endosulfan II	EPA 608.3	1
Endosulfan sulfate	EPA 608.3	1
Endrin	EPA 608.3	1
Endrin aldehyde	EPA 608.3	1
Endrin ketone	EPA 608.3	1
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608.3	1
gamma-Chlordane	EPA 608.3	1
Heptachlor	EPA 608.3	1
Heptachlor epoxide	EPA 608.3	1
Methoxychlor	EPA 608.3	1
Toxaphene (Chlorinated camphene)	EPA 608.3	1
Azinphos-methyl (Guthion)	EPA 614	1
Demeton	EPA 614	1
Diazinon	EPA 614	1
Disulfoton	EPA 614	1
Malathion	EPA 614	1
Methyl parathion (Parathion, methyl)	EPA 614	1
Parathion, ethyl	EPA 614	1
Acetylene	EPA RSK-175	1
Ethane	EPA RSK-175	1

Matrix/Analyte	**Method**	**Notes**
Non-Potable Water		
Ethene	EPA RSK-175	1
Methane	EPA RSK-175	1
n-Butane	EPA RSK-175	1
n-Propane	EPA RSK-175	1
1,1,1,2-Tetrachloroethane	EPA 624.1	1
1,1,1-Trichloroethane	EPA 624.1	1
1,1,2,2-Tetrachloroethane	EPA 624.1	1
1,1,2-Trichloroethane	EPA 624.1	1
1,1-Dichloroethane	EPA 624.1	1
1,1-Dichloroethylene	EPA 624.1	1
1,2,3-Trichloropropane	EPA 624.1	1
1,2-Dibromo-3-chloropropane (DBCP)	EPA 624.1	1
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 624.1	1
1,2-Dichlorobenzene	EPA 624.1	1
1,2-Dichloroethane (Ethylene dichloride)	EPA 624.1	1
1,2-Dichloropropane	EPA 624.1	1
1,3-Dichlorobenzene	EPA 624.1	1
1,4-Dichlorobenzene	EPA 624.1	1
2-Butanone (Methyl ethyl ketone, MEK)	EPA 624.1	1
2-Chloroethyl vinyl ether	EPA 624.1	1
2-Hexanone	EPA 624.1	1
4-Methyl-2-pentanone (MIBK)	EPA 624.1	1
Acetone	EPA 624.1	1
Acrolein (Propenal)	EPA 624.1	1
Acrylonitrile	EPA 624.1	1
Benzene	EPA 624.1	1
Bromodichloromethane	EPA 624.1	1
Bromoform	EPA 624.1	1
Carbon disulfide	EPA 624.1	1
Carbon tetrachloride	EPA 624.1	1
Chlorobenzene	EPA 624.1	1
Chlorodibromomethane	EPA 624.1	1
Chloroethane (Ethyl chloride)	EPA 624.1	1
Chloroform	EPA 624.1	1
cis-1,2-Dichloroethylene	EPA 624.1	1
cis-1,3-Dichloropropene	EPA 624.1	1
Dibromomethane (Methylene bromide)	EPA 624.1	1

Matrix/Analyte	Method	Notes
Non-Potable Water		
Dichlorodifluoromethane	EPA 624.1	1
Ethylbenzene	EPA 624.1	1
m+p-xylene	EPA 624.1	1
Methyl bromide (Bromomethane)	EPA 624.1	1
Methyl chloride (Chloromethane)	EPA 624.1	1
Methyl tert-butyl ether (MTBE)	EPA 624.1	1
Methylene chloride (Dichloromethane)	EPA 624.1	1
n-Hexane	EPA 624.1	1
o-Xylene	EPA 624.1	1
Styrene	EPA 624.1	1
Tetrachloroethylene (Perchloroethylene)	EPA 624.1	1
Toluene	EPA 624.1	1
trans-1,2-Dichloroethylene	EPA 624.1	1
trans-1,3-Dichloropropylene	EPA 624.1	1
Trichloroethene (Trichloroethylene)	EPA 624.1	1
Trichlorofluoromethane (Freon 11)	EPA 624.1	1
Vinyl acetate	EPA 624.1	1
Vinyl chloride	EPA 624.1	1
Xylene (total)	EPA 624.1	1
1,2,4,5-Tetrachlorobenzene	EPA 625.1	1
1,2,4-Trichlorobenzene	EPA 625.1	1
1,2-Dichlorobenzene	EPA 625.1	1
1,2-Diphenylhydrazine	EPA 625.1	1
1,4-Dioxane (1,4- Diethyleneoxide)	EPA 625.1	1
2,2'-Oxybis(1-chloropropane)	EPA 625.1	1
2,4,5-Trichlorophenol	EPA 625.1	1
2,4,6-Trichlorophenol	EPA 625.1	1
2,4-Dichlorophenol	EPA 625.1	1
2,4-Dimethylphenol	EPA 625.1	1
2,4-Dinitrophenol	EPA 625.1	1
2,4-Dinitrotoluene (2,4-DNT)	EPA 625.1	1
2,6-Dichlorophenol	EPA 625.1	1
2,6-Dinitrotoluene (2,6-DNT)	EPA 625.1	1
2-Chloronaphthalene	EPA 625.1	1
2-Chlorophenol	EPA 625.1	1
2-Methylphenol (o-Cresol)	EPA 625.1	1
2-Nitrophenol	EPA 625.1	1

Matrix/Analyte	Method	Notes
Non-Potable Water		
3,3'-Dichlorobenzidine	EPA 625.1	1
4,6-Dinitro-2-methylphenol	EPA 625.1	1
4-Bromophenyl phenyl ether (BDE-3)	EPA 625.1	1
4-Chloro-3-methylphenol	EPA 625.1	1
4-Chlorophenyl phenylether	EPA 625.1	1
4-Methylphenol (p-Cresol)	EPA 625.1	1
4-Nitrophenol	EPA 625.1	1
Acenaphthene	EPA 625.1	1
Acenaphthylene	EPA 625.1	1
Acetophenone	EPA 625.1	1
alpha-Terpineol	EPA 625.1	1
Aniline	EPA 625.1	1
Anthracene	EPA 625.1	1
Azobenzene	EPA 625.1	1
Benzidine	EPA 625.1	1
Benzo(a)anthracene	EPA 625.1	1
Benzo(a)pyrene	EPA 625.1	1
Benzo(g,h,i)perylene	EPA 625.1	1
Benzo(k)fluoranthene	EPA 625.1	1
Benzo[b]fluoranthene	EPA 625.1	1
Benzoic acid	EPA 625.1	1
bis(2-Chloroethoxy)methane	EPA 625.1	1
bis(2-Chloroethyl) ether	EPA 625.1	1
bis(2-Chloroisopropyl) ether	EPA 625.1	1
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 625.1	1
Butyl benzyl phthalate	EPA 625.1	1
Carbazole	EPA 625.1	1
Chrysene	EPA 625.1	1
Dibenz(a,h) acridine	EPA 625.1	1
Dibenz(a,h) anthracene	EPA 625.1	1
Diethyl phthalate	EPA 625.1	1
Dimethyl phthalate	EPA 625.1	1
Di-n-butyl phthalate	EPA 625.1	1
Di-n-octyl phthalate	EPA 625.1	1
Fluoranthene	EPA 625.1	1
Fluorene	EPA 625.1	1
Hexachlorobenzene	EPA 625.1	1

Matrix/Analyte	Method	Notes
Non-Potable Water		
Hexachlorobutadiene	EPA 625.1	1
Hexachlorocyclopentadiene	EPA 625.1	1
Hexachloroethane	EPA 625.1	1
Indeno(1,2,3-cd) pyrene	EPA 625.1	1
Isophorone	EPA 625.1	1
m+p Cresol	EPA 625.1	1
Naphthalene	EPA 625.1	1
n-Decane	EPA 625.1	1
Nitrobenzene	EPA 625.1	1
N-Nitrosodimethylamine	EPA 625.1	1
N-Nitroso-di-n-propylamine	EPA 625.1	1
N-Nitrosodiphenylamine	EPA 625.1	1
n-Octadecane	EPA 625.1	1
Pentachlorobenzene	EPA 625.1	1
Pentachlorophenol	EPA 625.1	1
Phenanthrene	EPA 625.1	1
Phenol	EPA 625.1	1
Pyrene	EPA 625.1	1
Pyridine	EPA 625.1	1
Solid and Chemical Materials		
Percent Moisture	ASTM D2216-10	1
Ammonia	EPA 350.1_2_1993	1,3
Nitrate + Nitrite	EPA 353.2_2_1993	1
Perchlorate	EPA 6860	1
Chromium, Hexavalent	EPA 7196A_1_1992	1
Cyanide, Total	EPA 9012 B-02	1
Cyanides, Amenable to Chlorination	EPA 9012 B-02	1,3
Total Organic Halides (TOX)	EPA 9020B_2_1994	1,3
Sulfide	EPA 9034_1996	1
pH	EPA 9040 B-1995	1,3
pH	EPA 9040C_2004	1
pH	EPA 9045D_2002	1
Specific Conductance	EPA 9050A_1_1996	1
Bromide	EPA 9056A_(02/07)	1
Chloride	EPA 9056A_(02/07)	1
Fluoride	EPA 9056A_(02/07)	1
Nitrate	EPA 9056A_(02/07)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Nitrate + Nitrite	EPA 9056A_(02/07)	1
Nitrite	EPA 9056A_(02/07)	1
Orthophosphate	EPA 9056A_(02/07)	1
Sulfate	EPA 9056A_(02/07)	1
Total Organic Carbon	EPA 9060A_1_2004	1
Phenolics, Total	EPA 9066	1,3
Alkalinity	SM 2320 B-2011	1,3
Specific Conductance	SM 2510 B-2011	1,3
Cyanide, Total	SM 4500-CN¯ E-2011	1,3
Nitrite	SM 4500-NO2¯ B-2011	1
Aluminum	EPA 6010D_(7/14)	1
Antimony	EPA 6010D_(7/14)	1
Arsenic	EPA 6010D_(7/14)	1
Barium	EPA 6010D_(7/14)	1
Beryllium	EPA 6010D_(7/14)	1
Bismuth	EPA 6010D_(7/14)	1
Boron	EPA 6010D_(7/14)	1
Cadmium	EPA 6010D_(7/14)	1
Calcium	EPA 6010D_(7/14)	1
Chromium	EPA 6010D_(7/14)	1
Cobalt	EPA 6010D_(7/14)	1
Copper	EPA 6010D_(7/14)	1
Iron	EPA 6010D_(7/14)	1
Lead	EPA 6010D_(7/14)	1
Lithium	EPA 6010D_(7/14)	1
Magnesium	EPA 6010D_(7/14)	1
Manganese	EPA 6010D_(7/14)	1
Molybdenum	EPA 6010D_(7/14)	1
Nickel	EPA 6010D_(7/14)	1
Phosphorus, total	EPA 6010D_(7/14)	1
Potassium	EPA 6010D_(7/14)	1
Selenium	EPA 6010D_(7/14)	1
Silica	EPA 6010D_(7/14)	1
Silicon	EPA 6010D_(7/14)	1
Silver	EPA 6010D_(7/14)	1
Sodium	EPA 6010D_(7/14)	1
Strontium	EPA 6010D_(7/14)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Sulfur	EPA 6010D_(7/14)	1
Thallium	EPA 6010D_(7/14)	1
Tin	EPA 6010D_(7/14)	1
Titanium	EPA 6010D_(7/14)	1
Vanadium	EPA 6010D_(7/14)	1
Zinc	EPA 6010D_(7/14)	1
Aluminum	EPA 6020B_(7/14)	1
Antimony	EPA 6020B_(7/14)	1
Arsenic	EPA 6020B_(7/14)	1
Barium	EPA 6020B_(7/14)	1
Beryllium	EPA 6020B_(7/14)	1
Cadmium	EPA 6020B_(7/14)	1
Calcium	EPA 6020B_(7/14)	1
Chromium	EPA 6020B_(7/14)	1
Cobalt	EPA 6020B_(7/14)	1
Copper	EPA 6020B_(7/14)	1
Iron	EPA 6020B_(7/14)	1
Lead	EPA 6020B_(7/14)	1
Magnesium	EPA 6020B_(7/14)	1
Manganese	EPA 6020B_(7/14)	1
Molybdenum	EPA 6020B_(7/14)	1
Natural uranium	EPA 6020B_(7/14)	1
Nickel	EPA 6020B_(7/14)	1
Potassium	EPA 6020B_(7/14)	1
Selenium	EPA 6020B_(7/14)	1
Silver	EPA 6020B_(7/14)	1
Sodium	EPA 6020B_(7/14)	1
Strontium	EPA 6020B_(7/14)	1
Thallium	EPA 6020B_(7/14)	1
Thorium	EPA 6020B_(7/14)	1
Tin	EPA 6020B_(7/14)	1
Vanadium	EPA 6020B_(7/14)	1
Zinc	EPA 6020B_(7/14)	1
Mercury	EPA 7470A_1_1994	1,3
Mercury	EPA 7471B_(1/98)	1
1,2,3-Trichloropropane	EPA 8011-92	1
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8011-92	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Dibromochloropropane	EPA 8011-92	1
Diesel range organics (DRO)	EPA 8015D_4_(6/03)	1
Gasoline range organics (GRO)	EPA 8015D_4_(6/03)	1
Jet Fuel	EPA 8015D_4_(6/03)	1
Motor Oil	EPA 8015D_4_(6/03)	1
2,4'-DDD	EPA 8081B_(2/07)	1
2,4'-DDE	EPA 8081B_(2/07)	1
2,4'-DDT	EPA 8081B_(2/07)	1
4,4'-DDD	EPA 8081B_(2/07)	1
4,4'-DDE	EPA 8081B_(2/07)	1
4,4'-DDT	EPA 8081B_(2/07)	1
Aldrin	EPA 8081B_(2/07)	1
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081B_(2/07)	1
alpha-Chlordane	EPA 8081B_(2/07)	1
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081B_(2/07)	1
Chlordane (tech.)	EPA 8081B_(2/07)	1
Chlorobenzilate	EPA 8081B_(2/07)	1
delta-BHC	EPA 8081B_(2/07)	1
Diallate	EPA 8081B_(2/07)	1
Dicofol	EPA 8081B_(2/07)	1
Dieldrin	EPA 8081B_(2/07)	1
Endosulfan I	EPA 8081B_(2/07)	1
Endosulfan II	EPA 8081B_(2/07)	1
Endosulfan sulfate	EPA 8081B_(2/07)	1
Endrin	EPA 8081B_(2/07)	1
Endrin aldehyde	EPA 8081B_(2/07)	1
Endrin ketone	EPA 8081B_(2/07)	1
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081B_(2/07)	1
gamma-Chlordane	EPA 8081B_(2/07)	1
Heptachlor	EPA 8081B_(2/07)	1
Heptachlor epoxide	EPA 8081B_(2/07)	1
Hexachlorobenzene	EPA 8081B_(2/07)	1
Isodrin	EPA 8081B_(2/07)	1
Kepone	EPA 8081B_(2/07)	1
Methoxychlor	EPA 8081B_(2/07)	1
Mirex	EPA 8081B_(2/07)	1
Propachlor (Ramrod)	EPA 8081B_(2/07)	1,3

