FOCUSED SITE ASSESSMENT REPORT

NORTHERN STATE HOSPITAL PROPERTY
SEDRO-WOOLLEY, WASHINGTON

Prepared for
PORT OF SKAGIT
BURLINGTON, WASHINGTON
January 19, 2015
Project No. 0624.04.02

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The material and data in this report were prepared under the supervision and direction of the undersigned.

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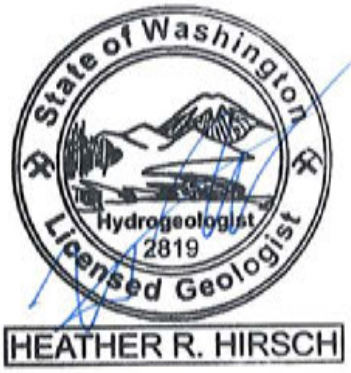

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ACRONYMS AND ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
ARI	Analytical Resources, Inc.
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
COI	chemical of interest
cPAH	carcinogenic PAHs
CSM	conceptual site model
CUL	cleanup level
Department of Enterprise Services	Washington State Department of Enterprise Services
DRO	diesel-range organics
Ecology	Washington State Department of Ecology
EIC	ecological indicator concentrations
FSDS	field sampling data sheet
GRO	gasoline-range organics
HCID	hydrocarbon identification
heavy oils	DRO and motor-oil-range hydrocarbons
IHS	indicator hazardous substance
MFA	Maul Foster & Alongi, Inc.
mg/kg	milligrams per kilogram
MTCA	Model Toxics Control Act
NWTPH	Northwest Method Total Petroleum Hydrocarbon
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
POC	point of compliance
the Port	Port of Skagit County, Washington
the Property	Northern State Hospital property
SAP	sampling and analysis plan
TCE	trichloroethene
TEE	terrestrial ecological evaluation
TEQ	toxic equivalency quotient
TPH	total petroleum hydrocarbons
ug/L	micrograms per liter
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code

1 INTRODUCTION

On behalf of the Port of Skagit (the Port), Maul Foster & Alongi, Inc. (MFA) has prepared this focused site assessment report for the Northern State Hospital property (the Property) located at 24909 Hub Drive within the urban growth area of Sedro-Woolley, Washington (Figure 1). The Property is currently owned and managed by the Washington State Department of Enterprise Services (Department of Enterprise Services), with buildings leased to multiple tenants, including the Cascade Job Corps, for on-site housing and educational services; the Pioneer Center, as a drug and alcohol treatment facility with on-site housing; and the National Guard, for a vehicle storage, maintenance, and fueling facility. Historically, the Property was used as a self-sustaining treatment and residence facility for the mentally ill that included on-site patient and staff housing, a power house, maintenance shops, a laundry, and a fueling station.

1.1 Regulatory Framework

The Port received an Integrated Planning Grant from the Washington State Department of Ecology (Ecology) to fund preliminary environmental investigation and planning activities in support of redevelopment of the Property into a revitalized asset for the community. The purpose of this focused site assessment was to collect physical and chemical data to identify and characterize chemical impacts to environmental media associated with features of environmental concern, evaluate potential risk to human and ecological health, and identify preliminary cleanup alternatives, if necessary. This focused assessment partially addresses the substantive requirements of Washington Administrative Code (WAC) 173-340 of the Model Toxics Control Act (MTCA) and was conducted in accordance with the Ecology-approved work plan (MFA, 2014).

1.2 Site Assessment Objectives

MFA conducted a focused subsurface investigation at the Property on August 19, 2014. Prior to that, a limited subsurface investigation had been completed at the Property (Lone Rock Resources, 1993). The focused site assessment was completed to assess potential areas of concern at the Property identified in the work plan (MFA, 2014). Site assessment objectives included the following:

- Develop a conceptual site model (CSM) and data quality objectives for a limited site characterization.
- Conduct a focused assessment of the nature and extent of hazardous substances in environmental media above relevant cleanup levels (CULs) near potential sources of contamination.
- Evaluate potential risk to current and reasonably likely future human and ecological receptors, as appropriate.
- Identify preliminary cleanup options for impacted media.

2 BACKGROUND

This section describes the physical location and characteristics of the Property, including the geology and hydrogeology, and summarizes the site history.

2.1 Property Description

The Property is located in section 8 of township 35 north and range 5 east of the Willamette Meridian. The Property comprises four parcels: two rectangular-shaped parcels to the north with the same parcel number and a combined area of 143.23 acres (parcel number 38607); a square-shaped, 39.37-acre parcel (parcel number 39356) to the south; and an irregularly shaped, 33.57-acre parcel (parcel number 100632) to the east (Figures 1, 2a, 2b, 2c, and 2d). The Property is located on a small plateau with a slight downward topographic slope toward the east, south, and southwest toward Hansen Creek and Brickyard Creek.

The Property is bordered by Fruitdale Road to the west and the Northern State Recreation Area to the north, south, and east. The Property is currently zoned urban reserve public open space and is outside the eastern edge of the Sedro-Woolley, Washington, city limits, but located within its urban growth area.

The Property currently comprises over 80 buildings and structures. Several buildings have been demolished, and the debris from a few of these buildings reportedly has been buried and/or disposed of on site, as determined through interviews of maintenance staff at the Property (see work plan [MFA, 2014]). The ground surface consists of grass and well established trees and shrubs, which are dispersed throughout the Property. The Property abuts the Northern State Recreation Area (owned by Skagit County), which contains more than 700 acres of vegetated open space.

2.2 Property History

The Property was developed in 1909 and operated as a treatment and residence facility and hospital for the mentally ill until its closure in 1973. The approximately 217-acre campus, which includes the former treatment and residence facility, hospital, and grounds, was designed to be self-sustaining and included on-site patient and staff housing, dedicated water supply reservoirs and an associated potable water treatment facility, a fueling station for on-site vehicles, maintenance and paint shops, and a laundry facility. Many of the buildings associated with the former facility, including the campus landscape as a whole, are listed on the National Registry of Historic Places. After the facility's closure, the Property was transferred from the Department of Social and Health Services to the Department of Natural Resources and General Services Administration (today the Department of Enterprise Services). The Property's current primary occupants are the Cascade Job Corps, the Pioneer Center, and the National Guard, with many of the remaining historical buildings vacant.

Environmental impacts to the Property, associated with former underground storage tanks (USTs), have been confirmed (Lone Rock Resources, 1993). Other features of environmental concern were identified in the work plan (MFA, 2014) and those of greatest concern were assessed during the August 19, 2014, environmental investigation.

2.3 Features of Potential Environmental Concern

The focused site assessment was designed to investigate the features of potential concern, as developed through consultation with Ecology staff and identified in the work plan, with the greatest potential for environmental impacts (MFA, 2014)(see Table 1). Not all the features of potential environmental concern identified in the work plan were investigated. Table 1 provides a summary of all features of potential environmental concern identified at the Property and indicates which of those were evaluated as part of this preliminary site investigation. Locations for the features of potential environmental concern are also show in Figures 2a through 2d.

In the work plan, MFA identified chemicals of interest (COIs) associated with each of the features of potential concern listed above (MFA, 2014). COIs identified at the Property include: petroleum hydrocarbons, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc).

2.4 Geology

According to the Geologic Map of the Sedro-Woolley North and Lyman 7.5-minute quadrangles, the Property and vicinity are underlain by Quaternary glaciomarine drift (Dragovich et al., 1999). The glaciomarine deposits typically consist of "poorly sorted, poorly compacted diamicton consisting of silty, sandy, gravelly clay to clayey gravel; moderately well- to well-sorted sandy silt, sandy clay, clayey silt, and clay" (Dragovich et al., 1999). MFA reviewed geologic cross sections, developed through interpretation of well log, geotechnical boring, and field information, which showed approximately horizontally oriented, 100- to 130-foot thick deposits of Quaternary glaciomarine drift within the vicinity of the Property (Dragovich, et al., 1999).

MFA reviewed well logs from Ecology's online well log database for wells located in the nearest quarter sections adjacent to the Property tax parcels to better understand the local geology and identify potential water-bearing zones that may be encountered at the Property. Several logs were located for geotechnical borings located on the Property. The exact location of these borings is unknown, but the logs indicate that the Property is underlain by approximately 25 feet of silt in some locations and approximately 15 feet of sand and gravel overlying silty sand in other locations.

Soil observations from borings advanced at the north end of the Property indicate that the geology in that area generally consists of an approximately 1- to 2-foot-thick surficial layer of gravelly sand and silt underlain by silts and clays extending to approximately 12 to 14 feet below ground surface (bgs) (see boring logs in Appendix A). Lenses of silty sand were observed throughout the silt and clay unit. The density of the silt and clay unit tended to increase with depth. A unit of gravelly sand was also observed at some boring locations, beginning at approximately 14 feet bgs and extending to

the maximum boring depth of 15 feet bgs. Trace amounts of coal-like material were observed in thin layers at various depths in most of the borings at the Property.

Heterogeneities and cross-cutting layers are typical of this type of geologic environment; therefore, environmental impacts at the Property are not likely to migrate significant distances because conductive soil layers are probably not well interconnected or continuous.

2.5 Hydrogeology

Previous investigations identified groundwater between 6 and 14 feet bgs (Lone Rock Resources, 1993). MFA identified several logs from Ecology's online well log database for domestic water wells in the general vicinity, which indicate that shallow groundwater is present at depths from less than 20 feet bgs to greater than 80 feet bgs (MFA, 2014). These domestic water well logs suggest that the local geology is variable and is generally composed of water-bearing zones of sand and gravel interspersed with layers of silt and clay. This type of variable geologic environment is consistent with MFA's understanding of the glaciomarine drift deposits present in the area.

The groundwater flow direction in the area of the Property has not been confirmed, but is inferred to flow toward the south, southwest, and southeast at the south end of the Property, consistent with the local topography and as a result of discharge to Hansen and Brickyard creeks (Figure 1). At the north end of the Property, groundwater likely flows generally north toward Hansen Creek.

Groundwater was encountered in four out of eight borings that were advanced to depths of at least 12 feet bgs. Water bearing zones were initially encountered at depths ranging from 7 to 14 feet bgs in three borings advanced at the Property (GP2, GP5, GP6, and GP8) (see Appendix A). Static water levels were measured in three borings (GP2, GP6, and GP8) at approximately 7 feet bgs (see Figure 3). Given the relative continuity in the observed water levels between boring locations and the absence of a continuous confining unit, the uppermost geologic deposits likely act in bulk as a water table aquifer.

Because of the limited number of borings that encountered groundwater and the unreliability of groundwater elevation measurements from reconnaissance borings, a groundwater flow direction has not been determined. Groundwater at the north end of the Property, in the vicinity of the boring locations, is inferred to flow north toward and discharge into Hansen Creek. However, groundwater in other areas of the Property may flow southeast due to the gradual topographic slope of the area toward the Skagit River Valley. Groundwater in other areas of the Property may also flow west towards Brickyard Creek or east towards Hansen Creek (see Figure 1).

3 FIELD AND ANALYTICAL METHODS

The investigation was conducted on August 19, 2014, and focused on evaluating chemical impacts in the northeast portion of the Property, where the features of concern with the greatest potential for environmental impacts are located (see Figure 3). The investigation included soil and groundwater

sample collection from temporary boreholes and analysis for potential COIs, field observations of physical conditions, measurement of groundwater levels, and measurement of field water quality parameters. Sample locations, sample depths, and chemical analyses are summarized in Table 2.

The investigation included collection of soil and groundwater samples in the following locations to evaluate potential chemical impacts associated with features of environmental concern (see Figure 3):

- **Maintenance Building (Boring GP1):** Potential chemical impacts associated with former gasoline USTs located north of the Maintenance Building. A soil sample was collected and analyzed for petroleum hydrocarbons and metals. A groundwater sample was proposed for this location, but groundwater was not encountered in the boring.
- **Power House (Borings GP2, GP9, and GP10):** Potential chemical impacts associated with existing diesel ASTs and former coal storage activities north of the Power House. Soil and groundwater samples were collected and analyzed for one or more of the following: petroleum hydrocarbons, metals, VOCs, PAHs, and PCBs.
- **Waste Piles (Boring GP3):** Potential chemical impacts associated with a former refuse incinerator and coal storage and disposal activities east of the Power House. A soil sample was collected and analyzed for petroleum hydrocarbons, metals, PAHs, and PCBs.
- **Debris Piles: (Borings GP4 and GP5):** Potential chemical impacts associated with buried building debris piles east and northeast of the Power House. Soil samples were collected and analyzed for petroleum hydrocarbons, metals, VOCs, and PAHs.
- **Former Filtration Building (Boring GP6):** Potential chemical impacts associated with drinking water chlorination activities north of the Filtration Building. A groundwater sample was collected for field water quality parameter measurements.
- **Gasoline AST (Boring GP7):** Potential chemical impacts associated with an existing gasoline AST located north of the Planer and Paint Shops. A soil sample was collected and analyzed for gasoline-range petroleum hydrocarbons (i.e., gasoline-range organics [GRO]) and for benzene, toluene, ethylbenzene, and xylenes (BTEX).
- **Former Laundry Building (Boring GP8):** Chemical impacts associated with potential dry cleaning operations east of the former Laundry Building. A groundwater sample was collected and analyzed for petroleum hydrocarbons and VOCs.

Environmental sampling, measurement, and quality control procedures were conducted in accordance with industry standard operating procedures as described in the Sampling and Analysis Plan (SAP; included as an appendix to the work plan [MFA, 2014]).

3.1 Soil Sampling

Soil samples were collected from temporary boreholes (see Figure 3 for boring locations). A direct-push drilling rig was used to advance continuous soil cores at ten boring locations from the ground

surface up to a maximum depth of 19 feet bgs. Most borings were advanced to 16 feet bgs to evaluate potential shallow soil impacts and to collect shallow reconnaissance groundwater samples. Borings GP9 and GP10 were added during the sampling event and were advanced to 8 feet bgs to evaluate potential shallow soil impacts in the vicinity of the existing diesel ASTs and the former coal storage area to the north of Power House. Boring logs are provided as Appendix A and sampling depths are summarized in Table 2.

Soil conditions were described and visual and olfactory observations were recorded during drilling. Soil olfactory indications of contamination (e.g., petroleum-like odors) were screened with a photoionization detector (PID). Geographic coordinates for the boring locations were recorded using a hand-held global positioning system device.

During sampling, coal-like material was encountered in thin lenses from approximately 0.5 to 2.0 feet bgs in borings located to the north of the Power House (GP2, GP9 and GP10), and was intermittently observed from the surface to approximately 9 feet bgs in the borings near the waste and debris piles to the east of the Power House (GP3, GP4, GP5). Very little debris was encountered in any of the borings, except for one small roof tile piece in boring GP4. Thick units of silt and clay were observed below 2.0 feet bgs at most boring locations.

Samples were submitted to Analytical Resources, Inc. (ARI) of Tukwila, Washington, for analysis under standard chain-of-custody procedures. Soil samples were selected for analysis, based on observed impacts and olfactory observations, and on elevated head-space readings collected with a PID. Specific chemical analyses were chosen for each location, based on the potential chemical sources identified in Section 2.3 and in the work plan (MFA, 2014). Follow-up analyses were selected based on initial analytical results. Soil samples submitted for analysis and the specific chemical analyses performed are summarized in Table 2.

The following tiered approach was used for the soil sample analysis:

- All soil samples, except the soil sample collected from GP7, were initially analyzed for hydrocarbon identification (HCID) by the Northwest Total Petroleum Hydrocarbon (NWTPH) HCID method (NWTPH-HCID).
- If hydrocarbons were detected by NWTPH-HCID, additional analyses were requested for that sample as follows:
  - Analysis for diesel-range organics (DRO) and/or motor-oil-range hydrocarbons by the NWTPH-Dx method was requested for samples with DRO detections.
  - Analysis for GRO by the NWTPH-Gx method was requested for samples with GRO detections.
- If DRO or GRO were detected, analysis for BTEX by U.S. Environmental Protection Agency (USEPA) Method 8021B Modified was also requested for that sample.
- Additional follow-up analyses were conducted for PAHs, PCBs, and total metals because of the relatively higher concentrations of DRO in the sample collected from GP9 relative to GP10 concentrations.

- For the soil sample collected from GP7, analyses of GRO by NWTPH-Gx and BTEX by USEPA Method 8021B were conducted without any prior HCID testing based on GP7's proximity to an existing gasoline AST.
- All soil samples, with the exception of those collected from GP7 and GP10, were analyzed for total metals by USEPA Method 200.8 and total mercury by USEPA Method 7470A/7471A.
- Additional analyses of soil samples were requested based on their associated areas of concern. At least one of the following additional analyses was requested for a soil sample:
  - PAHs by USEPA Method 8270D selective ion monitoring
  - VOCs by USEPA Method 8260C
  - PCBs by USEPA Method 8082A
- None of the soil samples were analyzed for pesticides or herbicides because building debris and landfill debris were not encountered during sampling, with the exception of the roof tile piece in boring GP4.

3.2 Groundwater Sampling

Temporary well screens were set in the temporary boreholes for collection of reconnaissance groundwater samples. Groundwater samples and/or parameters were collected from borings GP2, GP6, and GP8 as shown in Figure 3 and discussed in Section 6.2. Field water quality parameters were measured before sample collection and recorded on field sampling data sheets (FSDSs), which are included as Appendix B. Groundwater sampling was conducted in accordance with the methods and protocols outlined in the SAP provided as an appendix to the work plan (MFA, 2014).

Well screens were set in borings GP2, GP6, and GP8 between 10 and 15 feet bgs (GP2 and GP6) and 13 to 18 feet bgs (GP8). A groundwater sample was proposed in the work plan at GP1, but groundwater was not encountered in this boring, which was advanced to 16 feet bgs. Reconnaissance groundwater samples were collected from two borings: GP2 and GP8. Water quality parameters were measured in groundwater at GP6 to identify any spikes in pH related to the former storage and use of chlorination chemicals in the Filtration Building, but a groundwater sample was not collected from this boring.

Groundwater samples were submitted to ARI for analysis under standard chain-of-custody procedures. Specific chemical analyses were chosen for each location, based on the COIs identified in the work plan (MFA, 2014). The specific chemical analyses performed for each sample are summarized in Table 2. Reconnaissance groundwater samples were analyzed for the following:

- **GP2:**
  - Total petroleum hydrocarbons (TPH) HCID by Method NWTPH-HCID

  - Analysis of DRO and motor-oil-range hydrocarbons by NWTPH-Dx was performed following a detection of hydrocarbons in the sample by TPH-HCID.
  - BTEX by USEPA Method 8021B
  - Dissolved metals by USEPA Method 200.8
  - Dissolved mercury by USEPA Method 7470A/7471A
  - PAHs by USEPA Method 8270
- **GP8:**
  - TPH-HCID by Method NWTPH-HCID
  - VOCs by USEPA Method 8260C

4 ANALYTICAL RESULTS

Laboratory analytical reports are provided as Appendix C. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they meet project-specific data quality objectives. This review was performed consistent with accepted USEPA procedures for evaluating laboratory analytical data (USEPA, 2004, 2008) and appropriate laboratory and method-specific guidelines (ARI, 2012). A data validation memorandum summarizing data evaluation procedures, data usability, and deviations from specific field and/or laboratory methods for the August 19, 2014, investigation data is included as Appendix D. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

In the following discussion, "heavy oils" refers to the sum of the DRO and motor-oil-range hydrocarbon concentrations.

4.1 Soil

Soil analytical results are summarized in Table 3. Eight soil samples were collected and analyzed for COIs related to potential environmental conditions (see Table 2 and Figure 3).

In the following discussion, metals detections include total arsenic, barium, cadmium, total chromium, copper, lead, mercury, selenium, silver, and zinc.

The following is a summary of results by boring location:

- **GP1:** Hydrocarbons were not detected by TPH-HCID. Metals were detected.
- **GP2 and GP3:** Hydrocarbons were not detected by TPH-HCID and PCBs were not detected. Metals and PAHs were detected.

- **GP4 and GP5:** Hydrocarbons were not detected by TPH-HCID. Metals and acetone were detected; no other VOCs were detected. PAHs were detected at GP4, but not GP5.

- **GP7:** Neither GRO nor BTEX were detected.

- **GP9:** DRO and motor-oil-range hydrocarbons were detected by TPH-HCID and follow-up NWTPH-Dx analysis detected heavy oils at 2,920 milligrams per kilogram (mg/kg) in the sample from 0.5 feet bgs. Metals were detected. BTEX, PAHs, and PCBs were not detected.

- **GP10:** DRO and motor-oil-range hydrocarbons were detected by TPH-HCID and follow-up NWTPH-Dx analysis detected heavy oils at 2,520 mg/kg in the sample from 0.5 feet bgs. BTEX was not detected.

A risk screening was conducted to compare concentrations of chemicals detected in soil to applicable CULs (see Section 6).

4.2 Groundwater

Groundwater analytical results are summarized in Table 4. Field water quality parameters were recorded on the FSDSs included as Appendix B. Reconnaissance groundwater samples were collected at depths of approximately 10 feet bgs and 12.5 feet bgs, respectively, from borings GP2 and GP8 (see Figure 3). A groundwater sample was not collected from boring GP6.

The following is a summary of results by boring location:

- **GP2:** DRO and motor-oil-range hydrocarbons were detected by TPH-HCID and follow-up NWTPH-Dx analysis detected heavy oils at a concentration of 1.74 milligrams per liter. Total arsenic, barium, copper, and naphthalene were detected; no other metals or PAHs were detected. BTEX was not detected.

- **GP8:** Tetrachloroethene (PCE), trichloroethene (TCE), and cis-1,2-dichloroethene were detected; no other VOCs were detected. Hydrocarbons were not detected.

Field parameters measured at GP6 were compared to those from GP1 to assess potential water quality impacts at GP6 associated with former chlorination activities. No water quality anomalies were measured at GP6. Only one set of field parameter measurements was recorded at GP8 because of a limited amount of available water in the boring and very little observed recharge.

A risk screening was conducted to compare concentrations of chemicals detected in groundwater to applicable CULs (see Section 6).

5 CONCEPTUAL SITE MODEL

A CSM was developed to describe release mechanisms, environmental transport processes, exposure routes, and receptors for sources identified on the Property. The primary purpose of the CSM is to identify potential current and future pathways by which human and ecological receptors could be exposed to site-related chemicals. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment, (2) an environmental transport medium for a released chemical, (3) a point of potential contact with the impacted medium (referred to as the exposure point), and (4) an exposure route (e.g., soil ingestion) at the exposure point. However, an incomplete exposure pathway does not guarantee that the exposure pathway will always remain incomplete. If the Property is redeveloped, it may be necessary to reevaluate potential exposure pathways. The CSM describes potential exposure scenarios based on information collected during the site assessment, including the risk screening presented in Section 6. Elements of potentially complete exposure scenarios relevant to human health and ecological receptors are discussed below and are presented in Figure 4.

5.1 Source Characterization

Potential contaminant sources associated with historical and current operations were identified during the environmental due diligence activities conducted as part of the work plan (MFA, 2014), as discussed in Section 2.3 and listed in Table 1.

Contaminants detected in soil and groundwater on the Property include metals, petroleum hydrocarbons, VOCs, and PAHs. Metals, petroleum hydrocarbons, and petroleum-related constituents, including PAHs and VOCs (specifically BTEX), were generally detected in shallow soil (less than 7 feet bgs) near current and former fuel handling areas and former coal storage and disposal areas. PCE was detected in groundwater near the former Laundry Building. PCE has been the primary solvent used for dry cleaning since the late 1950s. No record of dry cleaning operations at the former Laundry Building was located; however, the presence of PCE in groundwater near the building indicates that dry cleaning solvents may have been used sometime after the late 1950s. Nonaqueous-phase liquids were not observed during the site investigation.

5.2 Fate and Transport of Contaminants

The primary mechanisms likely to influence the fate and transport of chemicals at the Property include natural biodegradation of organic chemicals, sorption to soil, advection and dispersion in groundwater, volatilization from soil or groundwater to air, and leaching of chemicals from soil to groundwater. The relative importance of these processes will vary, depending on the chemical and physical properties of a released contaminant. The properties of soil and the dynamics of groundwater flow also affect contaminant fate and transport.

The Property is widely vegetated, with large areas of unpaved ground surface. The soil-to-groundwater migration pathway is potentially complete because of the potential for infiltration of precipitation through the unpaved ground surface at the Property into the vadose-zone soil. Leaching of near-surface soil impacts during precipitation events could result in impacts to shallow groundwater at the Property.

The shallow groundwater at the Property likely discharges to Hansen Creek to the north. This indicates that there is a potentially complete migration pathway from groundwater to surface water and sediments at the Property.

Volatile contaminants may partition to the vapor phase in the source area or downgradient of the source area via groundwater transport of dissolved-phase contamination. Contaminant vapors partitioning from contaminated soil or groundwater could result in impacts to indoor and outdoor air quality.

Dissolved-phase contamination migrating downgradient of the source area could potentially discharge to Hansen Creek, resulting in surface water and sediment impacts. Fish intake of contaminated surface water or sediment could result in the bioaccumulation of contaminants in the fatty tissue of these animals.

