

CLEANUP ACTION PLAN

SUNNYDELL DRYKE SHOOTING RANGE

CLALLAM COUNTY, WASHINGTON

Issued By

Washington State Department of Ecology

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List of Acronyms

bgs	below ground surface
BMPs	Best Management Practices
CCHHS	Clallam County Health and Human Services
CFR	Code of Federal Regulations
CLARC	Cleanup Levels and Risk Calculation
cm/sec	centimeters per second
COC	contaminant of concern
CUL	cleanup level
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
mg/kg	milligrams per kilogram
MSDS	material safety data sheet
MSL	mean sea level
MTCA	Model Toxics Control Act
MW	monitoring well
O&M	operation and maintenance
PAH	poly aromatic hydrocarbons
PCHB	Pollution Control Hearings Board
ppm	parts per million
QA	quality assurance
QC	quality control
RCW	Revised Code of Washington
RI/FS	remedial investigation / feasibility study
RPD	relative percent difference
SB	soil boring
TOC	total organic carbon
µg/L	micrograms per liter
WAC	Washington Administrative Code

1. INTRODUCTION

This Cleanup Action Plan (CAP) has been prepared by the Washington State Department of Ecology (Ecology) to specify cleanup standards and identify the cleanup action to be implemented at the Sunnydell Dryke Shooting Range Site (also referred to as the “Site”). As required by the Model Toxics Control Act (MTCA), Chapter 70.105D RCW, this CAP describes the alternatives chosen for remediation of the Site and is written according to the requirements set forth in WAC 173-340-380. The proposed cleanup action addresses both the existing and proposed future land use of this Site as a shooting range.

The purpose of the CAP is to:

- Describe the Site, including a summary of its history and extent of contamination;
- Identify site-specific cleanup levels and points of compliance for each contaminant of concern (COC) and applicable exposure medium;
- Identify applicable state and federal laws for the proposed cleanup action;
- Summarize the cleanup action alternatives evaluated in the Feasibility Study (FS);
- Identify and describe the selected cleanup action alternative for the Site;
- Outline elements of the selected cleanup action for the different media that result in protection of human health and the environment.

Previously, a remedial investigation/feasibility study (RI/FS) was conducted to investigate soil, sediment, surface water and groundwater conditions affected by past activities at the Site, located approximately five miles west of Sequim, Washington. The Site is located in the NW1/4, SE1/4, Section 17, Township 30 North, Range 4 West, Willamette Meridian. The RI/FS Report was prepared by LaManna Geosciences, Inc. (LGI) and was submitted to Ecology under the requirements of Agreed Order No. DE 6551 and pursuant to the MTCA, RCW 70.105D.050(1). Agreed Order No. DE 6551 is between Ecology, Chuck Dryke (now deceased) and Rosemary Knotek. Mr. Dryke’s and Ms. Knotek’s ownership shares have since passed to Ellen Dryke, making her sole owner.

2. EXECUTIVE SUMMARY

A summary of the remedial investigation at this Site is as follows:

- Lead from shot and cPAH’s from clay targets made from pitch, are present in soil and sediment at concentrations that exceed cleanup levels at locations on the Site.
- Nearly all of the elevated lead concentrations are present in the upper one foot of soil at the Site. There is no evidence of lead leaching from surface soils to deeper underlying soil or groundwater.

- Two quarters of groundwater monitoring were performed (November 2010 and June 2011) to simulate high and low water tables. A drinking water sample was also obtained by Ecology from a down gradient residence in July 2010. The groundwater monitoring results and drinking water sample results were below the MTCA cleanup levels for lead and PAHs. Additional groundwater monitoring is required as part of this CAP starting four years from the beginning of the remedial action and subsequently every five years thereafter as specified in the Remedial Action Work Plan.
- Metallic lead and PAHs were not found in surface water at levels of concern. Although one surface water sample of dissolved lead exceeded the site-specific lead cleanup level of 2.3 ug/L in the Upper Pond during the remedial investigation, it was believed to have been caused by turbidity from lead reclamation activities. A subsequent surface water sample was collected and analyzed for dissolved lead in November 2012 and the results were below the site specific cleanup level.
- Lead reclamation is currently being done independently, resulting in partial cleanup of soil and sediment at the Site as well as reducing the spread and buildup of lead shot and clay targets. Periodic lead reclamation will continue at this Site.
- Lead and PAH contaminated soil will be removed from the Lower Pond as detailed in the Remedial Action Work Plan.
- Institutional controls will be used to contain lead and cPAHs on the property. Best Management Practices will maintain proper management controls and periodic lead recycling will mitigate build up of lead.
- Periodic reviews by Ecology, as required by WAC 173-340-420, will ensure that the remedy remains protective of human health and the environment.

3. SITE DESCRIPTION

The Sunnyside Dryke Shooting Range Site is an active shooting range facility, located at 292 Dryke Road near Sequim, Washington in the NW1/4, SE1/4, Section 17, Township 30 North, Range 4 West (Willamette Meridian). The original facility property was a total of 38.89 acres (Figure 1) but was subdivided in 2013 into Lot 1 (9.03 acres) and Lot 2 (29.86 acres). The Site is described by Clallam County as Lot 2, tax parcel number 0430178020, by the Clallam County Assessor's Office (Exhibit 1). The Site is comprised of several improved areas for shooting practice and a club house, the upper, middle and lower ponds, as well as unimproved wooded areas. Lot 1 contains the main residence and dog kennel; other areas are wooded and unimproved. Lot 1 was never used for shooting and is not considered part of the Site.

The property generally slopes gently northward and is bordered to the north, east and west by residential properties, and to the south by Dryke Road. Land features include an Upper Pond, Middle Pond, Lower Pond, West Creek, wooded and open areas.