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Toxaphene (Chlorinated camphene)	EPA 8081B_(2/07)	1
Aroclor-1016 (PCB-1016)	EPA 8082A_(2/07)	1
Aroclor-1221 (PCB-1221)	EPA 8082A_(2/07)	1
Aroclor-1232 (PCB-1232)	EPA 8082A_(2/07)	1
Aroclor-1242 (PCB-1242)	EPA 8082A_(2/07)	1
Aroclor-1248 (PCB-1248)	EPA 8082A_(2/07)	1
Aroclor-1254 (PCB-1254)	EPA 8082A_(2/07)	1
Aroclor-1260 (PCB-1260)	EPA 8082A_(2/07)	1
Atrazine	EPA 8141B_2_(2/07)	1
Azinphos-ethyl (Ethyl guthion)	EPA 8141B_2_(2/07)	1
Azinphos-methyl (Guthion)	EPA 8141B_2_(2/07)	1
Bolstar (Sulprofos)	EPA 8141B_2_(2/07)	1
Carbophenothion	EPA 8141B_2_(2/07)	1
Chlorpyrifos	EPA 8141B_2_(2/07)	1
Coumaphos	EPA 8141B_2_(2/07)	1
Demeton	EPA 8141B_2_(2/07)	1
Demeton-o	EPA 8141B_2_(2/07)	1
Demeton-s	EPA 8141B_2_(2/07)	1
Diazinon	EPA 8141B_2_(2/07)	1
Dichlorovos (DDVP, Dichlorvos)	EPA 8141B_2_(2/07)	1
Dimethoate	EPA 8141B_2_(2/07)	1
Disulfoton	EPA 8141B_2_(2/07)	1
EPN	EPA 8141B_2_(2/07)	1
Ethoprop	EPA 8141B_2_(2/07)	1
Famphur	EPA 8141B_2_(2/07)	1
Fensulfothion	EPA 8141B_2_(2/07)	1
Fenthion	EPA 8141B_2_(2/07)	1
Malathion	EPA 8141B_2_(2/07)	1
Merphos	EPA 8141B_2_(2/07)	1
Methyl parathion (Parathion, methyl)	EPA 8141B_2_(2/07)	1
Mevinphos	EPA 8141B_2_(2/07)	1
Naled	EPA 8141B_2_(2/07)	1
Parathion, ethyl	EPA 8141B_2_(2/07)	1
Phorate	EPA 8141B_2_(2/07)	1
Phosmet (Imidan)	EPA 8141B_2_(2/07)	1
Ronnel	EPA 8141B_2_(2/07)	1
Simazine	EPA 8141B_2_(2/07)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Sulfotepp	EPA 8141B_2_(2/07)	1
Tetrachlorvinphos (Stirophos, Gardona)	EPA 8141B_2_(2/07)	1
Thionazin (Zinophos)	EPA 8141B_2_(2/07)	1
Tokuthion (Prothiophos)	EPA 8141B_2_(2/07)	1
Trichloronate	EPA 8141B_2_(2/07)	1
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8330B_(10/06)	1
1,3,5-Trinitroso-1,3,5-hexahydrotriazine (TNX)	EPA 8330B_(10/06)	1
1,3-Dinitrobenzene (1,3-DNB)	EPA 8330B_(10/06)	1
2,4,6-Trinitrotoluene (2,4,6-TNT)	EPA 8330B_(10/06)	1
2,4-Dinitrotoluene (2,4-DNT)	EPA 8330B_(10/06)	1
2,6-Dinitrotoluene (2,6-DNT)	EPA 8330B_(10/06)	1
2-Amino-4,6-dinitrotoluene (2-am-dnt)	EPA 8330B_(10/06)	1
2-Nitrotoluene	EPA 8330B_(10/06)	1
3,5-Dinitroaniline	EPA 8330B_(10/06)	1
3-Nitrotoluene	EPA 8330B_(10/06)	1
4-Amino-2,6-dinitrotoluene (4-am-dnt)	EPA 8330B_(10/06)	1
4-Nitrotoluene	EPA 8330B_(10/06)	1
Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine (DNX)	EPA 8330B_(10/06)	1,3
Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine (MNX)	EPA 8330B_(10/06)	1,3
Methyl-2,4,6-trinitrophenylnitramine (tetryl)	EPA 8330B_(10/06)	1
Nitrobenzene	EPA 8330B_(10/06)	1
Nitroglycerin	EPA 8330B_(10/06)	1
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	EPA 8330B_(10/06)	1
Pentaerythritoltetranitrate (PETN)	EPA 8330B_(10/06)	1
Picric Acid	EPA 8330B_(10/06)	1
RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine)	EPA 8330B_(10/06)	1
Tetryl (methyl-2,4,6-trinitrophenylnitramine)	EPA 8330B_(10/06)	1
Diesel range organics (DRO)	WDOE NWTPH-Dx_(1997)	1
Gasoline range organics (GRO)	WDOE NWTPH-Gx_(1997)	1
1,1,1,2-Tetrachloroethane	EPA 8260D_4_(6/18)	1
1,1,1-Trichloroethane	EPA 8260D_4_(6/18)	1
1,1,2,2-Tetrachloroethane	EPA 8260D_4_(6/18)	1
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	EPA 8260D_4_(6/18)	1
1,1,2-Trichloroethane	EPA 8260D_4_(6/18)	1
1,1-Dichloroethane	EPA 8260D_4_(6/18)	1
1,1-Dichloroethylene	EPA 8260D_4_(6/18)	1
1,1-Dichloropropene	EPA 8260D_4_(6/18)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
1,2,3-Trichlorobenzene	EPA 8260D_4_(6/18)	1
1,2,3-Trichloropropane	EPA 8260D_4_(6/18)	1
1,2,3-Trimethylbenzene	EPA 8260D_4_(6/18)	1
1,2,4-Trichlorobenzene	EPA 8260D_4_(6/18)	1
1,2,4-Trimethylbenzene	EPA 8260D_4_(6/18)	1
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260D_4_(6/18)	1
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260D_4_(6/18)	1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	EPA 8260D_4_(6/18)	1
1,2-Dichloro-1,1,2-trifluoroethane	EPA 8260D_4_(6/18)	1
1,2-Dichlorobenzene	EPA 8260D_4_(6/18)	1
1,2-Dichloroethane (Ethylene dichloride)	EPA 8260D_4_(6/18)	1
1,2-Dichloropropane	EPA 8260D_4_(6/18)	1
1,3,5-Trichlorobenzene	EPA 8260D_4_(6/18)	1
1,3,5-Trimethylbenzene	EPA 8260D_4_(6/18)	1
1,3-Dichlorobenzene	EPA 8260D_4_(6/18)	1
1,3-Dichloropropane	EPA 8260D_4_(6/18)	1
1,3-Dichloropropene	EPA 8260D_4_(6/18)	1
1,4-Dichlorobenzene	EPA 8260D_4_(6/18)	1
1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8260D_4_(6/18)	1,3
1-Chlorohexane	EPA 8260D_4_(6/18)	1
2,2-Dichloro-1,1,1-trifluoroethane (Freon 123)	EPA 8260D_4_(6/18)	1
2,2-Dichloropropane	EPA 8260D_4_(6/18)	1
2-butanol (sec-butanol)	EPA 8260D_4_(6/18)	1
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260D_4_(6/18)	1
2-Chloro-1,1,1-Trifluoroethane	EPA 8260D_4_(6/18)	1
2-Chloro-1,1,1-Trifluoroethane	EPA 8260D_4_(6/18)	1
2-Chloroethyl vinyl ether	EPA 8260D_4_(6/18)	1
2-Chlorotoluene	EPA 8260D_4_(6/18)	1
2-Hexanone	EPA 8260D_4_(6/18)	1
2-Nitropropane	EPA 8260D_4_(6/18)	1
2-Pentanone	EPA 8260D_4_(6/18)	1
4-Chlorotoluene	EPA 8260D_4_(6/18)	1
4-Isopropyltoluene (p-Cymene)	EPA 8260D_4_(6/18)	1
4-Methyl-2-pentanone (MIBK)	EPA 8260D_4_(6/18)	1
Acetone	EPA 8260D_4_(6/18)	1
Acetonitrile	EPA 8260D_4_(6/18)	1
Acrolein (Propenal)	EPA 8260D_4_(6/18)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Acrylonitrile	EPA 8260D_4_(6/18)	1
Allyl chloride (3-Chloropropene)	EPA 8260D_4_(6/18)	1
Benzene	EPA 8260D_4_(6/18)	1
Benzyl chloride	EPA 8260D_4_(6/18)	1
Bromobenzene	EPA 8260D_4_(6/18)	1
Bromochloromethane	EPA 8260D_4_(6/18)	1
Bromodichloromethane	EPA 8260D_4_(6/18)	1
Bromoform	EPA 8260D_4_(6/18)	1
Carbon disulfide	EPA 8260D_4_(6/18)	1
Carbon tetrachloride	EPA 8260D_4_(6/18)	1
Chlorobenzene	EPA 8260D_4_(6/18)	1
Chlorodibromomethane	EPA 8260D_4_(6/18)	1
Chloroethane (Ethyl chloride)	EPA 8260D_4_(6/18)	1
Chloroform	EPA 8260D_4_(6/18)	1
Chloroprene (2-Chloro-1,3-butadiene)	EPA 8260D_4_(6/18)	1
Chlorotrifluoroethene	EPA 8260D_4_(6/18)	1
Chlorotrifluoroethene	EPA 8260D_4_(6/18)	1
cis & trans-1,2-Dichloroethene	EPA 8260D_4_(6/18)	1
cis-1,2-Dichloroethylene	EPA 8260D_4_(6/18)	1
cis-1,3-Dichloropropene	EPA 8260D_4_(6/18)	1
cis-1,4-Dichloro-2-butene	EPA 8260D_4_(6/18)	1
Cyclohexane	EPA 8260D_4_(6/18)	1
Cyclohexanone	EPA 8260D_4_(6/18)	1
Dibromomethane	EPA 8260D_4_(6/18)	1
Dichlorodifluoromethane (Freon-12)	EPA 8260D_4_(6/18)	1
Dichlorofluoromethane (Freon 21)	EPA 8260D_4_(6/18)	1
Diethyl ether	EPA 8260D_4_(6/18)	1
Di-isopropylether (DIPE)	EPA 8260D_4_(6/18)	1
Ethanol	EPA 8260D_4_(6/18)	1
Ethyl acetate	EPA 8260D_4_(6/18)	1
Ethyl acrylate	EPA 8260D_4_(6/18)	1
Ethyl methacrylate	EPA 8260D_4_(6/18)	1
Ethylbenzene	EPA 8260D_4_(6/18)	1
Ethylene oxide	EPA 8260D_4_(6/18)	1
Ethyl-t-butylether (ETBE)	EPA 8260D_4_(6/18)	1,3
Fluorobenzene	EPA 8260D_4_(6/18)	1
Hexachlorobutadiene	EPA 8260D_4_(6/18)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Iodomethane (Methyl iodide)	EPA 8260D_4_(6/18)	1
Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260D_4_(6/18)	1
Isopropyl alcohol (2-Propanol)	EPA 8260D_4_(6/18)	1
Isopropylbenzene	EPA 8260D_4_(6/18)	1
m+p-xylene	EPA 8260D_4_(6/18)	1
Methacrylonitrile	EPA 8260D_4_(6/18)	1
Methyl acetate	EPA 8260D_4_(6/18)	1
Methyl bromide (Bromomethane)	EPA 8260D_4_(6/18)	1
Methyl chloride (Chloromethane)	EPA 8260D_4_(6/18)	1
Methyl methacrylate	EPA 8260D_4_(6/18)	1
Methyl tert-butyl ether (MTBE)	EPA 8260D_4_(6/18)	1
Methylcyclohexane	EPA 8260D_4_(6/18)	1
Methylene chloride (Dichloromethane)	EPA 8260D_4_(6/18)	1
m-Xylene	EPA 8260D_4_(6/18)	1
Naphthalene	EPA 8260D_4_(6/18)	1
n-Butyl alcohol (1-Butanol, n-Butanol)	EPA 8260D_4_(6/18)	1
n-Butylbenzene	EPA 8260D_4_(6/18)	1
n-Heptane	EPA 8260D_4_(6/18)	1
n-Hexane	EPA 8260D_4_(6/18)	1
Nonanal	EPA 8260D_4_(6/18)	1
n-Propylbenzene	EPA 8260D_4_(6/18)	1
o-Xylene	EPA 8260D_4_(6/18)	1
Pentachloroethane	EPA 8260D_4_(6/18)	1
Propionitrile (Ethyl cyanide)	EPA 8260D_4_(6/18)	1
Propylene oxide	EPA 8260D_4_(6/18)	1
p-Xylene	EPA 8260D_4_(6/18)	1
sec-Butylbenzene	EPA 8260D_4_(6/18)	1
Styrene	EPA 8260D_4_(6/18)	1
tert-amylmethylether (TAME)	EPA 8260D_4_(6/18)	1
tert-Butyl alcohol	EPA 8260D_4_(6/18)	1,3
tert-Butylbenzene	EPA 8260D_4_(6/18)	1
Tetrachloroethylene (Perchloroethylene)	EPA 8260D_4_(6/18)	1
Tetrahydrofuran (THF)	EPA 8260D_4_(6/18)	1
Tetrahydrothiophene	EPA 8260D_4_(6/18)	1
Toluene	EPA 8260D_4_(6/18)	1
Total BTEX	EPA 8260D_4_(6/18)	1
Total Trihalomethanes	EPA 8260D_4_(6/18)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
trans-1,2-Dichloroethylene	EPA 8260D_4_(6/18)	1
trans-1,3-Dichloropropylene	EPA 8260D_4_(6/18)	1
trans-1,4-Dichloro-2-butene	EPA 8260D_4_(6/18)	1
Trichloroethene (Trichloroethylene)	EPA 8260D_4_(6/18)	1
Trichlorofluoromethane (Freon 11)	EPA 8260D_4_(6/18)	1
Vinyl acetate	EPA 8260D_4_(6/18)	1
Vinyl chloride	EPA 8260D_4_(6/18)	1
Xylene (total)	EPA 8260D_4_(6/18)	1
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260D_SIM_4_(6/18)	1,3
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260D_SIM_4_(6/18)	1,3
1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8260D_SIM_4_(6/18)	1,3
Acrylonitrile	EPA 8260D_SIM_4_(6/18)	1,3
Benzene	EPA 8260D_SIM_4_(6/18)	1,3
Vinyl chloride	EPA 8260D_SIM_4_(6/18)	1,3
1,1'-Biphenyl (BZ-0)	EPA 8270E_6_(6/18)	1
1,2,4,5-Tetrachlorobenzene	EPA 8270E_6_(6/18)	1
1,2,4-Trichlorobenzene	EPA 8270E_6_(6/18)	1
1,2-Dichlorobenzene	EPA 8270E_6_(6/18)	1
1,2-Diphenylhydrazine	EPA 8270E_6_(6/18)	1
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270E_6_(6/18)	1
1,3-Dichlorobenzene	EPA 8270E_6_(6/18)	1
1,3-Dinitrobenzene (1,3-DNB)	EPA 8270E_6_(6/18)	1
1,4-Dichlorobenzene	EPA 8270E_6_(6/18)	1
1,4-Dinitrobenzene	EPA 8270E_6_(6/18)	1
1,4-Dioxane (1,4- Diethyleneoxide)	EPA 8270E_6_(6/18)	1
1,4-Naphthoquinone	EPA 8270E_6_(6/18)	1
1,4-Phenylenediamine	EPA 8270E_6_(6/18)	1
1-Chloronaphthalene	EPA 8270E_6_(6/18)	1
1-Methylnaphthalene	EPA 8270E_6_(6/18)	1
1-Naphthylamine	EPA 8270E_6_(6/18)	1
2,3,4,6-Tetrachlorophenol	EPA 8270E_6_(6/18)	1
2,4,5-Trichlorophenol	EPA 8270E_6_(6/18)	1
2,4,6-Trichlorophenol	EPA 8270E_6_(6/18)	1
2,4-Dichlorophenol	EPA 8270E_6_(6/18)	1
2,4-Dimethylphenol	EPA 8270E_6_(6/18)	1
2,4-Dinitrophenol	EPA 8270E_6_(6/18)	1
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270E_6_(6/18)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
2,6-Dichlorophenol	EPA 8270E_6_(6/18)	1
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270E_6_(6/18)	1
2-Acetylaminofluorene	EPA 8270E_6_(6/18)	1
2-Chloronaphthalene	EPA 8270E_6_(6/18)	1
2-Chlorophenol	EPA 8270E_6_(6/18)	1
2-Ethoxyethanol (cellosolve)	EPA 8270E_6_(6/18)	1
2-Methylaniline (o-Toluidine)	EPA 8270E_6_(6/18)	1
2-Methylnaphthalene	EPA 8270E_6_(6/18)	1
2-Methylphenol (o-Cresol)	EPA 8270E_6_(6/18)	1
2-Naphthylamine	EPA 8270E_6_(6/18)	1
2-Nitroaniline	EPA 8270E_6_(6/18)	1
2-Nitrophenol	EPA 8270E_6_(6/18)	1
2-Picoline (2-Methylpyridine)	EPA 8270E_6_(6/18)	1
3,3'-Dichlorobenzidine	EPA 8270E_6_(6/18)	1
3,3'-Dimethylbenzidine	EPA 8270E_6_(6/18)	1
3-Methylcholanthrene	EPA 8270E_6_(6/18)	1
3-Methylphenol (m-Cresol)	EPA 8270E_6_(6/18)	1
3-Nitroaniline	EPA 8270E_6_(6/18)	1
4,4'-Methylenebis(2-chloroaniline)	EPA 8270E_6_(6/18)	1
4,6-Dinitro-2-methylphenol	EPA 8270E_6_(6/18)	1
4-Aminobiphenyl	EPA 8270E_6_(6/18)	1
4-Bromophenyl phenyl ether (BDE-3)	EPA 8270E_6_(6/18)	1
4-Chloro-3-methylphenol	EPA 8270E_6_(6/18)	1
4-Chloroaniline	EPA 8270E_6_(6/18)	1
4-Chlorophenyl phenylether	EPA 8270E_6_(6/18)	1
4-Dimethyl aminoazobenzene	EPA 8270E_6_(6/18)	1
4-Methylphenol (p-Cresol)	EPA 8270E_6_(6/18)	1
4-Nitroaniline	EPA 8270E_6_(6/18)	1
4-Nitrophenol	EPA 8270E_6_(6/18)	1
4-Nitroquinoline 1-oxide	EPA 8270E_6_(6/18)	1
5-Nitro-o-toluidine	EPA 8270E_6_(6/18)	1
6-Methylchrysene	EPA 8270E_6_(6/18)	1
7,12-Dimethylbenz(a) anthracene	EPA 8270E_6_(6/18)	1
a,a-Dimethylphenethylamine	EPA 8270E_6_(6/18)	1
Acenaphthene	EPA 8270E_6_(6/18)	1
Acenaphthylene	EPA 8270E_6_(6/18)	1
Acetophenone	EPA 8270E_6_(6/18)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Acrylamide	EPA 8270E_6_(6/18)	1
Alachlor	EPA 8270E_6_(6/18)	1
alpha-Terpineol	EPA 8270E_6_(6/18)	1
Aniline	EPA 8270E_6_(6/18)	1
Anthracene	EPA 8270E_6_(6/18)	1
Aramite	EPA 8270E_6_(6/18)	1
Atrazine	EPA 8270E_6_(6/18)	1
Azobenzene	EPA 8270E_6_(6/18)	1
Benzaldehyde	EPA 8270E_6_(6/18)	1
Benzenethiol	EPA 8270E_6_(6/18)	1
Benzidine	EPA 8270E_6_(6/18)	1
Benzo(a)anthracene	EPA 8270E_6_(6/18)	1
Benzo(a)pyrene	EPA 8270E_6_(6/18)	1
Benzo(e)pyrene	EPA 8270E_6_(6/18)	1
Benzo(g,h,i)perylene	EPA 8270E_6_(6/18)	1
Benzo(k)fluoranthene	EPA 8270E_6_(6/18)	1
Benzo[b]fluoranthene	EPA 8270E_6_(6/18)	1
Benzoic acid	EPA 8270E_6_(6/18)	1
Benzyl alcohol	EPA 8270E_6_(6/18)	1
bis(2-Chloroethoxy)methane	EPA 8270E_6_(6/18)	1
bis(2-Chloroethyl) ether	EPA 8270E_6_(6/18)	1
bis(2-Chloroisopropyl) ether	EPA 8270E_6_(6/18)	1
Butyl benzyl phthalate	EPA 8270E_6_(6/18)	1
Caprolactam	EPA 8270E_6_(6/18)	1
Carbazole	EPA 8270E_6_(6/18)	1
Chlorobenzilate	EPA 8270E_6_(6/18)	1
Chrysene	EPA 8270E_6_(6/18)	1
Coelution - 3-Chlorophenol + 4-Chlorophenol	EPA 8270E_6_(6/18)	1
Di(2-ethylhexyl)phthalate	EPA 8270E_6_(6/18)	1
Diallate	EPA 8270E_6_(6/18)	1
Dibenz(a,h) acridine	EPA 8270E_6_(6/18)	1
Dibenz(a,h) anthracene	EPA 8270E_6_(6/18)	1
Dibenz(a,j) acridine	EPA 8270E_6_(6/18)	1
Dibenzo(a,e) pyrene	EPA 8270E_6_(6/18)	1
Dibenzofuran	EPA 8270E_6_(6/18)	1
Diethyl phthalate	EPA 8270E_6_(6/18)	1
Dimethoate	EPA 8270E_6_(6/18)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Dimethyl phthalate	EPA 8270E_6_(6/18)	1
Di-n-butyl phthalate	EPA 8270E_6_(6/18)	1
Di-n-octyl phthalate	EPA 8270E_6_(6/18)	1
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8270E_6_(6/18)	1
Diphenylamine	EPA 8270E_6_(6/18)	1
Disulfoton	EPA 8270E_6_(6/18)	1
Ethyl methanesulfonate	EPA 8270E_6_(6/18)	1
Famphur	EPA 8270E_6_(6/18)	1
Fluoranthene	EPA 8270E_6_(6/18)	1
Fluorene	EPA 8270E_6_(6/18)	1
Hexachlorobenzene	EPA 8270E_6_(6/18)	1
Hexachlorobutadiene	EPA 8270E_6_(6/18)	1
Hexachlorocyclopentadiene	EPA 8270E_6_(6/18)	1
Hexachloroethane	EPA 8270E_6_(6/18)	1
Hexachlorophene	EPA 8270E_6_(6/18)	1
Hexachloropropene	EPA 8270E_6_(6/18)	1
Indene	EPA 8270E_6_(6/18)	1
Indeno(1,2,3-cd) pyrene	EPA 8270E_6_(6/18)	1
Isodrin	EPA 8270E_6_(6/18)	1
Isophorone	EPA 8270E_6_(6/18)	1
Isosafrole	EPA 8270E_6_(6/18)	1
Kepone	EPA 8270E_6_(6/18)	1
m+p Cresol	EPA 8270E_6_(6/18)	1
Methapyrilene	EPA 8270E_6_(6/18)	1
Methyl methanesulfonate	EPA 8270E_6_(6/18)	1
Methyl parathion (Parathion, methyl)	EPA 8270E_6_(6/18)	1
Naphthalene	EPA 8270E_6_(6/18)	1
n-Decane	EPA 8270E_6_(6/18)	1
n-Hexadecane	EPA 8270E_6_(6/18)	1
Nitrobenzene	EPA 8270E_6_(6/18)	1
N-Nitrosodiethylamine	EPA 8270E_6_(6/18)	1
N-Nitrosodimethylamine	EPA 8270E_6_(6/18)	1
N-Nitroso-di-n-butylamine	EPA 8270E_6_(6/18)	1
N-Nitroso-di-n-propylamine	EPA 8270E_6_(6/18)	1
N-Nitrosodiphenylamine	EPA 8270E_6_(6/18)	1
N-Nitrosomethylethylamine	EPA 8270E_6_(6/18)	1
N-Nitrosomorpholine	EPA 8270E_6_(6/18)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
N-Nitrosopiperidine	EPA 8270E_6_(6/18)	1
N-Nitrosopyrrolidine	EPA 8270E_6_(6/18)	1
o,o,o-Triethyl phosphorothioate	EPA 8270E_6_(6/18)	1
o-Anisidine	EPA 8270E_6_(6/18)	1
Parathion, ethyl	EPA 8270E_6_(6/18)	1
Pentachlorobenzene	EPA 8270E_6_(6/18)	1
Pentachloroethane	EPA 8270E_6_(6/18)	1
Pentachloronitrobenzene	EPA 8270E_6_(6/18)	1
Pentachlorophenol	EPA 8270E_6_(6/18)	1
Perylene	EPA 8270E_6_(6/18)	1
Phenacetin	EPA 8270E_6_(6/18)	1
Phenanthrene	EPA 8270E_6_(6/18)	1
Phenol	EPA 8270E_6_(6/18)	1
Phorate	EPA 8270E_6_(6/18)	1
Phthalic anhydride	EPA 8270E_6_(6/18)	1
Pronamide (Kerb)	EPA 8270E_6_(6/18)	1
Pyrene	EPA 8270E_6_(6/18)	1
Pyridine	EPA 8270E_6_(6/18)	1
Quinoline	EPA 8270E_6_(6/18)	1
Safrole	EPA 8270E_6_(6/18)	1
Sulfotepp	EPA 8270E_6_(6/18)	1
Thionazin (Zinophos)	EPA 8270E_6_(6/18)	1
Tributyl phosphate	EPA 8270E_6_(6/18)	1
tris-(2,3-Dibromopropyl) phosphate (tris-BP)	EPA 8270E_6_(6/18)	1
1-Methylnaphthalene	EPA 8270E_6_(6/18) SIM	1
2-Methylnaphthalene	EPA 8270E_6_(6/18) SIM	1
Acenaphthene	EPA 8270E_6_(6/18) SIM	1
Acenaphthylene	EPA 8270E_6_(6/18) SIM	1
Anthracene	EPA 8270E_6_(6/18) SIM	1
Benzo(a)anthracene	EPA 8270E_6_(6/18) SIM	1
Benzo(a)pyrene	EPA 8270E_6_(6/18) SIM	1
Benzo(g,h,i)perylene	EPA 8270E_6_(6/18) SIM	1
Benzo(k)fluoranthene	EPA 8270E_6_(6/18) SIM	1
Benzo[b]fluoranthene	EPA 8270E_6_(6/18) SIM	1
Butyl benzyl phthalate	EPA 8270E_6_(6/18) SIM	1
Chrysene	EPA 8270E_6_(6/18) SIM	1
Di(2-ethylhexyl)phthalate	EPA 8270E_6_(6/18) SIM	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Dibenz(a,h) anthracene	EPA 8270E_6_(6/18) SIM	1
Dibenzofuran	EPA 8270E_6_(6/18) SIM	1
Diethyl phthalate	EPA 8270E_6_(6/18) SIM	1
Dimethyl phthalate	EPA 8270E_6_(6/18) SIM	1
Di-n-butyl phthalate	EPA 8270E_6_(6/18) SIM	1
Di-n-octyl phthalate	EPA 8270E_6_(6/18) SIM	1
Fluoranthene	EPA 8270E_6_(6/18) SIM	1
Fluorene	EPA 8270E_6_(6/18) SIM	1
Indeno(1,2,3-cd) pyrene	EPA 8270E_6_(6/18) SIM	1
Naphthalene	EPA 8270E_6_(6/18) SIM	1
Phenanthrene	EPA 8270E_6_(6/18) SIM	1
Pyrene	EPA 8270E_6_(6/18) SIM	1
2,4,5-T	EPA 8321B_2_(2/07)	1
2,4-D	EPA 8321B_2_(2/07)	1
2,4-DB	EPA 8321B_2_(2/07)	1
Aldicarb (Temik)	EPA 8321B_2_(2/07)	1
Aminocarb	EPA 8321B_2_(2/07)	1
Carbaryl (Sevin)	EPA 8321B_2_(2/07)	1
Carbofuran (Furaden)	EPA 8321B_2_(2/07)	1
Chloropropham	EPA 8321B_2_(2/07)	1
Dicamba	EPA 8321B_2_(2/07)	1
Dichloroprop (Dichlorprop)	EPA 8321B_2_(2/07)	1
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8321B_2_(2/07)	1
Diuron	EPA 8321B_2_(2/07)	1
Fenuron	EPA 8321B_2_(2/07)	1
Fluometuron	EPA 8321B_2_(2/07)	1
Linuron (Lorox)	EPA 8321B_2_(2/07)	1
MCPA	EPA 8321B_2_(2/07)	1
MCPP	EPA 8321B_2_(2/07)	1
Methiocarb (Mesurol)	EPA 8321B_2_(2/07)	1
Methomyl (Lannate)	EPA 8321B_2_(2/07)	1
Mexacarbate	EPA 8321B_2_(2/07)	1
Monuron	EPA 8321B_2_(2/07)	1
Neburon	EPA 8321B_2_(2/07)	1
Propham	EPA 8321B_2_(2/07)	1
Propoxur (Baygon)	EPA 8321B_2_(2/07)	1
Siduron	EPA 8321B_2_(2/07)	1