5.3 Potential Human Health Exposure Scenarios

Potential human and ecological exposure pathways are shown in Figure 4. Ecological exposure pathways are discussed in the next section.

The Property is currently used for commercial and residential purposes. Buildings historically used for hospital operations provide temporary housing for Cascade Job Corps students and Pioneer Center residents. Redevelopment plans for the Property may include expanded residential use of the existing buildings. Therefore, based on current and potential future uses of the Property, human receptors may include construction workers, occupational workers, and residents.

Hansen Creek, located along the north end of the Property, provides fish habitat that may attract recreational fishers. Therefore, recreational fishers are also potential receptors at the Property.

Potentially complete human exposure pathways are discussed below for the receptors identified for the Property.

Occupational workers and on-site residents—Occupational workers and residents currently occupy the Property for incremental amounts of time for activities related to the operation of the Cascade Job Corps and the Pioneer Center. Future redevelopment may include increased residential use of the Property. The pathways by which current or future residents could potentially be exposed to chemicals at the Property include:

- Direct skin contact with, incidental ingestion of, and inhalation of wind-borne particulates from chemically impacted shallow soil.

- Inhalation of indoor air vapors emanating from soil or groundwater with volatile chemical impacts.
- Direct skin contact with, incidental ingestion of, and inhalation of volatizing chemically impacted potable groundwater.
- Direct skin contact with and incidental ingestion of surface water or sediment in Hansen Creek that has been chemically impacted via discharges of chemically impacted groundwater.

On-site construction workers—There are currently no construction workers (e.g., excavation workers, trench workers) on the Property. However, construction activities may be performed as part of the Property's redevelopment or future maintenance or improvement activities. Future construction workers could potentially be exposed to chemicals at the Property by the following pathways:

- Direct skin contact with, incidental ingestion of, and inhalation of wind-borne particulates from chemically impacted shallow soil or deep soil in excavations.
- Inhalation of indoor air vapors emanating from soil or groundwater with volatile chemical impacts.
- Dermal contact with, ingestion of, or inhalation of vapors emanating from chemically impacted shallow groundwater encountered in excavations below the water table and if groundwater is used for potable purposes.
- Direct skin contact with and incidental ingestion of surface water or sediment in Hansen Creek that has been chemically impacted via discharges of chemically impacted groundwater.

Recreational fishers—Hansen Creek, a tributary of the Skagit River, has been identified as a salmon habitat area and may be used by recreational fishers. Recreational fishers could potentially be exposed to chemicals at the Property by the following pathways:

- Direct skin contact with and incidental ingestion of surface water or sediment in Hansen Creek that has been chemically impacted via discharges of chemically impacted groundwater.
- Ingestion of chemicals bioaccumulated in the tissue of fish from chemically impacted surface water or sediment in Hansen Creek.

Ecological receptors—Soil exposure routes and potential screening levels for terrestrial ecological receptors at the Property are discussed in Section 5.4. Ecological receptors - aquatic and terrestrial - may also be exposed to chemicals at the Property in surface water, sediment, and/or fish tissue by the following pathways:

- Direct contact with and ingestion of surface water or sediment in Hansen Creek that has been chemically impacted via discharges of chemically impacted groundwater.

- Ingestion of chemicals bioaccumulated in the tissue of fish from chemically impacted surface water or sediment in Hansen Creek.

Groundwater contamination was detected at relatively low concentrations at a distance of approximately 300 feet or more from Hansen Creek. Therefore, exposure pathways that include discharges of chemically impacted groundwater to surface water and sediment in Hansen Creek are potentially insignificant, but will be retained as potentially complete pathways pending further investigation.

Scenarios involving exposure to vapors in outdoor air are also considered insignificant, given the attenuation that would likely occur in outdoor air.

Groundwater beneath the Property is not currently used as a drinking water source, however it is considered potable and available for use. Therefore, scenarios involving exposure to contaminated groundwater as drinking water are considered potentially complete. If groundwater impacts remain on the Property following the eventual selection of a remedy for groundwater contamination, an environmental covenant may be required to restrict groundwater uses.

5.4 Terrestrial Ecological Evaluation

Potential ecological exposure pathways are shown in Figure 4. Ecological receptors could potentially be exposed to chemical impacts in shallow soil at the Property. The Property abuts the Northern State Recreation Area, which includes more than 700 acres of undeveloped forestland, grasslands, and wetlands. Because this large area of undeveloped open space is likely to attract wildlife to the Property, a site-specific terrestrial ecological evaluation (TEE) was performed. The purpose of the TEE is to evaluate potential risk to ecological receptors from contamination at the Property (see WAC 173-340-7490(1)(b)). The TEE is included as Appendix E. Ecological screening levels may be used as potential soil cleanup levels.

The exposure routes assessed for the TEE included plant uptake of chemicals in soil, ingestion of soil, and ingestion of chemicals in plant material or prey. Detections of chemicals in soil were compared to ecological screening levels for plants, soil biota, and wildlife; using values from Table 749-3 of WAC 173-340-900 (see Appendix E).

The TEE found six sample locations exceeding plant, soil biota, and/or wildlife ecological indicator concentrations (EICs) for total metals (see Figure 5). Two sample locations were identified as exceeding soil biota EIC for DRO. However, if eventual plans for remediation of soils at the Property include removal and off-site disposal and/or capping, the risk posed to plant and wildlife receptors will be removed. Additional investigation at the Property is proposed to further delineate the extent of soil impacts, develop remediation actions, and determine the need for additional ecological risk screening.

5.5 Cleanup Standards

According to MTCA, the cleanup standards for a particular site have two primary components: chemical-specific CULs and points of compliance (POCs). The CUL is the concentration of a chemical in a specific environmental medium that will not pose unacceptable risks to human health or the environment. The POC is the location where the CUL must be met.

MTCA provides three different options for establishing CULs for human health: Method A, Method B, and Method C. MTCA Method A is designed for cleanups at relatively simple sites, such as small sites that have only a few hazardous substances. Method B can be used at any site. Method C is used primarily for industrial sites.

Preliminary CULs were developed for screening purposes, as discussed below. These CULs are not considered final CULs for the Property; CULs may be redeveloped following additional investigation and characterization of the identified impacts on the Property.

5.5.1 Soil Cleanup Levels

Relatively few contaminants were detected in soil at the Property. The Property historically has been used for residential purposes and it is anticipated to be used for residential purposes in the future. Therefore, soil was screened to MTCA Method A CULs for unrestricted land use. The Method A values are for protection of human health via the direct contact or ingestion pathways and protection of groundwater via the leaching to groundwater pathway. Other soil cleanup levels, beyond Method A, may be required to protect terrestrial species via the direct contact pathway (as discussed in Section 5.4 and Appendix E) or benthic species via direct contact with sediment impacted by erosion and runoff of chemically impacted soil. Soil CULs will be reevaluated following additional site characterization.

For certain constituents, MTCA Method A CULs are not available and Method B CULs were applied. Method B CULs are calculated concentrations that are estimated to result in no acute or chronic toxic effects on human health for noncarcinogens, and concentrations for which the upper bound on the estimated excess cancer risk is less than or equal to one in one million (1×10^{-6}) for carcinogens.

Soil CULs for the protection of potable groundwater (leaching-to-groundwater pathway) are not currently recommended as potential cleanup targets for soil on the Property. The leaching-to-groundwater criteria are helpful in providing an initial screening of soil data to assess the potential for impacts to groundwater. However, because empirical groundwater data are available, they are used to evaluate groundwater conditions.

5.5.1.1 Points of Compliance in Soil

The soil POC is the depth bgs at which soil CULs shall be attained. The standard POC is soil within 15 feet of the ground surface throughout the entire site. This standard POC is applied to soil on the Property.

5.5.2 Groundwater Cleanup Levels

Groundwater was screened relative to MTCA Method A CULs and applicable or relevant and appropriate requirements (ARARs) for freshwater surface water. For certain constituents, Method A CULs were not available and Method B CULs were used. The minimum concentration of the state and federal aquatic life and human health freshwater water quality standards were selected as the surface water ARARs. These ARARs are for protection of aquatic species via direct contact with surface water potentially impacted by discharges of chemically impacted ground water. Additional CULs may be required to be protective of benthic species via direct contact with sediment impacted by discharges of chemically impacted groundwater.

Concentrations of VOCs detected in groundwater were also compared to groundwater screening levels for vapor intrusion, from Table B-1 of Ecology's draft guidance on evaluation soil vapor intrusion (Ecology, 2009). Groundwater CULs, surface water ARARs, and vapor screening levels are summarized in Table 4.

5.5.2.1 Points of Compliance in Groundwater

For groundwater, the POC is the point or points where the groundwater CULs must be attained for a site to be in compliance with the cleanup standards. Groundwater CULs shall be attained in all groundwater from the POC to the outer boundary of the hazardous-substance plume. A conditional POC may be established if it is not practicable to meet the CULs throughout the site within a reasonable restoration time frame (WAC 173-340-720(8)(c)). A conditional POC for groundwater is not proposed at this time.

6 RISK SCREENING

The soil sample results were compared to MTCA Method A CULs for unrestricted use and to Method B CULs when applicable (see Table 3). The groundwater sample results were compared to MTCA Method A CULs and freshwater surface water ARARs protective of aquatic life and human health (see Table 4). Soil and groundwater CUL exceedances are shown in Figures 5 and 6, respectively. VOCs detected in groundwater were also compared to vapor intrusion screening levels for unrestricted land use.

As discussed below, preliminary indicator hazardous substances (IHSs) were selected by comparing the maximum concentrations found in soil and groundwater to their respective CULs. An IHS is defined as a chemical that exceeds a CUL at one or more locations. Given that additional investigation is required to sufficiently characterize the Property for selection of a cleanup action(s) and that final CULs have not been developed, these IHSs are considered preliminary and were selected in order to focus the discussion of chemical impacts. Future characterization work will not be limited to these IHSs, but will also include investigation for other COIs detected at the Property.

Detected concentrations of some constituents were summed for comparison to applicable CULs as follows:

- A toxic equivalency quotient (TEQ) was calculated for carcinogenic PAHs (cPAHs) for comparison to the benzo(a)pyrene CUL.
- DRO and motor-oil-range hydrocarbon were summed for comparison to the heavy oils CUL.
- M-, p-, and o-xylenes were summed for comparison to the total xylenes CUL.
- 1- and 2-methylnaphthalene and naphthalene were summed for comparison to the naphthalene CUL.

6.1 Soil

Eight soil samples were collected and analyzed at the Property. The following detected chemicals in soil exceed CULs (see Table 3 and Figure 5):

- Total heavy oils exceed the MTCA Method A CUL in two samples (collected from borings GP9 and GP10 at approximately 0.5 foot bgs) near the existing diesel ASTs and the former coal storage area to the north of the Power House.
- cPAH TEQ exceeds the benzo(a)pyrene CUL in one soil sample (collected from GP9 at approximately 0.5 foot bgs); the benzo(a)pyrene result using the cPAH TEQ calculation was "J-flagged" by the analytical laboratory as an estimated value.

Analytical results indicate that no other samples contain detectable COIs above applicable CULs or screening levels.

Exceedances of terrestrial ecological indicator concentrations were noted on Figure 5 and are further discussed in Appendix E. As discussed in Section 5.5.1, terrestrial ecological indicator concentrations may be selected as final CULs for the Property. Final CULs will be developed following additional site characterization.

6.2 Groundwater

Reconnaissance groundwater samples were collected from borings GP2 and GP8. The following detected chemicals in groundwater exceed CULs or other screening criteria (see Table 4 and Figure 6):

- Dissolved arsenic (as total arsenic) at GP2 exceeds the surface water screening level, but is below the MTCA Method A CUL.
- Total heavy oils at GP2 exceed the MTCA Method A CUL.
- PCE at GP8 exceeds the Method A CUL and the surface water screening level.

All other groundwater detections were significantly below CULs or surface water screening levels.

The following VOCs were detected in the groundwater sample collected from boring GP8: cis-1,2-dichloroethene, PCE, and TCE. These detected VOC concentrations were compared to vapor screening levels for groundwater from the Ecology draft guidance (Ecology, 2009). The PCE concentration of 11 micrograms per liter (ug/L) exceeds the vapor screening level of 1 ug/L, and the TCE concentration of 0.79 ug/L exceeds the vapor screening level of 0.42 ug/L.

6.3 Indicator Hazardous Substances

The following chemicals were detected above CULs in soil and were selected as preliminary IHSs for soil:

- Total heavy oils
- cPAHs

The following chemicals were detected above CULs, surface water ARARs, and/or vapor screening levels in groundwater and were selected as preliminary IHSs for groundwater:

- Total heavy oils
- Arsenic
- PCE
- TCE

Total heavy oils exceedances were generally detected in shallow soil (0 to 1 foot bgs) and groundwater (approximately 10 feet bgs) to the north of the Power House. An arsenic exceedance was also detected in shallow groundwater in that area.

PCE and TCE exceedances in groundwater were detected downgradient of the current carpentry shop that was formerly the Laundry Building. The presence of PCE breakdown products (TCE and cis-1,2-dichloroethene) indicates that the PCE source is naturally degrading.

Further characterization of these preliminary IHSs, as well as other detected COIs is recommended in order to delineate the extent of CUL exceedances, refine the CSM, and reevaluate CULs, in particular to assess whether the groundwater-to-surface-water pathway is complete. In addition, potential remedial actions should be identified and developed and should be considered in the development of final CULs.

7 DATA GAPS AND RECOMMENDATIONS

Potential features of environmental concern were identified during due diligence activities conducted during development of the work plan (MFA, 2014). The presence or absence of

environmental impacts associated with primary features of concern identified in the work plan was evaluated as part of this investigation. Table 1 identifies the potential features of environmental concern identified during due diligence activities, indicates which of those features of concern were investigated as part of this focused site assessment, and includes a rationale for additional investigation work, if recommended, for those features of concern that were either not previously investigated or for which associated chemical impacts were confirmed. Potential features of environmental concern that were identified during the due diligence, but were not evaluated during the field investigation are also summarized in Table 1.

MFA recommends conducting additional subsurface investigation to further evaluate the following data gaps associated with known environmental conditions identified at the Property during the August sampling event (see Table 1 and Appendix E):

- The vertical and lateral extent of total heavy oils exceedances in shallow soil and groundwater to the north of the Power House.
- The lateral extent of PCE and TCE exceedances in shallow groundwater near the former Laundry building.
- PCE and TCE exceedances in soil and sub-slab soil vapor associated with the identified groundwater impacts.
- Preliminary IHS exceedance discharges from groundwater to surface water in Hansen Creek.
- The shallow groundwater flow direction.
- Area background metals assessment to identify the presence/absence of an elevated background condition.
- Applicability of TEE exclusions or the need for a more in-depth, site-specific TEE.

MFA also recommends additional subsurface investigation to evaluate those features of concern that were not evaluated as part of initial investigation activities, as summarized in Table 1. In order to adequately characterize environmental impacts at the Property for the purposes of developing cleanup alternatives, MFA recommends conducting an additional subsurface investigation to address the data gaps and features of potential environmental concern listed above and in Table 1.

8 CONCLUSIONS AND ANTICIPATED REMEDIAL ACTIONS

The focused site assessment was completed to evaluate the presence of and the nature and extent of COIs in soil and groundwater associated with the features identified in the work plan with the greatest potential for environmental concern. Investigation results indicate that there are total heavy oils impacts in shallow soil and groundwater; cPAH impacts in shallow soil; and PCE, TCE, and

arsenic impacts in shallow groundwater, however, these contaminants are present at relatively low concentrations and appear to be confined to discrete locations. It is unknown whether contaminated groundwater discharges to surface water and sediments in Hansen Creek.

Based on the findings of this assessment, some targeted remedial actions and engineered and institutional controls will likely be required to support redevelopment of the property. Human and ecological exposure pathways are currently complete for contaminated soil and groundwater. Redevelopment of the Property may include expanded residential use of the existing infrastructure. Following additional characterization, MFA recommends development of remedial actions that are protective of both human and ecological receptors at the Property, including the following:

- In situ remediation and/or monitored natural attenuation of groundwater impacts
- Excavation and off-site disposal of impacted soils to a depth of 6 feet, in combination with the use of applicable institutional controls
- Capping of impacted soils through the use of paving to limit any future potential exposure and infiltration of precipitation that would increase the likelihood of impacts leaching to near-surface soil

These remedial actions can all be considered routine measures to address low level impacts from the COIs. They can conducted either as part of redevelopment site preparation work or in advance. Additional investigation of the subsurface is recommended to improve the understanding of identified impacts and develop remedial actions that will be protective of identified receptors at the Property.

LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

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TABLES

Table 1
Features of Potential Environmental Concern
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, WA

	Included in August 2014 site investigation?[b]	Location ID	Report figure showing this feature/boring location	Feature Index Number on Figure 2a	Additional Investigation Recommended?[c]	Rationale
Features of Potential Environmental Concern[a]						
Former 1,000- and 2,000-gallon gasoline USTs and associated soil and groundwater impacts adjacent to the Maintenance Building	Yes	GP1	2a, 3	18, 19	Yes	Soil in the immediate vicinity of the former USTs was not collected and groundwater was not encountered in the downgradient (inferred) boring location.
Parts cleaning and maintenance activities in the Maintenance Building	Yes	GP1	2a, 3	17	Yes	Soil samples collected adjacent to the building were evaluated for heavy metals, but potential parts-cleaning-related solvents were not evaluated in soil or groundwater.
Two existing 8,000-gallon (approximately) diesel ASTs with a fuel dispenser located north of the Power House	Yes	GP2, GP9, GP10	2a, 3	15	Yes	Heavy oils impacts were confirmed in soil and groundwater, but the extent has not been delineated.
Former coal bin and smokestack north of the Power House	Yes	GP2, GP9, GP10	2a, 3	14, 16	Yes	Coal fragments were observed in soil with an associated PAH preliminary cleanup level exceedance that may be associated with the coal or potentially associated with confirmed heavy oils impacts in that area. The nature and extent of potential coal-related PAH impacts has not been adequately characterized.
Former refuse incinerator and potential coal storage and/or disposal location east of the Power House	Yes	GP3	2a, 3	12	No	Debris was not encountered in the boring advanced in this location and coal-related chemicals in soil did not exceed applicable preliminary cleanup levels.
Buried debris pile with potential building demolition debris, landfill refuse, coal, and asphalt located east of the Power House	Yes	GP4	2a, 3	11	No	Debris was not encountered in the boring advanced in this location and coal-related chemicals in soil did not exceed applicable preliminary cleanup levels.
Buried debris pile in former Mill Pond area with potential building demolition debris, landfill refuse, coal, and asphalt located northeast of the Power House	Yes	GP5	2a, 3	9	No	Debris was not encountered in the boring advanced in this location and coal-related chemicals in soil did not exceed applicable preliminary cleanup levels.
Drinking water chlorination chemical storage and use in the former Filtration Building	Yes	GP6	2a, 3	6, 7	No	Field parameter measurements from a groundwater sample collected downgradient (inferred) of the former Filtration Building do not indicate the likely presence of environmental impacts associated with chlorination chemicals.
Existing 500-gallon (approximately) unleaded gasoline AST located north of the Paint and Planar shops	Yes	GP7	2a, 3	2	No	Gasoline-related impacts were not identified in shallow soil adjacent to the UST.
Potential dry cleaning solvent use in the former Laundry Building	Yes	GP8	2a, 3	1	Yes	PCE and TCE impacts were identified in groundwater and associated soil and vapor impacts may also be present, but were not investigated.
Potential chips of and sandblasting grit from building paint that may have contained lead and other heavy metals in soil along the exteriors of historical buildings.[d]	Yes	GP1, GP2, GP9	2a, 3	NA	Yes	Shallow soil samples collected adjacent to the Power House and Maintenance Building did not exhibit heavy metals concentrations above preliminary cleanup levels; however, soil along the perimeter of other historical buildings has not been evaluated.
Former approximately 500-gallon diesel UST and associated soil and/or groundwater impacts adjacent to the Douglas Building	No	NA	2a	26	Yes	A previous investigation identified diesel in soil in contact with groundwater, but groundwater was not collected and analyzed. Diesel concentrations in soil were below preliminary cleanup levels.[e]
Historical operation of the former Paint, Planer, and Carpentry Shops, including storage of wood painting materials	No	NA	2a, 3	3, 4, 5	Yes	Chemicals associated with former paint storage and mixing and tin, blacksmith, plumbing, and carpentry shop activities have not been evaluated in soil or groundwater.
Unknown USTs: there may be unknown USTs that were associated with former heating or generator fuel storage	No	NA	NA	NA	No	MFA conducted an exhaustive review of historical records during due diligence activities and did not identify any additional former or current USTs on the property, aside from those mentioned above. However, the potential exists for unknown USTs to be present (e.g., heating oil USTs associated with large buildings), but given the absence of information confirming additional USTs and given that they are considered to pose a low environmental risk, additional investigation is not recommended.

Table 1
Features of Potential Environmental Concern
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, WA

	Included in August 2014 site investigation?[b]	Location ID	Report figure showing this feature/boring location	Feature Index Number on Figure 2a	Additional Investigation Recommended?[c]	Rationale
Chlorination Activities: the types of chemicals used and the duration of operation of a former chlorination plant are unknown	No	NA	2a, 3	6, 7	No	Groundwater impacts in association with former chlorination chemical storage and use were not identified downgradient (inferred) of the former Filtration Building. Chlorination chemicals may have been used in other areas of the Property, but specific locations were not identified during due diligence activities.
Former PCB-containing Transformer Locations: the location and resulting impacts of storage of formerly used PCB-containing transformers.	No	NA	NA	NA	No	No PCB-containing transformers are currently known to be present on the property. Environmental impacts associated with former PCB-containing transformers may be present on the property, but exact locations were not identified during the due diligence activities.
The National Guard Armory: a fueling island, an oil/water separator, and an AST are currently present on the facility	No	NA	2d	NA	No	Land use and operations are not likely to change in this area of the property given the long-term lease in place with the National Guard. Given that and access limitations, MFA does not recommend investigating this area of the property.
Laundry Building: presence/absence of dry cleaning activities	Yes	NA	2a, 3	1	No	PCE and TCE were confirmed in groundwater downgradient (inferred) of the Laundry Building, but dry cleaning activities have not been definitively verified and PCE may be associated with other chlorinated solvent uses. As mentioned above, additional investigation of PCE-related impacts in groundwater and associated environmental media is recommended, but verification of the potential PCE source is not required.
Waste Management: unknown or unmarked landfills may be present on the Property containing debris from historical operation of the hospital	No	NA	NA	NA	No	MFA conducted an exhaustive review of historical records during due diligence activities and did not identify any landfills on the property. However, the potential exists for unknown landfills to be present (e.g., associated with the former hospital building). Given the lack of information on potential presence and locations of any landfills, additional investigation is not recommended.
Building Debris: several buildings have been buried in-place on site potentially resulting in impacts to soil due to asbestos or heavy metals, including the former Ward, Employee and Winfield Garage, and Horton buildings; and the former Superintendent's Residence. Building debris was reportedly buried in the former septic tanks and may have been buried in the former Mill Pond area and near the former incinerator.	No	NA	2a, 2b, 2c, 2d, 3	9, 11	No	Environmental impacts, if present, associated with building debris is likely relatively immobile and confined to the former building footprints. Whereas the debris itself, if disturbed or removed, should be managed and disposed of properly, associated environmental impacts are likely minimal and may be addressed during and as part of any debris removal activities.
Building materials, paint, and waste or debris in historical buildings	No	NA	2a, 3	NA	No	Assessment of lead paint and asbestos was not conducted as part of due diligence activities and is outside the scope of this focused site assessment. However, potentially harmful and/or hazardous building materials and debris or wastes remaining in vacant buildings may need to be addressed during future building renovation activities.

Table 1
Features of Potential Environmental Concern
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, WA

Notes:

bgs = below ground surface.

AST = aboveground storage tank.

MTCA = Model Toxics Control Act.

PAH = polycyclic aromatic hydrocarbon.

PCE = tetrachloroethene.

UST = underground storage tank.

[a]These features of concern were identified during due diligence activities conducted as part of the focused site assessment work plan (MFA, 2014). Only those features of primary concern were evaluated during the field investigation, as indicated in the second column of the this table.

[b]A summary of sampling details and laboratory analytical testing is provided in Table 2.

[C]Sampling recommendations are discussed in Section 7.

[d]The Cultural Resource Assessment (Artifacts Consulting, 2008) indicates a white lead and zinc paint blend was used on wood surfaces of the buildings exteriors. Heavy metals may also be present in the paint and pigment that was used on the wood surfaces and/or stucco of the buildings exteriors.

[e]As discussed in the 1993 Lone Rock Resources UST Removal Report.