4. PROJECT HISTORY

The Sunnydell Dryke Shooting Range opened in 1967 and has been used as an active shooting range and dog training facility to the present day (Figure 2). The original property occupies approximately 39 acres of wooded and open areas and contains three ponds, a creek, a main residence, a second residence, and some small structures (i.e., Club House, kennels, gun repair shop) associated with the shooting range. The Site is surrounded by single family dwellings with variable lot sizes, including a trailer park that lies on the other side of Dryke Road to the south and upgradient from the Site.

Environmental samples collected by Clallam County Health and Human Services in 2004 indicated the presence of lead in sediment and surface water at the Site. The owners of this Site signed an agreed order with Ecology in August 2009 requiring them to conduct a Remedial Investigation/Feasibility Study (RI/FS).

5. PHYSICAL SITE CHARACTERISTICS

Surface and near-surface soil, freshwater sediment, surface water and groundwater are the primary medias of concern for Site cleanup and are described below:

5.1 Subsurface/Near-Surface Soil Conditions

The Site is located approximately five miles west of Sequim in Clallam County. The Strait of Juan de Fuca lies approximately 0.5 miles to the north. The Site soils are comprised of three soil units, including Cassolary fine sandy loam, Clallam gravelly sandy loam, and Hoypus gravelly sandy loam. These soil types typically form on hillslopes in glacial drift and glaciomarine deposits, or on outwash terraces in glacial outwash. According to Schasse and Wegmann (2000) this Site is situated on Pleistocene deposits of undifferentiated drift related to the Frasier glaciations, and the various deposits vary from 50 to 150 feet thick.

5.2 Groundwater Conditions

Shallow groundwater, surface water, and wet soils suggest a continuous and steep groundwater table under the surface of the Site (LGI, 2012). Groundwater flows north and appears to be in hydraulic contact with the Upper Pond, Lower Pond, Middle Pond and West Creek. Drinking water wells in the vicinity draw water from a much deeper regional aquifer that does not appear to be hydraulically connected with the water table aquifer of the Site. (Figure 3)

5.3 Freshwater Sediments

Freshwater sediments have been impacted by lead and cPAHs in the Upper Pond, and to a much lesser extent in the Lower Pond. The sediments in the Upper Pond, as well as some affected soil, are currently being dredged as part of an independent lead recycling effort.

5.4 Surface Water

Surface water exists at the Upper Pond, Middle Pond, Lower Pond, and West Creek at this Site. The water level in the Upper Pond is periodically augmented by pumping water from the Lower Pond.

6. NATURE AND EXTENT OF CONTAMINATION

A remedial investigation was completed by LGI in June of 2012 to identify the source(s) of the contamination and complete the assessment of the vertical and horizontal extent of the contamination, and identify alternative remedial strategies. It was found after this investigation approximately nine acres of this parcel were not part of the Active Shooting Range.

Lead from shot and cPAHs in clay targets made from pitch exist in the soil and sediment at concentrations that exceed site-specific cleanup levels at the Active Shooting Areas of the Site. The extent of soil contamination is limited to areas downrange of shooting stations and varies depending on lead reclamation activities and the amount of lead shot in each area over time. Based on ballistic properties of the largest size of lead shot used at this Site, it is possible that lead shot may be present up to 700 feet downrange of all shooting areas, but most shot is found within 200 yards or so of each shooting station. The tree canopy may also stop some lead shot from traveling very far.

Most of the elevated lead concentrations are present in the upper one foot or so of soil at the Site. Lead was found to exceed site-specific cleanup levels in the Rabbit Run Area (180,000 mg/Kg) and Weeping Willow Area (73,000 mg/Kg), both of which are currently, and will continue to be, Active Shooting Range Areas.

Sediment sampling was performed by LGI during the remedial investigation in the Upper Pond, Lower Pond, Middle Pond, and West Creek in 2012. Many sediment samples in the Upper Pond contained concentrations of lead, BTEQ, and total PAHs that exceed the site-specific cleanup levels. The vertical distribution of lead in the Upper Pond was not determined as samples did not extend below six inches deep and lead recycling efforts began. The Upper Pond was created by digging out a peat bog five feet thick until hardpan was reached in the 1950's. The gun club opened in 1967 so it is anticipated that lead shot and clay targets were present throughout the entire thickness of sediment that has accumulated in the Upper Pond until recent recycling efforts.

In the Lower Pond, from a total of 28 sediment samples, only three samples exceeded the 220 mg/Kg lead cleanup level and only two exceeded the 0.1 mg/Kg BTEQ cleanup

level. Only one sample exceeded the 17 mg/Kg total PAH cleanup level. Sampling efforts did not extend beyond six inches below the surface so the vertical extent of contamination is not known but is believed to be very limited due to very limited historical usage.

6.1 Contaminants of Concern

The contaminants of concern (COCs) for the Sunnyside Dryke Shooting Range Site were defined as those hazardous substances identified as exceeding MTCA Method A cleanup levels (CULs), at least one time in the Remedial Investigation (RI). The use of the Site has resulted in an accumulation of lead shot and PAHs in certain areas due to target practice. This target practice deposited lead shot, lead bullets, and fragments from “clay targets” on the ground surface and in the ponds. Three surrogates were evaluated to determine PAH toxicity. Benzo-a-pyrene was chosen because it is the cPAH with the highest toxicity, is frequently detected at the Site, and has specific cleanup criteria. The second surrogate is benzo-a-pyrene Toxicity Equivalence (bTEQ). The third surrogate used to evaluate PAH toxicity is total PAHs.

A summary of applicable environmental criteria for chemicals of concern is attached as Exhibit 2 (Table 5-1).

The following table lists the Site Specific Cleanup Levels for COCs in soil (MTCA Method A), freshwater sediment (Sediment Quality Standard/Screening Level 1), and for groundwater (MTCA Method A Standards).