Matrix/Analyte	Method	Notes
Solid and Chemical Materials		
Silvex (2,4,5-TP)	EPA 8321B_2_(2/07)	1
Ignitability	EPA 1010A - 2002	1

Accredited Parameter Note Detail

(1) Accreditation based in part on recognition of Oregon NELAP accreditation. (2) Approved for compliance testing only when holding time is met. (3) Accreditation is limited to liquid matrix only.(4) Provisional accreditation pending submittal of acceptable Proficiency Testing (PT) results (WAC 173-50-110).

Rebecca Wood

Authentication Signature
Rebecca Wood, Lab Accreditation Unit Supervisor

09/19/2022
Date

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 488 • Manchester, WA 98353-0488 • (360) 871-8840

September 16, 2022

Maria Fayard
Eurofins TestAmerica Denver
4955 Yarrow St.
Arvada, CO 80002

Dear Maria Fayard:

Thank you for your application for renewal in the Environmental Laboratory Accreditation Program. Attached is a Certificate of Accreditation covering the one-year period beginning August 4, 2022 and a current Scope of Accreditation.

A number of parameters have been withdrawn at laboratory request. See document 220916N_Eurofins_Denver, footnote a.

A number of additions were requested in the renewal application. These were all reviewed and either added to the current scope, or denied. For denied parameters see document 220916N_Eurofins_Denver, footnotes b and c.

The following parameter has been downgraded from good standing to provisional, because the most recent of the three PT results submitted over the past accreditation year, was unacceptable:

Orthophosphate by EPA Method 300.0_2.1_1993, in Non-Potable Water

The following parameters have been downgraded from good standing to denied, because no PT results were submitted over the past accreditation year, although available from at least 2 of our approved PT providers:

Aroclor-1262 by EPA Method 8082A_(2/07), in Solid and Chemical Materials
Aroclor-1268 by EPA Method 8082A_(2/07), in Solid and Chemical Materials
Sulfide by EPA Method 9030B_1996, in Solid and Chemical Materials
Fluoromethane by EPA Method 8260D_4_(6/18), in Solid and Chemical Materials

Approved PT providers for WA Laboratory Accreditation:
https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Laboratory-Accreditation/Proficiency-testing-providers

Renewal of accreditation is based in part on review of your lab's performance over the past year as evidenced by participation in proficiency testing (PT) studies. In general, full accreditation is awarded for those parameters for which the two most recent PT results, if applicable, were rated satisfactory. Provisional accreditation is awarded if the latest of the two most recent PT results was rated "Not Acceptable" or only one PT result was submitted during the past twelve months. Accreditation is withheld for those parameters for which the two most recent PT results were rated "Not Acceptable" or no PT results were submitted during the past twelve-months.

As a reminder, continued participation in the Ecology Lab Accreditation Program requires the lab to:

- Submit a renewal application and fees annually
- Report significant changes in facility, personnel, analytical methods, equipment, the lab's quality assurance (QA) manual or QA procedures as they occur
- **Participate in proficiency testing studies semi-annually, with the following exception: For each parameter where all PT results were satisfactory, you are required to submit only one PT result over this next year, and in subsequent years, as long as the results are satisfactory.**
- Submit copies of current third-party Scopes of Accreditation when they are available.

Your Right To Appeal

You have a right to appeal Ecology's decision to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this decision letter. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of this decision:

- File your appeal and a copy of this decision with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this decision on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Address And Location Information

Street Addresses:

Department of Ecology
Attn: Appeals Processing Desk
300 Desmond Drive SE
Lacey, WA 98503

Pollution Control Hearings Board
1111 Israel RD SW
STE 301
Tumwater, WA 98501

Mailing Addresses:

Department of Ecology
Attn: Appeals Processing Desk
PO Box 47608
Olympia, WA 98504-7608

Pollution Control Hearings Board
PO Box 40903
Olympia, WA 98504-0903

E-Mail Address:

Department of Ecology
Not currently available (see WAC 371-08)

Pollution Control Hearings Board
Pchb-shbappeals@eluho.wa.gov

If you have any questions concerning the accreditation of your lab, please contact Rebecca Wood at (360) 871-8811, fax (360) 871-8849, or by e-mail at rebecca.wood@ecy.wa.gov.

Sincerely,

Rebecca Wood
Lab Accreditation Unit Supervisor

RW:RW:rw
Enclosures

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

EUROFINS TESTAMERICA DENVER
4955 Yarrow Street
Arvada, CO 80002
Maria Fayard Phone: 303-736-0166
www.testamericainc.com

ENVIRONMENTAL

Valid To: October 31, 2023 Certificate Number: 2907.01

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with the 2009 and 2016 TNI Environmental Testing Laboratory Standard, the requirements of the DoD Environmental Laboratory Accreditation Program (DoD ELAP), and the requirements of the Department of Energy Consolidated Audit Program (DOECAP) as detailed in version 5.4 of the DoD/DOE Quality Systems Manual for Environmental Laboratories), and for the test methods applicable to the Wyoming Storage Tank Remediation Laboratory Accreditation Program, accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

Testing Technologies

Atomic Absorption/ICP-AES Spectrometry, ICP/MS, Gas Chromatography, Gas Chromatography/Mass Spectrometry, Gravimetry, High Performance Liquid Chromatography, Ion Chromatography, Misc.- Electronic Probes (pH, O_2), Oxygen Demand, Hazardous Waste Characteristics Tests, Spectrophotometry (Visible), Spectrophotometry (Automated), Titrimetry, Total Organic Carbon, Total Organic Halide

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
Metals			
Aluminum	EPA 200.7	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Antimony	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Arsenic	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Barium	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Beryllium	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Bismuth	----------------------	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Boron	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Cadmium	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Calcium	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
Chromium	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Cobalt	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Copper	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Iron	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Lead	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Lithium	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Magnesium	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Manganese	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Mercury	EPA 245.1	EPA 7470A	EPA 7471A/7471B
Molybdenum	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Nickel	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Potassium	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Selenium	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Silica	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Silicon	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Silver	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Sodium	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Strontium	EPA 200.7	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Sulfur	----------------------	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Thallium	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Thorium	----------------------	EPA 6020/6020A/6020B	EPA 6020/6020A/6020B
Tin	EPA 200.7	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Titanium	EPA 200.7	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Tungsten	----------------------	EPA 6020/6020A/6020B	EPA 6020/6020A/6020B
Uranium	EPA 200.8	EPA 6020/6020A/6020B	EPA 6020/6020A/6020B
Vanadium	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Zinc	EPA 200.7/200.8	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B	EPA 6010B/6010C/6010D EPA 6020/6020A/6020B
Zirconium	----------------------	EPA 6010B/6010C/6010D	----------------------
Nutrients			
Nitrate (as N)	EPA 300.0 By calculation	EPA 300.0 EPA 9056/9056A By Calculation/Nitrate by Calc	EPA 9056/9056A By Calculation/Nitrate by Calc

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
Nitrate-Nitrite (as N)	EPA 300.0 EPA 353.2	EPA 300.0 EPA 353.2 EPA 9056/9056A	EPA 9056/9056A
Nitrite (as N)	EPA 300.0 EPA 353.2 SM 4500-NO_2 B	EPA 300.0 EPA 353.2 EPA 9056/9056A SM 4500-NO_2 B	EPA 353.2 EPA 9056/9056A
Orthophosphate (as P)	EPA 300.0	EPA 300.0 EPA 9056/9056A	EPA 9056/9056A
Total Phosphorus	EPA 365.1	EPA 6010B/6010C/6010D	EPA 6010B/6010C/6010D
Demands			
Total Organic Carbon	----------------------	EPA 9060/9060A	EPA 9060/9060A
Total Organic Halides	----------------------	EPA 9020B	--------------------------
Wet Chemistry			
Alkalinity (Total Bicarbonate, Carbonate, and Hydroxide Alkalinity)	SM 2320B	SM 2320B	SM 2320B
Ammonia	EPA 350.1	EPA 350.1	--------------------------
Biological Oxygen Demand	SM 5210B	SM 5210B	--------------------------
Bromide	EPA 300.0	EPA 300.0 EPA 9056/9056A	EPA 9056/9056A
Chloride	EPA 300.0 SM 4500-CL E	EPA 300.0 EPA 9056/9056A SM 4500-CL E	EPA 9056/9056A
Chemical Oxygen Demand	EPA 410.4	EPA 410.4	--------------------------
Conductivity	----------------------	EPA 9050/9050A	EPA 9050/9050A
Cyanide	----------------------	EPA 9012A/9012B	EPA 9012A/9012B
Ferrous Iron	SM 3500Fe B, D	SM 3500Fe B, D	--------------------------
Fluoride	EPA 300.0	EPA 300.0 EPA 9056/9056A	EPA 9056/9056A
Flashpoint	----------------------	EPA 1010A	--------------------------
Hexavalent Chromium	----------------------	EPA 7196A	EPA 7196A
Hardness, Total	SM 2340C	SM 2340C	--------------------------
pH	SM 4500 H+B	EPA 9040B/9040C	EPA 9045C/9045D
Oil and Grease (HEM and SGT-HEM)	----------------------	EPA 1664A/1664B	--------------------------
Percent Moisture	----------------------	----------------------------	ASTM D2216
Perchlorate	----------------------	EPA 6860	EPA 6860
Phenols	----------------------	EPA 9066	--------------------------
Solids, Total	----------------------	----------------------	SM 2540B
Solids, Total Suspended	SM 2540D	SM 2540D	SM 2540D
Solids, Total Dissolved	SM 2540C	SM 2540C	SM 2540C
Sulfate	EPA 300.0 SM 4500-SO4 E	EPA 300.0 EPA 9056/9056A SM 4500-SO4 E	EPA 9056/9056A
Sulfide, Total	SM 4500S2 D	EPA 9034/SM 4500S2 D	EPA 9034
Sulfide	----------------------	EPA 9030B	EPA 9030B

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
Total Kjeldahl Nitrogen	EPA 351.2	EPA 351.2	EPA 351.2
Purgeable Organics (Volatiles)			
1,1,1,2-Tetrachloroethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1,1-Trichloroethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1,2,2-Tetrachloroethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1,2-Trichloro-1,2,2-trifluoroethane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1,2-Trichloroethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1-Dichloroethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1-Dichloroethene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,1-Dichloropropene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2 Dibromoethane (EDB)	EPA 624/624.1	EPA 8260B/8260C/8260D EPA 8011	EPA 8260B/8260C/8260D EPA 8011
1,2,3-Trichlorobenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2,3-Trichloropropane	EPA 624/624.1	EPA 8260B/8260C/8260D EPA 8011	EPA 8260B/8260C/8260D EPA 8011
1,2,3-Trimethylbenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2,4-Trichlorobenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2,4-Trimethylbenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dibromo-3-chloropropane (DBCP)	EPA 624/624.1	EPA 8260B/8260C/8260D EPA 8011	EPA 8260B/8260C/8260D EPA 8011
1,2-Dichlorobenzene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dichloroethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dichloroethene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Dichloropropane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,2-Xylene (o-Xylene)	EPA 624/624.1	EPA 8260B/8260C/8260D AK101/OK DEQ GRO	EPA 8260B/8260C/8260D AK101/OK DEQ GRO
1,3,5-Trichlorobenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,3,5-Trimethylbenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,3-Dichlorobenzene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,3-Dichloropropane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,3-Dichloropropene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,4-Dichlorobenzene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
1,4-Dioxane	EPA 624/624.1	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D EPA 8260B/8260C/8260D SIM
1-Chlorohexane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2,2-Dichloropropane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Butanone [Methyl Ethyl Ketone (MEK)]	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Chloro-1,3-butadiene (Chloroprene)	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Chloroethyl Vinyl Ether	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Chlorotoluene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Hexanone	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Nitropropane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
2-Pentanone	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
4-Chlorotoluene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
4-Isopropyltoluene (p-Cymene)	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
4-Methyl-2-pentanone (MIBK)	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Acetone	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Acetonitrile	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Acetylene	----------------------	RSK-175	----------------------
Acetylene Ethane	----------------------	RSK-175	----------------------
Acrolein	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Acrylonitrile	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Allyl Chloride (3-Chloro-1-propene)	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Benzene	EPA 624/624.1	EPA 8260B/8260C/8260D AK101/OK DEQ GRO	EPA 8260B/8260C/8260D AK101/OK DEQ GRO
Bromobenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromochloromethane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromodichloromethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromoform	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Bromomethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Butadiene	----------------------	EPA 8260B/8260C/8260D SIM	EPA 8260B/8260C/8260D SIM
Carbon Disulfide	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Carbon Tetrachloride	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Chlorobenzene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Chloroethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Chloroform	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Chloromethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
cis-1,2-Dichloroethene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
cis-1,3-Dichloropropene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
cis-1,4-Dichloro-2-butene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Cyclohexane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Cyclohexanone	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Dibromochloromethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Dibromomethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Dichlorodifluoromethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Dichlorofluoromethane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Diethyl Ether (Ethyl Ether)	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Di-isopropylether (Isopropyl ether)	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Ethane	----------------------	RSK-175	----------------------
Ethanol	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Ethyl Acetate	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Ethyl Benzene	EPA 624/624.1	EPA 8260B/8260C/8260D AK101/OK DEQ GRO	EPA 8260B/8260C/8260D AK101/OK DEQ GRO
Ethyl Methacrylate	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Ethyl Tert-Butyl Ether	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Ethylene (Ethene)	----------------------	RSK-175	----------------------
Gas Range Organics (GRO)	----------------------	EPA 8015B/8015C/8015D/ AK101/OK DEQ GRO/NWTPH-Gx	EPA 8015B/8015C/8015D/ AK101/OK DEQ GRO/NWTPH-Gx

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
Hexachlorobutadiene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Hexane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Iodomethane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Isobutyl alcohol (2-Methyl-1-propanol)	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Isopropyl Alcohol	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Isopropylbenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
m+p-Xylene	EPA 624/624.1	EPA 8260B/8260C/8260D AK101/OK DEQ GRO	EPA 8260B/8260C/8260D AK101/ K DEQ GRO
Methacrylonitrile	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Methane	----------------------	RSK-175	----------------------
Methyl Acetate	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Methyl Cyclohexane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Methyl Methacrylate	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Methyl Tert-Butyl Ether (MtBE)	EPA 624/624.1	EPA 8260B/8260C/8260D OK DEQ GRO	EPA 8260B/8260C/8260D OK DEQ GRO
Methylene Chloride	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Naphthalene	EPA 624/624.1	EPA 8260B/8260C/8260D OK DEQ GRO	EPA 8260B/8260C/8260D OK DEQ GRO
n-Butyl Alcohol (n-Butanol)	----------------------	EPA 8260B/8260C/8260D EPA 8015B/8015C	EPA 8260B/8260C/8260D EPA 8015B/8015C
n-Butylbenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
n-Propylbenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Pentachloroethane	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Propionitrile	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
sec-Butylbenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Styrene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
tert-Butyl Alcohol (2-Methyl-2-propanol)	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
tert-Butylbenzene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Tetrachloroethene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Tetrahydrofuran	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Toluene	EPA 624/624.1	EPA 8260B/8260C/8260D AK101/OK DEQ GRO	EPA 8260B/8260C/8260D AK101/OK DEQ GRO
Total Petroleum Hydrocarbons (TPH)	EPA 1664A/1664B	EPA 1664A/1664B	--------------------------
trans-1,2-Dichloroethene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
trans-1,3-Dichloropropene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
trans-1,4-Dichloro-2-butene	----------------------	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Trichloroethene	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Trichlorofluoromethane	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Vinyl Acetate	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Vinyl Chloride	EPA 624/624.1	EPA 8260B/8260C/8260D	EPA 8260B/8260C/8260D
Xylenes, Total	EPA 624/624.1	EPA 8260B/8260C/8260D AK101/OK DEQ GRO	EPA 8260B/8260C/8260D AK101/OK DEQ GRO
Extractable Organics (Semivolatiles)			
1,1-Biphenyl	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
1,2,4,5-Tetrachlorobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,2,4-Trichlorobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,2-Dichlorobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,2-Diphenylhydrazine (Azobenzene)	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,3,5-Trinitrobenzene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,3-Dichlorobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,3-Dinitrobenzene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,4-Dichlorobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,4-Dinitrobenzene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,4-Dioxane	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1,4-Naphthoquinone	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1-Chloronaphthalene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
1-Methylnaphthalene	----------------------	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
1-Naphthylamine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,2-oxybis(1-chloropropane) [bis (2-Chloroisopropyl) Ether]	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,3,4,6-Tetrachlorophenol	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,4,5-Trichlorophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,4,6-Tribromophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,4,6-Trichlorophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,4-Dichlorophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,4-Dimethylphenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,4-Dinitrophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,4-Dinitrotoluene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,6-Dichlorophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2,6-Dinitrotoluene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-Acetylaminofluorene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-Chloronaphthalene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-Chlorophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-methyl-4,6-Dinitrophenol (Dinoseb)	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-Methylnaphthalene	----------------------	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
2-Methylphenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-Naphthylamine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-Nitroaniline	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-Nitrophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-Picoline	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
2-sec-butyl-4,6-Dinitrophenol	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
3,3’-Dichlorobenzidine	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
3,3-Dimethylbenzidine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
3+4-Methylphenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
3-Methylcholanthrene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
3-Nitroaniline	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
4,6-Dinitro-2-methylphenol	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
4-Aminobiphenyl	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
4-Bromophenyl phenyl ether	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
4-chloro-3-Methylphenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
4-Chloroanilene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
4-Chlorophenyl phenyl ether	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
4-Nitroaniline	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
4-Nitrophenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
5-nitro-o-Toluidine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
7,12-Dimethylbenz(a)anthracene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Acenaphthene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Acenaphthylene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Acetophenone	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Alachlor	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
alpha-, alpha-Dimethylphenethylamine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Aniline	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Anthracene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Aramite	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Atrazine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Azobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Benzaldehyde	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Benzidine	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Benzo(a)anthracene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Benzo(a)pyrene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Benzo(b)fluoranthene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Benzo(ghi)perylene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Benzo(k)fluoranthene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Benzoic Acid	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Benzyl Alcohol	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
bis (2-Chloroethoxy) Methane	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
bis (2-Chloroethyl) Ether	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
bis (2-Ethylhexyl) Phthalate	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
butyl Benzyl Phthalate	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Caprolactam	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Carbazole	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Chlorobenzilate	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Chrysene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Cresols	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
Diallate	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Dibenzo (a,h) anthracene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Dibenzofuran	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Diesel Range Organics (DRO)	----------------------	EPA 8015B/8015C/8015D AK102/8015D/OK DEQ DRO/NWTPH-Dx	EPA 8015B/8015C/8015D AK102/8015D/OK DEQ DRO/NWTPH-Dx
Diethyl Phthalate	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Dimethoate	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Dimethyl Phthalate	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
di-n-butyl Phthalate	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
di-n-octyl Phthalate	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
woDiphenylamine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Disulfoton	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Ethyl Methanesulfonate	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Famphur	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Fluorene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Fluoroanthene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Hexachlorobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Hexachlorobutadiene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Hexachlorocyclopentadiene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Hexachloroethane	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Hexachlorophene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Hexachloropropene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Indeno (1,2,3-cd) pyrene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Isodrin	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Isophorone	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Isosafrole	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Methapyrilene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Methyl Methane Sulfonate	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Motor Oil (Residual Range Organics)	----------------------	EPA 8015B/8015C/8015D AK103/OK DEQ RRO	EPA 8015B/ 8015C/8015D AK103/ OK DEQ RRO
Naphthalene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Nitrobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Nitroquinoline-1-oxide (4-Nitroquinoline-1-oxide)	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
N-Nitrosodiethylamine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
N-Nitrosodimethylamine	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
N-Nitrosodi-n-butylamine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
N-Nitrosodi-n-propylamine	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
N-Nitrosodiphenylamine	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
N-Nitrosomethylethylamine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
N-Nitrosomorpholine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
N-Nitrosopiperidine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
N-Nitrosopyrrolidine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
o,o,o-triethyl Phosphorothioate	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
o-Toluidine	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Parathion, ethyl	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Parathion, methyl	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
p-Dimethylaminoazobenzene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Pentachlorobenzene	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Pentachloroethane	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Pentachloronitobenzene	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Pentachlorophenol	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8321A/8321B	EPA 8270C/8270D/8270E EPA 8321A/8321B
Phenacetin	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Phenanthrene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Phenol	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Phorate	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
p-Phenylene Diamine	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Pronamide	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Pyrene	EPA 625/625.1	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM	EPA 8270C/8270D/8270E EPA 8270C/8270D/8270E SIM
Pyridine	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Safrole	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Sulfotepp	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Thionazin	----------------------	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Tributyl phosphate	EPA 625/625.1	EPA 8270C/8270D/8270E	EPA 8270C/8270D/8270E
Pesticides/Herbicides/PCBs			
2,4,5-T	----------------------	EPA 8151A	EPA 8151A
2,4,5-TP	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
2,4-D	----------------------	EPA 8151A	EPA 8151A
2,4-DB	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
4,4’-DDD	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
4,4’-DDE	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
4,4’-DDT	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Aldrin	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
alpha-BHC	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
alpha-Chlordane (cis-Chlordane)	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Atrazine	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Azinophos ethyl	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Azinophos methyl	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
beta-BHC	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Bolstar	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Chlordane (technical)	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Chloropyrifos	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Coumaphos	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Dalapon	----------------------	EPA 8151A EPA 8321A/8321B	EPA 8151A EPA 8321A/8321B