Table 2
Sample and Analysis Summary
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, WA

Location ID	Feature(s) of Potential Environmental Concern[a]	Total Depth (feet bgs)	Sample Matrix	Sample Collection Depth (feet bgs)	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx[b]	BTEX	VOCs	Total Metals	Dissolved Metals	PAHs	PCBs
GP1	North of Maintenance Building: downgradient (inferred) of maintenance building and former 1,000- and 2,000-gallon gasoline USTs	16	Soil	1.4	X	--	--	--	--	X	--	--	--
GP2	North of Power House: adjacent to and downgradient (inferred) of two existing 8,000-gallon (approximately) diesel ASTs with dispenser and former coal bin and smokestack	12	Soil	3	X	--	--	--	--	X	--	X	X
			Groundwater	10	X	X	--	X	--	--	X	X	--
GP3	East of Power House: former refuse incinerator and potential coal storage or disposal location	16	Soil	7	X	--	--	--	--	X	--	X	X
GP4	East of Power House: buried debris pile with potential building demolition debris, landfill refuse, coal, and asphalt	16	Soil	5.4	X	--	--	--	X	X	--	X	--
GP5	Northeast of Power House: buried debris pile with potential building demolition debris, landfill refuse, coal, and asphalt	16	Soil	14.5	X	--	--	--	X	X	--	X	--
GP6	North of former Filtration Building: downgradient (inferred) of former filtration building where drinking water was formerly chlorinated	16	Groundwater	12.5	--	--	--	--	--	--	--	--	--
GP7	North of gasoline AST: existing 500-gallon (approximately) unleaded gasoline AST	16	Soil	0.8	--	--	X	X	--	--	--	--	--
GP8	North of former Laundry Building: downgradient (inferred) of former laundry with potential dry cleaning solvent use	19	Groundwater	12.5	X	--	--	--	X	--	--	--	--
GP9	North of Power House: adjacent to and downgradient (inferred) of two existing 8,000-gallon (approximately) diesel ASTs with dispenser and former coal bin and smokestack	8	Soil	0.5	X	X	--	X	--	X	--	X	X
GP10	North of Power House: adjacent to and downgradient (inferred) of two existing 8,000-gallon (approximately) diesel ASTs with dispenser and former coal bin and smokestack	8	Soil	0.5	X	X	--	X	--	--	--	--	--

Table 2
Sample and Analysis Summary
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, WA

NOTES:

-- = not analyzed.

X = analyzed.

AST = aboveground storage tank.

bgs = below ground surface.

BTEX = benzene, toluene, ethylbenzene, and xylenes; analysis by USEPA Method 8021B.

NWTPH-Dx = Northwest Total Petroleum Hydrocarbon method for analysis of diesel-range organics.

NWTPH-Gx = Northwest Total Petroleum Hydrocarbon method for analysis of gasoline-range organics.

NWTPH-HCID = Northwest Total Petroleum Hydrocarbons-Hydrocarbon Identification method.

PAH = polycyclic aromatic hydrocarbon, analysis by USEPA Method 8270.

PCB = polychlorinated biphenyl, analysis by USEPA Method 8082A.

Total Metals = arsenic, barium, cadmium, chromium, copper, lead, selenium, silver, and zinc, analysis by USEPA Method 200.8; and mercury, analysis by USEPA Method 7470A/7471A. Only dissolved metals were analyzed in groundwater reconnaissance samples.

USEPA = U.S. Environmental Protection Agency.

UST = underground storage tank.

VOC = volatile organic compound, analysis by USEPA Method 8260B.

[a]Environmental analyses associated with boring GP6 were limited to recording of field groundwater parameters; no sample was submitted to the analytical laboratory for analysis.

[b]Soil samples analyzed by NWTPH-Gx and USEPA 8260B were collected using the USEPA 5035 method.

Table 3
Soil Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

		Location:	GP1	GP2	GP3	GP4	GP5	GP7	GP9	GP10
		Sample Name:	GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4	GP5-S-14.5	GP7-S-0.8	GP9-S-0.5	GP10-S-0.5
		Collection Date:	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014
		Collection Depth (ft bgs):	1.1 - 1.7	1.3 - 4.8	5.7 - 8.3	4.6 - 6.4	13.9 - 15.1	0 - 1.6	0 - 1.0	0 - 1.1
	MTCA Method A, Unrestricted Land Use CUL	MTCA Method B, Unrestricted Land Use CUL								
Metals (mg/kg)										
Arsenic	20	--	**7.4**	**13**	**4.0**	**6.2**	**6.1**	--	**9.1**	--
Barium	NV	16000	**162**	**180**	**388**	**141**	**58.4**	--	**178**	--
Cadmium	2	--	**0.1**	**0.2**	0.1 U	**0.2**	**0.2**	--	**0.2**	--
Chromium, Total	2000[a]	--	**106**	**107**	**38.4**	**108**	**170**	--	**62**	--
Copper	NV	3200	**42.7**	**55.1**	**52.2**	**28.4**	**53.6**	--	**59.4**	--
Lead	250	--	**13.1**	**19.9**	**15.3**	**28.3**	**10**	--	**43.9**	--
Mercury	2	--	**0.07**	**0.09**	**0.06**	**0.08**	**0.09**	--	**0.05**	--
Selenium	NV	400	0.7 U	0.7 U	0.7 U	0.7 U	**0.7**	--	0.6 U	--
Silver	NV	400	0.3 U	0.3 U	0.3 U	**0.4**	0.3 U	--	0.2 U	--
Zinc	NV	24000	**107**	**122**	**66**	**143**	**96**	--	**121**	--
PCBs (mg/kg)										
Aroclor 1016	NV	--	--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1221	NV	--	--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1232	NV	--	--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1242	NV	--	--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1248	NV	--	--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1254	NV	--	--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1260	NV	--	--	0.032 U	0.033 U	--	--	--	0.032 U	--
Total PCB Aroclors	1	--	--	ND	ND	--	--	--	ND	--
VOCs (mg/kg)										
1,1,1,2-Tetrachloroethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,1,1-Trichloroethane	2	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,1,2,2-Tetrachloroethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,1,2-Trichloroethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,1-Dichloroethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,1-Dichloroethene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,1-Dichloropropene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,2,3-Trichlorobenzene	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
1,2,3-Trichloropropane	NV	--	--	--	--	0.0035 U	0.003 U	--	--	--
1,2,4-Trichlorobenzene	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
1,2,4-Trimethylbenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,2-Dibromo-3-chloropropane	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
1,2-Dibromoethane	0.005	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,2-Dichlorobenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--

Table 3
Soil Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

		Location:	GP1	GP2	GP3	GP4	GP5	GP7	GP9	GP10
		Sample Name:	GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4	GP5-S-14.5	GP7-S-0.8	GP9-S-0.5	GP10-S-0.5
		Collection Date:	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014
		Collection Depth (ft bgs):	1.1 - 1.7	1.3 - 4.8	5.7 - 8.3	4.6 - 6.4	13.9 - 15.1	0 - 1.6	0 - 1.0	0 - 1.1
	MTCA Method A, Unrestricted Land Use CUL	MTCA Method B, Unrestricted Land Use CUL								
1,2-Dichloroethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,2-Dichloropropane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,3,5-Trimethylbenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,3-Dichlorobenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,3-Dichloropropane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
1,4-Dichlorobenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
2,2-Dichloropropane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
2-Butanone	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
2-Chloroethylvinyl ether	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
2-Chlorotoluene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
2-Hexanone	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
4-Chlorotoluene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
4-Isopropyltoluene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
4-Methyl-2-pentanone	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
Acetone	NV	72000	--	--	--	**0.16**	**0.055**	--	--	--
Acrolein	NV	--	--	--	--	0.087 U	0.074 U	--	--	--
Acrylonitrile	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
Benzene	0.03	--	--	--	--	0.0017 U	0.0015 U	0.014 U	0.016 U	0.021 U
Bromobenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Bromodichloromethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Bromoethane	NV	--	--	--	--	0.0035 U	0.003 U	--	--	--
Bromoform	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Bromomethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Carbon disulfide	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Carbon tetrachloride	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Chlorobenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Chlorobromomethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Chloroethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Chloroform	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Chloromethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
cis-1,2-Dichloroethene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
cis-1,3-Dichloropropene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Dibromochloromethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Dibromomethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Ethylbenzene	6	--	--	--	--	0.0017 U	0.0015 U	0.014 U	0.016 U	0.021 U

Table 3
Soil Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

		Location:	GP1	GP2	GP3	GP4	GP5	GP7	GP9	GP10
		Sample Name:	GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4	GP5-S-14.5	GP7-S-0.8	GP9-S-0.5	GP10-S-0.5
		Collection Date:	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014
		Collection Depth (ft bgs):	1.1 - 1.7	1.3 - 4.8	5.7 - 8.3	4.6 - 6.4	13.9 - 15.1	0 - 1.6	0 - 1.0	0 - 1.1
	MTCA Method A, Unrestricted Land Use CUL	MTCA Method B, Unrestricted Land Use CUL								
Freon 113	NV	--	--	--	--	0.0035 U	0.003 U	--	--	--
Hexachlorobutadiene	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
Isopropylbenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
m,p-Xylene	9[b]	--	--	--	--	0.0017 U	0.0015 U	0.027 U	0.032 U	0.042 U
Methyl iodide	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Methylene chloride	0.02	--	--	--	--	0.0099 U	0.0071 U	--	--	--
Naphthalene	5	--	--	--	--	0.0087 U	0.0074 U	--	--	--
n-Butylbenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
n-Propylbenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
o-Xylene	9[b]	--	--	--	--	0.0017 U	0.0015 U	0.014 U	0.016 U	0.021 U
sec-Butylbenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Styrene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
tert-Butylbenzene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Tetrachloroethene	0.05	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Toluene	7	--	--	--	--	0.0017 U	0.0015 U	0.014 U	0.016 U	0.021 U
trans-1,2-dichloroethene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
trans-1,3-Dichloropropene	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
trans-1,4-Dichloro-2-butene	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
Trichloroethene	0.03	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Trichlorofluoromethane	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Vinyl Acetate	NV	--	--	--	--	0.0087 U	0.0074 U	--	--	--
Vinyl Chloride	NV	--	--	--	--	0.0017 U	0.0015 U	--	--	--
Total Xylenes	9	--	--	--	--	ND	ND	ND	ND	ND
PAHs (mg/kg)										
1-Methylnaphthalene	NV	34.5	--	**0.013**	**0.56**	**0.0076**	0.0046 U	--	0.06 UJ	--
2-Methylnaphthalene	NV	320	--	**0.018**	**0.6**	**0.0091**	0.0046 U	--	0.06 UJ	--
Acenaphthene	NV	4800	--	0.0049 U	**0.086**	0.0048 U	0.0046 U	--	0.06 UJ	--
Acenaphthylene	NV	NV	--	**0.0065**	**0.052**	0.0048 U	0.0046 U	--	**0.12** J	--
Anthracene	NV	24000	--	**0.014**	**0.052**	**0.0058**	0.0046 U	--	**0.11** J	--
Benzo(a)anthracene	NV	1.37	--	**0.041**	**0.051**	**0.0099**	0.0046 U	--	**0.26** J	--
Benzo(a)pyrene	0.1[c]	--	--	**0.046**	**0.03**	**0.011**	0.0046 U	--	**0.39** J	--
Benzo(ghi)perylene	NV	NV	--	**0.051**	**0.019**	**0.0091**	0.0046 U	--	**0.25** J	--
Chrysene	NV	137	--	**0.07**	**0.057**	**0.014**	0.0046 U	--	**0.35** J	--
Dibenzo(a,h)anthracene	NV	0.137	--	**0.007**	**0.0074**	0.0048 U	0.0046 U	--	**0.069** J	--
Dibenzofuran	NV	80	--	**0.011**	**0.11**	**0.0088**	0.0046 U	--	0.06 UJ	--

Table 3
Soil Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

		Location:	GP1	GP2	GP3	GP4	GP5	GP7	GP9	GP10
		Sample Name:	GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4	GP5-S-14.5	GP7-S-0.8	GP9-S-0.5	GP10-S-0.5
		Collection Date:	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014
		Collection Depth (ft bgs):	1.1 - 1.7	1.3 - 4.8	5.7 - 8.3	4.6 - 6.4	13.9 - 15.1	0 - 1.6	0 - 1.0	0 - 1.1
	MTCA Method A, Unrestricted Land Use CUL	MTCA Method B, Unrestricted Land Use CUL								
Fluoranthene	NV	3200	--	**0.097**	**0.068**	**0.028**	0.0046 U	--	**0.26** J	--
Fluorene	NV	3200	--	**0.0089**	**0.023**	0.0048 U	0.0046 U	--	0.06 UJ	--
Indeno(1,2,3-cd)pyrene	NV	1.37	--	**0.028**	**0.012**	**0.0064**	0.0046 U	--	**0.2** J	--
Naphthalene	5	--	--	**0.06**	**0.38**	**0.019**	0.0046 U	--	0.06 UJ	--
Phenanthrene	NV	NV	--	**0.079**	**0.21**	**0.021**	0.0046 U	--	**0.12** J	--
Pyrene	NV	2400	--	**0.089**	**0.071**	**0.024**	0.0046 U	--	**0.29** J	--
Total Benzofluoranthenes	NV	1.37	--	**0.087**	**0.062**	**0.017**	0.0046 U	--	**0.68** J	--
Total Naphthalenes	5	--	--	**0.091**	**1.54**	**0.0357**	0.0046 U	--	0.06 UJ	--
cPAH TEQ	0.1	--	--	**0.063**	**0.044**	**0.015**	ND	--	**0.51** J	--
TPH Identification (Presence/Absence)										
Gasoline	NV	NV	ND	ND	ND	ND	ND	--	ND	ND
Diesel	NV	NV	ND	ND	ND	ND	ND	--	**DETECT**	**DETECT**
Motor-Oil Range	NV	NV	ND	ND	ND	ND	ND	--	**DETECT**	**DETECT**
TPH (mg/kg)										
Gasoline	100	--	--	--	--	--	--	5.4 U	--	--
Diesel	2000	--	--	--	--	--	--	--	**220**	**220**
Motor-Oil Range	2000	--	--	--	--	--	--	--	**2700**	**2300**
Total Heavy Oils (Diesel + Motor Oil)	2000	--	--	--	--	--	--	--	**2920**	**2520**

Table 3
Soil Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

NOTES:
Detected concentrations in **bold.**
MTCA Method A or B unrestricted land use CUL exceedances are highlighted.
MTCA Method B CULs are provided for only those detected constituents for which there is no MTCA Method A CUL.
Non-detect results are not evaluated against cleanup criteria.
-- = not analyzed or cleanup level or ARAR not provided.
CUL = cleanup level.
cPAH TEQ = carcinogenic PAH toxic equivalency quotient.
ft bgs = feet below ground surface.
J = result is an estimated value.
mg/kg = milligrams per kilogram.
MTCA = Model Toxics Control Act.
ND = not detected.
NV = no value.
PCB = polychlorinated biphenyl.
PAH = polycyclic aromatic hydrocarbon.
Total Heavy Oils = sum of the diesel- and motor-oil-range hydrocarbon fractions.
Total Naphthalenes = sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.
Total PCB Aroclors = sum of all PCB Aroclors.
Total Xylenes = sum of m-, p-, and o-xylene isomers.
TPH = total petroleum hydrocarbons.
U = analyte not detected at or above specified method reporting limit.
VOC = volatile organic compound.
[a]Trivalent chromium (chromium III) CUL.
[b]Total xylenes CUL.
[c]Benzo(a)pyrene is compared to the CUL as cPAH TEQ.

Table 4
Groundwater Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

				Location:	GP2	GP8
				Sample Name:	GP2-W-10.0	GP8-W-12.5
				Collection Date:	08/19/2014	08/19/2014
				Collection Depth (ft bgs):	10	12.5
	MTCA Method A CUL	MTCA Method B CUL	Surface Water ARARs	Method B Vapor Screening Levels		
Metals, Dissolved (ug/L)						
Arsenic	5	--	0.018	NV	**2.9**	--
Barium	NV	3200	1000	NV	**20.5**	--
Cadmium	5	--	--	--	0.1 U	--
Chromium, Total	50[a]	--	--	--	0.5 U	--
Copper	NV	320	3.47	NV	**1.0**	--
Lead	15	--	--	--	0.1 U	--
Mercury	2	--	--	--	0.1 U	--
Selenium	NV	--	--	--	0.5 U	--
Silver	NV	--	--	--	0.2 U	--
Zinc	NV	--	--	--	4.0 U	--
VOCs (ug/L)						
1,1,1,2-Tetrachloroethane	NV	--	--	--	--	0.2 U
1,1,1-Trichloroethane	200	--	--	--	--	0.2 U
1,1,2,2-Tetrachloroethane	NV	--	--	--	--	0.2 U
1,1,2-Trichloroethane	NV	--	--	--	--	0.2 U
1,1-Dichloroethane	NV	--	--	--	--	0.2 U
1,1-Dichloroethene	NV	--	--	--	--	0.2 U
1,1-Dichloropropene	NV	--	--	--	--	0.2 U
1,2,3-Trichlorobenzene	NV	--	--	--	--	0.5 U
1,2,3-Trichloropropane	NV	--	--	--	--	0.5 U
1,2,4-Trichlorobenzene	NV	--	--	--	--	0.5 U

Table 4
Groundwater Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

				Location:	GP2	GP8
				Sample Name:	GP2-W-10.0	GP8-W-12.5
				Collection Date:	08/19/2014	08/19/2014
				Collection Depth (ft bgs):	10	12.5
	MTCA Method A CUL	MTCA Method B CUL	Surface Water ARARs	Method B Vapor Screening Levels		
1,2,4-Trimethylbenzene	NV	--	--	--	--	0.2 U
1,2-Dibromo-3-chloropropane	NV	--	--	--	--	0.5 U
1,2-Dibromoethane	0.01	--	--	--	--	0.2 U
1,2-Dichlorobenzene	NV	--	--	--	--	0.2 U
1,2-Dichloroethane	5	--	--	--	--	0.2 U
1,2-Dichloropropane	NV	--	--	--	--	0.2 U
1,3,5-Trimethylbenzene	NV	--	--	--	--	0.2 U
1,3-Dichlorobenzene	NV	--	--	--	--	0.2 U
1,3-Dichloropropane	NV	--	--	--	--	0.2 U
1,4-Dichlorobenzene	NV	--	--	--	--	0.2 U
2,2-Dichloropropane	NV	--	--	--	--	0.2 U
2-Butanone	NV	--	--	--	--	5 U
2-Chloroethylvinyl ether	NV	--	--	--	--	1 U
2-Chlorotoluene	NV	--	--	--	--	0.2 U
2-Hexanone	NV	--	--	--	--	5 U
4-Chlorotoluene	NV	--	--	--	--	0.2 U
4-Isopropyltoluene	NV	--	--	--	--	0.2 U
4-Methyl-2-pentanone	NV	--	--	--	--	5 U
Acetone	NV	--	--	--	--	5 U
Acrolein	NV	--	--	--	--	5 U
Acrylonitrile	NV	--	--	--	--	1 U
Benzene	5	--	--	--	1 U	0.2 U

Table 4
Groundwater Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

				Location:	GP2	GP8
				Sample Name:	GP2-W-10.0	GP8-W-12.5
				Collection Date:	08/19/2014	08/19/2014
				Collection Depth (ft bgs):	10	12.5
	MTCA Method A CUL	MTCA Method B CUL	Surface Water ARARs	Method B Vapor Screening Levels		
Bromobenzene	NV	--	--	--	--	0.2 U
Bromodichloromethane	NV	--	--	--	--	0.2 U
Bromoethane	NV	--	--	--	--	0.2 U
Bromoform	NV	--	--	--	--	0.2 U
Bromomethane	NV	--	--	--	--	1 U
Carbon disulfide	NV	--	--	--	--	0.2 U
Carbon tetrachloride	NV	--	--	--	--	0.2 U
Chlorobenzene	NV	--	--	--	--	0.2 U
Chlorobromomethane	NV	--	--	--	--	0.2 U
Chloroethane	NV	--	--	--	--	0.2 U
Chloroform	NV	--	--	--	--	0.2 U
Chloromethane	NV	--	--	--	--	0.5 U
cis-1,2-Dichloroethene	NV	16	NV	160	--	**0.6**
cis-1,3-Dichloropropene	NV	--	--	--	--	0.2 U
Dibromochloromethane	NV	--	--	--	--	0.2 U
Dibromomethane	NV	--	--	--	--	0.2 U
Ethylbenzene	700	--	--	--	1 U	0.2 U
Freon 113	NV	--	--	--	--	0.2 U
Hexachlorobutadiene	NV	--	--	--	--	0.5 U
Isopropylbenzene	NV	--	--	--	--	0.2 U
m,p-Xylene	1000[b]	--	--	--	2 U	0.4 U

Table 4
Groundwater Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

				Location:	GP2	GP8
				Sample Name:	GP2-W-10.0	GP8-W-12.5
				Collection Date:	08/19/2014	08/19/2014
				Collection Depth (ft bgs):	10	12.5
	MTCA Method A CUL	MTCA Method B CUL	Surface Water ARARs	Method B Vapor Screening Levels		
Methyl iodide	NV	--	--	--	--	1 U
Methylene chloride	5	--	--	--	--	1 U
Naphthalene	160	--	--	--	--	0.5 U
n-Butylbenzene	NV	--	--	--	--	0.2 U
n-Propylbenzene	NV	--	--	--	--	0.2 U
o-Xylene	1000[b]	--	--	--	1 U	0.2 U
sec-Butylbenzene	NV	--	--	--	--	0.2 U
Styrene	NV	--	--	--	--	0.2 U
tert-Butylbenzene	NV	--	--	--	--	0.2 U
Tetrachloroethene	5	--	0.69	1	--	**11**
Toluene	1000	--	--	--	1 U	0.2 U
trans-1,2-dichloroethene	NV	--	--	--	--	0.2 U
trans-1,3-Dichloropropene	NV	--	--	--	--	0.2 U
trans-1,4-Dichloro-2-butene	NV	--	--	--	--	1 U
Trichloroethene	5	--	2.5	0.42	--	**0.79**
Trichlorofluoromethane	NV	--	--	--	--	0.2 U
Vinyl Acetate	NV	--	--	--	--	0.2 U
Vinyl Chloride	0.2	--	--	--	--	0.2 U
Total Xylenes	1000	--	--	--	ND	ND

Table 4
Groundwater Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

				Location:	GP2	GP8
				Sample Name:	GP2-W-10.0	GP8-W-12.5
				Collection Date:	08/19/2014	08/19/2014
				Collection Depth (ft bgs):	10	12.5
	MTCA Method A CUL	MTCA Method B CUL	Surface Water ARARs	Method B Vapor Screening Levels		
PAHs (ug/L)				--		
1-Methylnaphthalene	NV	--	--	--	0.1 U	--
2-Methylnaphthalene	NV	--	--	--	0.1 U	--
Acenaphthene	NV	--	--	--	0.1 U	--
Acenaphthylene	NV	--	--	--	0.1 U	--
Anthracene	NV	--	--	--	0.1 U	--
Benzo(a)anthracene	NV	--	--	--	0.1 U	--
Benzo(a)pyrene	0.1	--	--	--	0.1 U	--
Benzo(ghi)perylene	NV	--	--	--	0.1 U	--
Chrysene	NV	--	--	--	0.1 U	--
Dibenzo(a,h)anthracene	NV	--	--	--	0.1 U	--
Dibenzofuran	NV	--	--	--	0.1 U	--
Fluoranthene	NV	--	--	--	0.1 U	--
Fluorene	NV	--	--	--	0.1 U	--
Indeno(1,2,3-cd)pyrene	NV	--	--	--	0.1 U	--
Naphthalene	160	--	NV	170	**0.14**	--
Phenanthrene	NV	--	--	--	0.1 U	--
Pyrene	NV	--	--	--	0.1 U	--
Total Benzofluoranthenes	NV	--	--	--	0.1 U	--
Total Naphthalenes	160	--	NV	170	**0.14**	
cPAH TEQ	0.1	--	--	--	ND	--

Table 4
Groundwater Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

				Location:	GP2	GP8
				Sample Name:	GP2-W-10.0	GP8-W-12.5
				Collection Date:	08/19/2014	08/19/2014
				Collection Depth (ft bgs):	10	12.5
	MTCA Method A CUL	MTCA Method B CUL	Surface Water ARARs	Method B Vapor Screening Levels		
TPH Identification (Presence/Absence)						
Gasoline	NV	--	--	--	ND	ND
Diesel	NV	--	--	NV	**DETECT**	ND
Motor-Oil Range	NV	--	--	NV	**DETECT**	ND
TPH (mg/L)						
Diesel	0.5	--	NV	NV	**0.54**	--
Motor-Oil Range	0.5	--	NV	NV	**1.2**	--
Total Heavy Oils (Diesel + Motor Oil)	0.5	--	NV	NV	**1.74**	--

Table 4
Groundwater Analytical Results
Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

NOTES:

Detected concentrations in **bold.**

MTCA Method A or B CUL, or MTCA Method A or B CUL and surface water ARAR, exceedances are highlighted.

Surface water ARAR exceedances are highlighted.

MTCA Method B CULs are provided for only those detected constituents for which there is no MTCA Method A CUL.

Surface water ARARs are provided for detected constituents and are the minimum of the state and federal aquatic life and human health freshwater water quality standards.

Vapor screening levels are provided, as available, for detected constituents and were obtained from the draft Washington State Department of Ecology soil vapor intrusion guidance (Ecology, 2009). Vapor screening level exceedances are not highlighted, but are discussed in-text.