Table 5-2. Summary of Site-specific CULs

Parameter	Medium	CUL Concentration	Comments
Lead	Soil	220 mg/Kg	Most restrictive of the soil and sediment criteria listed in Table 5-1(Exhibit 2). Soil and sediment may be hard to distinguish in the shoreline area of the ponds.
Lead	Groundwater	15 µg/L	Most restrictive of the groundwater and drinking water criteria listed in Table 5-1(Exhibit 2).
Lead	Fresh Surface Water	2.3 µg/L	Assumes a hardness of 100 mg/L CaCO ₃ , which is higher than the hardnesses measured at the Site.
Total PAHs	Fresh water sediment	17 mg/Kg	This proposed sediment quality standard may not apply to the Upper Pond because it is an active shooting range whose habitat quality is significantly limited.
bTEQ	Soil	0.1 mg/Kg	MTCA Method A for unrestricted land use (WAC173-340-900, Table 740-1).
bTEQ	Groundwater	0.1 µg/L	MTCA Method A for Ground Water (WAC173-340-900, Table 720-1). This CUL is based on the laboratory instrument reporting limits.

6.2 Soil

Clallam County Health and Human Services (CCHHS) collected one soil sample in the area referred to as “Rabbit Run” and it contained 618 mg/Kg lead and 9.66 mg/Kg bTEQ (Figure 2). Environmental Services Associates, Inc. (ESA) then collected ten samples from five locations at Rabbit Run, resulting in a lead concentration of 180,000 mg/Kg and bTEQ of 255.72 mg/Kg (Exhibit 3).

CCHHS collected two soil samples in the “Weeping Willow” area and they contained 71.3 mg/Kg lead and 261.5 mg/Kg bTEQ. ESA collected ten samples from five locations resulting in a lead concentration of 73,000 mg/Kg lead and 81.76 mg/Kg bTEQ.

6.3 Ground Water

One groundwater sample was collected from the water-supply well at the adjacent and down-gradient Miller property in July 2010. Groundwater samples were also collected from monitoring wells on the Sunnydell property in November 2010 and June 2011. The monitoring well data and drinking water sample results were all below MTCA CULs for lead and PAHs (Figure 3).

6.4 Surface Water

Surface water samples were collected by CCHHS, ESA, and LGI in the Upper Pond, Lower Pond, West Creek, and wet soils on the Miller property. All filtered samples were below cleanup levels except one filtered sample from the Upper Pond which contained 11.2 ug/L lead, exceeding the 2.3 ug/L cleanup level. High turbidity at the time of sampling due to ongoing lead reclamation was believed to have resulted in this lead exceedance. A subsequent dissolved lead surface water sample from the Upper Pond following lead reclamation was below the cleanup level.

Filtered samples from the Lower Pond were below the lead CUL and did not contain detectable PAHs. Filtered samples from the West Creek were below the lead CUL and were not analyzed for PAHs since clay targets have not been used nearby.

6.5 Sediment

Many sediment samples collected from the Upper Pond contained concentrations of lead, bTEQ, and total PAHs above site-specific cleanup levels. As previously mentioned, it is believed that lead was present in the Upper Pond sediment throughout the entire thickness from the surface of the sediment to the underlying hard pan at approximately five feet BGS until recent lead recycling.

Prior to sampling the Lower Pond, lead and PAH sediment contamination was believed to be limited since the Lower Pond was mostly used for dog training. Out of 28 sediment samples collected by ESA in the Lower Pond, three exceeded the lead cleanup level, one exceeded the bTEQ cleanup level, and one exceeded the total PAH criterion.

CLEANUP STANDARDS

The Sunnyside Dryke Shooting Range Site is zoned Rural Neighborhood Conservation (NC) and is surrounded by residential properties. MTCA Method A cleanup levels for unrestricted use were used to evaluate soil and groundwater cleanup levels and freshwater sediment was screened against proposed values in Ecology Publication No. 11-09-054 titled "Development of Benthic SQVs for Freshwater Sediments in Washington, Oregon, and Idaho", November 2011.

The point of compliance for soil is throughout the Site for protection of groundwater and from the ground surface to a depth of 15 feet for soil for the protection of human health based on direct contact exposure. Protection of indoor air is not a pathway of concern at this Site since the COCs are not volatile.

The point of compliance for groundwater is throughout the Site from the upper most level of the saturated zone extending vertically to the lowest depth which could potentially be affected by the site.

The media specific cleanup levels and points of compliance constitute the cleanup standards for this Site.

8.0 SUMMARY OF REMEDIAL ACTION ALTERNATIVES

In the Feasibility Study (FS), alternatives were identified and screened for their applicability in addressing Site contamination and achieving remedial objectives (meeting cleanup standards). The various alternatives were screened to narrow the list of technologies. Other measures were considered for more detailed evaluation in the FS.

The remedial action alternatives developed and evaluated for the Sunnyside Dryke Site were:

Alternative 1 – No Action. This alternative is listed as a baseline for comparison only. It is not judged acceptable because it does not address potential exposures to humans and wildlife; does not reduce the potential for Site operations to spread COCs; and this alternative does not include institutional controls to ensure protection of human health and the environment.

Alternative 2 – Develop and implement BMPs, specific remedial actions, and institutional controls. BMP's and specific remedial actions will be used at the Site to ensure that spent lead shot and targets are managed in a manner to avoid threats to human health and the environment while the range remains active.

Alternative 3 – Excavate shallow soil, recover lead shot, consolidate contaminated soil on-site, and cap with clean soil. The alternative was not chosen since removal of contaminated soil would not be appropriate for this Site, with its active shooting ranges, because more lead shot will immediately re-accumulate.

Alternative 4 – Excavate shallow soil (and sediment), recover lead shot, and dispose of off-site. The alternative was not chosen since removal of contaminated soil would not be appropriate for this Site, with its active shooting ranges, because more lead shot will immediately re-accumulate.