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
delta-BHC	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Demeton, total	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Demeton-O	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Demeton-S	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Diazinon	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Dicamba	----------------------	EPA 8151A EPA 8321A/8321B	EPA 8151A EPA 8321A/8321B
Dichloroprop	----------------------	EPA 8151A EPA 8321A/8321B	EPA 8151A EPA 8321A/8321B
Dichlorovos	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Dieldrin	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Dimethoate	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Dinoseb (2-methyl-4,6-Dinitrophenol)	----------------------	EPA 8151A EPA 8321A/8321B	EPA 8321A/8321B
Disulfoton	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Endonsulfan sulfate	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Endosulfan I	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Endosulfan II	EPA 608/608.3	EPA 8081A /8081B	EPA 8081A/8081B
Endrin	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Endrin aldehyde	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Endrin ketone	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
EPN	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Ethoprop	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Ethyl Parathion	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Famphur	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Fensulfothion	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Fenthion	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
gamma-BHC	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
gamma-Chlordane (trans-Chlordane)	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Heptachlor	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Heptachlor epoxide	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Hexachlorobenzene	----------------------	EPA 8081A/8081B	EPA 8081A/8081B
Malathion	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
MCPA	----------------------	EPA 8151A EPA 8321A/8321B	EPA 8151A EPA 8321A/8321B
MCPP	----------------------	EPA 8151A EPA 8321A/8321B	EPA 8151A EPA 8321A/8321B
Merphos	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Methoxychlor	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Methyl parathion	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Mevinphos	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Naled	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
o,o,o-Triethylphos Phorothioate	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
PCB-1016 (Arochlor)	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
PCB-1221	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
PCB-1232	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
PCB-1242	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
PCB-1248	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
PCB-1254	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
PCB-1260	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
PCB-1262	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
PCB-1268	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
Pentachlorophenol	----------------------	EPA 8151A	EPA 8151A
Phorate	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Phosmet	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Picrolam	----------------------	EPA 8151A	EPA 8151A
Propazine	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Ronnel	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Simazine	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Stirophos	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Sulfotepp	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Thionazin	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Tokuthion	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Total PCBs	EPA 608/608.3	EPA 8082/8082A	EPA 8082/8082A
Toxaphene	EPA 608/608.3	EPA 8081A/8081B	EPA 8081A/8081B
Trichloronate	----------------------	EPA 8141A/8141B	EPA 8141A/8141B
Explosives			
1,3,5-Trinitrobenzene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
1,3-Dinitrobenzene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
2,4,6-Trinitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
3,5-Dinitroaniline	----------------------	EPA 8330B EPA 8321A/8321B	EPA 8330B EPA 8321A/8321B
2,4-Dinitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
2,4-Diamino-6-nitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
2,6-Dinitroltoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
2,6-Diamino-4-nitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
2-amino-4,6-Dinitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
2-Nitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
3-Nitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
4-amino-2,6-Dinitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
4-Nitrotoluene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
Nitrobenzene	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
Nitroglycerin	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
Nitroguanidine	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
HMX (octahydro-1,3,5,7-tetrabitro-1,3,5,7-Tetrazocine)	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
Pentaerythritoltetranitrate (PETN)	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
Picric acid	----------------------	EPA 8330A/8330B	EPA 8330A/8330B
RDX (hexahydro-1,3,5-trinitro-1,3,5-Triazine)	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
Tetryl (methyl 2,4,6-Trinitrophenylnitramine	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
DNX (Hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine)	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
MNX (Hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine)	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
TNX (hexahydro-1,3,5-trinitroso-1,3,5-triazine)	----------------------	EPA 8330A/8330B EPA 8321A/8321B	EPA 8330A/8330B EPA 8321A/8321B
Triaminotrinitrobenzene (TATB)	--------------------	EPA 8330B EPA 8321A/8321B	EPA 8330B EPA 8321A/8321B
Explosives LC/MS/MS			
1,3,5-Trinitrobenzene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
1,3-Dinitrobenzene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
2,4,6-Trinitrotoluene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
3,5-Dinitroaniline	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
2,4-Dinitrotoluene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
2,6-Dinitroltoluene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
2-Amino-4,6-Dinitrotoluene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
2-Nitrotoluene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
3-Nitrotoluene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
4-Amino-2,6-Dinitrotoluene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
4-Nitrotoluene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
DNX (hexahydro-1,3-dinitroso-5-nitro-1,3,5-triazine)	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
MNX (hexahydro-1-nitroso-3,5-dinitro-1,3,5-triazine)	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
Nitrobenzene	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
Nitroglycerin	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
Nitroguanidine	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
HMX (octahydro-1,3,5,7-tetrabitro-1,3,5,7-Tetrazocine)	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
Pentaerythritoltetranitrate (PETN)	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
RDX (hexahydro-1,3,5-trinitro-1,3,5-Triazine)	----------------------	EPA 8321A/8321B	EPA 8321A/8321B

Parameter/Analyte	**Non-Potable (Water)**	**Solid Hazardous Waste (Water)**	**Solid Hazardous Waste (Solid)**
Tetryl (methyl 2,4,6-Trinitrophenylnitramine	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
TNX (hexahydro-1,3,5-trinitroso-1,3,5-triazine)	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
Tris(o-cresyl)phosphate	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
Triaminotrinitrobenzene (TATB)	--------------------	EPA 8321A/8321B	EPA 8321A/8321B
Chemical Warfare Agents			
Thiodiglycol (2,2'-Thiodiethanol)	----------------------	EPA 8321A/8321B	EPA 8321A/8321B
Hazardous Waste Characteristics			
Conductivity	SM 2510B	EPA 9050A	EPA 9050A
Corrosivity	SM 4500 H+B	EPA 9040B/9040C	EPA 9045C/9045D
Paint filter liquids test	----------------------	EPA 9095A	EPA 9095A
Synthetic Precipitation Leaching Procedure (SPLP)	----------------------	EPA 1312	EPA 1312
Toxicity Characteristic Leaching Procedure	----------------------	EPA 1311	EPA 1311
California Waste Extraction Test	----------------------	CA WET	CA WET
Turbidity	EPA 180.1	--------------------------	--------------------------
Organic Prep Methods			
Continuous liquid-liquid extraction	----------------------	EPA 3520C	--------------------------
Microwave extraction	----------------------	----------------------------	EPA 3546
Separatory funnel liquid-liquid extraction	----------------------	EPA 3510C	--------------------------
Solid phase extraction	----------------------	EPA 3535A	--------------------------
Soxhlet extraction	----------------------	----------------------------	EPA 3540C
Ultrasonic extraction	----------------------	----------------------------	EPA 3550B/3550C
Volatiles purge and trap	----------------------	EPA 5030B	EPA 5030A EPA 5035/5035A
Waste dilution	----------------------	EPA 3580A	EPA 3580A
Organic Cleanup Procedures			
Florisil Cleanup	----------------------	EPA 3620B	EPA 3620B
Florisil Cleanup	----------------------	EPA 3620C	EPA 3620C
Sulfur Cleanup	----------------------	EPA 3660A/EPA 3660B	EPA 3660A/EPA 3660B
Sulfuric Acid/Permanganate Cleanup	----------------------	EPA 3665A	EPA 3665A
Metals Digestion			
Acid Digestion for Total Metals	----------------------	EPA 3010A	--------------------------
Acid Digestion for Total Metals	----------------------	EPA 3020A	--------------------------
Acid Digestion of Sediments, Sludges and Soils	----------------------	----------------------------	EPA 3050B
Acid Digestion Total Recoverable or Dissolved Metals	----------------------	EPA 3005A	--------------------------

In recognition of the successful completion of the A2LA evaluation process, (including an assessment of the laboratory's compliance with ISO IEC 17025:2005, and for the test methods applicable to the Wyoming Storage Tank Remediation Laboratory Accreditation Program), accreditation is granted to this laboratory to perform recognized EPA methods using the following testing technologies and in the analyte categories identified below:

WYOMING STORAGE TANK PROGRAM

Parameter/Analyte	**Method(s)**
Metals	
Cadmium	EPA 6010C/6010D
Chromium	EPA 6010C/6010D
Lead	EPA 6010C/6010D
Wet Chemistry	
Hexavalent chromium	EPA 7196A
Pureable Organics (Volatiles)	
tert-Amyl Methyl Ether	EPA 8260B/8260C
Benzene	EPA 8260B/8260C
tert-Butyl alcohol (2-Methyl-2-propanol)	EPA 8260B/8260C
1,2-Dichloroethane	EPA 8260B/8260C
Di-isopropylether	EPA 8260B/8260C
Ethyl benzene	EPA 8260B/8260C
Ethyl tert-butyl ether	EPA 8260B/8260C
Gas Range Organics (GRO)	EPA 8015B/8015C/8015D
Methyl tert-butyl ether (MTBE)	EPA 8260B/8260C
Naphthalene	EPA 8260B/8260C
Toluene	EPA 8260B/8260C
Xylenes, total	EPA 8260B/8260C
1,2-Xylene	EPA 8260B/8260C
m+p-Xylene	EPA 8260B/8260C
Extractable Organics (Semivolatiles)	
Diesel Range Organics (DRO)	EPA 8015B/8015C/8015D (WY: C10-C32)
Organic Prep Methods	
Volatiles Purge and Trap	EPA 5030B (water) /5030A (solids)

Accredited Laboratory

A2LA has accredited

EUROFINS TESTAMERICA DENVER

Arvada, CO

for technical competence in the field of

Environmental Testing

In recognition of the successful completion of the A2LA evaluation process that includes an assessment of the laboratory's compliance with ISO/IEC 17025:2017, the 2009 and 2016 TNI Environmental Testing Laboratory Standard, the requirements of the Department of Defense Environmental Laboratory Accreditation Program (DoD ELAP), and the requirements of the Department of Energy Consolidated Audit Program (DOECAP) as detailed in version 5.4 of the DoD/DOE Quality System Manual for Environmental Laboratories (QSM), accreditation is granted to this laboratory to perform recognized EPA methods as defined on the associated A2LA Environmental Scope of Accreditation. This accreditation demonstrates technical competence for this defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Presented this 1st day of December 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2907.01
Valid to October 31, 2023

For the tests to which this accreditation applies, please refer to the laboratory's Environmental Scope of Accreditation.

Appendix D: Survey Report

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NOTIFICATION: THIS PAGE CONTAINS SENSITIVE BUT UNCLASSIFIED INFORMATION WHICH IS PROTECTED BY THE FREEDOM OF INFORMATION ACT

EXEMPTION 3. (5 USC 552(b)(3))

Information exempted by other statutes

10 USC Section 130(e) Treatment of Certain Critical Infrastructure Security Information

Pages *3* - *12*

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Appendix E: MDAS and WIS Documentation

E-1: WIS Documentation

E-2: MDAS Documentation

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E-1: WIS Documentation

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For Contractor Use Only

WASTE INFORMATION SPECIFICATION (WIS) FORM

Naval Base Kitsap (Select One)

☑ Bangor ☐ NAVHOSP ☐ Jackson Park ☐ Camp Wesley Harris

WIS #: 09400821

WIS TRACKING #: CTR RT0237A

STATE TOOL #: NBK Soil Policy

SAMPLE #:

Designator's initials: BS

IEO Use Only

1. Engineering Technician:
Janice Horton, NAVFAC NW

2. Phone # and Email Address:
360.556.0621
janice.l.horton5.civ@us.navy.mil

3. Originator (name):
Mitch Baron

4. Phone # and Email Address:
360 908-3246
mitch.baron@tetratech.com

5. Company Name and Work Order #:
Tetra Tech
N62470-16-D-D9008, N4425519F4112

6. Name of Waste Produced (Use SDS name if applicable):
Soil with hydraulic fluid

7. Total Waste Quantity:
(# of containers, size of containers, and frequency of generation)
1 each, 5 gal Bucket

8. Buildings and room numbers of points of generation:
NBK Bangor, remote location [redacted].

9. Hazardous Waste Accumulation Area ID #s

10. Waste Produced is:
☐ Process Waste ☐ Empty ☐ Pure Product
☑ One-time waste ☐ Expired/unused (Exp. Date:__________)

11. State of Waste Produced is:
☑ Solid ☐ Gas ☐ Aerosol
☐ Liquid ☐ Debris ☐ Other:

12. Re-submittal - Old Tracking #

13. Other notable characteristics

14. Potential Contaminants:
☐ Asbestos ☐ Metals ☑ Oil ☐ None
☐ PCBS ☐ Solvents ☐ Other:

15. A) Provide a detailed description on how the waste was produced and what process the waste was used in. B) Please note any other materials the waste could be contaminated with and any operating procedures that may impact the chemical composition. C) Please provide intended disposal facility info for each waste stream, or attach estimated waste table with this info. D) If the waste contains demolished building material, then please provide asbestos and lead test results or evidence that justifies not testing. E) Provide Safety Data Sheets (SDSs) for all materials that have an SDS.

Excavator equipment failure (hydraulic hose) resulting in hydraulic fluid spill. Estimated 10 to 20 ounces of hydraulic fluid spilled to ground soil surface. Released fluid, soil, and absorbent pads collected and placed into (double) plastic bag and staged in 5 gallon bucket pending disposition. No remaining spilled hydraulic fluid left in place, all spilled fluid was recovered. If necessary, Tetra Tech can arrange for off-site transport and disposal.

16. List all materials in the waste (must attach SDS)

	Material/Trade Name	SDS No.	NSN/Part No.	MFG w/ Phone #	% of waste by weight
1.)	Soil				80-90
2.)	Hydraulic Fluid				10-20
3.)					
4.)					

17. Certification: I certify that the above is accurate and true; and this waste has not been mixed with any other materials; will be controlled by me; and will be turned in for disposal as directed on side 2 of this WIS.

Mitch Baron Digitally signed by Mitch Baron
Date: 2022.09.26 13:10:24 -07'00' 9-26-2022

Originator's Signature **Date**

Return this form to your Engineering Technician

HW Coordinator Review and Concurrence: RT 11 Oct 2022

Initials Date

IEO Use Only

A - ORIGINATOR INSTRUCTIONS (Labeling, Accumulation, Disposition)

☐ Dispose as refuse in dumpster

☐ Discharge in sanitary sewer

☐ Recycle via Command HW Coordinator per Bangor Recycle Program Instruction

■ Attach completed Originator Label and applicable Hazard Class Label(s) - Per Section B

Use Green HW Label for WIS #s that begin with 5, 6, 7, 8 Use BLUE Non-Hazardous Label for WIS #s that begin with 0, 1, 2, 3, 4

☒ Special Handling Instructions: Dispose at minimum in subtitle D landfill and IAW approved EPP/Waste Management Plan

B - LABEL INFORMATION

a. WIS #: 09400821 Hazard Class: N/A

b. Waste Name: PETROLEUM CONTAMINATED SOIL

c. Required Labels: NON-HAZWASTE

C - NBK DISPOSITION

BEO Use Only

■ Consolidate and dispose per WIS Profile

☐ Transport to IWTP. IWTP shall treat per WIS Profile

☐ Turn-in material to MTIS

☐ Recycles on base or transport to off-base recycler

☐ Special Handling Instructions: ____________________

D - BEO CERTIFICATION

Signature PRB41

10/14/2022

Date

For assistance call your Command HW Coordinator

Copy to: Originator, Command HW Coordinator

This WIS certification expires five years after the above signature date or when the waste described by the originator does not match the waste created.

WIS SIDE 2 - TO BE COMPLETED BY BEO

NAVBASEKITSAP 5090.3E

SOIL TESTING AND DISPOSAL GUIDANCE

Ref: (a) Washington Administrative Code (WAC) 173-303, Dangerous Waste Regulations
(b) WAC 173-350 Solid Waste Handling Standards
(c) WAC 173-340, Table 740-1 Unrestricted Land Use Soil Cleanup Standards
(d) WA Dept. of Ecology, Guidance for Remediation of Petroleum Contaminated Sites

1. Purpose. To establish policy and procedures for controlling soil disturbed during construction, maintenance and repair projects.
2. Scope. This guidance applies to all construction and repair activities performed at Naval Base Kitsap Bangor, Keyport, Zelatched Point, Jackson Park, Naval Hospital Bremerton, Camp Wesley Harris and Naval Magazine Indian Island, including all tenant activities within the fence lines.
3. Policy. Soil shall be segregated, stored and tested depending on the intent for reuse on site or disposal off the installation.
   a. Soil storage area(s) should be created in the following manner:
      (1) Underlay the soil accumulation area with a continuous impervious sheet of plastic. Protect the plastic from perforation during loading and handling operations. The thickness of the plastic shall be sufficient to contain the soil, and in no case be less than 10-mil.
      (2) Install an impervious continuous sheet of plastic, 10-mil minimum thickness, over the pile and secure the top cover sheet to ensure wind does not blow it off or to the side, leaving the soil exposed.
      (3) The soil shall remain covered and secured except when actually adding or removing soil, or collecting soil samples.
      (4) Signage with Contractor's name, identification of where the soil came from, and the name and phone number of the NAVFAC Engineering Technician assigned to the project.
   b. Soil intended for reuse at the same worksite shall be accumulated in the area from which it was removed, preferably as near to the excavation as practicable.
   c. Soil not intended for reuse at the same worksite shall be considered a waste, and a Waste Information Specification (WIS) shall be submitted to the Installation Environmental Office (IEO). The soil characterization and disposal shall be per Tables 1, 2 and 3 below.
      (1) All tests will be required unless specifically indicated by IEO. The cost of analytical testing shall be borne by the project.
      (2) A sampling plan must be submitted to and approved by the IEO prior to sampling.
      (3) All analytical results shall be submitted to the IEO along with the WIS/WGR for review and designation.
      (4) No soils shall leave the installation without an approved WIS/WGR.
      (5) All manifests for soil disposal shall be submitted for approval to the IEO. Copies of manifests or bills of lading shall be provided to the IEO after disposal.
      (6) There are no soil disposal sites on the installations.