Non-detect results are not evaluated against cleanup criteria.

-- = not analyzed or cleanup level or ARAR not provided.

ARAR = applicable or relevant and appropriate requirements.

cPAH TEQ = carcinogenic PAH toxic equivalency quotient.

CUL = cleanup level.

ft bgs = feet below ground surface.

mg/L = milligrams per liter.

MTCA = Model Toxics Control Act.

ND = not detected.

NV = no value.

PAH = polycyclic aromatic hydrocarbon.

Total Heavy Oils = sum of the diesel- and motor-oil-range hydrocarbon fractions.

Total Naphthalenes = sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.

Total Xylenes = sum of m-, p-, and o-xylene isomers.

TPH = total petroleum hydrocarbons.

U = Analyte not detected at or above specified method reporting limit.

ug/L = micrograms per liter.

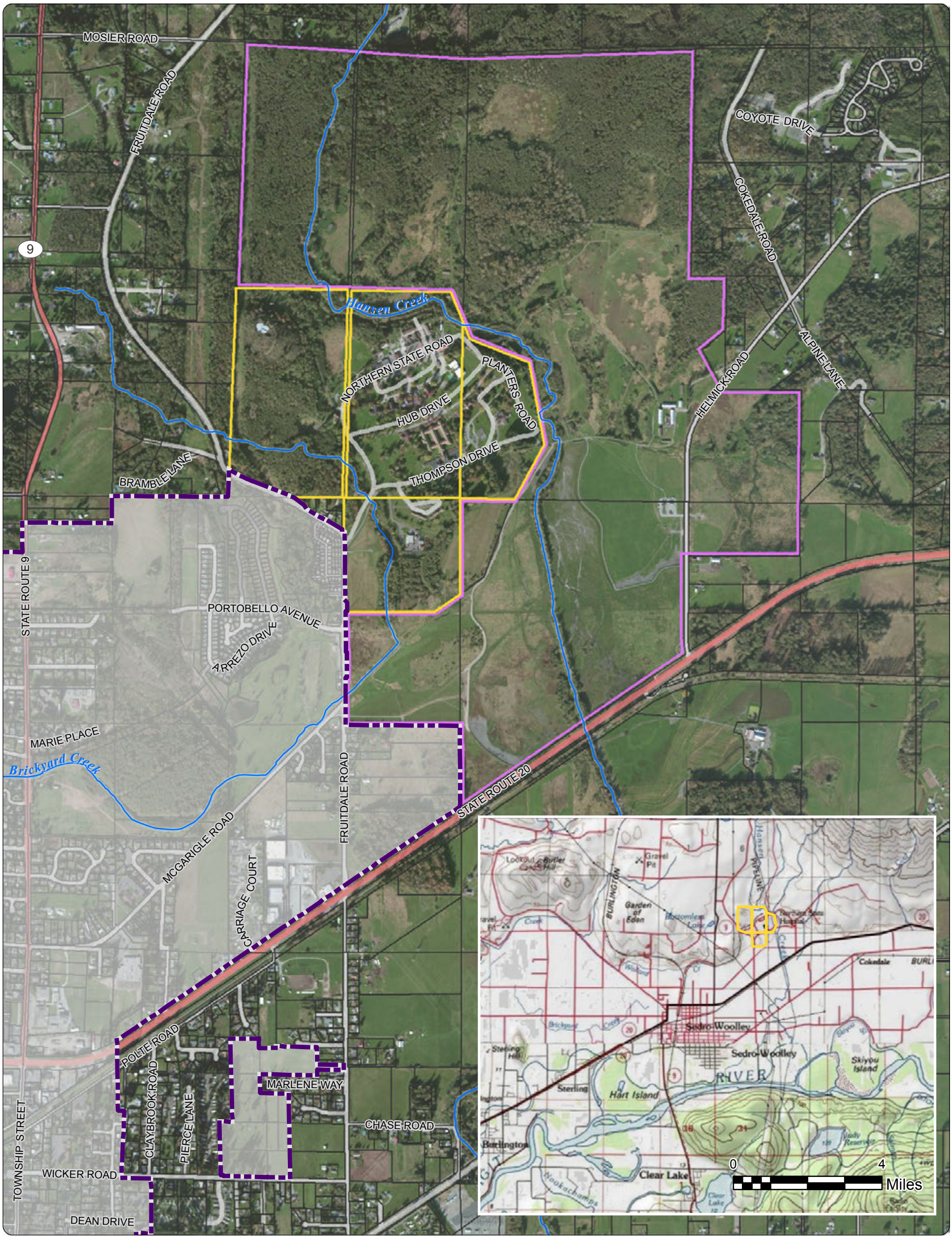
VOC = volatile organic compound.

[a]Trivalent chromium (chromium III) CUL.

[b]Total xylenes CUL.

FIGURES

Path: X:\0624.04 Port of Skagit\02_Adaptive Reuse Study\Projects\Fig1_Site Location.mxd



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and roads and streams datasets obtained from Skagit County; city limits dataset obtained from City of Sedro-Woolley.

Property address:
24909 Hub Drive
Sedro-Woolley, Washington

Legend

- Property Parcel
- Parcel Boundary
- Northern State Recreational Area
- Sedro-Woolley City Limits
- Stream

Figure 1
Property Location

Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

0 500 1,000
Feet

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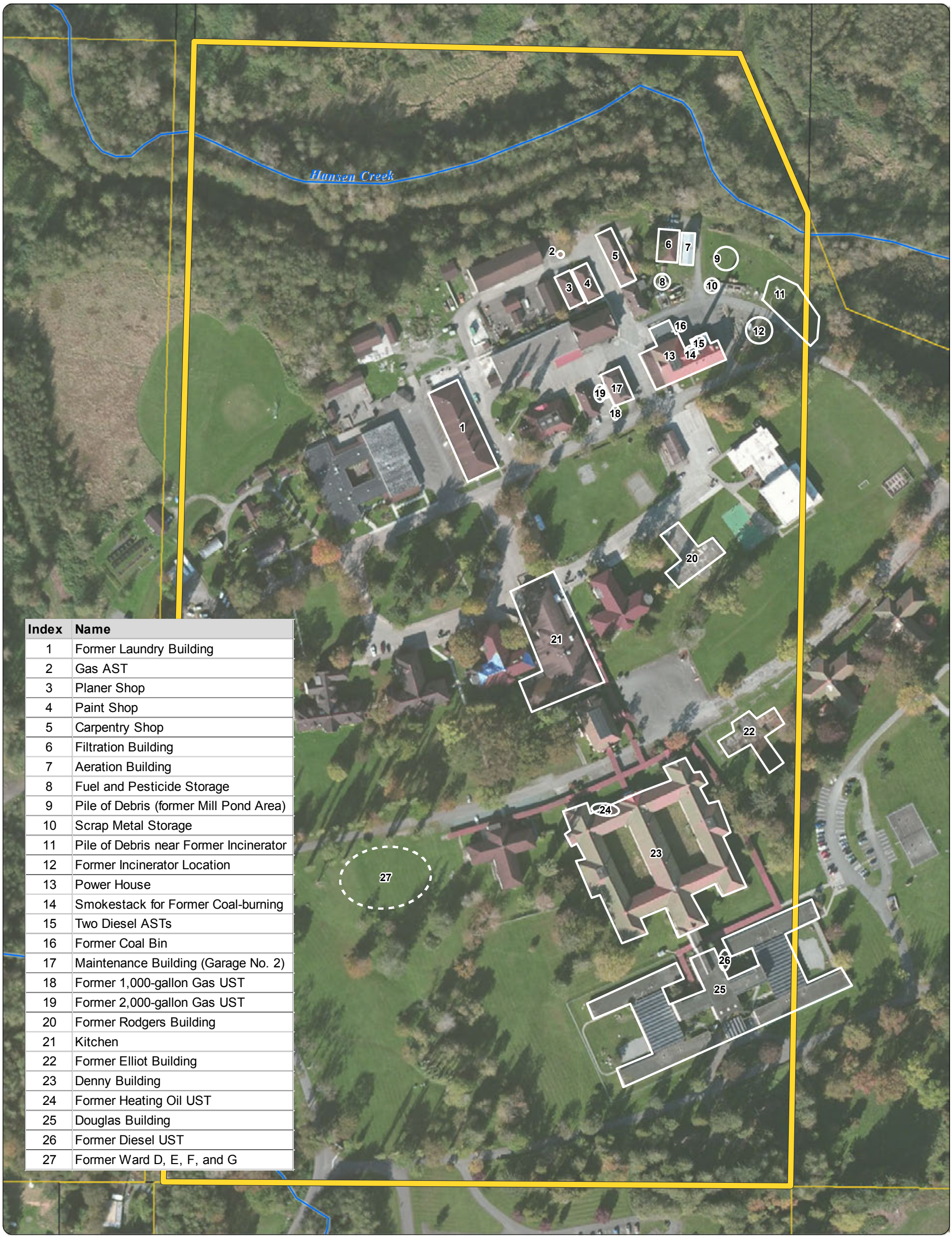
Project: 0624.04.01-01 Produced By: rcallihan Approved By: mstringer Print Date: 1/15/2015



Index	Name
1	Former Laundry Building
2	Gas AST
3	Planer Shop
4	Paint Shop
5	Carpentry Shop
6	Filtration Building
7	Aeration Building
8	Fuel and Pesticide Storage
9	Pile of Debris (former Mill Pond Area)
10	Scrap Metal Storage
11	Pile of Debris near Former Incinerator
12	Former Incinerator Location
13	Power House
14	Smokestack for Former Coal-burning
15	Two Diesel ASTs
16	Former Coal Bin
17	Maintenance Building (Garage No. 2)
18	Former 1,000-gallon Gas UST
19	Former 2,000-gallon Gas UST
20	Former Rodgers Building
21	Kitchen
22	Former Elliot Building
23	Denny Building
24	Former Heating Oil UST
25	Douglas Building
26	Former Diesel UST
27	Former Ward D, E, F, and G

Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and streams datasets obtained from Skagit County.

Notes: All property features are approximate.
AST = aboveground storage tank.
UST = underground storage tank.

Legend

- Parcel No. P38607 (1)
- Property Parcel
- Parcel Boundary
- Stream

Figure 2a
Property Features
Parcel No. P38607 (1)

Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

0 100 200
Feet

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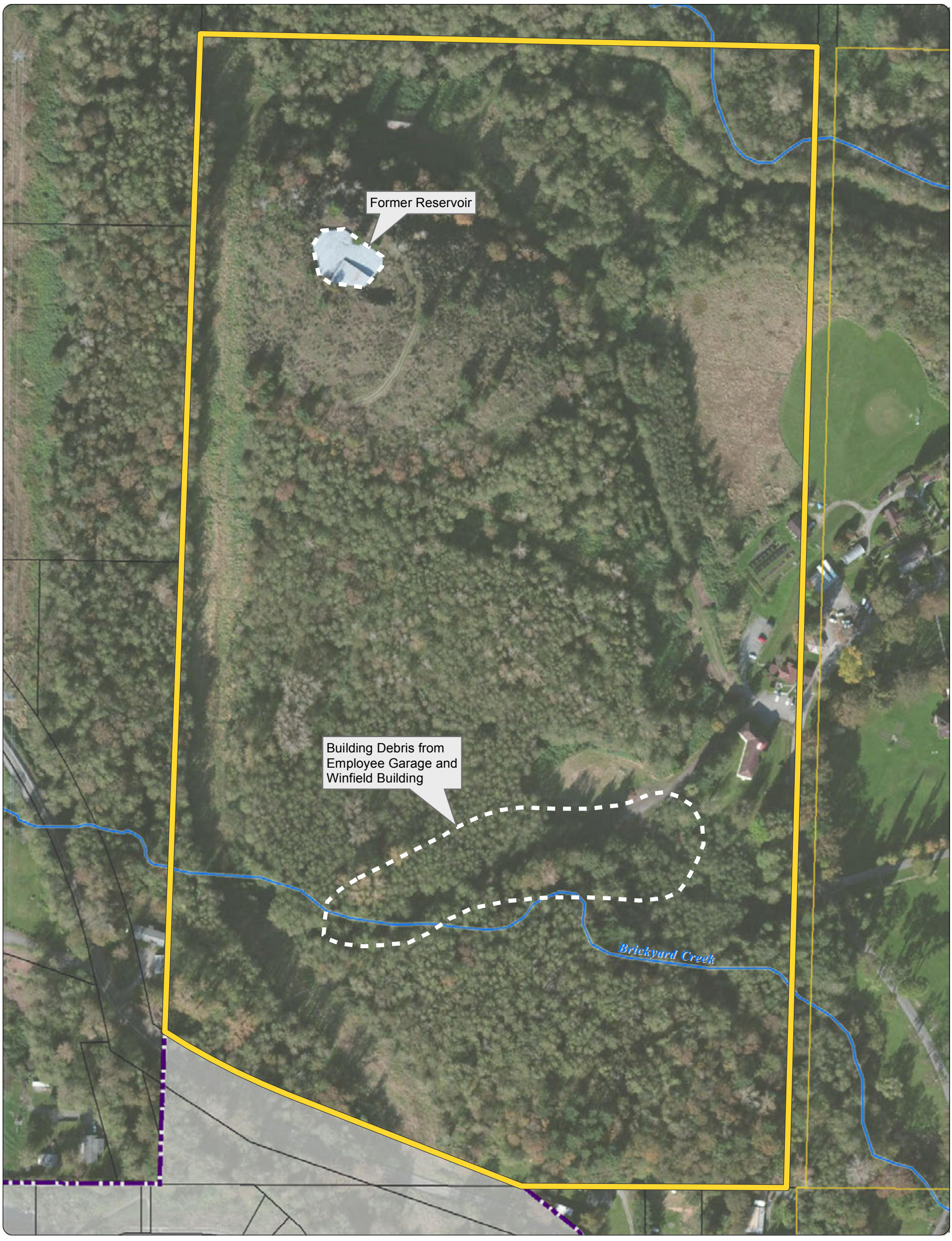
Path: X:\0624.04 Port of Skagit\02_Adaptive Reuse Study\Projects\Fig2a_Property Features_Parcel No P38607_1.mxd
Print Date: 1/15/2015
Approved By: mstringer
Produced By: rcallihan
Project: 0624.04.01-01

Path: X:\0624.04 Port of Skagit\02_Adaptive Reuse Study\Projects\Fig2b_Property Features Parcel No P38607_2.mxd



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and streams datasets obtained from Skagit County; city limits obtained from City of Sedro-Woolley.

Note: All property features are approximate.

Legend

- Parcel No. P38607 (2)
- Property Parcel
- Parcel Boundary
- City Limits
- Stream

Figure 2b
Property Features
Parcel No. P38607 (2)

Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

0 100 200
Feet

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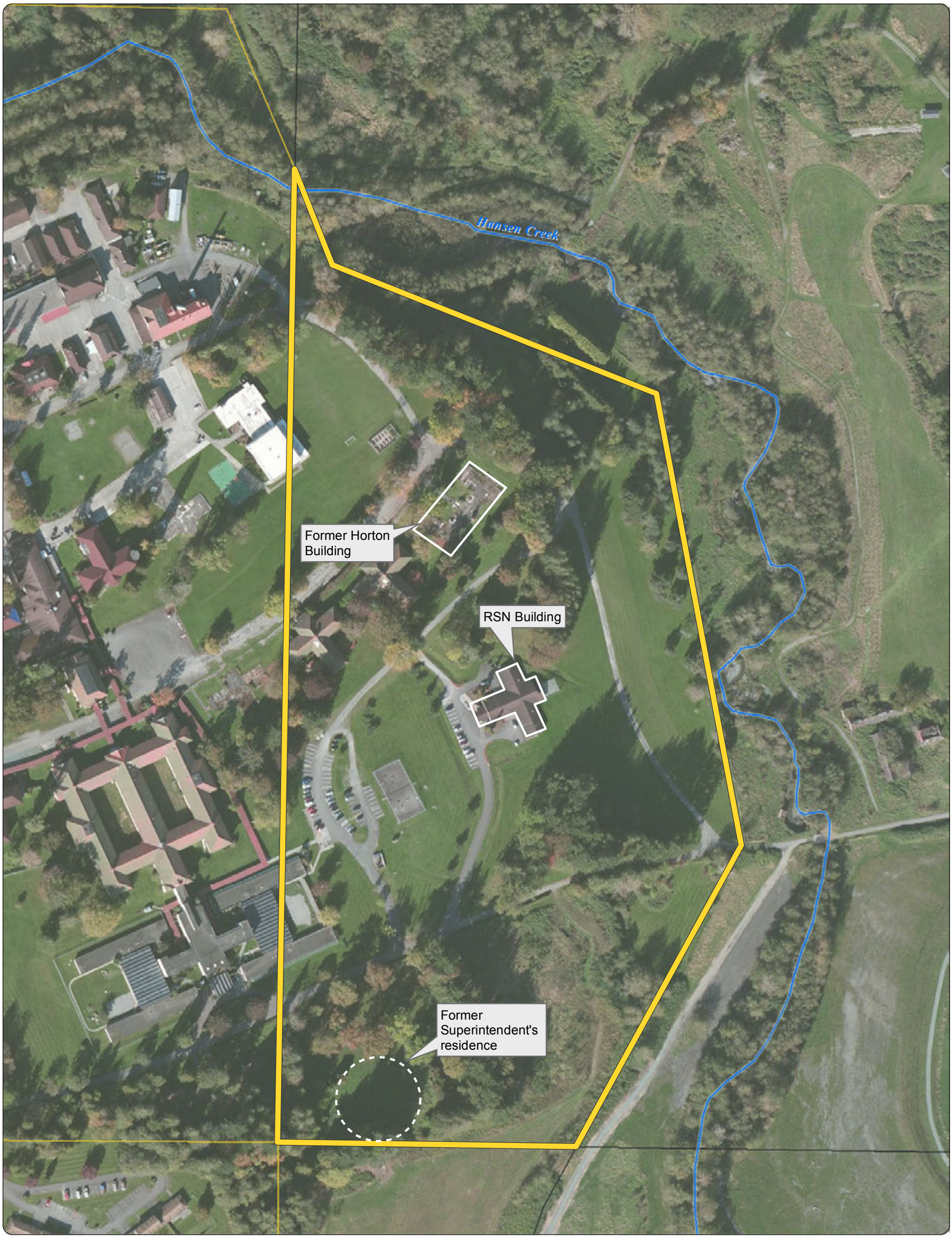
Print Date: 11/3/2014
Approved By: mstringer
Produced By: rcallihan
Project: 0624.04.01-01

Path: X:\0624.04 Port of Skagit\02_Adaptive Reuse Study\Projects\Fig2c_Site Features Parcel No P100632.mxd



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and streams datasets obtained from Skagit County.

Note: All property features are approximate.

Legend

- Parcel No. P100632
- Property Parcel
- Parcel Boundary
- Stream

Figure 2c
Property Features
Parcel No. P100632

Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

0 100 200
Feet

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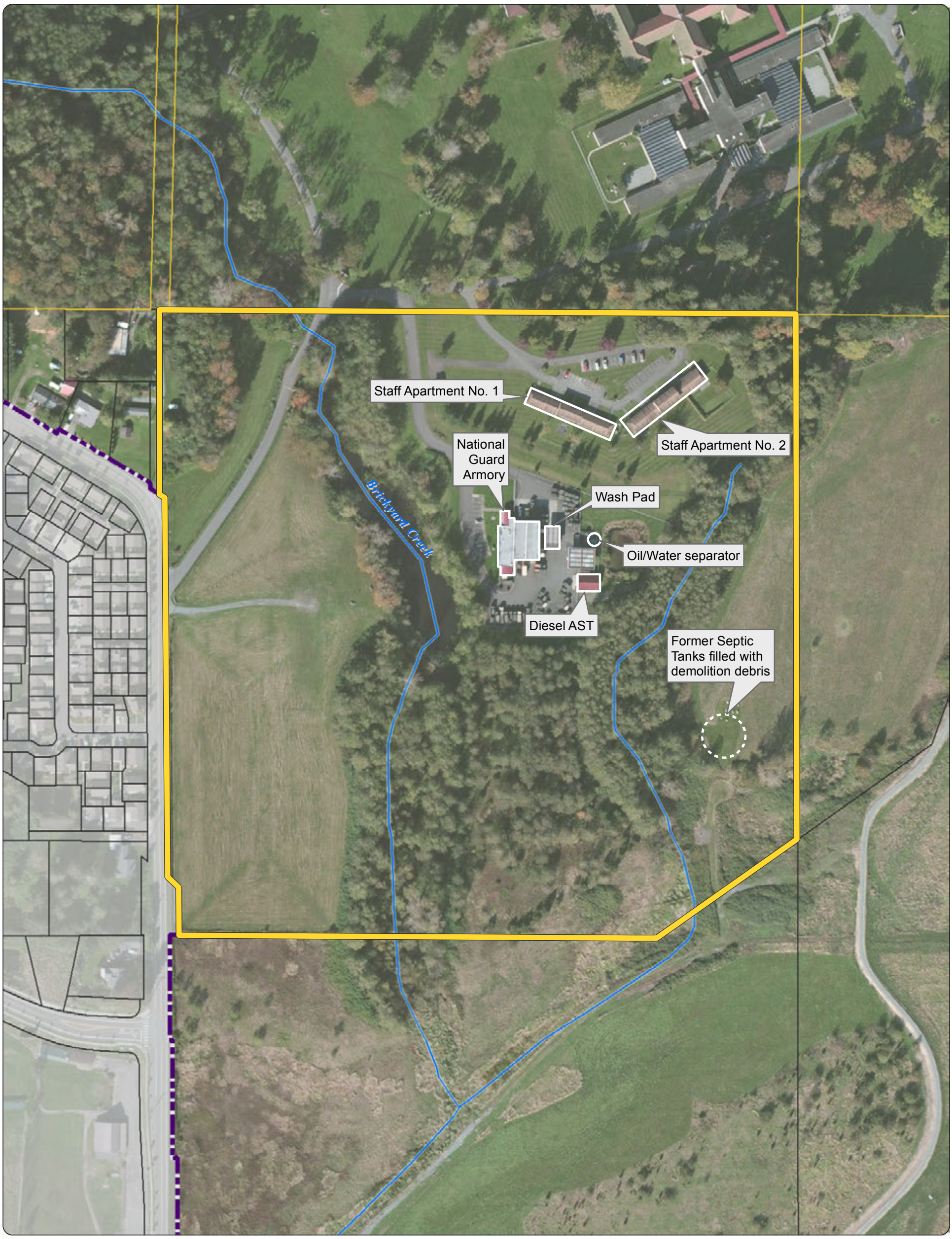
Path: X:\0624.04 Port of Skagit\02_Adaptive Reuse Study\Projects\Fig2d_Site Features Parcel No P39356.mxd



Source: Aerial photograph obtained from Esri ArcGIS Online; parcels and streams datasets obtained from Skagit County; city limits obtained from City of Sedro-Woolley.

Notes: All property features are approximate.
AST = aboveground storage tank.