9.0 SELECTED REMEDIAL ACTION ALTERNATIVE

In this cleanup action plan, Alternative 2 has been identified as the preferred remedial alternative for the Sunnydell Dryke Shooting Range Site. This alternative involves dividing the Site into Management Areas based on historical site use. Those areas include Active Shooting Ranges, Lower Pond Areas, and Non-shooting Areas (Figure 4). The current owners do not plan on expanding or creating new active shooting ranges. This alternative will provide a high level of protection to human health and the environment by implementing BMPs, institutional controls, and removing selected soils. The selected alternative will not allow COCs to migrate out of Active Shooting Range areas.

Active Shooting Range Management Areas

The four Active Shooting Range Management Areas will be operated in accordance with the following BMPs:

- Lead reclamation will be conducted in a manner that does not spread COCs (shot, target fragments, post-reclamation soil, muddy water, etc.) beyond the area that is undergoing reclamation. Boundary limits will be established for lead reclamation operations to prevent releases onto Non-Shooting Areas.
- Recovered lead shot destined for recycling will be temporarily stored on-site in sealed containers that are not subject to rainfall infiltration and rodent damage.
- Movement of soil within Active Shooting Areas will be minimized to limit potential environmental impacts.
- Records should be kept of lead shot reclamation and the tonnage of reclaimed lead received by recyclers or reused for on-site reloading. These records will demonstrate that recycling has been taking place.
- Soil from Active Shooting Ranges (including waste soil from lead recovery operations) will not be deposited in Non-Shooting Areas.
- Biodegradable targets are preferred over targets made with pitch and will be used if economically and practically feasible.
- Target fragments and debris recovered during reclamation will be sent off-site as solid waste.
- Shooting platforms and target launchers will be positioned to keep shot falling within the already established boundaries of the Active Shooting Ranges.

- Shot size will be restricted to #8 or smaller to limit the shot fall areas. Signs will be placed in all shooting ranges to notify shooters of this restriction in shot size.
- Post-reclamation areas of bare soil will be planted with vegetation, mulched, or covered to prevent erosion and direct contact with potentially contaminated soil. Vegetation should be properly chosen because excessive vegetation may hinder reclamation efforts and vegetation typically must be removed prior to reclamation. Children will not be allowed to play with or sit on the ground (i.e., the soil), sediment, or water in Active Shooting Ranges.
- Livestock will not be allowed to graze on plants growing in Active Shooting Ranges.
- Hunting will not be allowed. This restriction will prevent the spread of shot or bullets beyond the boundaries of the Active Shooting Ranges. Killing of nuisance animals will be allowed if done lawfully.
- Compliance monitoring will consist of record keeping. Records will be kept of soil excavations, soil fills, lead reclamation, and target composition.

Lower Pond Management Area

The Lower Pond Area is shown on Figure 5. The following specific mitigation and BMPs will be implemented.

- Soil from two locations at the Lower Pond contains lead and PAHs that exceed CULs. The soil at the Lower Pond will be remediated by excavating the upper 1-foot and relocating this soil to the soil berm at the Rabbit Run and/or one of the other Active Shooting Ranges. It is estimated that 20 cubic yards of soil will be removed from the lower pond (Figure 5).
- Confirmation soil sampling will ensure that lead and PAH cleanup levels have been met in the Lower Pond excavation areas. The soil remaining after the excavation is complete, where located above the water level, will be allowed to vegetate to prevent erosion.
- Target practice and hunting will not be allowed. These restrictions will prevent further addition of shot or bullets onto shallow soil surfaces. Killing of nuisance animals will be allowed if done lawfully and in active shooting range management areas.
- Adults and children will not be allowed to play or sit on the ground (soil), sediment, or water in the Lower Pond Area until after the hot spots are remediated.
- Surface water runoff to adjoining properties will be controlled by maintaining the soil berm along the northern property line.
- Records will be kept of soil excavations, soil fills, and lead reclamation.

Non-Shooting Management Areas

The Non-Shooting Areas will be operated with the following BMPs:

- Soil from the Active Shooting Ranges and the Lower Pond Area will not be brought onto Non-Shooting Areas.
- Lead reclamation activity (i.e., processing contaminated soil or sediment) will not take place on Non-Shooting Areas. Potentially contaminated soil or sediment will not be transported across the Non-Shooting Areas unless the soil, and any entrained water, is contained.
- Target practice and hunting will not take place on Non-Shooting Areas. This will prevent the deposition of lead shot and target fragments in an area not suspected of shooting operations.

9.1 Institutional Controls

The current owner of the original 38.89 acre property subdivided it into two properties in 2013, Lot 1 (9.03 Acres) and Lot 2 (29.86 Acres). Lot 1 will be excluded from the BMPs and the Institutional Controls because it was never part of the shooting range, and contains the main residence and the dog kennel.

An environmental covenant will be recorded and attached to the deed for the parcel identified as Lot 2. The covenant will alert future owners that this part (Lot 2) of the original 38.89 acre property was used as a commercial target range and potential contamination from lead shot and target fragments may be present in soil or sediment. The environmental covenant will run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in Lot 2 as long as the use of the property remains as a shooting range. If the use of Lot 2 changes, additional investigation and/or cleanup will be necessary.

10.0 CRITERIA FOR SELECTION OF CLEANUP ACTION

MTCA specifies the criteria for selecting an appropriate cleanup action (WAC 173-340-360). Presented below are the requirements for selecting a cleanup action along with determinations of how the selected cleanup action meets each requirement.

10.1 Protection of Human Health and the Environment: The selected alternative, along with periodic lead reclamation, will protect human health and the environment. The remedy will mitigate risk by removing contaminated soil from two hotspot locations at the Lower Pond, and moving the soil to an Active Shooting Range Area where exposure is less likely. Concentrations of lead will be reduced following lead reclamation, estimated to remove 50 tons in 2013. These activities, BMPs and institutional controls will protect human health and the environment.

10.2 Compliance with Cleanup Standards: MTCA cleanup standards have been achieved when cleanup levels are met at the point of compliance. Groundwater is currently in compliance with MTCA based on groundwater monitoring results. Surface water, soil and sediment will also be in compliance with cleanup standards throughout the Site following implementation of the selected remedy, except in active shooting areas where BMP's and institutional controls will protect human health and the environment.