TABLE 1. TESTS REQUIRED FOR CHARACTERIZATION[1]

Total Metals by SW 846 EPA Methods 6010C and 7470A[2]
VOCs by SW 846 EPA Method 8260C
SVOCs by SW 846 EPA Method 8270D
NWTPH – HCID, Gx, Dx (dependent on suspected contamination)
PAHs by SW 846 EPA Method 8270D
PCB/Pesticides by SW 846 EPA Method 8082A/8081B

[1] Additional testing may be required by the IEO per the contract.

[2] Landfill disposal requires TCLP metals (8 RCRA metals by SW 846 EPA Method 1311) for designation of waste.

TABLE 2. MINIMUM NUMBER OF SAMPLES PER VOLUME OF DISPOSED SOIL

Volume Of Soil in Cubic Yards	Number of Composite Samples
0-25	1
25-99	3
100-500	5
501-1000	7
1001-2000	10
>2000	10 + 1(one) additional sample for each additional 500 cy.

- Note: Composite sample consists of three discrete samples taken at different depths.

TABLE 3. WASTE DISPOSAL INFORMATION

Soil Designation	Disposal Location
Hazardous waste soil.	Subtitle C Landfill.
Non-hazardous soil that exceeds any of the above characterization criteria.	Subtitle D Landfill.
Non-hazardous soil that does not exceed any of the above characterization criteria.	Project manager discretion after approval from IEO.
Soil located in a designated CERCLA Installation Restoration (IR) program site.	Subtitle C or D Landfill after approval from Remediation Project Manager.

Note: This document provides general awareness only. The assigned project Engineering Technician shall address any issues.

For Contractor Use Only

WASTE INFORMATION SPECIFICATION (WIS) FORM

Naval Base Kitsap (Select One)

☑ Bangor ☐ NAVHOSP ☐ Jackson Park ☐ Camp Wesley Harris

WIS #: 12200170

WIS TRACKING #: CTR RT0237B

STATE TOOL #: Used Oil

SAMPLE #:

Designator's initials: BS

IEO Use Only

1. Engineering Technician:
Janice Horton, NAVFAC NW

2. Phone # and Email Address:
360.556.0621
janice.l.horton5.civ@us.navy.mil

3. Originator (name):
Mitch Baron

4. Phone # and Email Address:
360 908-3246
mitch.baron@tetratech.com

5. Company Name and Work Order #:
Tetra Tech
N62470-16-D-D9008, N4425519F4112

6. Name of Waste Produced (Use SDS name if applicable):
absorbent pads with hydraulic fluid

7. Total Waste Quantity:
(# of containers, size of containers, and frequency of generation)
1 each, 5 gal Bucket

8. Buildings and room numbers of points of generation:
NBK Bangor, remote location [redacted]

9. Hazardous Waste Accumulation Area ID #s

10. Waste Produced is:
☐ Process Waste ☐ Empty ☐ Pure Product
☑ One-time waste ☐ Expired/unused (Exp. Date:__________)

11. State of Waste Produced is:
☑ Solid ☐ Gas ☐ Aerosol
☐ Liquid ☐ Debris ☐ Other: __________

12. Re-submittal - Old Tracking #

13. Other notable characteristics

14. Potential Contaminants:
☐ Asbestos ☐ Metals ☑ Oil ☐ None
☐ PCBS ☐ Solvents ☐ Other:__________

15. A) Provide a detailed description on how the waste was produced and what process the waste was used in. B) Please note any other materials the waste could be contaminated with and any operating procedures that may impact the chemical composition. C) Please provide intended disposal facility info for each waste stream, or attach estimated waste table with this info. D) If the waste contains demolished building material, then please provide asbestos and lead test results or evidence that justifies not testing. E) Provide Safety Data Sheets (SDSs) for all materials that have an SDS.

Excavator equipment failure (hydraulic hose) resulting in hydraulic fluid spill. Estimated 10 to 20 ounces of hydraulic fluid spilled to ground soil surface. Released fluid, soil, and absorbent pads collected and placed into (double) plastic bag and staged in 5 gallon bucket pending disposition. No remaining spilled hydraulic fluid left in place, all spilled fluid was recovered. If necessary, Tetra Tech can arrange for off-site transport and disposal.

16. List all materials in the waste (must attach SDS)

	Material/Trade Name	SDS No.	NSN/Part No.	MFG w/ Phone #	% of waste by weight
1.)					
2.)	Hydraulic Fluid				10-20
3.)	Absorbent pads, gloves				80-90
4.)					

17. Certification: I certify that the above is accurate and true; and this waste has not been mixed with any other materials; will be controlled by me; and will be turned in for disposal as directed on side 2 of this WIS.

Mitch Baron
Digitally signed by Mitch Baron
Date: 2022.09.26 13:10:24 -07'00'

9-26-2022

Originator's Signature **Date**

Return this form to your Engineering Technician

HW Coordinator Review and Concurrence: RT (Initials) 11 Oct 2022 (Date)

IEO Use Only

A - ORIGINATOR INSTRUCTIONS (Labeling, Accumulation, Disposition)

☐ Dispose as refuse in dumpster

☐ Discharge in sanitary sewer

☐ Recycle via Command HW Coordinator per Bangor Recycle Program Instruction

☒ Attach completed Originator Label and applicable Hazard Class Label(s) - Per Section B

Use Green HW Label for WIS #s that begin with 5, 6, 7, 8 Use BLUE Non-Hazardous Label for WIS #s that begin with 0, 1, 2, 3, 4

☒ Special Handling Instructions: Dispose/Recycle IAW approved EPP/Waste management plan.

B - LABEL INFORMATION

a. WIS #: 12200170 Hazard Class: N/A

b. Waste Name: USED OIL & GREASE ABSORBENTS FOR ENERGY RECOVERY (COMBUSTIBLE)

c. Required Labels: NON-HAZWASTE

C - NBK DISPOSITION

BEO Use Only

☒ Consolidate and dispose per WIS Profile
☐ Transport to IWTP. IWTP shall treat per WIS Profile
☐ Turn-in material to MTIS
☐ Recycles on base or transport to off-base recycler
☐ Special Handling Instructions:

D - BEO CERTIFICATION

10/14/2022

Signature PRB41 **Date**

For assistance call your Command HW Coordinator

Copy to: Originator, Command HW Coordinator

This WIS certification expires five years after the above signature date or when the waste described by the originator does not match the waste created.

WIS SIDE 2 - TO BE COMPLETED BY BEO

NAVBASEKITSAP 5090.3E

For Contractor Use Only

WASTE INFORMATION SPECIFICATION (WIS) FORM

Naval Base Kitsap (Select One)

☑ Bangor ☐ NAVHOSP ☐ Jackson Park ☐ Camp Wesley Harris

WIS #: B11500871

WIS TRACKING #: CTR RT0250

STATE TOOL #: CTR RT0250

SAMPLE #:

Designator's initials: BS

IEO Use Only

1. Engineering Technician:
Janice Horton, NAVFAC NW

2. Phone # and Email Address:
360.556.0621
janice.l.horton5.civ@us.navy.mil

3. Originator (name):
Mitch Baron

4. Phone # and Email Address:
360 908-3246
mitch.baron@tetratech.com

5. Company Name and Work Order #:
Tetra Tech
N62470-16-D-D9008, N4425519F4112

6. Name of Waste Produced (Use SDS name if applicable):
IDW - Wash water from sampling equipment cleaning

7. Total Waste Quantity:
(# of containers, size of containers, and frequency of generation)
1 each, 5 gal Bucket

8. Buildings and room numbers of points of generation:
NBK Bangor. Remote [redacted].

9. Hazardous Waste Accumulation Area ID #s

10. Waste Produced is:
☐ Process Waste ☐ Empty ☐ Pure Product
☑ One-time waste ☐ Expired/unused (Exp. Date:__________)

11. State of Waste Produced is:
☐ Solid ☐ Gas ☐ Aerosol
☑ Liquid ☐ Debris ☐ Other: __________

12. Re-submittal - Old Tracking #

13. Other notable characteristics

14. Potential Contaminants:
☐ Asbestos ☐ Metals ☐ Oil ☑ None
☐ PCBS ☐ Solvents ☐ Other: __________

15. A) Provide a detailed description on how the waste was produced and what process the waste was used in. B) Please note any other materials the waste could be contaminated with and any operating procedures that may impact the chemical composition. C) Please provide intended disposal facility info for each waste stream, or attach estimated waste table with this info. D) If the waste contains demolished building material, then please provide asbestos and lead test results or evidence that justifies not testing. E) Provide Safety Data Sheets (SDSs) for all materials that have an SDS.

One time surface soil sampling operation for presence of munitions constituents performed at two remote sites, 1) east of [redacted] Road and 2) west of [redacted] Road. Decon water generated during cleaning of sampling equipment. Equipment washed with dilute Alconox/water detergent and rinsed with deionized water. IDW water was sampled 11-8-2022 and results are pending. If necessary, Tetra Tech can arrange for off-site transport and disposal.

16. List all materials in the waste (must attach SDS)

	Material/Trade Name	SDS No.	NSN/Part No.	MFG w/ Phone #	% of waste by weight
1.)	Water				90-100
2.)	Soil				1-10
3.)	Alconox				0-1
4.)					

17. Certification: I certify that the above is accurate and true; and this waste has not been mixed with any other materials; will be controlled by me; and will be turned in for disposal as directed on side 2 of this WIS.

Mitch Baron Digitally signed by Mitch Baron
Date: 2022.11.09 09:54:59 -08'00'

11-9-2022

Originator's Signature **Date**

Return this form to your Engineering Technician

HW Coordinator Review and Concurrence: RT 11/21/2022
Initials Date
IEO Use Only

A - ORIGINATOR INSTRUCTIONS (Labeling, Accumulation, Disposition)

☐ Dispose as refuse in dumpster

☐ Discharge in sanitary sewer

☐ Recycle via Command HW Coordinator per Bangor Recycle Program Instruction

☒ Attach completed Originator Label and applicable Hazard Class Label(s) - Per Section B

Use Green HW Label for WIS #s that begin with 5, 6, 7, 8 Use BLUE Non-Hazardous Label for WIS #s that begin with 0, 1, 2, 3, 4

☒ Special Handling Instructions: Contact BOSC at 360-396-6918 to schedule a pickup. Dispose IAW approved EPP/waste management plan.

B - LABEL INFORMATION

a. WIS #: 11500871 Hazard Class: NA

b. Waste Name: WATER WITH POTENITAL LOW METALS

c. Required Labels: NON-HAZWASTE

C - NBK DISPOSITION

BEO Use Only

☐ Consolidate and dispose per WIS Profile
☒ Transport to IWTP. IWTP shall treat per WIS Profile
☐ Turn-in material to MTIS
☐ Recycles on base or transport to off-base recycler
☐ Special Handling Instructions: ______

D - BEO CERTIFICATION

Signature PRB41

12/13/2022
Date

For assistance call your Command HW Coordinator

Copy to: Originator, Command HW Coordinator

This WIS certification expires five years after the above signature date or when the waste described by the originator does not match the waste created.

WIS SIDE 2 - TO BE COMPLETED BY BEO

NAVBASEKITSAP 5090.3E

Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Mitch Baron
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, Washington 98011

Generated 12/5/2022 5:54:48 PM

JOB DESCRIPTION

NB Kitsap Bangor CTO NW194112, WA

JOB NUMBER

280-168924-1

Eurofins Denver
4955 Yarrow Street
Arvada CO 80002

See page two for job notes and contact information.

Job Notes

The test results in this report relate only to the samples in this report and meet all requirements of NELAC, with any exceptions noted. Pursuant to NELAP, this report shall not be reproduced except in full, without the written approval of the laboratory. All questions regarding this report should be directed to the Eurofins TestAmerica Denver Project Manager.

The Lab Certification ID# is 4025.

Reporting limits are adjusted for sample size used, dilutions and moisture content if applicable.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins TestAmerica Project Manager.

Authorization

Generated
12/5/2022 5:54:48 PM

Authorized for release by
Michael Norton, Project Manager I
Michael.Norton@et.eurofinsus.com
Designee for
Shelby Turner, Project Manager I
Shelby.Turner@et.eurofinsus.com
(303)736-0100

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Definitions/Glossary

Client: Tetra Tech, Inc.
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Job ID: 280-168924-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
Q	One or more quality control criteria failed.
U	Undetected at the Limit of Detection.

GC/MS Semi VOA

Qualifier	Qualifier Description
M	Manual integrated compound.
Q	One or more quality control criteria failed.
U	Undetected at the Limit of Detection.

GC Semi VOA

Qualifier	Qualifier Description
M	Manual integrated compound.
U	Undetected at the Limit of Detection.

LCMS

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

Metals

Qualifier	Qualifier Description
J	Estimated: The analyte was positively identified; the quantitation is an estimation
U	Undetected at the Limit of Detection.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
U	Undetected at the Limit of Detection.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 280-168924-1

Laboratory: Eurofins Denver

Narrative

CASE NARRATIVE

Client: Tetra Tech, Inc.

Project: NB Kitsap Bangor CTO NW194112, WA

Report Number: 280-168924-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 11/9/2022 1:25 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 2.9º C and 4.4º C.

TCLP ORGANOCHLORINE PESTICIDES (GC)

Sample WW-11082201 (280-168924-1) was analyzed for TCLP Organochlorine Pesticides (GC) in accordance with SW 846 1311/8081B. The samples were leached on 11/16/2022, prepared on 11/18/2022 and analyzed on 11/29/2022.

The continuing calibration verification (CCV) associated with batch 280-594771 recovered above the upper control limit for Heptachlor and Methoxychlor on the primary column. The confirmation column recovered in control, therefore the confirmation column result has been reported. The associated samples are impacted: WW-11082201 (280-168924-1) and (CCV 280-594771/25).

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

HERBICIDES BY LC/MS

Sample WW-11082201 (280-168924-1) was analyzed for herbicides by LC/MS in accordance with SW846 8321A. The samples were leached on 11/16/2022 and analyzed on 11/19/2022.

Internal standard (ISTD) response for 13C6-Pentachlorophenol(IS) for the following sample in analytical batch 280-594103 was outside acceptance criteria: WW-11082201 (280-168924-1). This ISTD does not correspond to any of the requested target compounds reported from this analytical batch; therefore, the data have been reported.

A matrix spike/matrix spike duplicate (MS/MSD) was not performed associated with preparation batch 280-593784 and analytical batch 280-594103 due to sample matrix. Sample was cloudy. The following sample is impacted: WW-11082201 (280-168924-1).

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP METALS (ICP)

Sample WW-11082201 (280-168924-1) was analyzed for TCLP Metals (ICP) in accordance with SW 846 1311/6010D. The samples were leached on 11/16/2022, prepared on 11/18/2022 and analyzed on 11/23/2022.

Barium was detected in method blank LB3 280-593784/1-B at a level that was above the method detection limit but below the reporting

Job ID: 280-168924-1 (Continued)

Laboratory: Eurofins Denver (Continued)

limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Chromium failed the recovery criteria high for the MS of sample 280-169154-1 in batch 280-594548. Chromium failed the recovery criteria high for the MSD of sample 280-169154-1 in batch 280-594548.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP MERCURY

Sample WW-11082201 (280-168924-1) was analyzed for TCLP mercury in accordance with SW-846 1311/7470. The samples were leached on 11/16/2022, prepared on 11/29/2022 and analyzed on 11/30/2022.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP VOLATILE ORGANIC COMPOUNDS

Sample WW-11082201 (280-168924-1) was analyzed for TCLP volatile organic compounds in accordance with SW-846 1311/8260D. The samples were leached on 11/22/2022 and analyzed on 11/27/2022.

2-Butanone (MEK) failed the recovery criteria high for LCS 280-594498/2-A. 2-Butanone (MEK) failed the recovery criteria high for LCSD 280-594498/3-A.

1,1-Dichloroethene failed the recovery criteria low for the MS/MDS of sample 140-29542-1 in batch 280-594681. 1,1-Dichloroethene exceeded the RPD limit.

The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 280-594333 and 280-594498 and analytical batch 280-594681 were outside control limits for one or more analytes. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

The matrix spike / matrix spike duplicate / sample duplicate (MS/MSD/DUP) precision for preparation batch 280-594333 and 280-594498 and analytical batch 280-594681 was outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample / laboratory control sample duplicate (LCS/LCSD) precision was within acceptance limits.

The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 280-594498 and analytical batch 280-594681 recovered outside control limits for the following analyte: 2-Butanone. The analyte was biased high in the LCS and was not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TCLP SEMI VOLATILE ORGANIC COMPOUNDS

Sample WW-11082201 (280-168924-1) was analyzed for TCLP semi volatile organic compounds in accordance with SW-846 1311/8270E. The samples were leached on 11/16/2022, prepared on 11/18/2022 and analyzed on 11/21/2022.

The continuing calibration verification (CCV) associated with batch 280-594208 recovered above the upper control limit for Pentachlorophenol. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: WW-11082201 (280-168924-1) and (CCV 280-594208/3).

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

IGNITABILITY

Sample WW-11082201 (280-168924-1) was analyzed for ignitability in accordance with EPA SW-846 Method 1010. The samples were analyzed on 11/14/2022.

Job ID: 280-168924-1 (Continued)

Laboratory: Eurofins Denver (Continued)

Sample WW-11082201 (280-168924-1) is not associated with a duplicate as none of the samples in the batch had a detectable flashpoint.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CYANIDE, TOTAL AND/OR AMENABLE

Sample WW-11082201 (280-168924-1) was analyzed for Cyanide, Total and/or Amenable in accordance with 9012B. The samples were analyzed on 11/18/2022.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SULFIDE

Sample WW-11082201 (280-168924-1) was analyzed for sulfide in accordance with EPA SW-846 Method 9034. The samples were prepared and analyzed on 11/11/2022.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

CORROSIVITY (PH)

Sample WW-11082201 (280-168924-1) was analyzed for Corrosivity (pH) in accordance with EPA SW-846 9040C. The samples were analyzed on 11/14/2022.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Tetra Tech, Inc.
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Job ID: 280-168924-1

Client Sample ID: WW-11082201

Lab Sample ID: 280-168924-1

Analyte	Result	Qualifier	LOQ	DL	Unit	Dil Fac	D	Method	Prep Type
Chloroform	0.019		0.010	0.0036	mg/L	1		8260D	TCLP
Barium	0.013	J	0.20	0.00082	mg/L	1		6010D	TCLP
Cadmium	0.00071	J	0.020	0.00013	mg/L	1		6010D	TCLP
Chromium	0.0019	J	0.10	0.00066	mg/L	1		6010D	TCLP
Lead	0.0028	J	0.10	0.0028	mg/L	1		6010D	TCLP
Flashpoint	>160		1.00	1.00	Degrees F	1		1010A	Total/NA
pH adj. to 25 deg C	7.6	HF	0.1	0.1	SU	1		9040C	Total/NA
Temperature	21.8	HF	1.0	1.0	Degrees C	1		9040C	Total/NA

This Detection Summary does not include radiochemical test results.