Legend

- Parcel No. P39356
- Property Parcel
- Parcel Boundary
- City Limits
- Stream

Figure 2d
Property Features
Parcel No. P39356

Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

0 100 200
Feet

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Project: 0624.04.01-01 Produced By: rcallihan Approved By: mstringer Print Date: 1/15/2015

Path: X:\0624.04 Port of Skagit\002_Adaptive Reuse Study\Projects\Fig3_Boring Locations Parcel No P38607_1.mxd
Print Date: 1/15/2015
Approved By: H. Hirsch
Produced By: rcallihan
Project: 0624.01

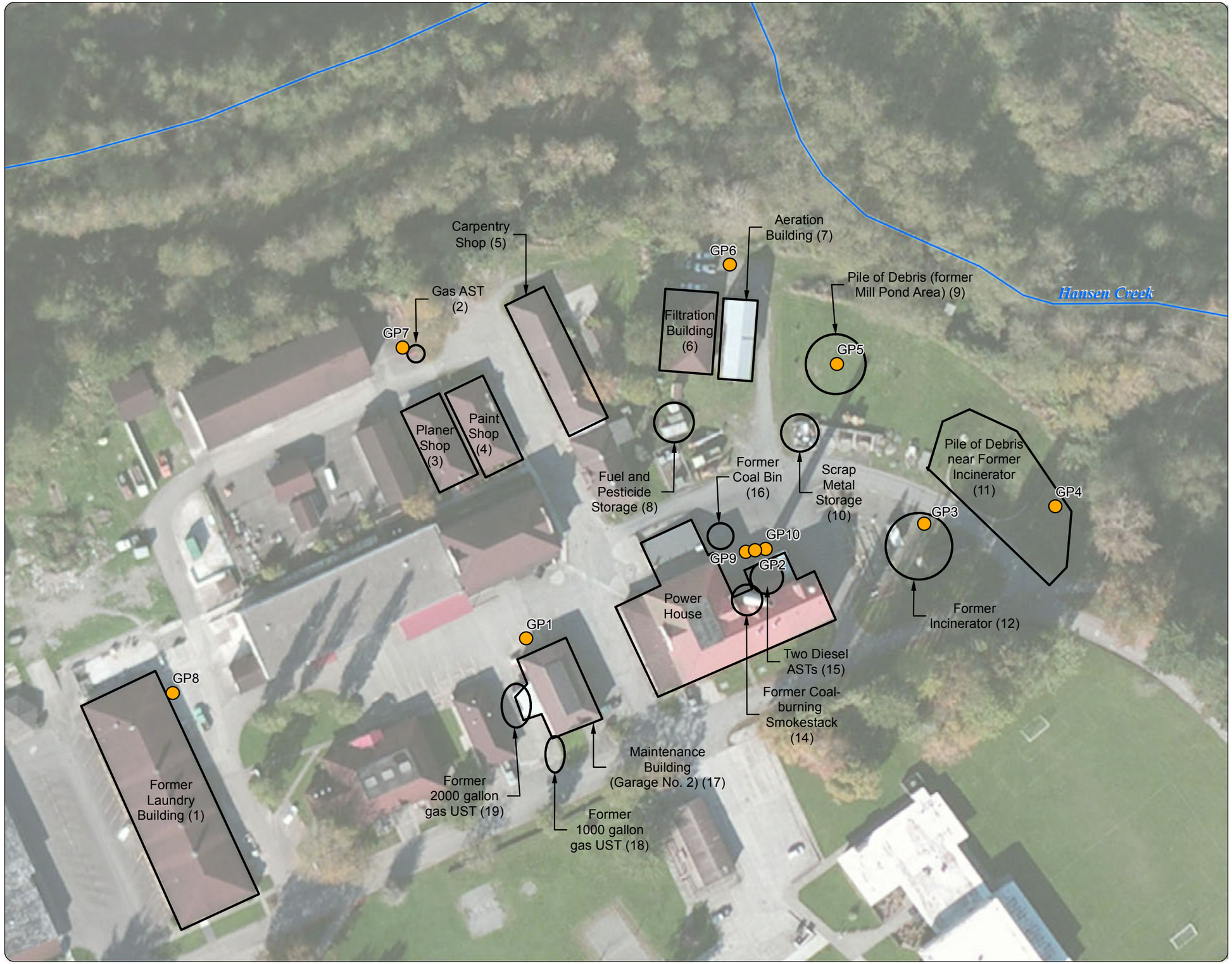

Figure 3
Boring Locations
Parcel No. P38607 (1)

Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

Legend

- Boring Location
- Stream
- (1) Feature Index Number*

Notes:

1) *Index number for feature as shown in Figure 2a.
2) All property features are approximate.
3) AST= aboveground storage tank.
4) UST = underground storage tank.
5) Boring locations were measured August 19, 2014 using a Trimble 6000 GeoXH GPS receiver.

0 40 80
Feet

Source: Aerial photograph obtained from Esri ArcGIS Online; streams dataset obtained from Skagit County.

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Figure 4
Conceptual Site Model
Northern State Hospital Property
Sedro-Woolley, Washington

Primary Sources	Primary Release Mechanism	Secondary Sources	Secondary Release Mechanism	Tertiary Source	Point of Potential Contact	Exposure Route	Current and Potential Future Receptors: Construction Workers	Occupational Workers/ Residents	Ecological Receptors	Recreational fishers
Historical Releases to On-Site Shallow Soil					Soil	Ingestion Dermal Contact Inhalation	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓	I I I
	Overland Flow				Indoor air	Inhalation	✓	✓	∅	∅
			Volatilization		Outdoor air	Inhalation	I	I	I	I
	Leaching	Groundwater			Groundwater	Ingestion Dermal Contact Inhalation	✓ ✓ ✓	✓ ✓ ✓	∅ ∅ ∅	∅ ∅ ∅
			Discharge	Hansen Creek	Surface Water and Sediment	Ingestion Dermal Contact	✓ ✓	✓ ✓	✓ ✓	✓ ✓
					Fish Tissue (via Bioaccumulation)	Ingestion	∅	∅	✓	✓

Notes:

- → Primary pathway
- - → Potential pathway
- ✓ Potentially Complete exposure route
- ∅ Incomplete exposure route
- I Insignificant exposure route

Figure 5
Soil Cleanup Level Exceedances

Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

Location	GP5
Sample Name	GP5-S-14.5
Collection Date	8/19/2014
Collection Depth (ft bgs)	13.9 - 15.1
Chromium	170
Copper	53.6
Selenium	0.7
Zinc	96

Location	GP2
Sample Name	GP2-S-3.0
Collection Date	8/19/2014
Collection Depth (ft bgs)	1.3 - 4.8
Arsenic	13
Barium	180
Chromium	107
Copper	55.1
Selenium	0.7 U
Zinc	122

Location	GP4
Sample Name	GP4-S-5.4
Collection Date	8/19/2014
Collection Depth (ft bgs)	4.6 - 6.4
Barium	141
Chromium	108
Selenium	0.7 U
Zinc	143

Location	GP3
Sample Name	GP3-S-7.0
Collection Date	8/19/2014
Collection Depth (ft bgs)	5.7 - 8.3
Barium	388
Copper	52.2
Selenium	0.7 U

Location	GP10
Sample Name	GP10-S-0.5
Collection Date	8/19/2014
Collection Depth (ft bgs)	0-1.0
Total Heavy Oils (mg/kg)	2520

Location	GP9
Sample Name	GP9-S-0.5
Collection Date	8/19/2014
Collection Depth (ft bgs)	0 - 1.0
Arsenic	9.1
Barium	178
Chromium	62
Copper	59.4
Selenium	0.6 U
Zinc	121
Total Heavy Oils	2920
cPAH TEQ	0.51

Location	GP1
Sample Name	GP1-S-1.4
Collection Date	8/19/2014
Collection Depth (ft bgs)	1.1 - 1.7
Arsenic	7.4
Barium	162
Chromium	106
Selenium	0.7 U
Zinc	107

MTCA Method A

Analyte	Unrestricted Land Use Cleanup Level (mg/kg)
cPAH TEQ	0.1
Total Heavy Oils	2000

Ecological Indicator Concentration

Analyte	Screening Level (mg/kg)		
	Plants	*Soil Biota*	*Wildlife*
Arsenic	10	60	7
Barium	500	NV	102
Chromium	42	42	67
Copper	100	50	217
Selenium	1	70	0.3
Zinc	86	200	360
Total Heavy Oils	200	6000	NV

Legend

- Boring Locations
- Boring Locations *(not sampled)*
- Soil Exceedances

Notes:

1) All property features are approximate.
2) Maximum detected values that exceed a CUL at each boring location are shown.
3) No soil samples were collected from grayed-out locations.
4) Soils were screened against MTCA Method A CULs and Ecological Indicator Concentrations for soil.
5) AST = aboveground storage tank.
6) cPAH TEQ = carcinogenic polycyclic aromatic hydrocarbon toxic equivalency quotient.
7) CUL = cleanup level.
8) ft bgs = feet below ground surface.
9) mg/kg = milligrams per kilogram.
10) MRL = method reporting limit.
11) MTCA = Model Toxics Control Act.
12) NV = No value.
13) U = analyte not detected at or above MRL.
14) UST = underground storage tank.
15) Boring locations were measured August 19, 2014 using a Trimble 6000 GeoXH GPS receiver.

0 40 80
Feet

Source: Aerial photograph obtained from Esri ArcGIS Online; streams dataset obtained from Skagit County.

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Path: X:\0624.04 Port of Skagit\02_Adaptive Reuse Study\Projects\Fig5_Soil Cleanup Level Exceedances.mxd
Print Date: 1/15/2015
Approved By: H. Hirsch
Produced By: rcallihan
Project: 0624.01

Analyte	Units	MTCA Method A, Cleanup Level	Surface Water ARARs
Arsenic	ug/L	5	0.018
PCE	ug/L	5	0.69
Total Heavy Oils	mg/L	0.5	NV

Location	GP8
Sample Name	GP8-W-12.5
Collection Date	8/19/2014
Collection Depth (ft bgs)	12.5
PCE (ug/L)	11

Location	GP2
Sample Name	GP2-W-10.0
Collection Date	8/19/2014
Collection Depth (ft bgs)	10
Arsenic (ug/L)	2.9
Total Heavy Oils (mg/L)	1.74

Carpentry Shop
Aeration Building
GP6
Gas AST
GP7
Filtration Building
Pile of Debris (former Mill Pond Area)
Hansen Creek
GP5
Planer Shop
Paint Shop
Fuel and Pesticide Storage
Former Coal Bin
Scrap Metal Storage
Pile of Debris near Former Incinerator
GP4
GP3
GP10
GP9
Power House
Former Incinerator
Two Diesel ASTs
Former Coal-burning Smokestack
GP1
Former Laundry Building
Former 2000 gallon gas UST
Maintenance Building (Garage No. 2)
Former 1000 gallon gas UST

Figure 6
Groundwater Cleanup Level Exceedances

Northern State Hospital Property
Port of Skagit
Sedro-Woolley, Washington

Legend

- Boring Locations
- Boring Locations *(not sampled)*
- Groundwater Exceedances

Notes:

1) All property features are approximate.
2) Groundwater CULs were developed under MTCA Method A and Surface Water ARARs.
3) Maximum detected values that exceed a CUL are shown at each boring.
4) ARAR = applicable or relevant and appropriate requirement.
5) AST = aboveground storage tank.
6) CUL = cleanup level.
7) ft bgs = feet below ground surface.
8) mg/L = miligrams per liter.
9) MTCA = Model Toxics Control Act.
10) NV = no value.
11) PCE = tetrachloroethene.
12) ug/L = micrograms per liter.
13) UST = underground storage tank.
14) Boring locations were measured August 19, 2014 using a Trimble 6000 GeoXH GPS receiver.

0 40 80
Feet

Source: Aerial photograph obtained from Esri ArcGIS Online; streams dataset obtained from Skagit County.

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Path: X:\0624.04 Port of Skagit\02_Adaptive Reuse Study\Projects\Fig6_Groundwater Cleanup Level Exceedances.mxd
Print Date: 1/15/2015
Approved By: H. Hirsch
Produced By: rcallihan
Project: 0624.01

APPENDIX A

BORING LOGS

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP1**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**16.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**65**	**GP**		**GP1-S-1.4**			*0.0 to 1.1 feet: GRAVEL (GW); light gray to dark gray; 5% fines; 35% sand, fine to medium; 60% gravel, fine to coarse, subangular to angular; no odor; dry to moist.*
2									*@ 1.0 to 1.1 feet: dark black fragments in concrete cover over sub-base. (CONCRETE SUB-BASE)*
3									*1.1 to 2.6 feet: CLAY (CL); greenish gray; 90% fines, medium plasticity; 10% sand, fine; stiff to very stiff; trace woody debris, gravel, and rootlets; orange mottles, blue mottles, and organics; no odor; dry to moist.*
4									*@ 1.4 to 1.5 feet: dark brown staining.*
									2.6 to 4.0 feet: no recovery.
5			**100**	**GP**					*4.0 to 8.0 feet: CLAY (CL); greenish gray; 90% fines, medium plasticity; 10% sand, fine; stiff to very stiff; trace woody debris, gravel, and rootlets; orange mottles, blue mottles, and organics; no odor; dry.*
6									
7									
8									
9			**100**	**GP**					*8.0 to 12.0 feet: CLAY (CL); greenish gray; 90% fines, medium plasticity; 10% sand, fine; stiff to very stiff; trace woody debris, gravel, and rootlets; orange mottles, blue mottles, and organics; no odor; dry.*
10									
11									
12									
13			**100**	**GP**					*12.0 to 15.6 feet: CLAY (CL); greenish gray; 90% fines, medium plasticity; 10% sand, fine; stiff to very stiff; trace gravel; orange mottles, blue mottles, and organics; no odor; dry.*
14									
15									
16									*15.6 to 16.0 feet: CLAY (CL); gray; 100% fines, high plasticity; soft; no odor; moist.*

NOTES: *Sampled for potential surface impacts due to maintenance activities at top of potential natural surface with stain. No evidence of petroleum impacts from nearby former underground storage tanks. Soil grab sample collected from 1.1 to 1.7 feet below ground surface. No groundwater encountered. Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner

GBLWC W:\GINT\GINTW\PROJECTS\0624.04.02 PORT OF SKAGIT\0624.04.02 PORT OF SKAGIT.GPJ 10/28/14

Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP2**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**12.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**40**	**GP**					0.0 to 1.3 feet: GRAVEL (GW); gray to dark brown; 5% fines; 35% sand, fine to coarse; 60% gravel, fine to medium, subangular; loose; trace rootlets; no odor; dry. (ASPHALT SUB-BASE)
									@ approximately 0.2 feet: black stain.
2									1.3 to 1.6 feet: CLAY (CL); dark gray to light gray; 95% fines; 5% sand; bluish/orange mottles and wood debris; no odor; dry.
									@ 1.3 feet: stain.
3									1.6 to 4.0 feet: no recovery.
						GP2-S-3.0*			
4			**67.5**	**GP**					4.0 to 4.3 feet: CLAY (CL); dark gray to light gray; 95% fines; 5% sand; bluish/orange mottles and wood debris; no odor; dry.
5									4.3 to 4.8 feet: GRAVELLY SAND (SW); light gray to dark gray; 5% fines; 75% sand, fine to coarse; 20% gravel, fine to medium, subrounded; loose; trace rootlets; no odor; dry.
6									@ 4.3 feet: black stain.
									4.8 to 6.7 feet: CLAY (CL); greenish gray to tan; 100% fines, medium plasticity; soft; orange/blue mottles and organics; no odor; dry.
7	▽			**GW**					6.7 to 8.0 feet: no recovery.
8			**100**	**GP**					8.0 to 9.0 feet: CLAY (CL); greenish gray to light gray; 90% fines, high plasticity; 10% sand, fine to coarse; soft; trace gravel; no odor; no stain; wet.
9									9.0 to 11.8 feet: CLAY (CL); dark brown; 90% fines, medium plasticity; 10% sand, fine; soft; trace rootlets and organics; no odor; moist.
10						**GP2-W-10.0**			
11									
12									11.8 to 12.0 feet: SILTY SAND (SM); dark gray; 20% fines, low plasticity; 80% sand, fine; soft; no odor; moist.

NOTES: *Boring location downgradient of aboveground storage tanks and within former coal bin area. No coal identified in sample. *Soil grab sample collected from 1.3 to 1.6 and 4.0 to 4.8 feet below ground surface. Groundwater sample collected (GP2-W-10.0). Boring decommissioned with bentonite chips. GP = geoprobe macrocore liner, GW = groundwater sample*

▽ ***Water level prior to sampling.***

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP3**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**16.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**22.5**	**GP**					0.0 to 0.2 feet: GRAVELLY SAND (SW); brown; 5% fines; 75% sand, fine to coarse; 20% gravel, fine, subrounded; loose; trace rootlets; organic odor; dry.
2									0.2 to 0.9 feet: GRAVELLY SAND (SW); light gray; 5% fines; 75% sand, fine to coarse; 20% gravel, fine to medium, subangular to subrounded; loose; no odor; dry.
									@ 0.4 feet: black fragments.
3									0.9 to 4.0 feet: no recovery.
4			**60**	**GP**					4.0 to 5.7 feet: GRAVELLY SAND (SW); light gray; 5% fines; 75% sand, fine to coarse; 20% gravel, fine to medium, subangular to subrounded; loose; no odor; dry.
5									
6									5.7 to 6.4 feet: COAL; black; 5% fines; 95% sand, fine to coarse; loose; coal-like material; reddish/white fragments present; no odor; dry.
7						**GP3-S-7.0**			6.4 to 8.0 feet: no recovery.
8			**75**	**GP**					8.0 to 8.3 feet: COAL; black; 5% fines; 95% sand, fine to coarse; loose; coal-like material; reddish/white fragments present; no odor; dry.
9									8.3 to 9.0 feet: GRAVELLY SAND (SW); light gray; 5% fines; 75% sand, fine to coarse; 20% gravel, fine to medium, subangular to subrounded; loose; no odor; dry.
10						**PID = 1.6 ppm**			9.0 to 9.3 feet: COAL; black; 5% fines; 95% sand, fine to coarse; loose; coal-like material; increased reddish/white fragments present; no odor; dry.
11									9.3 to 11.0 feet: SILT (ML); dark gray; 95% fines, low plasticity; 5% sand, fine; soft; trace rootlets; no odor; moist.
12			**80**	**GP**					11.0 to 12.0 feet: no recovery.
13									12.0 to 15.2 feet: SILT (ML); dark gray; 95% fines, low plasticity; 5% sand, fine; soft; trace rootlets; no odor; moist.
									@ 13.1 to 13.3 feet: coal fragments present.
14									
15									
16									15.2 to 16.0 feet: no recovery.

NOTES: *Soil grab sample collected from 5.7 to 8.3 feet below ground surface. Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner
PID = photoionzation detector
ppm = parts per million

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP4**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**16.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**85**	**GP**					0.0 to 0.8 feet: SAND (SW); light brown; 5% fines; 85% sand, fine to coarse; 10% gravel, fine, subrounded; loose; trace rootlets and coal fragments; no odor; dry.
2									0.8 to 3.4 feet: SILT (ML); light brown; 100% fines, nonplastic; very stiff; trace organics, coal fragments, gravel, and roof tile fragments; orange mottles present; no odor; dry.
3									
4									3.4 to 4.0 feet: no recovery.
5			**67.5**	**GP**					4.0 to 6.2 feet: SILT (ML); light brown; 100% fines, nonplastic; very stiff; trace organics, coal fragments, and gravel; orange mottles present; no odor; dry.
6						**GP4-S-5.4**			
7									6.2 to 6.7 feet: SILTY SAND (SM); dark gray; 20% fines, low plasticity; 80% sand, fine; medium stiff; trace reddish brown sand; no odor; moist.
8									6.7 to 8.0 feet: no recovery.
9			**52.5**	**GP**					8.0 to 8.5 feet: SILT WITH SAND (ML); dark gray; 85% fines; 15% sand, fine; soft; no odor; moist.
10									8.5 to 10.1 feet: SAND WITH SILT (SW-SM); dark gray; 10% fines, nonplastic; 80% sand, fine to medium; 10% gravel, fine to medium, subangular; soft; trace woody debris; no odor; moist to dry with depth.
11									10.1 to 12.0 feet: no recovery.
12			**55**	**GP**					12.0 to 12.8 feet: SILT (ML); light brown; 100% fines, nonplastic; very stiff; trace organics, coal fragments, and gravel; orange mottles present; no odor; dry.
13									12.8 to 14.2 feet: SAND (SW); dark gray; 5% fines; 85% sand, fine to coarse; 10% gravel, fine to medium, subangular; loose; trace coal fragments; no odor; dry.
14									@13.6 to 13.8 feet: white/chalky sand.
15									@13.8 feet: reddish brown stain.
16									14.2 to 16.0 feet: no recovery.

NOTES: *Soil grab sample collected from 4.6 to 6.4 feet below ground surface. Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP5**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**16.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			72.5	GP					0.0 to 0.6 feet: GRAVELLY SAND (SW); light gray; 5% fines; 75% sand, fine to coarse; 20% gravel, fine to medium, subangular to subrounded; loose; trace coal fragments, rootlets, and worms; no odor; dry.
2									0.6 to 2.7 feet: SILT WITH SAND (ML); light brown; 90% fines, low plasticity; 10% sand, fine; stiff; trace rootlets, coal fragments; orange mottles present; no odor; dry.
3									2.7 to 2.9 feet: SILTY SAND (SM); dark gray; 20% fines, nonplastic; 80% sand, fine to medium; stiff; trace coal fragments; no odor; dry.
4			82.5	GP					2.9 to 4.0 feet: no recovery.
5									4.0 to 4.8 feet: SILTY SAND (SM); dark gray; 20% fines, nonplastic; 80% sand, fine to medium; stiff; trace coal fragments; increasing fines with depth; no odor; moist.
6									4.8 to 6.5 feet: SILT WITH SAND (ML); dark gray; 80% fines, low plasticity to nonplastic with depth; 20% sand, fine; trace organics; increasing sand with depth, orange mottles present; no odor; moist.
7									6.5 to 7.3 feet: SAND WITH SILT (SW-SM); dark gray; 40% fines, nonplastic; 60% sand, fine; medium stiff; no odor; moist.
8									7.3 to 8.0 feet: no recovery.
9			75	GP					8.0 to 10.8 feet: SILT WITH SAND (ML); dark gray; 80% fines, low plasticity; 20% sand, very fine; soft; no odor; moist. @ 9.5 to 9.7 feet: lens of fine sand. @ 9.8 feet: reddish brown stain.
10									
11									10.8 to 11.0 feet: SAND WITH SILT (SW-SM); dark gray; 10% fines; 90% sand, fine; loose; trace rootlets and organics; no odor; moist.
12									11.0 to 12.0 feet: no recovery.
13	▽		77.5	GP					12.0 to 14.5 feet: SAND WITH SILT (SW-SM); dark gray; 10% fines; 90% sand, fine; loose; trace rootlets and organics; slight petroleum odor; moist to wet. @ 12.2 to 12.5 feet: silty lens.
14						PID = 0.8 ppm			
15						GP5-S-14.5			14.5 to 15.1 feet: GRAVELLY SAND (SW); dark gray; 5% fines; 70% sand, fine to medium; 25% gravel, fine, subangular; loose; no odor; wet.
16									15.1 to 16.0 feet: no recovery.

NOTES: *No visible impacts aside from trace coal fragments. Collected soil grab sample from depth with odor (13.9 to 15.1 feet below ground surface). Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner, PID = photoionzation detector, ppm = parts per million

▽ ***Water level based on soil core moisture from 12 to 16 foot core.***

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP6**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**16.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**65**	**GP**					0.0 to 0.8 feet: GRAVELLY SAND (SW); dark gray; 5% fines; 75% sand, fine to coarse; 20% gravel, fine to medium, subangular to subrounded; no odor; dry.
2									0.8 to 2.3 feet: SILT WITH SAND (ML); dark brown; 80% fines, low plasticity; 20% sand, fine; stiff; trace rootlets; no odor; dry.
3									2.3 to 2.6 feet: GRAVELLY SAND (SW); light gray; 10% fines, low plasticity; 70% sand, fine to coarse, 20% gravel, fine to medium, subangular to subrounded; soft; trace black fragments; no odor; dry.
4									2.6 to 4.0 feet: no recovery.
5			**62.5**	**GP**					4.0 to 6.5 feet: GRAVELLY SAND (SW); light gray; 10% fines, low plasticity; 70% sand, fine to coarse, 20% gravel, fine to medium, subangular to subrounded; soft; trace black fragments; no odor; dry.
6									
7	▽								6.5 to 8.0 feet: no recovery.
8			**55**	**GP**					8.0 to 10.2 feet: GRAVELLY SAND (SW); light gray; 10% fines, low plasticity; 70% sand, fine to coarse, 20% gravel, fine to medium, subangular to subrounded; soft; trace black fragments; no odor; dry to moist at 9.5 feet.
9									
10				**GW**					10.2 to 12.0 feet: no recovery.
11									
12			**55**	**GP**					12.0 to 14.2 feet: GRAVELLY SAND (SW); light gray; 10% fines, low plasticity; 70% sand, fine to coarse, 20% gravel, fine to medium, subangular to subrounded; soft; trace black fragments; no odor; wet.
13									
14									14.2 to 16.0 feet: no recovery.
15									
16									

NOTES: *No soil sample collected. Water was collected for measuring field water quality parameters, but no water sample was collected. Temporary screen installed from 10.0 to 15.0 feet. Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner, GW = groundwater sample

▽ ***Water level prior to measuring field water quality parameters.***

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP7**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**16.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**40**	**GP**		**GP7-S-0.8**			0.0 to 1.6 feet: GRAVELLY SAND (SW); light gray; 5% fines; 75% sand, fine to coarse; 20% gravel, fine, subangular; trace rootlets and coal fragments; no odor; dry. @ 0.5 to 0.7 feet: silt lens. @ 0.7 to 1.2 feet: yellowish orange color.
2									1.6 to 4.0 feet: no recovery.
3									
4			**95**	**GP**					4.0 to 4.3 feet: GRAVELLY SAND (SW); light gray; 5% fines; 75% sand, fine to coarse; 20% gravel, fine, subangular; trace rootlets and coal fragments; no odor; dry.
5									4.3 to 7.8 feet: CLAY (CL); greenish gray; 95% fines, medium plasticity; 5% sand, fine; very stiff; trace organics; distinct orange and gray discoloration layers; no odor; dry to moist.
6									
7									
8			**72.5**	**GP**					7.8 to 8.0 feet: no recovery.
9									8.0 to 10.9 feet: CLAY (CL); light gray; 95% fines, medium plasticity; 5% sand, fine; very stiff; orange to bluish/gray mottling; no odor; moist.
10									
11									10.9 to 12.0 feet: no recovery.
12			**95**	**GP**					12.0 to 13.2 feet: SILT (ML); light gray; 90% fines, medium plasticity; 10% sand, fine; medium stiff; no odor; moist.
13									@12.7 to 12.9 feet: sand lens. @ 13.1 to 13.2 feet: sand lens.
14									13.2 to 15.8 feet: CLAY (CL); olive gray; 100% fines, high plasticity; soft; no odor; moist to wet.
15									
16									15.8 to 16.0 feet: no recovery.