10.3 Compliance with ARARs: In addition to establishing minimum requirements for cleanup standards, applicable state and federal laws may also impose certain technical and procedural requirements for performing cleanup actions. This alternative is compliant with state and federal laws. The remedial cleanup action at the Sunnyside Dryke Site fulfills the requirements of a routine cleanup action under MTCA. MTCA Method A is appropriate as the primary method to establish cleanup levels for the Sunnyside Dryke Site because there are few hazardous substances, the Site will be undergoing a routine cleanup action, and numerical cleanup standards are available or can be calculated for the indicator hazardous substances in the media being remediated. MTCA Method A CULs were used for hazardous substances in soil and ground water, and the Sediment Quality Standard/Screening Level 1 was used for freshwater sediment.

10.4 Compliance Monitoring: Under MTCA, compliance monitoring is required for all cleanup actions (WAC 173-340-410). Compliance monitoring will consist of periodic groundwater monitoring and specific details will be included in the Remedial Action Work Plan to be submitted to the department for review and approval. Detailed recording keeping of ongoing activities will include but be not limited to:

- Periodic lead reclamation activities.
- Any soil disturbance or movement in Active Shooting Range Areas.
- Monitoring of the Lower Pond to prevent migration to adjoining properties.

10.5 Long-Term Effectiveness: It is anticipated that CULs will not be attained in active shooting areas one year after implementation of the remedy since lead shot will continue to accumulate, but the remedy will continue to be effective long term due to BMPs and periodic lead reclamation.

10.6 Short-Term Effectiveness: Removal of soil from two hotspots at the Lower Pond will provide short-term effectiveness. The direct contact/ingestion by humans pathway will also be mitigated by removal of lead from contaminated soil through lead reclamation. Monitoring will ensure that surface water is not migrating off-Site. BMPs will ensure effectiveness.

10.7 Permanent Reduction in the Toxicity, Mobility, and Volume of Hazardous Substances: Lead reclamation in soil will occur periodically to reduce the volume and potential mobility at the Site. The volume of contaminated soil will be reduced significantly as a result. Two hot spot areas at the Lower Pond will be excavated and moved to another Active Shooting Area at the Site.

10.8 Ability to be Implemented: Soil removal, lead reclamation and BMPS are readily implementable at this Site.

10.9 Addresses Community Concerns: Community acceptance will be evaluated based on the comments received during the public comment period. Public comments will be considered during preparation of the final CAP.

11.0 APPLICABLE, RELEVANT, AND APPROPRIATE REQUIREMENTS

WAC 173-340-700(4)(a) states, “In addition to establishing minimum requirements for cleanup levels, applicable state and federal laws may also impose certain technical and procedural requirements for performing cleanup actions.” Applicable, relevant, and appropriate requirements (ARARs) for this Site include:

- Chapter 49.17 RCW, Washington Industrial Safety and Health Act (WISHA).
- Chapter 173-201A WAC Water Quality Standards for Surface in Washington State
- Chapter 173-200 WAC Water Quality Standards for Drinking Water in Washington State
- Federal Maximum Contaminant Level (MCL).

Remedial actions performed under a consent decree, enforcement order, or agreed order, and Ecology when it conducts a remedial action, are exempt from the procedural requirements of certain laws. Sites that are cleaned up under an order or decree may be exempt from obtaining a permit under certain other laws but they must meet the substantive requirements of these other laws. This list does not preclude identification of other state or federal ARAR’s that may be identified prior to implementation of the selected remedy.

12.0 SCHEDULE

A Remedial Action Work Plan will be provided for Ecology review 60 days following the effective date of the agreed order. The Remedial Action Work Plan at a minimum should include the following components:

- BMP’s (following EPA guidelines),

- Sediment excavation details,
- Long term groundwater monitoring plan, and
- Plans for periodic lead recycling.

Ecology will have 30 days to review the draft work plan and provide comments. PLP will have 30 days to finalize the work plan.

An environmental covenant will be drafted by PLP for review by Ecology within 30 days following finalization of the work plan. Ecology will have 30 days to review environmental covenant. The environmental covenant will be recorded at Clallam County and a copy provided to Ecology.

Cleanup activities for the Site soil will commence 30 days after the Remedial Action Work Plan is finalized. A Remedial Action Report will be provided to Ecology 30 days following receipt of laboratory data from the soil excavation and will include activities performed as described in the Remedial Action Work Plan.

13.0 REFERENCES

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LaManna Geosciences Inc., Sunnyside Dryke Shooting Range, Remedial Investigation and Feasibility Study Report, June 22, 2012

FIGURES



Figure 16. Map showing locations of proposed Active Shooting Range Management Areas (4 black polygons); shooting locations (1, 2, 3A, 3B, 4, 5A, 5B); shooting directions (orange arrows); Lower Pond Management Area (green polygon), and Lots 1 and 2 (red polygons). There are berms located at the south and southeast sides of Management Area 5. These berms prevent stray shot and bullets. The area outside of the black and green polygons in Lot 2 comprise the Non-Shooting Management Areas. The text describes BMPs and an institutional control for these management areas. Lot 1 will be managed separately and is excluded from these BMPs and institutional control.

Figure 3

Sunnydell Dryke Shooting Range
292 Dryke Road
Sequim, WA 98382

LaManna Geosciences Inc.