Method Summary

Client: Tetra Tech, Inc.
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Job ID: 280-168924-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds (GC/MS)	SW846	EET DEN
8270E	Semivolatile Organic Compounds (GC/MS)	SW846	EET DEN
8081B	Organochlorine Pesticides (GC)	SW846	EET DEN
8321A Herb	Herbicides (LC/MS)	SW846	EET DEN
6010D	Metals (ICP)	SW846	EET DEN
7470A	Mercury (CVAA)	SW846	EET DEN
1010A	Ignitability, Pensky-Martens Closed-Cup Method	SW846	EET DEN
9012B	Cyanide, Total and/or Amenable	SW846	EET DEN
9034	Sulfide, Acid Soluble and Insoluble (Titrimetric)	SW846	EET DEN
9040C	pH	SW846	EET DEN
1311	TCLP Extraction	SW846	EET DEN
3010A	Preparation, Total Metals	SW846	EET DEN
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	EET DEN
5030C	Purge and Trap	SW846	EET DEN
7470A	Preparation, Mercury	SW846	EET DEN
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	SW846	EET DEN

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET DEN = Eurofins Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Sample Summary

Client: Tetra Tech, Inc.
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Job ID: 280-168924-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-168924-1	WW-11082201	Water	11/08/22 11:00	11/09/22 13:25

Client Sample Results

Method: SW846 8260D - Volatile Organic Compounds (GC/MS) - TCLP

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25

Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.0080	U	0.010	0.0031	mg/L			11/27/22 17:50	1
2-Butanone (MEK)	0.12	U Q	0.15	0.060	mg/L			11/27/22 17:50	1
Carbon tetrachloride	0.0080	U	0.010	0.0057	mg/L			11/27/22 17:50	1
Chlorobenzene	0.0080	U	0.010	0.0042	mg/L			11/27/22 17:50	1
Chloroform	**0.019**		0.010	0.0036	mg/L			11/27/22 17:50	1
1,2-Dichloroethane	0.0080	U	0.010	0.0054	mg/L			11/27/22 17:50	1
1,1-Dichloroethene	0.0080	U	0.010	0.0023	mg/L			11/27/22 17:50	1
Tetrachloroethene	0.0080	U	0.010	0.0040	mg/L			11/27/22 17:50	1
Trichloroethene	0.0040	U	0.010	0.0030	mg/L			11/27/22 17:50	1
Vinyl chloride	0.010	U	0.020	0.0051	mg/L			11/27/22 17:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*64 - 129*		*11/27/22 17:50*	*1*
Toluene-d8 (Surr)	*96*		*78 - 120*		*11/27/22 17:50*	*1*
4-Bromofluorobenzene (Surr)	*96*		*78 - 121*		*11/27/22 17:50*	*1*
Dibromofluoromethane (Surr)	*98*		*79 - 119*		*11/27/22 17:50*	*1*

Method: SW846 8270E - Semivolatile Organic Compounds (GC/MS) - TCLP

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25

Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylphenol	40	U M	50	4.9	ug/L		11/18/22 12:11	11/21/22 18:38	1
3 & 4 Methylphenol	40	U M	50	1.3	ug/L		11/18/22 12:11	11/21/22 18:38	1
1,4-Dichlorobenzene	16	U	20	6.4	ug/L		11/18/22 12:11	11/21/22 18:38	1
2,4-Dinitrotoluene	40	U	50	8.3	ug/L		11/18/22 12:11	11/21/22 18:38	1
Hexachlorobenzene	40	U	50	3.3	ug/L		11/18/22 12:11	11/21/22 18:38	1
Hexachlorobutadiene	40	U	50	17	ug/L		11/18/22 12:11	11/21/22 18:38	1
Hexachloroethane	40	U M	50	4.9	ug/L		11/18/22 12:11	11/21/22 18:38	1
Nitrobenzene	40	U	50	4.1	ug/L		11/18/22 12:11	11/21/22 18:38	1
Pentachlorophenol	200	U Q M	250	100	ug/L		11/18/22 12:11	11/21/22 18:38	1
Pyridine	22	U	100	8.5	ug/L		11/18/22 12:11	11/21/22 18:38	1
2,4,5-Trichlorophenol	40	U M	50	10	ug/L		11/18/22 12:11	11/21/22 18:38	1
2,4,6-Trichlorophenol	40	U M	50	2.8	ug/L		11/18/22 12:11	11/21/22 18:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*68*		*49 - 120*	*11/18/22 12:11*	*11/21/22 18:38*	*1*
2-Fluorophenol (Surr)	*60*		*50 - 120*	*11/18/22 12:11*	*11/21/22 18:38*	*1*
2,4,6-Tribromophenol (Surr)	*78*		*51 - 120*	*11/18/22 12:11*	*11/21/22 18:38*	*1*
Nitrobenzene-d5 (Surr)	*70*		*51 - 120*	*11/18/22 12:11*	*11/21/22 18:38*	*1*
Phenol-d5 (Surr)	*59*		*47 - 120*	*11/18/22 12:11*	*11/21/22 18:38*	*1*
Terphenyl-d14 (Surr)	*80*		*56 - 120*	*11/18/22 12:11*	*11/21/22 18:38*	*1*

Method: SW846 8081B - Organochlorine Pesticides (GC) - TCLP

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25

Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Endrin	0.00020	U	0.00050	0.000079	mg/L		11/18/22 12:09	11/29/22 03:51	1

Client Sample Results

Method: SW846 8081B - Organochlorine Pesticides (GC) - TCLP (Continued)

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25
Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Heptachlor	0.00020	U	0.00050	0.000077	mg/L		11/18/22 12:09	11/29/22 03:51	1
Heptachlor epoxide	0.00020	U	0.00050	0.000075	mg/L		11/18/22 12:09	11/29/22 03:51	1
gamma-BHC (Lindane)	0.00020	U	0.00050	0.000069	mg/L		11/18/22 12:09	11/29/22 03:51	1
Methoxychlor	0.00050	U	0.0010	0.00013	mg/L		11/18/22 12:09	11/29/22 03:51	1
Toxaphene	0.0075	U	0.020	0.0037	mg/L		11/18/22 12:09	11/29/22 03:51	1
Chlordane (technical)	0.0040	U	0.0050	0.0014	mg/L		11/18/22 12:09	11/29/22 03:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*92*		*28 - 115*	*11/18/22 12:09*	*11/29/22 03:51*	*1*
DCB Decachlorobiphenyl	*86*		*34 - 122*	*11/18/22 12:09*	*11/29/22 03:51*	*1*

Method: SW846 8321A Herb - Herbicides (LC/MS) - TCLP

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25
Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	4.0	U	5.0	1.6	ug/L			11/19/22 00:05	1
Silvex (2,4,5-TP)	2.0	U	5.0	0.97	ug/L			11/19/22 00:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCAA	*103*		*25 - 125*		*11/19/22 00:05*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25
Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.015	U	0.10	0.0044	mg/L		11/18/22 21:51	11/23/22 05:35	1
Barium	**0.013**	**J**	0.20	0.00082	mg/L		11/18/22 21:51	11/23/22 05:35	1
Cadmium	**0.00071**	**J**	0.020	0.00013	mg/L		11/18/22 21:51	11/23/22 05:35	1
Chromium	**0.0019**	**J**	0.10	0.00066	mg/L		11/18/22 21:51	11/23/22 05:35	1
Lead	**0.0028**	**J**	0.10	0.0028	mg/L		11/18/22 21:51	11/23/22 05:35	1
Selenium	0.019	U	0.020	0.0064	mg/L		11/18/22 21:51	11/23/22 05:35	1
Silver	0.0050	U	0.10	0.0020	mg/L		11/18/22 21:51	11/23/22 05:35	1

Method: SW846 7470A - Mercury (CVAA) - TCLP

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25
Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000080	U	0.0020	0.000060	mg/L		11/29/22 18:10	11/30/22 16:51	1

General Chemistry

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25
Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Flashpoint (SW846 1010A)	**>160**		1.00	1.00	Degrees F			11/14/22 16:21	1

Client Sample Results

Client: Tetra Tech, Inc.
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Job ID: 280-168924-1

General Chemistry (Continued)

Client Sample ID: WW-11082201
Date Collected: 11/08/22 11:00
Date Received: 11/09/22 13:25

Lab Sample ID: 280-168924-1
Matrix: Water

Analyte	Result	Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total (SW846 9012B)	0.0090	U	0.010	0.0050	mg/L			11/18/22 13:19	1
Sulfide (SW846 9034)	2.0	U	4.0	1.6	mg/L		11/11/22 13:39	11/11/22 13:45	1
pH adj. to 25 deg C (SW846 9040C)	**7.6**	**HF**	0.1	0.1	SU			11/14/22 16:04	1
Temperature (SW846 9040C)	**21.8**	**HF**	1.0	1.0	Degrees C			11/14/22 16:04	1

Surrogate Summary

Method: 8260D - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: TCLP

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (64-129)	TOL (78-120)	BFB (78-121)	DBFM (79-119)
280-168924-1	WW-11082201	107	96	96	98
LB3 280-594498/1-A	Method Blank	110	98	97	99
LCS 280-594498/2-A	Lab Control Sample	104	99	100	93
LCSD 280-594498/3-A	Lab Control Sample Dup	103	96	101	94

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270E - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: TCLP

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	FBP (49-120)	2FP (50-120)	TBP (51-120)	NBZ (51-120)	PHL (47-120)	TPHL (56-120)
280-168924-1	WW-11082201	68	60	78	70	59	80
280-168924-1 MS	WW-11082201	72	66	82	74	64	89
280-168924-1 MSD	WW-11082201	63	63	76	68	57	84
LB3 280-593784/1-D	Method Blank	71	64	76	78	63	91
LCS 280-593784/2-D	Lab Control Sample	78	70	83	78	64	84

Surrogate Legend

FBP = 2-Fluorobiphenyl
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Water

Prep Type: TCLP

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TCX1 (28-115)	DCBP1 (34-122)
280-168924-1	WW-11082201	92	86
280-168924-1 MS	WW-11082201	84	87
280-168924-1 MS	WW-11082201	88	90
280-168924-1 MSD	WW-11082201	89	97
280-168924-1 MSD	WW-11082201	83	84
LB3 280-593784/1-C	Method Blank	78	93
LCS 280-593784/2-C	Lab Control Sample	83	97
LCS 280-593784/4-B	Lab Control Sample	83	95

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCBP = DCB Decachlorobiphenyl

Surrogate Summary

Method: 8321A Herb - Herbicides (LC/MS)

Matrix: Water **Prep Type: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	DCPAA (25-125)
280-168924-1	WW-11082201	103
LB3 280-593784/1-A	Method Blank	114
LCS 280-593784/2-A	Lab Control Sample	105
LCSD 280-593784/3-A	Lab Control Sample Dup	110

Surrogate Legend

DCPAA = DCAA

QC Sample Results

Client: Tetra Tech, Inc. Job ID: 280-168924-1
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Method: 8260D - Volatile Organic Compounds (GC/MS)

Lab Sample ID: LB3 280-594498/1-A **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 595275

Analyte	LB3 Result	LB3 Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.0080	U	0.010	0.0031	mg/L			12/01/22 14:48	1
2-Butanone (MEK)	0.12	U	0.15	0.060	mg/L			12/01/22 14:48	1
Carbon tetrachloride	0.0080	U	0.010	0.0057	mg/L			12/01/22 14:48	1
Chlorobenzene	0.0080	U	0.010	0.0042	mg/L			12/01/22 14:48	1
Chloroform	0.0080	U	0.010	0.0036	mg/L			12/01/22 14:48	1
1,2-Dichloroethane	0.0080	U	0.010	0.0054	mg/L			12/01/22 14:48	1
1,1-Dichloroethene	0.0080	U	0.010	0.0023	mg/L			12/01/22 14:48	1
Tetrachloroethene	0.0080	U	0.010	0.0040	mg/L			12/01/22 14:48	1
Trichloroethene	0.0040	U	0.010	0.0030	mg/L			12/01/22 14:48	1
Vinyl chloride	0.010	U	0.020	0.0051	mg/L			12/01/22 14:48	1

Surrogate	*LB3 %Recovery*	*LB3 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*64 - 129*		*12/01/22 14:48*	*1*
Toluene-d8 (Surr)	*98*		*78 - 120*		*12/01/22 14:48*	*1*
4-Bromofluorobenzene (Surr)	*97*		*78 - 121*		*12/01/22 14:48*	*1*
Dibromofluoromethane (Surr)	*99*		*79 - 119*		*12/01/22 14:48*	*1*

Lab Sample ID: LCS 280-594498/2-A **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 595275

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Benzene			0.250	0.269		mg/L		108	74 - 135		
2-Butanone (MEK)			1.00	1.69	Q	mg/L		169	44 - 150		
Carbon tetrachloride			0.250	0.281		mg/L		113	67 - 135		
Chlorobenzene			0.250	0.271		mg/L		108	76 - 135		
Chloroform			0.250	0.255		mg/L		102	76 - 120		
1,2-Dichloroethane			0.250	0.304		mg/L		121	70 - 135		
1,1-Dichloroethene			0.250	0.247		mg/L		99	71 - 136		
Tetrachloroethene			0.250	0.274		mg/L		110	70 - 135		
Trichloroethene			0.250	0.261		mg/L		105	73 - 135		
Vinyl chloride			0.250	0.224		mg/L		89	40 - 144		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*104*		*64 - 129*
Toluene-d8 (Surr)	*99*		*78 - 120*
4-Bromofluorobenzene (Surr)	*100*		*78 - 121*
Dibromofluoromethane (Surr)	*93*		*79 - 119*

Lab Sample ID: LCSD 280-594498/3-A **Client Sample ID: Lab Control Sample Dup**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 595275

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene			0.250	0.268		mg/L		107	74 - 135	1	20
2-Butanone (MEK)			1.00	1.57	Q	mg/L		157	44 - 150	7	32
Carbon tetrachloride			0.250	0.283		mg/L		113	67 - 135	1	21
Chlorobenzene			0.250	0.261		mg/L		104	76 - 135	4	20

QC Sample Results

Client: Tetra Tech, Inc. Job ID: 280-168924-1
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Method: 8260D - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 280-594498/3-A **Client Sample ID: Lab Control Sample Dup**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 595275

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloroform	0.250	0.262		mg/L		105	76 - 120	3	20
1,2-Dichloroethane	0.250	0.296		mg/L		119	70 - 135	2	20
1,1-Dichloroethene	0.250	0.269		mg/L		108	71 - 136	9	20
Tetrachloroethene	0.250	0.268		mg/L		107	70 - 135	2	20
Trichloroethene	0.250	0.271		mg/L		108	73 - 135	4	20
Vinyl chloride	0.250	0.218		mg/L		87	40 - 144	2	24

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*64 - 129*
Toluene-d8 (Surr)	*96*		*78 - 120*
4-Bromofluorobenzene (Surr)	*101*		*78 - 121*
Dibromofluoromethane (Surr)	*94*		*79 - 119*

Method: 8270E - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: LB3 280-593784/1-D **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 594208 **Prep Batch: 594039**

Analyte	LB3 Result	LB3 Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylphenol	40	U	50	4.9	ug/L		11/18/22 12:11	11/21/22 17:54	1
3 & 4 Methylphenol	40	U	50	1.3	ug/L		11/18/22 12:11	11/21/22 17:54	1
1,4-Dichlorobenzene	16	U	20	6.4	ug/L		11/18/22 12:11	11/21/22 17:54	1
2,4-Dinitrotoluene	40	U	50	8.3	ug/L		11/18/22 12:11	11/21/22 17:54	1
Hexachlorobenzene	40	U	50	3.3	ug/L		11/18/22 12:11	11/21/22 17:54	1
Hexachlorobutadiene	40	U	50	17	ug/L		11/18/22 12:11	11/21/22 17:54	1
Hexachloroethane	40	U	50	4.9	ug/L		11/18/22 12:11	11/21/22 17:54	1
Nitrobenzene	40	U	50	4.1	ug/L		11/18/22 12:11	11/21/22 17:54	1
Pentachlorophenol	200	U	250	100	ug/L		11/18/22 12:11	11/21/22 17:54	1
Pyridine	22	U	100	8.5	ug/L		11/18/22 12:11	11/21/22 17:54	1
2,4,5-Trichlorophenol	40	U	50	10	ug/L		11/18/22 12:11	11/21/22 17:54	1
2,4,6-Trichlorophenol	40	U	50	2.8	ug/L		11/18/22 12:11	11/21/22 17:54	1

Surrogate	*LB3 %Recovery*	*LB3 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl	*71*		*49 - 120*	*11/18/22 12:11*	*11/21/22 17:54*	*1*
2-Fluorophenol (Surr)	*64*		*50 - 120*	*11/18/22 12:11*	*11/21/22 17:54*	*1*
2,4,6-Tribromophenol (Surr)	*76*		*51 - 120*	*11/18/22 12:11*	*11/21/22 17:54*	*1*
Nitrobenzene-d5 (Surr)	*78*		*51 - 120*	*11/18/22 12:11*	*11/21/22 17:54*	*1*
Phenol-d5 (Surr)	*63*		*47 - 120*	*11/18/22 12:11*	*11/21/22 17:54*	*1*
Terphenyl-d14 (Surr)	*91*		*56 - 120*	*11/18/22 12:11*	*11/21/22 17:54*	*1*

Lab Sample ID: LCS 280-593784/2-D **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 594208 **Prep Batch: 594039**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
2-Methylphenol	200	172		ug/L		86	30 - 117
3 & 4 Methylphenol	400	336		ug/L		84	29 - 110

Method: 8270E - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 280-593784/2-D
Matrix: Water
Analysis Batch: 594208

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 594039

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,4-Dichlorobenzene	200	149		ug/L		75	29 - 112
2,4-Dinitrotoluene	200	161		ug/L		81	57 - 128
Hexachlorobenzene	200	168		ug/L		84	53 - 125
Hexachlorobutadiene	200	148		ug/L		74	22 - 124
Hexachloroethane	200	153		ug/L		77	21 - 115
Nitrobenzene	200	164		ug/L		82	45 - 121
Pentachlorophenol	400	355		ug/L		89	35 - 138
Pyridine	200	135		ug/L		68	10 - 121
2,4,5-Trichlorophenol	200	171		ug/L		86	53 - 123
2,4,6-Trichlorophenol	200	174		ug/L		87	50 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl	*78*		*49 - 120*
2-Fluorophenol (Surr)	*70*		*50 - 120*
2,4,6-Tribromophenol (Surr)	*83*		*51 - 120*
Nitrobenzene-d5 (Surr)	*78*		*51 - 120*
Phenol-d5 (Surr)	*64*		*47 - 120*
Terphenyl-d14 (Surr)	*84*		*56 - 120*

Lab Sample ID: 280-168924-1 MS
Matrix: Water
Analysis Batch: 594208

Client Sample ID: WW-11082201
Prep Type: TCLP
Prep Batch: 594039

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
2-Methylphenol	40	U M	200	173		ug/L		86	30 - 117
3 & 4 Methylphenol	40	U M	400	343		ug/L		86	29 - 110
1,4-Dichlorobenzene	16	U	200	142		ug/L		71	29 - 112
2,4-Dinitrotoluene	40	U	200	168		ug/L		84	57 - 128
Hexachlorobenzene	40	U	200	168		ug/L		84	53 - 125
Hexachlorobutadiene	40	U	200	127		ug/L		63	22 - 124
Hexachloroethane	40	U M	200	142		ug/L		71	21 - 115
Nitrobenzene	40	U	200	152		ug/L		76	45 - 121
Pentachlorophenol	200	U Q M	400	422		ug/L		105	35 - 138
Pyridine	22	U	200	226		ug/L		113	10 - 121
2,4,5-Trichlorophenol	40	U M	200	186		ug/L		93	53 - 123
2,4,6-Trichlorophenol	40	U M	200	170		ug/L		85	50 - 125

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
2-Fluorobiphenyl	*72*		*49 - 120*
2-Fluorophenol (Surr)	*66*		*50 - 120*
2,4,6-Tribromophenol (Surr)	*82*		*51 - 120*
Nitrobenzene-d5 (Surr)	*74*		*51 - 120*
Phenol-d5 (Surr)	*64*		*47 - 120*
Terphenyl-d14 (Surr)	*89*		*56 - 120*

Method: 8270E - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 280-168924-1 MSD
Matrix: Water
Analysis Batch: 594208

Client Sample ID: WW-11082201
Prep Type: TCLP
Prep Batch: 594039

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
2-Methylphenol	40	U M	200	144		ug/L		72	30 - 117	18	30
3 & 4 Methylphenol	40	U M	400	305		ug/L		76	29 - 110	12	30
1,4-Dichlorobenzene	16	U	200	125		ug/L		63	29 - 112	12	30
2,4-Dinitrotoluene	40	U	200	143		ug/L		71	57 - 128	17	30
Hexachlorobenzene	40	U	200	155		ug/L		77	53 - 125	8	30
Hexachlorobutadiene	40	U	200	123		ug/L		61	22 - 124	3	30
Hexachloroethane	40	U M	200	129		ug/L		64	21 - 115	10	30
Nitrobenzene	40	U	200	135		ug/L		67	45 - 121	12	30
Pentachlorophenol	200	U Q M	400	354		ug/L		89	35 - 138	17	30
Pyridine	22	U	200	184		ug/L		92	10 - 121	20	30
2,4,5-Trichlorophenol	40	U M	200	138		ug/L		69	53 - 123	30	30
2,4,6-Trichlorophenol	40	U M	200	144		ug/L		72	50 - 125	17	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-Fluorobiphenyl	*63*		*49 - 120*
2-Fluorophenol (Surr)	*63*		*50 - 120*
2,4,6-Tribromophenol (Surr)	*76*		*51 - 120*
Nitrobenzene-d5 (Surr)	*68*		*51 - 120*
Phenol-d5 (Surr)	*57*		*47 - 120*
Terphenyl-d14 (Surr)	*84*		*56 - 120*

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: LB3 280-593784/1-C
Matrix: Water
Analysis Batch: 594771