NOTES: *Soil grab sample collected from 0.0 to 1.6 feet below ground surface. Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner

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Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP8**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**19.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**50**	**GP**					0.0 to 1.1 feet: GRAVELLY SAND (SW); light gray; 5% fines; 70% sand, fine to coarse; 25% gravel, fine, subangular; loose; trace woody debris; no odor; dry to moist.
2									@ 1.8 to 1.9 feet: coal fragments. 1.1 to 2.0 feet: SILT (ML); light brown; 95% fines, medium plasticity; 5% sand; very stiff; trace organics; orange/gray mottles; no odor; moist.
3									2.0 to 4.0 feet: no recovery.
4			**85**	**GP**					4.0 to 7.4 feet: SILT (ML); light brown; 95% fines, medium plasticity; 5% sand; very stiff; trace organics; orange/gray mottles; no odor; moist.
5									
6									
7	▽			**GW**					
8			**77.5**	**GP**					7.4 to 8.0 feet: no recovery.
9									8.0 to 11.1 feet: SILT (ML); light brown; 95% fines, medium plasticity; 5% sand; soft; trace organics, orange/gray mottles; no odor; moist.
10									
11									11.1 to 12.0 feet: no recovery.
12			**100**	**GP**					12.0 to 14.1 feet: SILT (ML); light brown; 95% fines, medium plasticity; 5% sand; soft; trace organics; orange/gray mottles; no odor; moist.
13						**GP8-W-12.5**			@ 12.8 to 15.5 feet: lenses of medium to coarse sand with gravel.
14									
15									14.1 to 14.7 feet: SILTY SAND (SM); dark gray; 30% fines, nonplastic; 70% sand, fine; medium stiff; no odor; wet. 14.7 to 15.2 feet: CLAY (CL); dark gray; 100% fines, high plasticity; very soft; no odor; wet.
16			**100**	**GP**					15.2 to 16.0 feet: SILTY SAND (SM); dark gray; 30% fines, nonplastic; 70% sand, fine; medium stiff; no odor; wet.
17									16.0 to 18.2 feet: CLAY (CL); dark gray; 100% fines, high plasticity; very soft; no odor; wet.
18									
19									18.2 to 19.0 feet: SILTY SAND (SM); dark gray; 30% fines, nonplastic; 70% sand, fine; medium stiff; no odor; wet.

NOTES: *No soil samples collected. Groundwater sample collected (GP8-W-12.5). Temporary screen installed from 7.0 to 18.0 feet. Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner
GW = groundwater sample

▽ ***Water level prior to sampling.***

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP9**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**8.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**30**	**GP**		**GP9-S-0.5**			*0.0 to 1.0 feet: GRAVELLY SAND (SW); light gray; 5% fines; 70% sand, fine to coarse; 25% gravel, fine, subangular; loose; trace organics and coal fragments; organic odor; dry. (ASPHALT SUB-BASE)*
2									*@ 0.5 feet: dark brown stain.*
									1.0 to 1.2 feet: SILT (ML); light brown; 95% fines, medium plasticity; 5% sand, fine; very stiff; trace organics and coarse sand; orange/gray mottles; no odor; dry.
3									*1.2 to 4.0 feet: no recovery.*
4			**62.5**	**GP**					*4.0 to 5.6 feet: SILT (ML); light brown; 95% fines, medium plasticity; 5% sand, fine; very stiff; trace organics and coarse sand; orange/gray mottles; no odor; dry.*
5									
6									*5.6 to 6.5 feet: CLAY (CL); greenish gray; 95% fines, high plasticity; 5% sand; soft to medium stiff; orange mottles; no odor; moist.*
7									*6.5 to 8.0 feet: no recovery.*
8									

NOTES: *New boring location adjacent to GP2, approximately 10.0 feet west of GP2. Soil grab sample collected from 0.0 to 1.0 feet below ground surface. Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner

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Maul Foster & Alongi, Inc.

Geologic Borehole Log/Well Construction

Project Number	Well Number	Sheet
0624.04.02	**GP10**	**1 of 1**

Project Name	**Northern State Hospital Property**	TOC Elevation (feet)	
Project Location	**Sedro-Woolley, WA**	Surface Elevation (feet)	
Start/End Date	**08/19/14 to 08/19/14**	Northing	
Driller/Equipment	**ESN Northwest/SP30-Direct Push Stratoprobe**	Easting	
Geologist/Engineer	**H. Hirsch/C. Wise**	Hole Depth	**8.0-feet**
Sample Method	**Direct Push**	Outer Hole Diam	**2.25-inch**

Depth (feet, BGS)	Well Details	Sample Data: Interval	Percent Recovery	Collection Method	Number	Name (Type)	Blows/6"	Lithologic Column	Soil Description
1			**37.5**	**GP**		**GP10-S-0.5**			*0.0 to 1.1 feet: GRAVELLY SAND (SW); light gray; 5% fines; 70% sand, fine to coarse; 25% gravel, fine, subangular; loose; organic odor; dry.*
									@ 0.9 to 1.1 feet: coal fragments.
2									*1.1 to 1.5 feet: SILT (ML); light brown; 95% fines, medium plasticity; 5% sand; medium stiff; trace woody debris and organics; no odor; dry.*
3									*1.5 to 4.0 feet: no recovery.*
4			**30**	**GP**					*4.0 to 5.2 feet: SILT (ML); light brown; 95% fines, medium plasticity; 5% sand; medium stiff; trace woody debris and organics; no odor; dry.*
5									
6									*5.2 to 8.0 feet: no recovery.*
7									
8									

NOTES: *New boring location adjacent to GP2, approximately 10.0 feet east of GP2. Soil grab sample collected from 0.0 to 1.1 feet below ground surface. Boring decommissioned with bentonite chips.*
GP = geoprobe macrocore liner

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APPENDIX B

WATER FIELD SAMPLING DATA SHEETS

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	Port of Skagit	**Sample Location**	GP2		
Project #	0624.04.02-01	**Sampler**	C. Wise		
Project Name	Northern State Hospital Property	**Sampling Date**	8/19/2014		
Sampling Event	FSA	**Sample Name**	GP2-W-10.0		
Sub Area		**Sample Depth**	10		
FSDS QA:	ENH 8/25/2014	**Easting**		**Northing**	**TOC**

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
8/19/2014	10:27	12		7		5	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**EH**	**Turbidity**
(2) Peristaltic Pump	10:28:00 AM			6.76	19.38	401	2.26	50.7	
Final Field Parameters	10:34:00 AM			6.61	19.28	393	1.21	57.7	14.7

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations: Slightly cloudy.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	11:10:00 AM	VOA-Glass	5	No
			Amber Glass	3	No
			White Poly	1	Yes
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	9	

General Sampling Comments Screen set at 10.0 to 15.0 feet.

Signature _____

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	Port of Skagit	**Sample Location**	GP6
Project #	0624.04.02-01	**Sampler**	C. Wise
Project Name	Northern State Hospital Property	**Sampling Date**	8/19/2014
Sampling Event	FSA	**Sample Name**	
Sub Area		**Sample Depth**	11
FSDS QA:	ENH 8/25/2014	**Easting**	**Northing**	**TOC**

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
8/19/2014	11:53	15		7		8	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**EH**	**Turbidity**
(2) Peristaltic Pump	11:55:00 AM			6.41	15.54	227	2.39	78.4	33.1
Final Field Parameters	12:06:00 PM			6.5	16.74	231	2.35	75.8	5.85

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations: Cloudy. Cleared slightly after first parameter.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
			VOA-Glass		
			Amber Glass		
			White Poly		
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	0	

General Sampling Comments No water samples collected. Temporary screen set at 10.0 to 15.0 feet.

Signature _____

Maul Foster & Alongi, Inc.

400 E. Mill Plain Blvd, Suite 400, Vancouver, WA 98660 (360) 694-2691 Fax. (360) 906-1958

Water Field Sampling Data Sheet

Client Name	Port of Skagit	**Sample Location**	GP8		
Project #	0624.04.02-01	**Sampler**	C. Wise		
Project Name	Northern State Hospital Property	**Sampling Date**	8/19/2014		
Sampling Event	FSA	**Sample Name**	GP8-W-12.5		
Sub Area		**Sample Depth**	12.5		
FSDS QA:	ENH 8/25/2014	**Easting**		**Northing**	**TOC**

Hydrology/Level Measurements

					(Product Thickness)	(Water Column)	(Gallons/ft x Water Column)
Date	**Time**	**DT-Bottom**	**DT-Product**	**DT-Water**	**DTP-DTW**	**DTB-DTW**	**Pore Volume**
8/19/2014	15:40	18		7		11	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Water Quality Data

Purge Method	**Time**	**Purge Vol (gal)**	**Flowrate l/min**	**pH**	**Temp (C)**	**E Cond (uS/cm)**	**DO (mg/L)**	**EH**	**Turbidity**
(2) Peristaltic Pump									
Final Field Parameters	4:00:00 PM			7.26	24.49	434	4.28	77.5	

Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) Vacuum Pump (5) Dedicated Bailer (6) Inertia Pump (7) Other (specify)

Water Quality Observations:

Very cloudy. Lots of sediment present. Turbidity not measured.

Sample Information

Sampling Method	**Sample Type**	**Sampling Time**	**Container Code/Preservative**	**#**	**Filtered**
(2) Peristaltic Pump	Groundwater	3:50:00 PM	VOA-Glass	5	No
			Amber Glass	2	No
			White Poly	1	Yes
			Yellow Poly		
			Green Poly		
			Red Total Poly		
			Red Dissolved Poly		
			Total Bottles	8	

General Sampling Comments

Boring was allowed 20 minutes to recharge prior to sampling. Water quality parameters were measured after the samples were collected due to a limited quantity of water available in the water column. Temporary screen set at 13.0 to 18.0 feet.

Signature _____

APPENDIX C

LABORATORY ANALYTICAL RESULTS

Analytical Resources, Incorporated
Analytical Chemists and Consultants

3 September 2014

Heather Hirsch
Maul, Foster and Alongi, Inc
1329 North State Street, Suite 301
Bellingham, WA 98225

RE: Project: Northern State Hospital, 0624.04.02
ARI Job No.: YX18

Dear Heather:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted two water samples and one trip blank on August 20, 2014. The samples were analyzed for VOCs, BETX, PAHs, NWTPH-HCID and dissolved metals as requested.

The percent recovery for the surrogate, d10-fluoranthene, was high following the PAH analyses of the LCS/LCSD associated with these samples. Since the percent recoveries for all spiked compounds were within established QC limits, no corrective actions were taken.

The remaining analyses proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file YX18

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: YX18	Turn-around Requested: STD	Page: 1 of 2	
ARI Client Company: Maul Foster & Alongi, Inc.	Phone: 360-594-6257	Date: 8/19/14	Ice Present?
Client Contact: Heather Hirsch		No. of Coolers:	Cooler Temps:
Client Project Name: Northern State Hospital IPG			
Client Project #: 0624.04.02	Samplers: H. Hirsch / C. Wise		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: HCID	BTEX 8021B	Metals-RCRA 8 Diss.	Cu & Zn dissolved by 6010/6020	PAHs by 8270	NWTPH-Dx	NWTPH-Gx	VOCs by 8260	Notes/Comments
GP2-W-10.0	8/19/14	1110	water	9	X	X	X	X	X	Hold	Hold	—	Field filtered metals
GP8-W-12.5	8/19/14	1550	↓	8	X	—	Hold	Hold	Hold	Hold	Hold	X	
TRIP BLANK	8/11/14	—	↓	4	—	—	—	—	—	—	—	X	

Comments/Special Instructions
Hold = hold for potential follow up
X = analyze
— = do not analyze

	Relinquished by (Signature)	Received by (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name	Carolyn Wise	Robert Turpaud	Robert Turpaud	A. Volgardsen
Company:	MFA			ARI
Date & Time	8/20 9:15	8/20 9:15	8-20-14 11:25	8/20/14 1125

YX18: 00062

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Mau | Foster & Alongi
COC No(s): _____ (NA)
Assigned ARI Job No: YX18

Project Name: Northern State Hospital IPT
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: MC Delivery
Tracking No: 590506 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6 0 °C for chemistry)
Time: 1125 — 2.8 2.8 ___ ___ ___ ___

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 8/20/14 Time: 1125

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?	Bubble Wrap (Wet Ice) Gel Packs Baggies (Foam Block) Paper Other:		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)	NA	(YES)	NO
Were all VOC vials free of air bubbles?	NA	YES	(NO)
Was sufficient amount of sample sent in each bottle?		(YES)	NO
Date VOC Trip Blank was made at ARI	NA	8/11/14	

Was Sample Split by ARI: (NA) YES Date/Time:_____ Equipment:_____ Split by:_____

Samples Logged by: AV Date: 8/20/14 Time: 1245

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

GP2-W-10.0 = 5pb TB-3pb
GP8-W-12.5 = 2lg

By: AV Date: 8/20/14

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles >4 mm
° ° °	° ° °	● ● ●

Small → "sm" (< 2 mm)
Peabubbles → "pb" (2 to < 4 mm)
Large → "lg" (4 to < 6 mm)
Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: YX18
Client: Maul Foster & Alongi
Project Event: 0624.04.02
Project Name: Northern State Hospital IPG

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	GP2-W-10.0	YX18A	14-17107	Water	08/19/14 11:10	08/20/14 11:25
2.	GP8-W-12.5	YX18B	14-17108	Water	08/19/14 15:50	08/20/14 11:25
3.	TRIP BLANKS	YX18C	14-17109	Water	08/19/14	08/20/14 11:25

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

TX18.00005

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

YX18 · 00006

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: GP8-W-12.5**
Page 1 of 2 **SAMPLE**

Lab Sample ID: YX18B
LIMS ID: 14-17108
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Instrument/Analyst: NT3/LH
Date Analyzed: 08/23/14 20:24

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
74-87-3	Chloromethane	0.50	< 0.50	U
74-83-9	Bromomethane	1.0	< 1.0	U
75-01-4	Vinyl Chloride	0.20	< 0.20	U
75-00-3	Chloroethane	0.20	< 0.20	U
75-09-2	Methylene Chloride	1.0	< 1.0	U
67-64-1	Acetone	5.0	< 5.0	U
75-15-0	Carbon Disulfide	0.20	< 0.20	U
75-35-4	1,1-Dichloroethene	0.20	< 0.20	U
75-34-3	1,1-Dichloroethane	0.20	< 0.20	U
156-60-5	trans-1,2-Dichloroethene	0.20	< 0.20	U
156-59-2	**cis-1,2-Dichloroethene**	**0.20**	**0.60**	
67-66-3	Chloroform	0.20	< 0.20	U
107-06-2	1,2-Dichloroethane	0.20	< 0.20	U
78-93-3	2-Butanone	5.0	< 5.0	U
71-55-6	1,1,1-Trichloroethane	0.20	< 0.20	U
56-23-5	Carbon Tetrachloride	0.20	< 0.20	U
108-05-4	Vinyl Acetate	0.20	< 0.20	U
75-27-4	Bromodichloromethane	0.20	< 0.20	U
78-87-5	1,2-Dichloropropane	0.20	< 0.20	U
10061-01-5	cis-1,3-Dichloropropene	0.20	< 0.20	U
79-01-6	**Trichloroethene**	**0.20**	**0.79**	
124-48-1	Dibromochloromethane	0.20	< 0.20	U
79-00-5	1,1,2-Trichloroethane	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U
10061-02-6	trans-1,3-Dichloropropene	0.20	< 0.20	U
110-75-8	2-Chloroethylvinylether	1.0	< 1.0	U
75-25-2	Bromoform	0.20	< 0.20	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0	< 5.0	U
591-78-6	2-Hexanone	5.0	< 5.0	U
127-18-4	**Tetrachloroethene**	**0.20**	**11**	
79-34-5	1,1,2,2-Tetrachloroethane	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
108-90-7	Chlorobenzene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
100-42-5	Styrene	0.20	< 0.20	U
75-69-4	Trichlorofluoromethane	0.20	< 0.20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U
95-50-1	1,2-Dichlorobenzene	0.20	< 0.20	U
541-73-1	1,3-Dichlorobenzene	0.20	< 0.20	U
106-46-7	1,4-Dichlorobenzene	0.20	< 0.20	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: GP8-W-12.5**
 SAMPLE

Lab Sample ID: YX18B
LIMS ID: 14-17108
Matrix: Water
Date Analyzed: 08/23/14 20:24

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

CAS Number	Analyte	LOQ	Result	Q
107-02-8	Acrolein	5.0	< 5.0	U
74-88-4	Iodomethane	1.0	< 1.0	U
74-96-4	Bromoethane	0.20	< 0.20	U
107-13-1	Acrylonitrile	1.0	< 1.0	U
563-58-6	1,1-Dichloropropene	0.20	< 0.20	U
74-95-3	Dibromomethane	0.20	< 0.20	U
630-20-6	1,1,1,2-Tetrachloroethane	0.20	< 0.20	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	< 0.50	U
96-18-4	1,2,3-Trichloropropane	0.50	< 0.50	U
110-57-6	trans-1,4-Dichloro-2-butene	1.0	< 1.0	U
108-67-8	1,3,5-Trimethylbenzene	0.20	< 0.20	U
95-63-6	1,2,4-Trimethylbenzene	0.20	< 0.20	U
87-68-3	Hexachlorobutadiene	0.50	< 0.50	U
106-93-4	1,2-Dibromoethane	0.20	< 0.20	U
74-97-5	Bromochloromethane	0.20	< 0.20	U
594-20-7	2,2-Dichloropropane	0.20	< 0.20	U
142-28-9	1,3-Dichloropropane	0.20	< 0.20	U
98-82-8	Isopropylbenzene	0.20	< 0.20	U
103-65-1	n-Propylbenzene	0.20	< 0.20	U
108-86-1	Bromobenzene	0.20	< 0.20	U
95-49-8	2-Chlorotoluene	0.20	< 0.20	U
106-43-4	4-Chlorotoluene	0.20	< 0.20	U
98-06-6	tert-Butylbenzene	0.20	< 0.20	U
135-98-8	sec-Butylbenzene	0.20	< 0.20	U
99-87-6	4-Isopropyltoluene	0.20	< 0.20	U
104-51-8	n-Butylbenzene	0.20	< 0.20	U
120-82-1	1,2,4-Trichlorobenzene	0.50	< 0.50	U
91-20-3	Naphthalene	0.50	< 0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	< 0.50	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	108%
d8-Toluene	94.4%
Bromofluorobenzene	93.0%
d4-1,2-Dichlorobenzene	99.7%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TRIP BLANKS SAMPLE**

Lab Sample ID: YX18C
LIMS ID: 14-17109
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Instrument/Analyst: NT3/LH
Date Analyzed: 08/23/14 19:57

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
74-87-3	Chloromethane	0.50	< 0.50	U
74-83-9	Bromomethane	1.0	< 1.0	U
75-01-4	Vinyl Chloride	0.20	< 0.20	U
75-00-3	Chloroethane	0.20	< 0.20	U
75-09-2	Methylene Chloride	1.0	< 1.0	U
67-64-1	Acetone	5.0	< 5.0	U
75-15-0	Carbon Disulfide	0.20	< 0.20	U
75-35-4	1,1-Dichloroethene	0.20	< 0.20	U
75-34-3	1,1-Dichloroethane	0.20	< 0.20	U
156-60-5	trans-1,2-Dichloroethene	0.20	< 0.20	U
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
67-66-3	Chloroform	0.20	< 0.20	U
107-06-2	1,2-Dichloroethane	0.20	< 0.20	U
78-93-3	2-Butanone	5.0	< 5.0	U
71-55-6	1,1,1-Trichloroethane	0.20	< 0.20	U
56-23-5	Carbon Tetrachloride	0.20	< 0.20	U
108-05-4	Vinyl Acetate	0.20	< 0.20	U
75-27-4	Bromodichloromethane	0.20	< 0.20	U
78-87-5	1,2-Dichloropropane	0.20	< 0.20	U
10061-01-5	cis-1,3-Dichloropropene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
124-48-1	Dibromochloromethane	0.20	< 0.20	U
79-00-5	1,1,2-Trichloroethane	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U
10061-02-6	trans-1,3-Dichloropropene	0.20	< 0.20	U
110-75-8	2-Chloroethylvinylether	1.0	< 1.0	U
75-25-2	Bromoform	0.20	< 0.20	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0	< 5.0	U
591-78-6	2-Hexanone	5.0	< 5.0	U
127-18-4	Tetrachloroethene	0.20	< 0.20	U
79-34-5	1,1,2,2-Tetrachloroethane	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
108-90-7	Chlorobenzene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
100-42-5	Styrene	0.20	< 0.20	U
75-69-4	Trichlorofluoromethane	0.20	< 0.20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U
95-50-1	1,2-Dichlorobenzene	0.20	< 0.20	U
541-73-1	1,3-Dichlorobenzene	0.20	< 0.20	U
106-46-7	1,4-Dichlorobenzene	0.20	< 0.20	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: TRIP BLANKS SAMPLE**

Lab Sample ID: YX18C
LIMS ID: 14-17109
Matrix: Water
Date Analyzed: 08/23/14 19:57

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

CAS Number	Analyte	LOQ	Result	Q
107-02-8	Acrolein	5.0	< 5.0	U
74-88-4	Iodomethane	1.0	< 1.0	U
74-96-4	Bromoethane	0.20	< 0.20	U
107-13-1	Acrylonitrile	1.0	< 1.0	U
563-58-6	1,1-Dichloropropene	0.20	< 0.20	U
74-95-3	Dibromomethane	0.20	< 0.20	U
630-20-6	1,1,1,2-Tetrachloroethane	0.20	< 0.20	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	< 0.50	U
96-18-4	1,2,3-Trichloropropane	0.50	< 0.50	U
110-57-6	trans-1,4-Dichloro-2-butene	1.0	< 1.0	U
108-67-8	1,3,5-Trimethylbenzene	0.20	< 0.20	U
95-63-6	1,2,4-Trimethylbenzene	0.20	< 0.20	U
87-68-3	Hexachlorobutadiene	0.50	< 0.50	U
106-93-4	1,2-Dibromoethane	0.20	< 0.20	U
74-97-5	Bromochloromethane	0.20	< 0.20	U
594-20-7	2,2-Dichloropropane	0.20	< 0.20	U
142-28-9	1,3-Dichloropropane	0.20	< 0.20	U
98-82-8	Isopropylbenzene	0.20	< 0.20	U
103-65-1	n-Propylbenzene	0.20	< 0.20	U
108-86-1	Bromobenzene	0.20	< 0.20	U
95-49-8	2-Chlorotoluene	0.20	< 0.20	U
106-43-4	4-Chlorotoluene	0.20	< 0.20	U
98-06-6	tert-Butylbenzene	0.20	< 0.20	U
135-98-8	sec-Butylbenzene	0.20	< 0.20	U
99-87-6	4-Isopropyltoluene	0.20	< 0.20	U
104-51-8	n-Butylbenzene	0.20	< 0.20	U
120-82-1	1,2,4-Trichlorobenzene	0.50	< 0.50	U
91-20-3	Naphthalene	0.50	< 0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	< 0.50	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	108%
d8-Toluene	96.1%
Bromofluorobenzene	92.0%
d4-1,2-Dichlorobenzene	104%

2-Chloroethylvinylether is an acid labile compound and may not be recovered from an acid preserved sample.