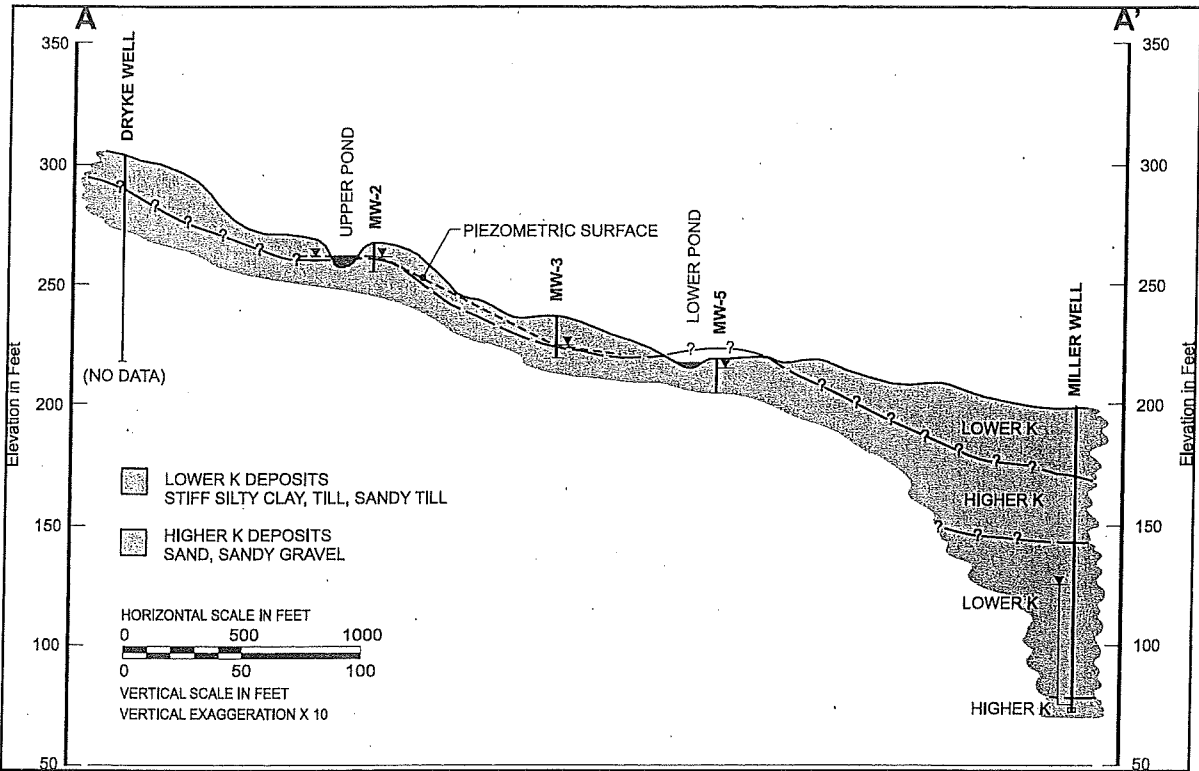
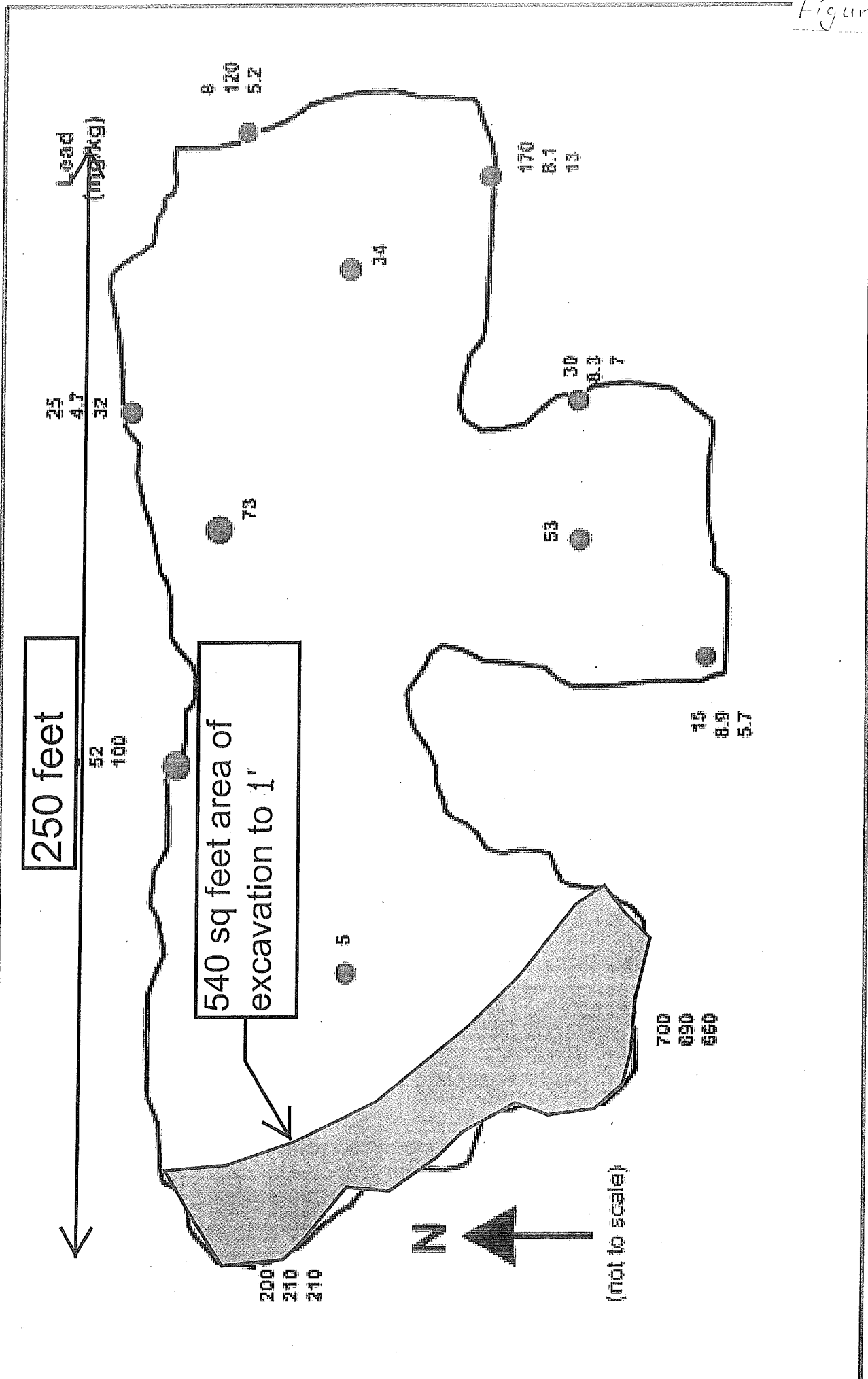


Figure 5b. Hydrogeologic cross section A-A'. This representation assumes a continuous water table exists beneath the Site that is in hydraulic contact with the surface water bodies. The strata appear to dip gently to the north, which is to the right. Boring logs for the monitoring wells and the Miller well are located in Appendix A of LGI (2011b).