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 594036

Analyte	LB3 Result	LB3 Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Endrin	0.00020	U	0.00050	0.000079	mg/L		11/18/22 12:09	11/29/22 02:59	1
Heptachlor	0.00020	U	0.00050	0.000077	mg/L		11/18/22 12:09	11/29/22 02:59	1
Heptachlor epoxide	0.00020	U	0.00050	0.000075	mg/L		11/18/22 12:09	11/29/22 02:59	1
gamma-BHC (Lindane)	0.00020	U	0.00050	0.000069	mg/L		11/18/22 12:09	11/29/22 02:59	1
Methoxychlor	0.00050	U	0.0010	0.00013	mg/L		11/18/22 12:09	11/29/22 02:59	1
Toxaphene	0.0075	U	0.020	0.0037	mg/L		11/18/22 12:09	11/29/22 02:59	1
Chlordane (technical)	0.0040	U	0.0050	0.0014	mg/L		11/18/22 12:09	11/29/22 02:59	1

Surrogate	*LB3 %Recovery*	*LB3 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Tetrachloro-m-xylene	*78*		*28 - 115*	*11/18/22 12:09*	*11/29/22 02:59*	*1*
DCB Decachlorobiphenyl	*93*		*34 - 122*	*11/18/22 12:09*	*11/29/22 02:59*	*1*

Lab Sample ID: LCS 280-593784/2-C
Matrix: Water
Analysis Batch: 594771

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 594036

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Endrin	0.00500	0.00494		mg/L		99	66 - 143
Heptachlor	0.00500	0.00495		mg/L		99	59 - 143
Heptachlor epoxide	0.00500	0.00530		mg/L		106	37 - 142

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 280-593784/2-C **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 594771 **Prep Batch: 594036**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
gamma-BHC (Lindane)			0.00500	0.00506		mg/L		101	68 - 142
Methoxychlor			0.00500	0.00513		mg/L		103	30 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*83*		*28 - 115*
DCB Decachlorobiphenyl	*97*		*34 - 122*

Lab Sample ID: LCS 280-593784/4-B **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 594771 **Prep Batch: 594036**

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Toxaphene			0.200	0.169	M	mg/L		85	63 - 142

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Tetrachloro-m-xylene	*83*		*28 - 115*
DCB Decachlorobiphenyl	*95*		*34 - 122*

Lab Sample ID: 280-168924-1 MS **Client Sample ID: WW-11082201**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 594771 **Prep Batch: 594036**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Endrin	0.00020	U	0.00500	0.00475		mg/L		95	66 - 143
Heptachlor	0.00020	U	0.00500	0.00488		mg/L		98	59 - 143
Heptachlor epoxide	0.00020	U	0.00500	0.00499		mg/L		100	37 - 142
gamma-BHC (Lindane)	0.00020	U	0.00500	0.00505		mg/L		101	68 - 142
Methoxychlor	0.00050	U	0.00500	0.00510		mg/L		102	30 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*84*		*28 - 115*
DCB Decachlorobiphenyl	*87*		*34 - 122*

Lab Sample ID: 280-168924-1 MS **Client Sample ID: WW-11082201**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 594771 **Prep Batch: 594036**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Toxaphene	0.0075	U	0.200	0.162	M	mg/L		81	63 - 142

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Tetrachloro-m-xylene	*88*		*28 - 115*
DCB Decachlorobiphenyl	*90*		*34 - 122*

QC Sample Results

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: 280-168924-1 MSD
Matrix: Water
Analysis Batch: 594771

Client Sample ID: WW-11082201
Prep Type: TCLP
Prep Batch: 594036

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Endrin	0.00020	U	0.00500	0.00520		mg/L		104	66 - 143	9	30
Heptachlor	0.00020	U	0.00500	0.00523		mg/L		105	59 - 143	7	30
Heptachlor epoxide	0.00020	U	0.00500	0.00541		mg/L		108	37 - 142	8	30
gamma-BHC (Lindane)	0.00020	U	0.00500	0.00541		mg/L		108	68 - 142	7	30
Methoxychlor	0.00050	U	0.00500	0.00540		mg/L		108	30 - 150	6	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*89*		*28 - 115*
DCB Decachlorobiphenyl	*97*		*34 - 122*

Lab Sample ID: 280-168924-1 MSD
Matrix: Water
Analysis Batch: 594771

Client Sample ID: WW-11082201
Prep Type: TCLP
Prep Batch: 594036

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Toxaphene	0.0075	U	0.200	0.160		mg/L		80	63 - 142	1	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Tetrachloro-m-xylene	*83*		*28 - 115*
DCB Decachlorobiphenyl	*84*		*34 - 122*

Method: 8321A Herb - Herbicides (LC/MS)

Lab Sample ID: LB3 280-593784/1-A
Matrix: Water
Analysis Batch: 594103

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	LB3 Result	LB3 Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	4.0	U	5.0	1.6	ug/L			11/18/22 23:47	1
Silvex (2,4,5-TP)	2.0	U	5.0	0.97	ug/L			11/18/22 23:47	1

Surrogate	*LB3 %Recovery*	*LB3 Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
DCAA	*114*		*25 - 125*		*11/18/22 23:47*	*1*

Lab Sample ID: LCS 280-593784/2-A
Matrix: Water
Analysis Batch: 594103

Client Sample ID: Lab Control Sample
Prep Type: TCLP

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
2,4-D	20.0	20.9		ug/L		104	70 - 130
Silvex (2,4,5-TP)	20.0	21.1		ug/L		106	70 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
DCAA	*105*		*25 - 125*

QC Sample Results

Method: 8321A Herb - Herbicides (LC/MS) (Continued)

Lab Sample ID: LCSD 280-593784/3-A
Client Sample ID: Lab Control Sample Dup
Matrix: Water
Prep Type: TCLP
Analysis Batch: 594103

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
2,4-D			20.0	21.7		ug/L		108	70 - 130	4	20
Silvex (2,4,5-TP)			20.0	21.5		ug/L		108	70 - 130	2	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
DCAA	*110*		*25 - 125*

Method: 6010D - Metals (ICP)

Lab Sample ID: LB3 280-593784/1-B
Client Sample ID: Method Blank
Matrix: Water
Prep Type: TCLP
Analysis Batch: 594548
Prep Batch: 593969

Analyte	LB3 Result	LB3 Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.015	U	0.10	0.0044	mg/L		11/18/22 21:51	11/23/22 05:27	1
Barium	0.000869	J	0.20	0.00082	mg/L		11/18/22 21:51	11/23/22 05:27	1
Cadmium	0.0014	U	0.020	0.00013	mg/L		11/18/22 21:51	11/23/22 05:27	1
Chromium	0.0026	U	0.10	0.00066	mg/L		11/18/22 21:51	11/23/22 05:27	1
Lead	0.0090	U	0.10	0.0028	mg/L		11/18/22 21:51	11/23/22 05:27	1
Selenium	0.019	U	0.020	0.0064	mg/L		11/18/22 21:51	11/23/22 05:27	1
Silver	0.0050	U	0.10	0.0020	mg/L		11/18/22 21:51	11/23/22 05:27	1

Lab Sample ID: LCS 280-593784/2-B
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: TCLP
Analysis Batch: 594548
Prep Batch: 593969

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic			1.00	1.06		mg/L		106	87 - 113		
Barium			1.00	1.06		mg/L		106	88 - 113		
Cadmium			1.00	1.03		mg/L		103	88 - 113		
Chromium			1.00	1.01		mg/L		101	90 - 113		
Lead			1.00	1.03		mg/L		103	86 - 113		
Selenium			1.00	1.01		mg/L		101	83 - 114		
Silver			0.0500	0.0526	J	mg/L		105	84 - 115		

Method: 7470A - Mercury (CVAA)

Lab Sample ID: LB3 280-593784/1-F
Client Sample ID: Method Blank
Matrix: Water
Prep Type: TCLP
Analysis Batch: 595214
Prep Batch: 594959

Analyte	LB3 Result	LB3 Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.000080	U	0.0020	0.000060	mg/L		11/29/22 18:10	11/30/22 16:46	1

Lab Sample ID: LCS 280-593784/2-F
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: TCLP
Analysis Batch: 595214
Prep Batch: 594959

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury			0.00500	0.00486		mg/L		97	82 - 119		

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 280-168924-1 MS **Client Sample ID: WW-11082201**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 595214 **Prep Batch: 594959**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Mercury	0.000080	U	0.00500	0.00487		mg/L		97	82 - 119		

Lab Sample ID: 280-168924-1 MSD **Client Sample ID: WW-11082201**
Matrix: Water **Prep Type: TCLP**
Analysis Batch: 595214 **Prep Batch: 594959**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.000080	U	0.00500	0.00490		mg/L		98	82 - 119	1	10

Method: 1010A - Ignitability, Pensky-Martens Closed-Cup Method

Lab Sample ID: MB 280-593417/11 **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 593417

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Flashpoint	>160.0		1.00	1.00	Degrees F			11/14/22 16:21	1

Lab Sample ID: MB 280-593417/2 **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 593417

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Flashpoint	>160.0		1.00	1.00	Degrees F			11/14/22 16:21	1

Lab Sample ID: LCS 280-593417/1 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 593417

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Flashpoint			90.0	95.00		Degrees F		106	98 - 114		

Lab Sample ID: LCSD 280-593417/10 **Client Sample ID: Lab Control Sample Dup**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 593417

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Flashpoint			90.0	93.40		Degrees F		104	98 - 114	2	10

Method: 9012B - Cyanide, Total and/or Amenable

Lab Sample ID: MB 280-594106/60 **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 594106

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	0.0090	U	0.010	0.0050	mg/L			11/18/22 12:40	1

Method: 9012B - Cyanide, Total and/or Amenable (Continued)

Lab Sample ID: HLCS 280-594106/54 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 594106

Analyte	Spike Added	HLCS Result	HLCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.350	0.357		mg/L		102	90 - 110

Lab Sample ID: LCS 280-594106/59 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 594106

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.100	0.0950		mg/L		95	83 - 116

Lab Sample ID: LLCS 280-594106/58 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 594106

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.100	0.106		mg/L		106	44 - 167

Method: 9034 - Sulfide, Acid Soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 280-593198/2-A **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 593199 **Prep Batch: 593198**

Analyte	MB Result	MB Qualifier	LOQ	DL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	2.0	U	4.0	1.6	mg/L		11/11/22 13:39	11/11/22 13:45	1

Lab Sample ID: LCS 280-593198/1-A **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 593199 **Prep Batch: 593198**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sulfide	19.3	18.4		mg/L		95	44 - 110

Method: 9040C - pH

Lab Sample ID: LCS 280-593471/27 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 593471

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
pH adj. to 25 deg C	7.00	7.1		SU		101	99 - 101

QC Association Summary

Client: Tetra Tech, Inc. Job ID: 280-168924-1
Project/Site: NB Kitsap Bangor CTO NW194112, WA

GC/MS VOA

Leach Batch: 594498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	1311	
LB3 280-594498/1-A	Method Blank	TCLP	Water	1311	
LCS 280-594498/2-A	Lab Control Sample	TCLP	Water	1311	
LCSD 280-594498/3-A	Lab Control Sample Dup	TCLP	Water	1311	

Analysis Batch: 594681

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	8260D	594498

Analysis Batch: 595275

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB3 280-594498/1-A	Method Blank	TCLP	Water	8260D	594498
LCS 280-594498/2-A	Lab Control Sample	TCLP	Water	8260D	594498
LCSD 280-594498/3-A	Lab Control Sample Dup	TCLP	Water	8260D	594498

GC/MS Semi VOA

Leach Batch: 593784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	1311	
LB3 280-593784/1-D	Method Blank	TCLP	Water	1311	
LCS 280-593784/2-D	Lab Control Sample	TCLP	Water	1311	
280-168924-1 MS	WW-11082201	TCLP	Water	1311	
280-168924-1 MSD	WW-11082201	TCLP	Water	1311	

Prep Batch: 594039

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	3510C	593784
LB3 280-593784/1-D	Method Blank	TCLP	Water	3510C	593784
LCS 280-593784/2-D	Lab Control Sample	TCLP	Water	3510C	593784
280-168924-1 MS	WW-11082201	TCLP	Water	3510C	593784
280-168924-1 MSD	WW-11082201	TCLP	Water	3510C	593784

Analysis Batch: 594208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	8270E	594039
LB3 280-593784/1-D	Method Blank	TCLP	Water	8270E	594039
LCS 280-593784/2-D	Lab Control Sample	TCLP	Water	8270E	594039
280-168924-1 MS	WW-11082201	TCLP	Water	8270E	594039
280-168924-1 MSD	WW-11082201	TCLP	Water	8270E	594039

GC Semi VOA

Leach Batch: 593784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	1311	
LB3 280-593784/1-C	Method Blank	TCLP	Water	1311	
LCS 280-593784/2-C	Lab Control Sample	TCLP	Water	1311	
LCS 280-593784/4-B	Lab Control Sample	TCLP	Water	1311	
280-168924-1 MS	WW-11082201	TCLP	Water	1311	
280-168924-1 MSD	WW-11082201	TCLP	Water	1311	

QC Association Summary

Client: Tetra Tech, Inc.
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Job ID: 280-168924-1

GC Semi VOA

Prep Batch: 594036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	3510C	593784
LB3 280-593784/1-C	Method Blank	TCLP	Water	3510C	593784
LCS 280-593784/2-C	Lab Control Sample	TCLP	Water	3510C	593784
LCS 280-593784/4-B	Lab Control Sample	TCLP	Water	3510C	593784
280-168924-1 MS	WW-11082201	TCLP	Water	3510C	593784
280-168924-1 MS	WW-11082201	TCLP	Water	3510C	593784
280-168924-1 MSD	WW-11082201	TCLP	Water	3510C	593784
280-168924-1 MSD	WW-11082201	TCLP	Water	3510C	593784

Analysis Batch: 594771

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	8081B	594036
LB3 280-593784/1-C	Method Blank	TCLP	Water	8081B	594036
LCS 280-593784/2-C	Lab Control Sample	TCLP	Water	8081B	594036
LCS 280-593784/4-B	Lab Control Sample	TCLP	Water	8081B	594036
280-168924-1 MS	WW-11082201	TCLP	Water	8081B	594036
280-168924-1 MS	WW-11082201	TCLP	Water	8081B	594036
280-168924-1 MSD	WW-11082201	TCLP	Water	8081B	594036
280-168924-1 MSD	WW-11082201	TCLP	Water	8081B	594036

LCMS

Leach Batch: 593784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	1311	
LB3 280-593784/1-A	Method Blank	TCLP	Water	1311	
LCS 280-593784/2-A	Lab Control Sample	TCLP	Water	1311	
LCSD 280-593784/3-A	Lab Control Sample Dup	TCLP	Water	1311	

Analysis Batch: 594103

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	8321A Herb	593784
LB3 280-593784/1-A	Method Blank	TCLP	Water	8321A Herb	593784
LCS 280-593784/2-A	Lab Control Sample	TCLP	Water	8321A Herb	593784
LCSD 280-593784/3-A	Lab Control Sample Dup	TCLP	Water	8321A Herb	593784

Metals

Leach Batch: 593784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	1311	
LB3 280-593784/1-B	Method Blank	TCLP	Water	1311	
LB3 280-593784/1-F	Method Blank	TCLP	Water	1311	
LCS 280-593784/2-B	Lab Control Sample	TCLP	Water	1311	
LCS 280-593784/2-F	Lab Control Sample	TCLP	Water	1311	
280-168924-1 MS	WW-11082201	TCLP	Water	1311	
280-168924-1 MSD	WW-11082201	TCLP	Water	1311	

Prep Batch: 593969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	3010A	593784
LB3 280-593784/1-B	Method Blank	TCLP	Water	3010A	593784

Metals (Continued)

Prep Batch: 593969 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 280-593784/2-B	Lab Control Sample	TCLP	Water	3010A	593784

Analysis Batch: 594548

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	6010D	593969
LB3 280-593784/1-B	Method Blank	TCLP	Water	6010D	593969
LCS 280-593784/2-B	Lab Control Sample	TCLP	Water	6010D	593969

Prep Batch: 594959

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	7470A	593784
LB3 280-593784/1-F	Method Blank	TCLP	Water	7470A	593784
LCS 280-593784/2-F	Lab Control Sample	TCLP	Water	7470A	593784
280-168924-1 MS	WW-11082201	TCLP	Water	7470A	593784
280-168924-1 MSD	WW-11082201	TCLP	Water	7470A	593784

Analysis Batch: 595214

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	TCLP	Water	7470A	594959
LB3 280-593784/1-F	Method Blank	TCLP	Water	7470A	594959
LCS 280-593784/2-F	Lab Control Sample	TCLP	Water	7470A	594959
280-168924-1 MS	WW-11082201	TCLP	Water	7470A	594959
280-168924-1 MSD	WW-11082201	TCLP	Water	7470A	594959

General Chemistry

Prep Batch: 593198

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	Total/NA	Water	9030B	
MB 280-593198/2-A	Method Blank	Total/NA	Water	9030B	
LCS 280-593198/1-A	Lab Control Sample	Total/NA	Water	9030B	

Analysis Batch: 593199

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	Total/NA	Water	9034	593198
MB 280-593198/2-A	Method Blank	Total/NA	Water	9034	593198
LCS 280-593198/1-A	Lab Control Sample	Total/NA	Water	9034	593198

Analysis Batch: 593417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	Total/NA	Water	1010A	
MB 280-593417/11	Method Blank	Total/NA	Water	1010A	
MB 280-593417/2	Method Blank	Total/NA	Water	1010A	
LCS 280-593417/1	Lab Control Sample	Total/NA	Water	1010A	
LCSD 280-593417/10	Lab Control Sample Dup	Total/NA	Water	1010A	

Analysis Batch: 593471

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	Total/NA	Water	9040C	
LCS 280-593471/27	Lab Control Sample	Total/NA	Water	9040C	

General Chemistry

Analysis Batch: 594106

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-168924-1	WW-11082201	Total/NA	Water	9012B	
MB 280-594106/60	Method Blank	Total/NA	Water	9012B	
HLCS 280-594106/54	Lab Control Sample	Total/NA	Water	9012B	
LCS 280-594106/59	Lab Control Sample	Total/NA	Water	9012B	
LLCS 280-594106/58	Lab Control Sample	Total/NA	Water	9012B	

Lab Chronicle

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Client Sample ID: WW-11082201
Lab Sample ID: 280-168924-1
Date Collected: 11/08/22 11:00
Matrix: Water
Date Received: 11/09/22 13:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			1.0 g	1.0 mL	594498	11/22/22 21:52	DFB1	EET DEN
TCLP	Analysis	8260D		1	0.5 mL	5 mL	594681	11/27/22 17:50	CKL	EET DEN
TCLP	Leach	1311			1.0 g	1.0 mL	593784	11/16/22 16:54	DFB1	EET DEN
TCLP	Prep	3510C			200 mL	1 mL	594039	11/18/22 12:11	KJZ	EET DEN
TCLP	Analysis	8270E		1	200 uL	200 uL	594208	11/21/22 18:38	NIT	EET DEN
TCLP	Leach	1311			1.0 g	1.0 mL	593784	11/16/22 16:54	DFB1	EET DEN
TCLP	Prep	3510C			100 mL	10 mL	594036	11/18/22 12:09	KJZ	EET DEN
TCLP	Analysis	8081B		1	1 mL	1 mL	594771	11/29/22 03:51	MKW	EET DEN
TCLP	Leach	1311			1.0 g	1.0 mL	593784	11/16/22 16:54	DFB1	EET DEN
TCLP	Analysis	8321A Herb		1	0.5 mL	1 mL	594103	11/19/22 00:05	JZ	EET DEN
TCLP	Leach	1311			1.0 g	1.0 mL	593784	11/16/22 16:54	DFB1	EET DEN
TCLP	Prep	3010A			50 mL	50 mL	593969	11/18/22 21:51	MCR	EET DEN
TCLP	Analysis	6010D		1			594548	11/23/22 05:35	KRP	EET DEN
TCLP	Leach	1311			1.0 g	1.0 mL	593784	11/16/22 16:54	DFB1	EET DEN
TCLP	Prep	7470A			30 mL	50 mL	594959	11/29/22 18:10	KMS	EET DEN
TCLP	Analysis	7470A		1			595214	11/30/22 16:51	KMS	EET DEN
Total/NA	Analysis	1010A		1			593417	11/14/22 16:21	ASP	EET DEN
Total/NA	Analysis	9012B		1	10 mL	10 mL	594106	11/18/22 13:19	MMP	EET DEN
Total/NA	Prep	9030B			50 mL	50 mL	593198	11/11/22 13:39	CAI	EET DEN
Total/NA	Analysis	9034		1			593199	11/11/22 13:45	CAI	EET DEN
Total/NA	Analysis	9040C		1			593471	11/14/22 16:04	KEG	EET DEN

Laboratory References:

EET DEN = Eurofins Denver, 4955 Yarrow Street, Arvada, CO 80002, TEL (303)736-0100

Accreditation/Certification Summary

Client: Tetra Tech, Inc. Job ID: 280-168924-1
Project/Site: NB Kitsap Bangor CTO NW194112, WA

Laboratory: Eurofins Denver

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	2907.01	10-31-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
9012B		Water	Cyanide, Total
9040C		Water	Temperature

Authority	Program	Identification Number	Expiration Date
Washington	State	C583-19	08-03-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8321A Herb		Water	2,4-D
8321A Herb		Water	Silvex (2,4,5-TP)
9012B		Water	Cyanide, Total
9040C		Water	pH adj. to 25 deg C
9040C		Water	Temperature

Eurofins Denver
4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Phone (303) 431-7171

Chain of Custody Record

eurofins Environment Testing America

Original

Client Information	Sampler: Mitch Baron	Lab PM: Turner, Shelby R	Carrier Tracking No(s):	COC No: 1054299
Client Contact: Mitch Baron	Phone: 360 908-3246	E-Mail: Shelby.Turner@et.eurofinsus.com	State of Origin:	Page: 1 of 1
Company: Tetra Tech, Inc.	PWSID:			Job #:

Address: 19803 North Creek Parkway
City: Bothell
State, Zip: WA, 98011
Phone: 412-600-8502(Tel)
Email: Mitch.Baron@tetratech.com
Project Name: NB Kitsap Bangor CTO NW194112, WA
Site:

Due Date Requested:
TAT Requested (days): standard
Compliance Project: Δ Yes Δ No
PO #: Purchase Order Requested
WO #:
Project #: 28023939
SSOW#:

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8330B_DOD5 - Explosives, Client list with 3,5-DNA, Picric & Diaminos	8321B_NGu - Nitroguanidine (LC/MS)	8270E_DOD5 - 2,4-Dinitrophenol, Diphenylamine, N-Nitrosodiphenylamine, Moisture		6010D_DOD5 - TCLP RCRA Metals, 7470A_DOD5 - TCLP Mercury	9012B_NP_DOD5 - Total Cyanide	8321A_Herb_DOD5 - TCLP Herbicides	1010A - Ignitability	9034 - Sulfide	8081B_DOD5 - TCLP Pesticides	9040C - pH / Corrosivity	8260D_DOD5 - TCLP VOCs	8270E_DOD5 - TCLP SVOCs	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N	N		N	B	N	N	CB	N	N	N	N		
WW-11082201	11-8-2022	1100	G	W	N	N					X	X	X	X	X	X	X	X	X	18	

M Baron 11-8-2022

280-168924 Chain of Custody

Preservation Codes:
A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)
Other:

Possible Hazard Identification
☒ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☒ *Disposal By Lab* ☐ *Archive For* ________ *Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Mitch Baron Mitch Baron Sealed in cooler	11-8-2022 1330	Tetra Tech		11/9/22 1315	ETA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 4.4 2.9 IR12 CF0.0

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Tetra Tech, Inc.