EPA SW-846 indicates that vinyl chloride and styrene may degrade in the presence of acid preservative.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-082314A**
 METHOD BLANK

Lab Sample ID: MB-082314A
LIMS ID: 14-17108
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT3/LH
Date Analyzed: 08/23/14 11:20

Sample Amount: 10.0 mL
Purge Volume: 10.0 mL

CAS Number	Analyte	LOQ	Result	Q
74-87-3	Chloromethane	0.50	< 0.50	U
74-83-9	Bromomethane	1.0	< 1.0	U
75-01-4	Vinyl Chloride	0.20	< 0.20	U
75-00-3	Chloroethane	0.20	< 0.20	U
75-09-2	Methylene Chloride	1.0	< 1.0	U
67-64-1	Acetone	5.0	< 5.0	U
75-15-0	Carbon Disulfide	0.20	< 0.20	U
75-35-4	1,1-Dichloroethene	0.20	< 0.20	U
75-34-3	1,1-Dichloroethane	0.20	< 0.20	U
156-60-5	trans-1,2-Dichloroethene	0.20	< 0.20	U
156-59-2	cis-1,2-Dichloroethene	0.20	< 0.20	U
67-66-3	Chloroform	0.20	< 0.20	U
107-06-2	1,2-Dichloroethane	0.20	< 0.20	U
78-93-3	2-Butanone	5.0	< 5.0	U
71-55-6	1,1,1-Trichloroethane	0.20	< 0.20	U
56-23-5	Carbon Tetrachloride	0.20	< 0.20	U
108-05-4	Vinyl Acetate	0.20	< 0.20	U
75-27-4	Bromodichloromethane	0.20	< 0.20	U
78-87-5	1,2-Dichloropropane	0.20	< 0.20	U
10061-01-5	cis-1,3-Dichloropropene	0.20	< 0.20	U
79-01-6	Trichloroethene	0.20	< 0.20	U
124-48-1	Dibromochloromethane	0.20	< 0.20	U
79-00-5	1,1,2-Trichloroethane	0.20	< 0.20	U
71-43-2	Benzene	0.20	< 0.20	U
10061-02-6	trans-1,3-Dichloropropene	0.20	< 0.20	U
110-75-8	2-Chloroethylvinylether	1.0	< 1.0	U
75-25-2	Bromoform	0.20	< 0.20	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0	< 5.0	U
591-78-6	2-Hexanone	5.0	< 5.0	U
127-18-4	Tetrachloroethene	0.20	< 0.20	U
79-34-5	1,1,2,2-Tetrachloroethane	0.20	< 0.20	U
108-88-3	Toluene	0.20	< 0.20	U
108-90-7	Chlorobenzene	0.20	< 0.20	U
100-41-4	Ethylbenzene	0.20	< 0.20	U
100-42-5	Styrene	0.20	< 0.20	U
75-69-4	Trichlorofluoromethane	0.20	< 0.20	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.20	< 0.20	U
179601-23-1	m,p-Xylene	0.40	< 0.40	U
95-47-6	o-Xylene	0.20	< 0.20	U
95-50-1	1,2-Dichlorobenzene	0.20	< 0.20	U
541-73-1	1,3-Dichlorobenzene	0.20	< 0.20	U
106-46-7	1,4-Dichlorobenzene	0.20	< 0.20	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-082314A**
 METHOD BLANK

Lab Sample ID: MB-082314A
LIMS ID: 14-17108
Matrix: Water
Date Analyzed: 08/23/14 11:20

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

CAS Number	Analyte	LOQ	Result	Q
107-02-8	Acrolein	5.0	< 5.0	U
74-88-4	Iodomethane	1.0	< 1.0	U
74-96-4	Bromoethane	0.20	< 0.20	U
107-13-1	Acrylonitrile	1.0	< 1.0	U
563-58-6	1,1-Dichloropropene	0.20	< 0.20	U
74-95-3	Dibromomethane	0.20	< 0.20	U
630-20-6	1,1,1,2-Tetrachloroethane	0.20	< 0.20	U
96-12-8	1,2-Dibromo-3-chloropropane	0.50	< 0.50	U
96-18-4	1,2,3-Trichloropropane	0.50	< 0.50	U
110-57-6	trans-1,4-Dichloro-2-butene	1.0	< 1.0	U
108-67-8	1,3,5-Trimethylbenzene	0.20	< 0.20	U
95-63-6	1,2,4-Trimethylbenzene	0.20	< 0.20	U
87-68-3	**Hexachlorobutadiene**	**0.50**	**0.70**	
106-93-4	1,2-Dibromoethane	0.20	< 0.20	U
74-97-5	Bromochloromethane	0.20	< 0.20	U
594-20-7	2,2-Dichloropropane	0.20	< 0.20	U
142-28-9	1,3-Dichloropropane	0.20	< 0.20	U
98-82-8	Isopropylbenzene	0.20	< 0.20	U
103-65-1	n-Propylbenzene	0.20	< 0.20	U
108-86-1	Bromobenzene	0.20	< 0.20	U
95-49-8	2-Chlorotoluene	0.20	< 0.20	U
106-43-4	4-Chlorotoluene	0.20	< 0.20	U
98-06-6	tert-Butylbenzene	0.20	< 0.20	U
135-98-8	sec-Butylbenzene	0.20	< 0.20	U
99-87-6	4-Isopropyltoluene	0.20	< 0.20	U
104-51-8	n-Butylbenzene	0.20	< 0.20	U
120-82-1	1,2,4-Trichlorobenzene	0.50	< 0.50	U
91-20-3	Naphthalene	0.50	< 0.50	U
87-61-6	1,2,3-Trichlorobenzene	0.50	< 0.50	U

Reported in µg/L (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	110%
d8-Toluene	96.2%
Bromofluorobenzene	94.4%
d4-1,2-Dichlorobenzene	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-082314A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-082314A
LIMS ID: 14-17108
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT3/LH
LCSD: NT3/LH
Date Analyzed LCS: 08/23/14 10:24
LCSD: 08/23/14 10:52

Sample Amount LCS: 10.0 mL
LCSD: 10.0 mL
Purge Volume LCS: 10.0 mL
LCSD: 10.0 mL

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	8.15	10.0	81.5%	8.38	10.0	83.8%	2.8%
Bromomethane	8.14	10.0	81.4%	8.72	10.0	87.2%	6.9%
Vinyl Chloride	8.35	10.0	83.5%	8.54	10.0	85.4%	2.2%
Chloroethane	8.54	10.0	85.4%	8.25	10.0	82.5%	3.5%
Methylene Chloride	9.05	10.0	90.5%	9.37	10.0	93.7%	3.5%
Acetone	42.7	50.0	85.4%	43.6	50.0	87.2%	2.1%
Carbon Disulfide	8.69	10.0	86.9%	8.89	10.0	88.9%	2.3%
1,1-Dichloroethene	8.48	10.0	84.8%	8.97	10.0	89.7%	5.6%
1,1-Dichloroethane	8.90	10.0	89.0%	8.83	10.0	88.3%	0.8%
trans-1,2-Dichloroethene	8.75	10.0	87.5%	8.93	10.0	89.3%	2.0%
cis-1,2-Dichloroethene	8.59	10.0	85.9%	8.79	10.0	87.9%	2.3%
Chloroform	9.17	10.0	91.7%	9.25	10.0	92.5%	0.9%
1,2-Dichloroethane	9.36	10.0	93.6%	9.52	10.0	95.2%	1.7%
2-Butanone	43.6	50.0	87.2%	45.2	50.0	90.4%	3.6%
1,1,1-Trichloroethane	9.57	10.0	95.7%	9.63	10.0	96.3%	0.6%
Carbon Tetrachloride	9.81	10.0	98.1%	9.88	10.0	98.8%	0.7%
Vinyl Acetate	8.11	10.0	81.1%	8.43	10.0	84.3%	3.9%
Bromodichloromethane	9.31	10.0	93.1%	9.58	10.0	95.8%	2.9%
1,2-Dichloropropane	8.14	10.0	81.4%	8.43	10.0	84.3%	3.5%
cis-1,3-Dichloropropene	9.07	10.0	90.7%	9.07	10.0	90.7%	0.0%
Trichloroethene	8.61	10.0	86.1%	8.85	10.0	88.5%	2.7%
Dibromochloromethane	9.62	10.0	96.2%	10.0	10.0	100%	3.9%
1,1,2-Trichloroethane	8.58	10.0	85.8%	8.55	10.0	85.5%	0.4%
Benzene	9.03	10.0	90.3%	8.95	10.0	89.5%	0.9%
trans-1,3-Dichloropropene	8.77	10.0	87.7%	9.48	10.0	94.8%	7.8%
2-Chloroethylvinylether	9.01	10.0	90.1%	9.17	10.0	91.7%	1.8%
Bromoform	10.3	10.0	103%	10.4	10.0	104%	1.0%
4-Methyl-2-Pentanone (MIBK)	44.7	50.0	89.4%	45.9	50.0	91.8%	2.6%
2-Hexanone	48.0	50.0	96.0%	48.9	50.0	97.8%	1.9%
Tetrachloroethene	8.58	10.0	85.8%	9.28	10.0	92.8%	7.8%
1,1,2,2-Tetrachloroethane	9.51	10.0	95.1%	9.15	10.0	91.5%	3.9%
Toluene	9.16	10.0	91.6%	9.40	10.0	94.0%	2.6%
Chlorobenzene	9.71	10.0	97.1%	9.87	10.0	98.7%	1.6%
Ethylbenzene	9.82	10.0	98.2%	10.1	10.0	101%	2.8%
Styrene	9.87	10.0	98.7%	10.1	10.0	101%	2.3%
Trichlorofluoromethane	11.1	10.0	111%	9.68	10.0	96.8%	13.7%
1,1,2-Trichloro-1,2,2-trifluoroetha	9.65	10.0	96.5%	9.65	10.0	96.5%	0.0%
m,p-Xylene	19.8	20.0	99.0%	20.5	20.0	102%	3.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-082314A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-082314A QC Report No: YX18-Maul Foster & Alongi
LIMS ID: 14-17108 Project: Northern State Hospital IPG
Matrix: Water 0624.04.02

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
o-Xylene	9.66	10.0	96.6%	10.0	10.0	100%	3.5%
1,2-Dichlorobenzene	9.33	10.0	93.3%	9.15	10.0	91.5%	1.9%
1,3-Dichlorobenzene	9.20	10.0	92.0%	9.06	10.0	90.6%	1.5%
1,4-Dichlorobenzene	8.96	10.0	89.6%	8.86	10.0	88.6%	1.1%
Acrolein	40.7	50.0	81.4%	44.2	50.0	88.4%	8.2%
Iodomethane	8.76	10.0	87.6%	8.34	10.0	83.4%	4.9%
Bromoethane	8.65	10.0	86.5%	9.03	10.0	90.3%	4.3%
Acrylonitrile	9.13	10.0	91.3%	8.82	10.0	88.2%	3.5%
1,1-Dichloropropene	8.79	10.0	87.9%	9.01	10.0	90.1%	2.5%
Dibromomethane	9.81	10.0	98.1%	9.94	10.0	99.4%	1.3%
1,1,1,2-Tetrachloroethane	9.93	10.0	99.3%	10.7	10.0	107%	7.5%
1,2-Dibromo-3-chloropropane	9.71	10.0	97.1%	10.1	10.0	101%	3.9%
1,2,3-Trichloropropane	9.89	10.0	98.9%	9.35	10.0	93.5%	5.6%
trans-1,4-Dichloro-2-butene	9.08	10.0	90.8%	8.94	10.0	89.4%	1.6%
1,3,5-Trimethylbenzene	10.1	10.0	101%	10.2	10.0	102%	1.0%
1,2,4-Trimethylbenzene	10.3	10.0	103%	10.4	10.0	104%	1.0%
Hexachlorobutadiene	10.2 B	10.0	102%	9.79 B	10.0	97.9%	4.1%
1,2-Dibromoethane	8.69	10.0	86.9%	8.43	10.0	84.3%	3.0%
Bromochloromethane	9.38	10.0	93.8%	10.1	10.0	101%	7.4%
2,2-Dichloropropane	9.77	10.0	97.7%	9.91	10.0	99.1%	1.4%
1,3-Dichloropropane	9.39	10.0	93.9%	9.57	10.0	95.7%	1.9%
Isopropylbenzene	10.2	10.0	102%	10.1	10.0	101%	1.0%
n-Propylbenzene	10.1	10.0	101%	10.2	10.0	102%	1.0%
Bromobenzene	9.84	10.0	98.4%	9.68	10.0	96.8%	1.6%
2-Chlorotoluene	11.2	10.0	112%	11.1	10.0	111%	0.9%
4-Chlorotoluene	10.2	10.0	102%	10.1	10.0	101%	1.0%
tert-Butylbenzene	9.52	10.0	95.2%	9.53	10.0	95.3%	0.1%
sec-Butylbenzene	10.2	10.0	102%	9.98	10.0	99.8%	2.2%
4-Isopropyltoluene	9.52	10.0	95.2%	9.66	10.0	96.6%	1.5%
n-Butylbenzene	9.76	10.0	97.6%	9.97	10.0	99.7%	2.1%
1,2,4-Trichlorobenzene	8.94	10.0	89.4%	8.37	10.0	83.7%	6.6%
Naphthalene	9.78	10.0	97.8%	8.89	10.0	88.9%	9.5%
1,2,3-Trichlorobenzene	8.79	10.0	87.9%	8.05	10.0	80.5%	8.8%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	105%	103%
d8-Toluene	93.3%	95.0%
Bromofluorobenzene	96.5%	95.1%
d4-1,2-Dichlorobenzene	96.0%	99.9%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

ARI ID	Client ID	PV	DCE	TOL	BFB	DCB	TOT OUT
MB-082314A	Method Blank	10	110%	96.2%	94.4%	102%	0
LCS-082314A	Lab Control	10	105%	93.3%	96.5%	96.0%	0
LCSD-082314A	Lab Control Dup	10	103%	95.0%	95.1%	99.9%	0
YX18B	GP8-W-12.5	10	108%	94.4%	93.0%	99.7%	0
YX18C	TRIP BLANKS	10	108%	96.1%	92.0%	104%	0

SW8260C	LCS/MB LIMITS	QC LIMITS
(DCE) = d4-1,2-Dichloroethane	(80-120)	(80-130)
(TOL) = d8-Toluene	(80-120)	(80-120)
(BFB) = Bromofluorobenzene	(80-120)	(80-120)
(DCB) = d4-1,2-Dichlorobenzene	(80-120)	(80-120)

Prep Method: SW5030B
Log Number Range: 14-17108 to 14-17109

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod

Sample ID: GP2-W-10.0
SAMPLE

Lab Sample ID: YX18A
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Analyzed: 08/28/14 15:09
Instrument/Analyst: PID1/PKC

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	2.0	< 2.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

BETX Surrogate Recovery

Trifluorotoluene	93.3%
Bromobenzene	90.9%

BETX values reported in µg/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: MB-082814
METHOD BLANK

Lab Sample ID: MB-082814
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Analyzed: 08/28/14 11:29
Instrument/Analyst: PID1/PKC

Purge Volume: 5.0 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
71-43-2	Benzene	1.0	< 1.0 U
108-88-3	Toluene	1.0	< 1.0 U
100-41-4	Ethylbenzene	1.0	< 1.0 U
179601-23-1	m,p-Xylene	2.0	< 2.0 U
95-47-6	o-Xylene	1.0	< 1.0 U

BETX Surrogate Recovery

Trifluorotoluene	83.9%
Bromobenzene	84.5%

BETX values reported in µg/L (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: LCS-082814
LAB CONTROL SAMPLE

Lab Sample ID: LCS-082814
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 08/28/14 10:31
LCSD: 08/28/14 11:00
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL

Dilution Factor LCS: 1.0
LCSD: 1.0

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	6.16	7.00	88.0%	6.24	7.00	89.1%	1.3%
Toluene	46.2	49.4	93.5%	47.0	49.4	95.1%	1.7%
Ethylbenzene	11.2	12.3	91.1%	11.6	12.3	94.3%	3.5%
m,p-Xylene	37.0	40.0	92.5%	37.6	40.0	94.0%	1.6%
o-Xylene	14.5	15.3	94.8%	14.8	15.3	96.7%	2.0%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	83.0%	87.8%
Bromobenzene	83.5%	89.8%

ANALYTICAL RESOURCES INCORPORATED

BETX WATER SURROGATE RECOVERY SUMMARY

ARI Job: YX18
Matrix: Water

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02

Client ID	TFT	BBZ	TOT OUT
MB-082814	83.9%	84.5%	0
LCS-082814	83.0%	83.5%	0
LCSD-082814	87.8%	89.8%	0
GP2-W-10.0	93.3%	90.9%	0

		LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(5 mL PV)	(80-120)	(80-120)
(TFT) = Trifluorotoluene	(15 mL PV)	(79-120)	(80-120)
(BBZ) = Bromobenzene	(5 mL PV)	(80-120)	(77-120)
(BBZ) = Bromobenzene	(15 mL PV)	(79-120)	(80-120)

Log Number Range: 14-17107 to 14-17107

YX18.00020

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: MB-082614
METHOD BLANK

Lab Sample ID: MB-082614
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized: MW
Reported: 08/28/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 08/26/14
Date Analyzed: 08/27/14 18:03
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	121%
d10-2-Methylnaphthalene	87.7%
d14-Dibenzo(a,h)anthracene	78.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Extraction Method: SW3520C
Page 1 of 1

Sample ID: GP2-W-10.0
SAMPLE

Lab Sample ID: YX18A
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 08/28/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 08/26/14
Date Analyzed: 08/27/14 19:54
Instrument/Analyst: NT8/JZ

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	**Naphthalene**	**0.10**	**0.14**
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U
TOTBFA	Total Benzofluoranthenes	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	106%
d10-2-Methylnaphthalene	88.0%
d14-Dibenzo(a,h)anthracene	56.7%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

Client ID	FLN	MNP	DBA	TOT OUT
MB-082614	121%	87.7%	78.3%	0
LCS-082614	123%*	88.3%	98.0%	1
LCSD-082614	124%*	82.3%	102%	1
GP2-W-10.0	106%	88.0%	56.7%	0

	LCS/MB LIMITS	QC LIMITS
(FLN) = d10-Fluoranthene	(46-121)	(46-121)
(MNP) = d10-2-Methylnaphthalene	(31-120)	(31-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(10-125)	(10-125)

Prep Method: SW3520C
Log Number Range: 14-17107 to 14-17107

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS

Sample ID: LCS-082614
LAB CONTROL SAMPLE

Lab Sample ID: LCS-082614
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized: MW
Reported: 08/28/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 08/26/14

Date Analyzed LCS: 08/27/14 18:31
LCSD: 08/27/14 18:59
Instrument/Analyst LCS: NT8/JZ
LCSD: NT8/JZ

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Naphthalene	1.92	3.00	64.0%	1.92	3.00	64.0%	0.0%
2-Methylnaphthalene	2.02	3.00	67.3%	1.77	3.00	59.0%	13.2%
1-Methylnaphthalene	2.10	3.00	70.0%	1.90	3.00	63.3%	10.0%
Acenaphthylene	1.90	3.00	63.3%	2.19	3.00	73.0%	14.2%
Acenaphthene	1.88	3.00	62.7%	1.86	3.00	62.0%	1.1%
Fluorene	2.27	3.00	75.7%	2.24	3.00	74.7%	1.3%
Phenanthrene	2.41	3.00	80.3%	2.44	3.00	81.3%	1.2%
Anthracene	2.17	3.00	72.3%	2.50	3.00	83.3%	14.1%
Fluoranthene	2.78	3.00	92.7%	2.80	3.00	93.3%	0.7%
Pyrene	2.59	3.00	86.3%	2.63	3.00	87.7%	1.5%
Benzo(a)anthracene	2.71	3.00	90.3%	2.86	3.00	95.3%	5.4%
Chrysene	2.69	3.00	89.7%	2.74	3.00	91.3%	1.8%
Benzo(a)pyrene	2.13	3.00	71.0%	2.57	3.00	85.7%	18.7%
Indeno(1,2,3-cd)pyrene	2.36	3.00	78.7%	2.50	3.00	83.3%	5.8%
Dibenz(a,h)anthracene	2.27	3.00	75.7%	2.40	3.00	80.0%	5.6%
Benzo(g,h,i)perylene	2.52	3.00	84.0%	2.74	3.00	91.3%	8.4%
Dibenzofuran	2.10	3.00	70.0%	2.08	3.00	69.3%	1.0%
Total Benzofluoranthenes	8.08	9.00	89.8%	8.12	9.00	90.2%	0.5%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

SIM Semivolatile Surrogate Recovery

	LCS	LCSD
d10-Fluoranthene	123%	124%
d10-2-Methylnaphthalene	88.3%	82.3%
d14-Dibenzo(a,h)anthracene	98.0%	102%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPH-HCID Method by GC/FID
Extraction Method: SW3510C

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Matrix: Water

Data Release Authorized:
Reported: 08/25/14

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-082114	Method Blank	08/21/14	08/21/14	1.0	Gas	< 0.25 U
14-17107					Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	82.4%
YX18A	GP2-W-10.0	08/21/14	08/21/14	1.0	Gas	< 0.25 U
14-17107	HC ID: **DRO/MOTOR OIL**				**Diesel**	**> 0.50**
					Oil	**> 0.50**
					o-Terphenyl	71.5%
YX18B	GP8-W-12.5	08/21/14	08/21/14	1.0	Gas	< 0.25 U
14-17108	HC ID: ---				Diesel	< 0.50 U
					Oil	< 0.50 U
					o-Terphenyl	70.3%

Reported in mg/L (ppm)

Gas value based on total peaks in the range from Toluene to C12.
Diesel value based on the total peaks in the range from C12 to C24.
Oil value based on the total peaks in the range from C24 to C38.

HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPH-HCID Method by GC/FID
Page 1 of 1

Sample ID: LCS-082114
LCS/LCSD

Lab Sample ID: LCS-082114
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 08/25/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted LCS/LCSD: 08/21/14
Date Analyzed LCS: 08/21/14 19:39
LCSD: 08/21/14 20:00
Instrument/Analyst LCS: FID/JGR
LCSD: FID/JGR

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.59	3.00	86.3%	2.59	3.00	86.3%	0.0%

HCID Surrogate Recovery

	LCS	LCSD
o-Terphenyl	81.5%	80.2%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL HCID RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Water
Date Received: 08/20/14

ARI Job: YX18
Project: Northern State Hospital IPG 0624.04.02

ARI ID	Client ID	Sample Amt	Final Vol	Prep Date
14-17107-082114MB	Method Blank	500 mL	1.00 mL	08/21/14
14-17107-082114LCS	Lab Control	500 mL	1.00 mL	08/21/14
14-17107-082114LCSD	Lab Control Dup	500 mL	1.00 mL	08/21/14
14-17107-YX18A	GP2-W-10.0	500 mL	1.00 mL	08/21/14
14-17108-YX18B	GP8-W-12.5	500 mL	1.00 mL	08/21/14

ANALYTICAL RESOURCES INCORPORATED

HCID SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

Client ID	O-TER	TOT OUT
MB-082114	82.4%	0
LCS-082114	81.5%	0
LCSD-082114	80.2%	0
GP2-W-10.0	71.5%	0
GP8-W-12.5	70.3%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-17107 to 14-17108

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: GP2-W-10.0
SAMPLE

Lab Sample ID: YX18A
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	08/22/14	200.8	08/25/14	**7440-38-2**	**Arsenic**	0.2	**2.9**	
200.8	08/22/14	200.8	08/25/14	**7440-39-3**	**Barium**	0.5	**20.5**	
200.8	08/22/14	200.8	08/25/14	7440-43-9	Cadmium	0.1	0.1	U
200.8	08/22/14	200.8	08/25/14	7440-47-3	Chromium	0.5	0.5	U
200.8	08/22/14	200.8	08/25/14	**7440-50-8**	**Copper**	0.5	**1.0**	
200.8	08/22/14	200.8	08/25/14	7439-92-1	Lead	0.1	0.1	U
7470A	08/22/14	7470A	08/27/14	7439-97-6	Mercury	0.1	0.1	U
200.8	08/22/14	200.8	08/25/14	7782-49-2	Selenium	0.5	0.5	U
200.8	08/22/14	200.8	08/25/14	7440-22-4	Silver	0.2	0.2	U
200.8	08/22/14	200.8	08/25/14	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: GP2-W-10.0
DUPLICATE

Lab Sample ID: YX18A
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	200.8	2.9	3.1	6.7%	+/- 20%	
Barium	200.8	20.5	21.0	2.4%	+/- 20%	
Cadmium	200.8	0.1 U	0.1 U	0.0%	+/- 0.1	L
Chromium	200.8	0.5 U	0.5 U	0.0%	+/- 0.5	L
Copper	200.8	1.0	1.1	9.5%	+/- 0.5	L
Lead	200.8	0.1 U	0.1 U	0.0%	+/- 0.1	L
Mercury	7470A	0.1 U	0.1 U	0.0%	+/- 0.1	L
Selenium	200.8	0.5 U	0.5 U	0.0%	+/- 0.5	L
Silver	200.8	0.2 U	0.2 U	0.0%	+/- 0.2	L
Zinc	200.8	4 U	4 U	0.0%	+/- 4	L

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: GP2-W-10.0
MATRIX SPIKE

Lab Sample ID: YX18A
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	200.8	2.9	30.8	25.0	112%	
Barium	200.8	20.5	45.7	25.0	101%	
Cadmium	200.8	0.1 U	23.8	25.0	95.2%	
Chromium	200.8	0.5 U	23.0	25.0	92.0%	
Copper	200.8	1.0	26.1	25.0	100%	
Lead	200.8	0.1 U	24.7	25.0	98.8%	
Mercury	7470A	0.1 U	1.2	1.00	120%	
Selenium	200.8	0.5 U	74.4	80.0	93.0%	
Silver	200.8	0.2 U	23.6	25.0	94.4%	
Zinc	200.8	4 U	78	80.0	97.5%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: METHOD BLANK

Lab Sample ID: YX18MB
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
200.8	08/22/14	200.8	08/25/14	7440-38-2	Arsenic	0.2	0.2	U
200.8	08/22/14	200.8	08/25/14	7440-39-3	Barium	0.5	0.5	U
200.8	08/22/14	200.8	08/25/14	7440-43-9	Cadmium	0.1	0.1	U
200.8	08/22/14	200.8	08/25/14	7440-47-3	Chromium	0.5	0.5	U
200.8	08/22/14	200.8	08/25/14	7440-50-8	Copper	0.5	0.5	U
200.8	08/22/14	200.8	08/25/14	7439-92-1	Lead	0.1	0.1	U
7470A	08/22/14	7470A	08/27/14	7439-97-6	Mercury	0.1	0.1	U
200.8	08/22/14	200.8	08/25/14	7782-49-2	Selenium	0.5	0.5	U
200.8	08/22/14	200.8	08/25/14	7440-22-4	Silver	0.2	0.2	U
200.8	08/22/14	200.8	08/25/14	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: YX18LCS
LIMS ID: 14-17107
Matrix: Water
Data Release Authorized:
Reported: 08/27/14

QC Report No: YX18-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

BLANK SPIKE/BLANK SPIKE DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Dup Found	Spike Added	Spike Recovery	Spike Dup Recovery	RPD	Q
Arsenic	200.8	28.1	28.0	25.0	112%	112%	0.4%	
Barium	200.8	25.2	25.0	25.0	101%	100%	0.8%	
Cadmium	200.8	24.4	24.4	25.0	97.6%	97.6%	0.0%	
Chromium	200.8	25.4	25.5	25.0	102%	102%	0.4%	
Copper	200.8	25.5	26.1	25.0	102%	104%	2.3%	
Lead	200.8	26.3	26.1	25.0	105%	104%	0.8%	
Mercury	7470A	2.4	2.3	2.0	120%	115%	4.3%	
Selenium	200.8	78.3	78.1	80.0	97.9%	97.6%	0.3%	
Silver	200.8	23.2	23.2	25.0	92.8%	92.8%	0.0%	
Zinc	200.8	79	88	80	98.8%	110%	10.8%	

Reported in ug/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

3 September 2014

Heather Hirsch
Maul, Foster and Alongi, Inc
1329 North State Street, Suite 301
Bellingham, WA 98225

RE: Project: Northern State Hospital, 0624.04.02
ARI Job No.: YX19

Dear Heather:

Please find enclosed the original chain of custody record and the final results for the samples from the project referenced above. Analytical Resources, Inc. (ARI) accepted eight soil samples on August 20, 2014. The samples were analyzed for VOCs, BETX, NWTPH-G, PAHs, PCBs, NWTPH-HCID and total metals as requested.