Figure 16. Map showing locations of proposed Active Shooting Range Management Areas (4 black polygons); shooting locations (1, 2, 3A, 3B, 4, 5A, 5B); shooting directions (orange arrows); Lower Pond Management Area (green polygon), and Lots 1 and 2 (red polygons). There are berms located at the south and southeast sides of Management Area 5. These berms prevent stray shot and bullets. The area outside of the black and green polygons in Lot 2 comprise the Non-Shooting Management Areas. The text describes BMPs and an institutional control for these management areas. Lot 1 will be managed separately and is excluded from these BMPs and institutional control.

Figure 5



EXHIBITS

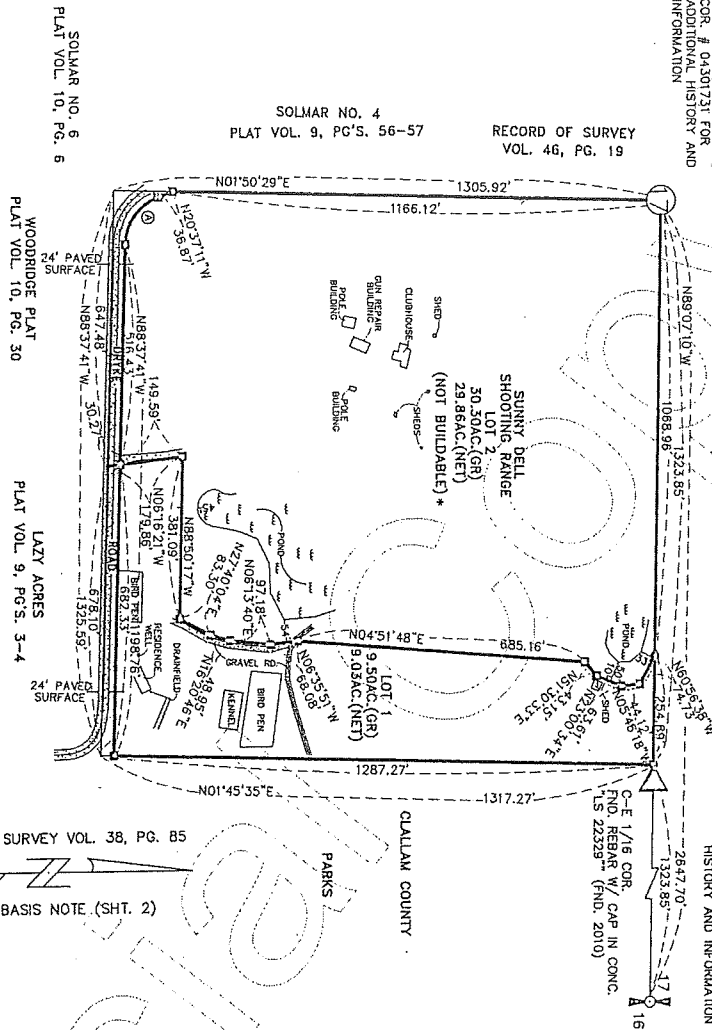
2013-1289727 V: 82 P: 843
 David Cummins & Associates
 11/23/2010 01:59:37 PM
 11/23/2010 01:59:37 PM

CHIR. OF SEC. (NOT
 VAD. G. (NOT
 ACCEPTED POSITION OF
 CALCULATED THORNTON R & C
 'S 12750' SEE GS/GPS
 SURVEY VOL. 38, PG. 85.
 COR. # 04301731 FOR
 ADDITIONAL HISTORY AND
 INFORMATION

CONNER
 SHORT PLAT
 VOL. 46, PG. 19

MILLER
 RECORD OF SURVEY
 VOL. 60, PG. 84

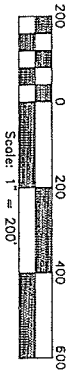
RECORD OF SURVEY
 VOL. 46, PG. 19



FND. 1/2" I.P. W/ WOOD
 PLUG (TED 1988) (NOT
 VASIED THIS SURVEY) SEE
 GS/GPS SURVEY VOL. 38,
 PG. 85 FOR ADDITIONAL
 HISTORY AND INFORMATION

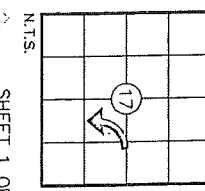
CURVE TABLE

LET.	ROAD BEG. IN	DELTA	RADIUS	LENGTH	ROAD BEG. OUT
1	N89°22'49"E	Δ=88°00'30"	R=120.97'	L=43.47'	N01°22'19"E



LEGEND

- FND. 1/2" REPAIR W/ PLASTIC CAP 70C & A LS 22328
- SET 1/2" REPAIR W/ PLASTIC CAP 70C & A LS 22328
- RIGHT-OF-WAY DEDICATED TO CLALLAM COUNTY FOR ROAD PURPOSES.
- EXISTING ROAD SURFACE
- LOT 2 IS NOT APPROVED FOR ON-SITE SEPTIC OR POTABLE WATER.



SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY CONDUCTED BY ME
 IN ACCORDANCE WITH THE SURVEYING ACT, TITLE 36, RCW,
 AND THE STATE SURVEYING REGISTRATION
 ACT, TITLE 59, RCW.