Job Number: 280-168924-1

Login Number: 168924

List Number: 1

Creator: Turner, Shelby R

List Source: Eurofins Denver

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), 29CFR1910/1200 and GHS Rev. 3

Effective date: 10.18.2017 **Revision**: 10.18.2017

Trade Name: Alconox

1 Identification of the substance/mixture and of the supplier

1.1 Product identifier

Trade Name: Alconox

Synonyms:

Product number: 1104-1, 1104, 1125, 1150, 1101, 1103, 1112-1, 1112

1.2 Application of the substance / the mixture : Cleaning material/Detergent

1.3 Details of the supplier of the Safety Data Sheet

Manufacturer	**Supplier**
Alconox, Inc. 30 Glenn Street White Plains, NY 10603 1-914-948-4040	

Emergency telephone number:

ChemTel Inc

North America: 1-800-255-3924

International: 01-813-248-0585

2 Hazards identification

2.1 Classification of the substance or mixture:

In compliance with EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments.

Hazard-determining components of labeling:

Tetrasodium Pyrophosphate
Sodium tripolyphosphate
Sodium Alkylbenzene Sulfonate

2.2 Label elements:

Skin irritation, category 2.
Eye irritation, category 2A.

Hazard pictograms:

Signal word: Warning

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Additional information: None.

Hazard description

Hazards Not Otherwise Classified (HNOC): None

Information concerning particular hazards for humans and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to EC regulation No. 1272/2008, 29CFR1910/1200 and GHS Rev. 3 and amendments, and extended by company and literature data. The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

3 Composition/information on ingredients

3.1 Chemical characterization : None

3.2 Description : None

3.3 Hazardous components (percentages by weight)

Identification	Chemical Name	Classification	Wt. %
CAS number: 7758-29-4	Sodium tripolyphosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	12-28
CAS number: 68081-81-2	Sodium Alkylbenzene Sulfonate	Acute Tox. 4; H303 Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	8-22
CAS number: 7722-88-5	Tetrasodium Pyrophosphate	Skin Irrit. 2 ; H315 Eye Irrit. 2; H319	2-16

3.4 Additional Information : None.

4 First aid measures

4.1 Description of first aid measures

General information: None.

After inhalation:

Maintain an unobstructed airway.
Loosen clothing as necessary and position individual in a comfortable position.

After skin contact:

Wash affected area with soap and water.
Seek medical attention if symptoms develop or persist.

After eye contact:

Rinse/flush exposed eye(s) gently using water for 15-20 minutes.
Remove contact lens(es) if able to do so during rinsing.
Seek medical attention if irritation persists or if concerned.

After swallowing:

Rinse mouth thoroughly.
Seek medical attention if irritation, discomfort, or vomiting persists.

4.2 Most important symptoms and effects, both acute and delayed

None

4.3 Indication of any immediate medical attention and special treatment needed:

No additional information.

5 Firefighting measures

5.1 Extinguishing media

Suitable extinguishing agents:

Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition.

For safety reasons unsuitable extinguishing agents : None

5.2 Special hazards arising from the substance or mixture :

Thermal decomposition can lead to release of irritating gases and vapors.

5.3 Advice for firefighters

Protective equipment:

Wear protective eye wear, gloves and clothing.
Refer to Section 8.

5.4 Additional information :

Avoid inhaling gases, fumes, dust, mist, vapor and aerosols.
Avoid contact with skin, eyes and clothing.

6 Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures :

Ensure adequate ventilation.
Ensure air handling systems are operational.

6.2 Environmental precautions :

Should not be released into the environment.
Prevent from reaching drains, sewer or waterway.

6.3 Methods and material for containment and cleaning up :

Wear protective eye wear, gloves and clothing.

6.4 Reference to other sections : None

7 Handling and storage

7.1 Precautions for safe handling :

Avoid breathing mist or vapor.
Do not eat, drink, smoke or use personal products when handling chemical substances.

7.2 Conditions for safe storage, including any incompatibilities :

Store in a cool, well-ventilated area.

7.3 Specific end use(s):

No additional information.

8 Exposure controls/personal protection

8.1 Control parameters :

a) 7722-88-5, Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3

b) Dusts, non-specific OEL, Irish Code of Practice

   (i) Total inhalable 10 mg/m3 (8hr)

   (ii) Respirible 4mg/m3 (8hr)

   (iii) Tetrasodium Pyrophosphate, OSHA TWA 5 mg/m3, (8hr)

8.2 Exposure controls

Appropriate engineering controls:

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Respiratory protection:

Not needed under normal use conditions.

Protection of skin:

Select glove material impermeable and resistant to the substance or preparation. Protective gloves recommended to comply with EN 374. Take note of break through times, permeability, and special workplace conditions, such as mechanical strain, duration of contact, etc. Protective gloves should be replaced at the first sign of wear.

Eye protection:

Safety goggles or glasses, or appropriate eye protection. Recommended to comply with ANSI Z87.1 and/or EN 166.

General hygienic measures:

Wash hands before breaks and at the end of work.

Avoid contact with skin, eyes and clothing.

9 Physical and chemical properties

Appearance (physical state, color):	White and cream colored flakes - powder	**Explosion limit lower**: **Explosion limit upper**:	Not determined or not available. Not determined or not available.
Odor:	Not determined or not available.	**Vapor pressure at 20°C**:	Not determined or not available.
Odor threshold:	Not determined or not available.	**Vapor density**:	Not determined or not available.
pH-value:	9.5 (aqueous solution)	**Relative density**:	Not determined or not available.
Melting/Freezing point:	Not determined or not available.	**Solubilities**:	Not determined or not available.
Boiling point/Boiling range:	Not determined or not available.	**Partition coefficient (n-octanol/water)**:	Not determined or not available.
Flash point (closed cup):	Not determined or not available.	**Auto/Self-ignition temperature**:	Not determined or not available.
Evaporation rate:	Not determined or not available.	**Decomposition**	Not determined or not available.

Flammability (solid, gaseous):	Not determined or not available.	**Viscosity**:	a. Kinematic: Not determined or not available. b. Dynamic: Not determined or not available.
Density at 20°C:	Not determined or not available.		

10 Stability and reactivity

10.1 Reactivity : None

10.2 Chemical stability : None

10.3 Possibility hazardous reactions : None

10.4 Conditions to avoid : None

10.5 Incompatible materials : None

10.6 Hazardous decomposition products : None

11 Toxicological information

11.1 Information on toxicological effects :

Acute Toxicity:

Oral:

: LD50 > 5000 mg/kg oral rat - Product .

Chronic Toxicity: No additional information.

Skin corrosion/irritation:

Sodium Alkylbenzene Sulfonate: Causes skin irritation. .

Serious eye damage/irritation:

Sodium Alkylbenzene Sulfonate: Causes serious eye irritation .

Tetrasodium Pyrophosphate: Rabbit - Risk of serious damage to eyes .

Respiratory or skin sensitization: No additional information.

Carcinogenicity: No additional information.

IARC (International Agency for Research on Cancer): None of the ingredients are listed.

NTP (National Toxicology Program): None of the ingredients are listed.

Germ cell mutagenicity: No additional information.

Reproductive toxicity: No additional information.

STOT-single and repeated exposure: No additional information.

Additional toxicological information: No additional information.

12 Ecological information

12.1 Toxicity:

Sodium Alkylbenzene Sulfonate: Fish, LC50 1.67 mg/l, 96 hours.
Sodium Alkylbenzene Sulfonate: Aquatic invertebrates, EC50 Daphnia 2.4 mg/l, 48 hours. Sodium Alkylbenzene Sulfonate: Aquatic Plants, EC50 Algae 29 mg/l, 96 hours.
Tetrasodium Pyrophosphate: Fish, LC50 - other fish - 1,380 mg/l - 96 h.
Tetrasodium Pyrophosphate: Aquatic invertebrates, EC50 - Daphnia magna (Water flea) - 391 mg/l - 48 h.

12.2 Persistence and degradability: No additional information.

12.3 Bioaccumulative potential: No additional information.

12.4 Mobility in soil: No additional information.

General notes: No additional information.

12.5 Results of PBT and vPvB assessment:

PBT: No additional information.

vPvB: No additional information.

12.6 Other adverse effects: No additional information.

13 Disposal considerations

13.1 Waste treatment methods (consult local, regional and national authorities for proper disposal)

Relevant Information:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities. (US 40CFR262.11).

14 Transport information

14.1 UN Number: ADR, ADN, DOT, IMDG, IATA	None
14.2 UN Proper shipping name: ADR, ADN, DOT, IMDG, IATA	None
14.3 Transport hazard classes: ADR, ADN, DOT, IMDG, IATA	
Class:	None
Label:	None
LTD. QTY:	None

US DOT
Limited Quantity Exception: None

Bulk:	**Non Bulk:**
RQ (if applicable): None	**RQ (if applicable):** None
Proper shipping Name: None	**Proper shipping Name:** None
Hazard Class: None	**Hazard Class:** None
Packing Group: None	**Packing Group:** None
Marine Pollutant (if applicable): No additional information.	**Marine Pollutant (if applicable):** No additional information.

Comments: None **Comments:** None

14.4 Packing group: None
ADR, ADN, DOT, IMDG, IATA

14.5 Environmental hazards : None

14.6 Special precautions for user: None

Danger code (Kemler): None
EMS number: None
Segregation groups: None

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code: Not applicable.

14.8 Transport/Additional information:

Transport category: None
Tunnel restriction code: None
UN "Model Regulation": None

15 Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture.

North American

SARA

Section 313 (specific toxic chemical listings): None of the ingredients are listed.
Section 302 (extremely hazardous substances): None of the ingredients are listed.

CERCLA (Comprehensive Environmental Response, Clean up and Liability Act) Reportable

Spill Quantity: None of the ingredients are listed.

TSCA (Toxic Substances Control Act):

Inventory: All ingredients are listed.
Rules and Orders: Not applicable.

Proposition 65 (California):

Chemicals known to cause cancer: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for females: None of the ingredients are listed.

Chemicals known to cause reproductive toxicity for males: None of the ingredients are listed.

Chemicals known to cause developmental toxicity: None of the ingredients are listed.

Canadian

Canadian Domestic Substances List (DSL):
All ingredients are listed.

EU

REACH Article 57 (SVHC): None of the ingredients are listed.

Germany MAK: Not classified.

EC 648/2004 – This is an industrial detergent. Contains >30% phosphate, 15-30% anionic surfactant, <5% EDTA salts

EC 551/2009 – This is not a laundry or dishwasher detergent

EC 907/2006 – Contains no enzymes, optical brighteners, perfumes, allergenic fragrances, or preservative agents

Asia Pacific

Australia

Australian Inventory of Chemical Substances (AICS): All ingredients are listed.

China

Inventory of Existing Chemical Substances in China (IECSC): All ingredients are listed.

Japan

Inventory of Existing and New Chemical Substances (ENCS): All ingredients are listed.

Korea

Existing Chemicals List (ECL): All ingredients are listed.

New Zealand

New Zealand Inventory of Chemicals (NZOIC): All ingredients are listed.

Philippines

Philippine Inventory of Chemicals and Chemical Substances (PICCS): All ingredients are listed.

Taiwan

Taiwan Chemical Substance Inventory (TSCI): All ingredients are listed.

16 Other information

Abbreviations and Acronyms: None

Summary of Phrases

Hazard statements:

H315 Causes skin irritation.
H319 Causes serious eye irritation.

NFPA: 1-0-0
HMIS: 1-0-0

Precautionary statements:

P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302+P352 If on skin: Wash with soap and water.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P321 Specific treatment (see supplemental first aid instructions on this label).
P332+P313 If skin irritation occurs: Get medical advice/attention.
P362 Take off contaminated clothing and wash before reuse.
P501 Dispose of contents and container as instructed in Section 13.

Manufacturer Statement:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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E-2: MDAS Documentation

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DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

PREVIOUS EDITION MAY BE USED

1 2 3	4 5 6	7	23 24	25 26 27 28 29	45	46 47 48 49 50	51	52	53 54	55 56	57 58 59	60 61	62 63 64	65 66	67 68 69	70	71	72 73	74 75 76 77 78 79 80
DOC IDENT	RI FROM	M&S	UNIT ISS	QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD DEL DATE	ADV	RI	O/P	COND	MGT	UNIT PRICE DOLLARS CTS	

1. TOTAL PRICE DOLLARS CTS

2. SHIP FROM

3. SHIP TO
CGS Inc.
Riverside,
CA

4. MARK FOR

5. DOC DATE | 6. NMFC | 7. FRT RATE | 8. TYPE CARGO | 9. PS

10. QTY. REC'D | 11. UP | 12. UNIT WEIGHT | 13. UNIT CUBE | 14. UFC | 15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE
Munitions Debris - MDAS

18. TY CONT: Barrel

19. NO CONT: 14

20. TOTAL WEIGHT

21. TOTAL CUBE

22. RECEIVED BY: Sergio Melendez

23. DATE RECEIVED: 11/29/22

24. DOCUMENT NUMBER & SUFFIX (30-44)

25. NATIONAL STOCK NO. & ADD (8-22)

26. RIC (4-6)
UI (23-24)
QTY (25-29)
CON CODE (71)
DIST (55-56)
UP (74-80)

27. ADDITIONAL DATA

Tetra Tech
1899 Powers Ferry Rd., Ste. 400
Atlanta, GA 30339

Inspected by:
Tony Aguirre, UXOSO
571-232-9224

Certified by:
Forrest Malone, SUXOS
253-666-3400

"The material listed on this form has been inspected and processed by DDESB approved means as required by DOD policy and to the best of my knowledge and belief does not pose an explosive hazard."

Site Location/Project Number: 112G08005-NW194112

Container/Seal: MDAS-01/2728; MDAS-02/2789; MDAS-03/2733; MDAS-04/2713; MDAS-05/2799; MDAS-06/2746; MDAS-07/2768; MDAS-08/2753; MDAS-09/2759; MDAS-10/2796; MDAS-11/2783; MDAS-12/2764; MDAS-13/2751; MDAS-14/2730

3

ATTENTION SHIPPERS! **FREIGHT CHARGES ARE PREPAID ON THIS BILL OF LADING UNLESS MARKED COLLECT.**

This Shipping Order must be legibly filled in, in Ink Indelible Pencil, or in Carbon, and retained by the agent

Shipper No.

Carrier No.

Page 1 of 1

VLS Environmental Solutions
(Name of carrier) (SCAC)

Date 11/29/22

On Collect on Delivery shipments, the letters "COD" must appear before consignee's name or as otherwise provided in Item 430, Sec.1.

TO:
Consignee 29 PALMS MARINE CORP BASE
Street
City 29 PALMS State CA Zip Code 92278

FROM:
Shipper NAVAL BASE KITSAP
Street
City BREMERTON State WA Zip Code 98312
24 hr. Emergency Contact Tel. No. 619 441 1818

Route

Vehicle Number

No. of Units & Container Type	HM	BASIC DESCRIPTION UN or NA Number, Proper Shipping Name, Hazard Class, Packing Group	TOTAL QUANTITY (Weight, Volume, Gallons, etc.)	WEIGHT (Subject to Correction)	RATE	CHARGES (For Carrier Use Only)
14 DM.		DRUMS OF SCRAP METAL	3800			

PLACARDS TENDERED: YES ☐ NO ☒

Note — (1) Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property, as follows: "The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding ______________ per ______________."
(2) Where the applicable tariff provisions specify a limitation of the carrier's liability absent a release or a value declaration by the shipper and the shipper does not release the carrier's liability or declare a value, the carrier's liability shall be limited to the extent provided by such provisions. See NMFC Item 172.
(3) Commodities requiring special or additional care or attention in handling or stowing must be so marked and packaged as to ensure safe transportation. See Section 2(e) of Item 360, Bills of Lading, Freight Bills and Statements of Charges and Section 1(a) of the Contract Terms and Conditions for a list of such articles.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

______________ Signature

REMIT
C.O.D. TO:
ADDRESS

COD Amt: $

C.O.D. FEE:
PREPAID ☐
COLLECT ☐ $

Subject to Section 7 of the conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

____
(Signature of Consignor)

TOTAL CHARGES $

FREIGHT CHARGES
FREIGHT PREPAID except when box at right is checked
Check box if charges are to be collect ☐

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of, said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of shipment.

Shipper hereby certifies that he is familiar with all the lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER NAVAL BASE KITSAP
PER

CARRIER VLS Environmental Sol.
PER Sevino Melendez
DATE 11/29/2022

2

Permanent post-office address of shipper.

STYLE F370-3 © 2012 LABELMASTER® (800) 621-5808 www.labelmaster.com

CGS
INCORPORATED *A Service-Disabled, Veteran-Owned Business*

Certificate of MDAS/Range Scrap Destruction

Project: Bangor, WA, Munitions Response Site 112G8005-NW194112
Description: 14 drums (5000 lbs). Misc. Pieces/Non NSN Assigned

(ie; 1348-1A and Demilitarization Certificate delivered with material from

Tetra Tech

Were disposal turn-in documents provided and correct? x Y ___ N

Weight (in pounds) of material destroyed: 5,000 lbs

Method of destruction: USF MAX 4000 Smelter

Certification Statement

I CERTIFY THAT THE ITEM(S) LISTED HEREIN HAS/HAVE BEEN DEMILITARIZED AND DESTROYED IN ACCORDANCE WITH DOD MANUAL 4160.28, VOLUME 3, "DEFENSE DEMILITARIZATION: PROCEDURAL GUIDANCE", CATEGORY 3, PARAGRAPH 2 AND/OR THE FOLLOWING APPLICABLE REGULATION: EM 385-1-97
SMELTED

Signature (Certifier): Palani Paahana Date: 10 January 23

Printed Name/Grade/Rank: Palani T. Paahana

Title: Supervisory UXO Specialist

Phone: 760.830.0302

Address:
NREA / Range Sustainment Branch, MCAGCC / MAGTFTC
Twenty-nine Palms, Ca 92277