DAVID CUMMINS P.L.S.
 CERTIFICATE NO. 22328
 1-9-2012
 DATE SIGNED

AUDITOR'S CERTIFICATE

FILED FOR RECORD THIS 23 DAY OF JAN
 2013, AT 1:58 P.M., IN VOL. 2
 OF LARGE LOT SUBDIVISIONS, ON PG. 43

RECORDS OF CLALLAM COUNTY, WASHINGTON, AT THE
 REQUEST OF DAVID CUMMINS AND ASSOCIATES, P.S.
 2013-1289727 Katelyn Mada
 DEPUTY COUNTY AUDITOR

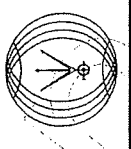
LEGAL DESCRIPTION

THE NORTHWEST-QUARTER OF THE SOUTHEAST-QUARTER, OF SEC. 17,
 T.30N., R.4W., W.M., CLALLAM COUNTY, WASHINGTON,
 EXCEPT RIGHT-OF-WAY FOR COUNTY ROAD,
 SITUATE IN CLALLAM COUNTY, STATE OF WASHINGTON,
 TOGETHER WITH AND SUBJECT TO EASEMENTS, RIGHT-OF-WAYS OR
 RESTRICTIONS OF RECORD, IF ANY.

**SUNNYDELL
 LARGE LOT SUBDIVISION**

OF A PORTION OF
 N.W.1/4.S.E.1/4.Soc.17.T.30N.,R.4W.,W.M.
 Clallam County, Washington

Ellen M. Dryke
 for



David Cummins
 and
 Associates, P.S.
 P.O. Box 120
 Sequim, WA
 98382
 (360) 683-2344

DATE SURVEYED, MONUMENTED & MAPPED
 APRIL 15, 2010-AUGUST 17, 2010
 JOB NO. 2-17-30-4-49751LS

Vol 2 Pg 43

LARGE LOT SUBDIVISION NO. LDV2010-00020
 PARCEL NO. 04-30-17-420000

Table 5-1. Summary of Applicable Environmental Criteria for COCs at the Site

Parameter	Medium	Concentration	Comments
Lead	Freshwater Sediment	360 mg/Kg (proposed)	Sediment Quality Standard/Screening Level 1 (Table ES-1; Ecology, 2011).
Lead	Soil	250 mg/Kg	Model Toxics Control Act (MTCA) Method A for unrestricted land use (WAC173-340-900, Table 740-1).
Lead	Soil	220 mg/Kg	MTCA Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure (WAC173-340-900, Table 749-2 for unrestricted land use).
Lead	Soil	220 mg/Kg	MTCA Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure (WAC173-340-900, Table 749-2 for unrestricted land use).
Lead	Groundwater	15 µg/L	MTCA Method A (WAC173-340-900, Table 720-1).
Lead ¹	Drinking Water	50 µg/L	WAC 173-200-040, Table 1.
Lead	Fresh Surface Water	2.3 µg/L	Assumes a hardness of 100 mg/L CaCO ₃ (WAC 173-201A).
Benzo-a-pyrene	Soil	30 mg/Kg	MTCA Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure (WAC173-340-900, Table 749-2 for unrestricted land use).
Benzo-a-pyrene	Soil	0.1 mg/Kg	MTCA Method A for unrestricted land use (WAC173-340-900, Table 740-1).
cPAH TEQ	Soil	0.1 mg/Kg	MTCA Method A for unrestricted land use (WAC173-340-900, Table 740-1).
Total PAHs	Freshwater Sediment	17 mg/Kg	Proposed Sediment Quality Standard/Screening Level 1 (Table ES-1; Ecology, 2011). This criterion may not be applicable to the Upper Pond because it is an active shooting range.
Benzo-a-pyrene	Groundwater	0.1 µg/L	MTCA Method A Cleanup Levels for Groundwater (WAC 173-340-900, Table 720-1).
cPAH TEQ	Groundwater	0.1 µg/L	MTCA Method A Cleanup Levels for Groundwater (WAC 173-340-900, Table 720-1).
Benzo-a-pyrene	Drinking Water	0.008 µg/L	WAC 173-200-040, Table 1. Note: 0.008 µ/L criterion is below the laboratory reporting limit. In this situation it is customary to substitute the reporting limit. For water samples collected June 2011 and analyzed by Fremont Analytical, the reporting limit was 0.1 µ/L for individual PAHs including benzo-a-pyrene.

Table 5-5. Selected Test Results for Samples Collected in the Rabbit Run Area

Date (sampler)	Sample ID	Lead (mg/Kg)	TEQ (mg/Kg)	Comments
7/29/2005 (CCHHS)	Dryke1RR	618	9.66	GPS position available. Probably surface grab.
7/15/2010 (ESA)	RR-1-1	66,000	105.68	1-in deep. Position uncertain.
7/15/2010 (ESA)	RR-1-2	3,100	44.88	6-in deep. Position uncertain.
7/15/2010 (ESA)	RR-2-1	180,000	255.72	1-in deep. Position uncertain.
7/15/2010 (ESA)	RR-2-2	290	21.80	12-in deep. Position uncertain.
7/15/2010 (ESA)	RR-3-1	100,000	85.78	1-in deep. Position uncertain.
7/15/2010 (ESA)	RR-3-2	38	1.09	12-in deep. Position uncertain.
7/15/2010 (ESA)	RR-4-1	52,000	101.98	1-in deep. Position uncertain.
7/15/2010 (ESA)	RR-4-2	180	2.71	12-in deep. Position uncertain.
7/15/2010 (ESA)	RR-5-1	63,000	140.31	1-in deep. Position uncertain.
7/15/2010 (ESA)	RR-5-2	82	6.61	12-in deep. Position uncertain.
7/15/2010 (ESA)	RR-5-2 Dup	76	(not tested)	Duplicate of RR-5-2.

Note:

Bold = Exceedance