The percent differences (%Ds) for several compounds were not within control limits for the 8/22/14 and 8/25/14 CCALs that bracketed the VOC analyses of these samples. All positive results for these compounds have been flagged with a "Q" qualifier to denote the high %Ds.

The remaining analyses proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file YX19

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

ARI Assigned Number: YX19
Turn-around Requested: STD
Page: 2 of 2
ARI Client Company: Maul Foster & Alongi, Inc.
Phone: 350-594-6257
Date: 8/19/14
Ice Present?
Client Contact: Heather Hirsch
No. of Coolers:
Cooler Temps:
Client Project Name: Northern State Hospital IPG
Client Project #: 0624.04.02
Samplers: H. Hirsch / C. Wise

Sample ID	Date	Time	Matrix	No. Containers	HCID	RCRA 8 metals plus Cu & Zn	PAHs by 8270	PCBs by 8082	VOCs by 8260	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	Notes/Comments
GP1-S-1.4	8/19/14	940	SOIL	8	X	X	Hold	Hold	—	Hold	Hold	Hold	
GP2-S-3.0	↓	1011	↓	8	X	X	X	X	—	Hold	Hold	Hold	
GP3-S-7.0	↓	1100	↓	8	X	X	X	Hold	—	Hold	Hold	Hold	
GP4-S-5.4	↓	1235	↓	9	X	X	X	Hold	X	Hold	Hold	—	
GP5-S-14.5	↓	1315	↓	9	X	X	X	Hold	X	Hold	Hold	—	
GP7-S-0.8	↓	1350	↓	7	—	—	—	—	—	—	X	X	
GP9-S-0.5	↓	1525	↓	8	X	Hold	Hold	Hold	—	Hold	Hold	Hold	
GP10-S-0.5	↓	1540	↓	8	X	Hold	Hold	Hold	—	Hold	Hold	Hold	

Comments/Special Instructions:
Hold = hold for follow-up
X = analyze
— = do not analyze

	Relinquished by	Received by	Relinquished by	Received by
(Signature)	[signature]	[signature]	[signature]	[signature]
Printed Name	Carolyn Wise	Robert Turpaud	Robert Turpaud	D. Valgardsen
Company	MFA		8-20-14 1125	ARI
Date & Time	8/20 9:15	8/20 915		8/20/14 1125

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Mail Foster & Alongi

COC No(s): _____ (NA)

Assigned ARI Job No: YX19

Project Name: Northern State Hospital IIR1

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: NC Delivery

Tracking No: 5915016 NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2 0-6 0 °C for chemistry)
Time: 1125 2.8 2.8 ___ ___

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 90877952

Cooler Accepted by: AV Date: 8/20/14 Time: 1125

Complete custody forms and attach all shipping documents

Log-in Phase:

Was a temperature blank included in the cooler? YES (NO)

What kind of packing material was used? Bubble Wrap (Wet Ice) Gel Packs (Baggies) (Foam Block) Paper Other: _____

Was sufficient ice used (if appropriate)? NA (YES) NO

Were all bottles sealed in individual plastic bags? YES (NO)

Did all bottles arrive in good condition (unbroken)? (YES) NO

Were all bottle labels complete and legible? (YES) NO

Did the number of containers listed on COC match with the number of containers received? (YES) NO

Did all bottle labels and tags agree with custody papers? (YES) NO

Were all bottles used correct for the requested analyses? (YES) NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... (NA) YES NO

Were all VOC vials free of air bubbles? (NA) YES NO

Was sufficient amount of sample sent in each bottle? (YES) NO

Date VOC Trip Blank was made at ARI (NA) _____

Was Sample Split by ARI: (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

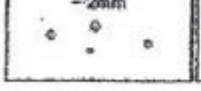
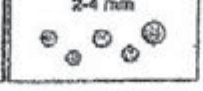
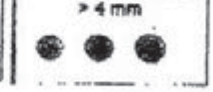
Samples Logged by: AV Date: 8/20/14 Time: 1343

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles ~2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
		

Small → "sm" (< 2 mm)

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: YX19
Client: Maul Foster & Alongi
Project Event: 0624.04.02
Project Name: Northern State Hospital IPG

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	GP1-S-1.4	YX19A	14-17110	Soil	08/19/14 09:40	08/20/14 11:25
2.	GP2-S-3.0	YX19B	14-17111	Soil	08/19/14 10:11	08/20/14 11:25
3.	GP3-S-7.0	YX19C	14-17112	Soil	08/19/14 11:00	08/20/14 11:25
4.	GP4-S-5.4	YX19D	14-17113	Soil	08/19/14 12:35	08/20/14 11:25
5.	GP5-S-14.5	YX19E	14-17114	Soil	08/19/14 13:15	08/20/14 11:25
6.	GP7-S-0.8	YX19F	14-17115	Soil	08/19/14 13:50	08/20/14 11:25
7.	GP9-S-0.5	YX19G	14-17116	Soil	08/19/14 15:25	08/20/14 11:25
8.	GP10-S-0.5	YX19H	14-17117	Soil	08/19/14 15:40	08/20/14 11:25

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

YX19:00005

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

YX19.00006

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

YX19 . 00007

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: GP4-S-5.4**
 SAMPLE

Lab Sample ID: YX19D
LIMS ID: 14-17113
Matrix: Soil
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Instrument/Analyst: NT15/PKC
Date Analyzed: 08/25/14 16:58

Sample Amount: 2.89 g-dry-wt
Purge Volume: 5.0 mL
Moisture: 28.2%

CAS Number	Analyte	RL	Result	Q
74-87-3	Chloromethane	1.7	< 1.7	U
74-83-9	Bromomethane	1.7	< 1.7	U
75-01-4	Vinyl Chloride	1.7	< 1.7	U
75-00-3	Chloroethane	1.7	< 1.7	U
75-09-2	**Methylene Chloride**	**3.5**	**9.9**	**B**
67-64-1	**Acetone**	**8.7**	**160**	
75-15-0	Carbon Disulfide	1.7	< 1.7	U
75-35-4	1,1-Dichloroethene	1.7	< 1.7	U
75-34-3	1,1-Dichloroethane	1.7	< 1.7	U
156-60-5	trans-1,2-Dichloroethene	1.7	< 1.7	U
156-59-2	cis-1,2-Dichloroethene	1.7	< 1.7	U
67-66-3	Chloroform	1.7	< 1.7	U
107-06-2	1,2-Dichloroethane	1.7	< 1.7	U
78-93-3	2-Butanone	8.7	< 8.7	U
71-55-6	1,1,1-Trichloroethane	1.7	< 1.7	U
56-23-5	Carbon Tetrachloride	1.7	< 1.7	U
108-05-4	Vinyl Acetate	8.7	< 8.7	U
75-27-4	Bromodichloromethane	1.7	< 1.7	U
78-87-5	1,2-Dichloropropane	1.7	< 1.7	U
10061-01-5	cis-1,3-Dichloropropene	1.7	< 1.7	U
79-01-6	Trichloroethene	1.7	< 1.7	U
124-48-1	Dibromochloromethane	1.7	< 1.7	U
79-00-5	1,1,2-Trichloroethane	1.7	< 1.7	U
71-43-2	Benzene	1.7	< 1.7	U
10061-02-6	trans-1,3-Dichloropropene	1.7	< 1.7	U
110-75-8	2-Chloroethylvinylether	8.7	< 8.7	U
75-25-2	Bromoform	1.7	< 1.7	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	8.7	< 8.7	U
591-78-6	2-Hexanone	8.7	< 8.7	U
127-18-4	Tetrachloroethene	1.7	< 1.7	U
79-34-5	1,1,2,2-Tetrachloroethane	1.7	< 1.7	U
108-88-3	Toluene	1.7	< 1.7	U
108-90-7	Chlorobenzene	1.7	< 1.7	U
100-41-4	Ethylbenzene	1.7	< 1.7	U
100-42-5	Styrene	1.7	< 1.7	U
75-69-4	Trichlorofluoromethane	1.7	< 1.7	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	3.5	< 3.5	U
179601-23-1	m,p-Xylene	1.7	< 1.7	U
95-47-6	o-Xylene	1.7	< 1.7	U
95-50-1	1,2-Dichlorobenzene	1.7	< 1.7	U
541-73-1	1,3-Dichlorobenzene	1.7	< 1.7	U
106-46-7	1,4-Dichlorobenzene	1.7	< 1.7	U
107-02-8	Acrolein	87	< 87	U
74-88-4	Iodomethane	1.7	< 1.7	U
74-96-4	Bromoethane	3.5	< 3.5	U
107-13-1	Acrylonitrile	8.7	< 8.7	U
563-58-6	1,1-Dichloropropene	1.7	< 1.7	U
74-95-3	Dibromomethane	1.7	< 1.7	U
630-20-6	1,1,1,2-Tetrachloroethane	1.7	< 1.7	U
96-12-8	1,2-Dibromo-3-chloropropane	8.7	< 8.7	U
96-18-4	1,2,3-Trichloropropane	3.5	< 3.5	U
110-57-6	trans-1,4-Dichloro-2-butene	8.7	< 8.7	U
108-67-8	1,3,5-Trimethylbenzene	1.7	< 1.7	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: GP4-S-5.4**
 SAMPLE

Lab Sample ID: YX19D
LIMS ID: 14-17113
Matrix: Soil
Date Analyzed: 08/25/14 16:58

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

CAS Number	Analyte	RL	Result	Q
95-63-6	1,2,4-Trimethylbenzene	1.7	< 1.7	U
87-68-3	Hexachlorobutadiene	8.7	< 8.7	U
106-93-4	1,2-Dibromoethane	1.7	< 1.7	U
74-97-5	Bromochloromethane	1.7	< 1.7	U
594-20-7	2,2-Dichloropropane	1.7	< 1.7	U
142-28-9	1,3-Dichloropropane	1.7	< 1.7	U
98-82-8	Isopropylbenzene	1.7	< 1.7	U
103-65-1	n-Propylbenzene	1.7	< 1.7	U
108-86-1	Bromobenzene	1.7	< 1.7	U
95-49-8	2-Chlorotoluene	1.7	< 1.7	U
106-43-4	4-Chlorotoluene	1.7	< 1.7	U
98-06-6	tert-Butylbenzene	1.7	< 1.7	U
135-98-8	sec-Butylbenzene	1.7	< 1.7	U
99-87-6	4-Isopropyltoluene	1.7	< 1.7	U
104-51-8	n-Butylbenzene	1.7	< 1.7	U
120-82-1	1,2,4-Trichlorobenzene	8.7	< 8.7	U
91-20-3	Naphthalene	8.7	< 8.7	U
87-61-6	1,2,3-Trichlorobenzene	8.7	< 8.7	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	118%
d8-Toluene	104%
Bromofluorobenzene	99.8%
d4-1,2-Dichlorobenzene	99.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: GP5-S-14.5**
 SAMPLE

Lab Sample ID: YX19E
LIMS ID: 14-17114
Matrix: Soil
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Instrument/Analyst: NT15/PKC
Date Analyzed: 08/22/14 17:19

Sample Amount: 3.39 g-dry-wt
Purge Volume: 5.0 mL
Moisture: 29.8%

CAS Number	Analyte	RL	Result	Q
74-87-3	Chloromethane	1.5	< 1.5	U
74-83-9	Bromomethane	1.5	< 1.5	U
75-01-4	Vinyl Chloride	1.5	< 1.5	U
75-00-3	Chloroethane	1.5	< 1.5	U
75-09-2	**Methylene Chloride**	**3.0**	**7.1**	**B**
67-64-1	**Acetone**	**7.4**	**55**	
75-15-0	Carbon Disulfide	1.5	< 1.5	U
75-35-4	1,1-Dichloroethene	1.5	< 1.5	U
75-34-3	1,1-Dichloroethane	1.5	< 1.5	U
156-60-5	trans-1,2-Dichloroethene	1.5	< 1.5	U
156-59-2	cis-1,2-Dichloroethene	1.5	< 1.5	U
67-66-3	Chloroform	1.5	< 1.5	U
107-06-2	1,2-Dichloroethane	1.5	< 1.5	U
78-93-3	2-Butanone	7.4	< 7.4	U
71-55-6	1,1,1-Trichloroethane	1.5	< 1.5	U
56-23-5	Carbon Tetrachloride	1.5	< 1.5	U
108-05-4	Vinyl Acetate	7.4	< 7.4	U
75-27-4	Bromodichloromethane	1.5	< 1.5	U
78-87-5	1,2-Dichloropropane	1.5	< 1.5	U
10061-01-5	cis-1,3-Dichloropropene	1.5	< 1.5	U
79-01-6	Trichloroethene	1.5	< 1.5	U
124-48-1	Dibromochloromethane	1.5	< 1.5	U
79-00-5	1,1,2-Trichloroethane	1.5	< 1.5	U
71-43-2	Benzene	1.5	< 1.5	U
10061-02-6	trans-1,3-Dichloropropene	1.5	< 1.5	U
110-75-8	2-Chloroethylvinylether	7.4	< 7.4	U
75-25-2	Bromoform	1.5	< 1.5	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	7.4	< 7.4	U
591-78-6	2-Hexanone	7.4	< 7.4	U
127-18-4	Tetrachloroethene	1.5	< 1.5	U
79-34-5	1,1,2,2-Tetrachloroethane	1.5	< 1.5	U
108-88-3	Toluene	1.5	< 1.5	U
108-90-7	Chlorobenzene	1.5	< 1.5	U
100-41-4	Ethylbenzene	1.5	< 1.5	U
100-42-5	Styrene	1.5	< 1.5	U
75-69-4	Trichlorofluoromethane	1.5	< 1.5	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	3.0	< 3.0	U
179601-23-1	m,p-Xylene	1.5	< 1.5	U
95-47-6	o-Xylene	1.5	< 1.5	U
95-50-1	1,2-Dichlorobenzene	1.5	< 1.5	U
541-73-1	1,3-Dichlorobenzene	1.5	< 1.5	U
106-46-7	1,4-Dichlorobenzene	1.5	< 1.5	U
107-02-8	Acrolein	74	< 74	U
74-88-4	Iodomethane	1.5	< 1.5	U
74-96-4	Bromoethane	3.0	< 3.0	U
107-13-1	Acrylonitrile	7.4	< 7.4	U
563-58-6	1,1-Dichloropropene	1.5	< 1.5	U
74-95-3	Dibromomethane	1.5	< 1.5	U
630-20-6	1,1,1,2-Tetrachloroethane	1.5	< 1.5	U
96-12-8	1,2-Dibromo-3-chloropropane	7.4	< 7.4	U
96-18-4	1,2,3-Trichloropropane	3.0	< 3.0	U
110-57-6	trans-1,4-Dichloro-2-butene	7.4	< 7.4	U
108-67-8	1,3,5-Trimethylbenzene	1.5	< 1.5	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: GP5-S-14.5**
 SAMPLE

Lab Sample ID: YX19E
LIMS ID: 14-17114
Matrix: Soil
Date Analyzed: 08/22/14 17:19

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

CAS Number	Analyte	RL	Result	Q
95-63-6	1,2,4-Trimethylbenzene	1.5	< 1.5	U
87-68-3	Hexachlorobutadiene	7.4	< 7.4	U
106-93-4	1,2-Dibromoethane	1.5	< 1.5	U
74-97-5	Bromochloromethane	1.5	< 1.5	U
594-20-7	2,2-Dichloropropane	1.5	< 1.5	U
142-28-9	1,3-Dichloropropane	1.5	< 1.5	U
98-82-8	Isopropylbenzene	1.5	< 1.5	U
103-65-1	n-Propylbenzene	1.5	< 1.5	U
108-86-1	Bromobenzene	1.5	< 1.5	U
95-49-8	2-Chlorotoluene	1.5	< 1.5	U
106-43-4	4-Chlorotoluene	1.5	< 1.5	U
98-06-6	tert-Butylbenzene	1.5	< 1.5	U
135-98-8	sec-Butylbenzene	1.5	< 1.5	U
99-87-6	4-Isopropyltoluene	1.5	< 1.5	U
104-51-8	n-Butylbenzene	1.5	< 1.5	U
120-82-1	1,2,4-Trichlorobenzene	7.4	< 7.4	U
91-20-3	Naphthalene	7.4	< 7.4	U
87-61-6	1,2,3-Trichlorobenzene	7.4	< 7.4	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery	
d4-1,2-Dichloroethane	113%
d8-Toluene	102%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	100%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-082214A**
 METHOD BLANK

Lab Sample ID: MB-082214A
LIMS ID: 14-17114
Matrix: Soil
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT15/PKC
Date Analyzed: 08/22/14 11:12

Sample Amount: 5.00 g-dry-wt
Purge Volume: 5.0 mL
Moisture: NA

CAS Number	Analyte	RL	Result	Q
74-87-3	Chloromethane	1.0	< 1.0	U
74-83-9	Bromomethane	1.0	< 1.0	U
75-01-4	Vinyl Chloride	1.0	< 1.0	U
75-00-3	Chloroethane	1.0	< 1.0	U
75-09-2	**Methylene Chloride**	**2.0**	**2.5**	
67-64-1	Acetone	5.0	< 5.0	U
75-15-0	Carbon Disulfide	1.0	< 1.0	U
75-35-4	1,1-Dichloroethene	1.0	< 1.0	U
75-34-3	1,1-Dichloroethane	1.0	< 1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	< 1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	< 1.0	U
67-66-3	Chloroform	1.0	< 1.0	U
107-06-2	1,2-Dichloroethane	1.0	< 1.0	U
78-93-3	2-Butanone	5.0	< 5.0	U
71-55-6	1,1,1-Trichloroethane	1.0	< 1.0	U
56-23-5	Carbon Tetrachloride	1.0	< 1.0	U
108-05-4	Vinyl Acetate	5.0	< 5.0	U
75-27-4	Bromodichloromethane	1.0	< 1.0	U
78-87-5	1,2-Dichloropropane	1.0	< 1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	< 1.0	U
79-01-6	Trichloroethene	1.0	< 1.0	U
124-48-1	Dibromochloromethane	1.0	< 1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	< 1.0	U
71-43-2	Benzene	1.0	< 1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	< 1.0	U
110-75-8	2-Chloroethylvinylether	5.0	< 5.0	U
75-25-2	Bromoform	1.0	< 1.0	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0	< 5.0	U
591-78-6	2-Hexanone	5.0	< 5.0	U
127-18-4	Tetrachloroethene	1.0	< 1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
108-90-7	Chlorobenzene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
100-42-5	Styrene	1.0	< 1.0	U
75-69-4	Trichlorofluoromethane	1.0	< 1.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	2.0	< 2.0	U
179601-23-1	m,p-Xylene	1.0	< 1.0	U
95-47-6	o-Xylene	1.0	< 1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0	U
107-02-8	Acrolein	50	< 50	U
74-88-4	Iodomethane	1.0	< 1.0	U
74-96-4	Bromoethane	2.0	< 2.0	U
107-13-1	Acrylonitrile	5.0	< 5.0	U
563-58-6	1,1-Dichloropropene	1.0	< 1.0	U
74-95-3	Dibromomethane	1.0	< 1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	< 1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	< 5.0	U
96-18-4	1,2,3-Trichloropropane	2.0	< 2.0	U
110-57-6	trans-1,4-Dichloro-2-butene	5.0	< 5.0	U
108-67-8	1,3,5-Trimethylbenzene	1.0	< 1.0	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-082214A**
 METHOD BLANK

Lab Sample ID: MB-082214A
LIMS ID: 14-17114
Matrix: Soil
Date Analyzed: 08/22/14 11:12

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

CAS Number	Analyte	RL	Result	Q
95-63-6	1,2,4-Trimethylbenzene	1.0	< 1.0	U
87-68-3	Hexachlorobutadiene	5.0	< 5.0	U
106-93-4	1,2-Dibromoethane	1.0	< 1.0	U
74-97-5	Bromochloromethane	1.0	< 1.0	U
594-20-7	2,2-Dichloropropane	1.0	< 1.0	U
142-28-9	1,3-Dichloropropane	1.0	< 1.0	U
98-82-8	Isopropylbenzene	1.0	< 1.0	U
103-65-1	n-Propylbenzene	1.0	< 1.0	U
108-86-1	Bromobenzene	1.0	< 1.0	U
95-49-8	2-Chlorotoluene	1.0	< 1.0	U
106-43-4	4-Chlorotoluene	1.0	< 1.0	U
98-06-6	tert-Butylbenzene	1.0	< 1.0	U
135-98-8	sec-Butylbenzene	1.0	< 1.0	U
99-87-6	4-Isopropyltoluene	1.0	< 1.0	U
104-51-8	n-Butylbenzene	1.0	< 1.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0	U
91-20-3	Naphthalene	5.0	< 5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	< 5.0	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	96.3%
d8-Toluene	100%
Bromofluorobenzene	103%
d4-1,2-Dichlorobenzene	98.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-082514A**
 METHOD BLANK

Lab Sample ID: MB-082514A
LIMS ID: 14-17113
Matrix: Soil
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Instrument/Analyst: NT15/PKC
Date Analyzed: 08/25/14 15:29

Sample Amount: 5.00 g-dry-wt
Purge Volume: 5.0 mL
Moisture: NA

CAS Number	Analyte	RL	Result	Q
74-87-3	Chloromethane	1.0	< 1.0	U
74-83-9	Bromomethane	1.0	< 1.0	U
75-01-4	Vinyl Chloride	1.0	< 1.0	U
75-00-3	Chloroethane	1.0	< 1.0	U
75-09-2	**Methylene Chloride**	**2.0**	**2.8**	
67-64-1	Acetone	5.0	< 5.0	U
75-15-0	Carbon Disulfide	1.0	< 1.0	U
75-35-4	1,1-Dichloroethene	1.0	< 1.0	U
75-34-3	1,1-Dichloroethane	1.0	< 1.0	U
156-60-5	trans-1,2-Dichloroethene	1.0	< 1.0	U
156-59-2	cis-1,2-Dichloroethene	1.0	< 1.0	U
67-66-3	Chloroform	1.0	< 1.0	U
107-06-2	1,2-Dichloroethane	1.0	< 1.0	U
78-93-3	2-Butanone	5.0	< 5.0	U
71-55-6	1,1,1-Trichloroethane	1.0	< 1.0	U
56-23-5	Carbon Tetrachloride	1.0	< 1.0	U
108-05-4	Vinyl Acetate	5.0	< 5.0	U
75-27-4	Bromodichloromethane	1.0	< 1.0	U
78-87-5	1,2-Dichloropropane	1.0	< 1.0	U
10061-01-5	cis-1,3-Dichloropropene	1.0	< 1.0	U
79-01-6	Trichloroethene	1.0	< 1.0	U
124-48-1	Dibromochloromethane	1.0	< 1.0	U
79-00-5	1,1,2-Trichloroethane	1.0	< 1.0	U
71-43-2	Benzene	1.0	< 1.0	U
10061-02-6	trans-1,3-Dichloropropene	1.0	< 1.0	U
110-75-8	2-Chloroethylvinylether	5.0	< 5.0	U
75-25-2	Bromoform	1.0	< 1.0	U
108-10-1	4-Methyl-2-Pentanone (MIBK)	5.0	< 5.0	U
591-78-6	2-Hexanone	5.0	< 5.0	U
127-18-4	Tetrachloroethene	1.0	< 1.0	U
79-34-5	1,1,2,2-Tetrachloroethane	1.0	< 1.0	U
108-88-3	Toluene	1.0	< 1.0	U
108-90-7	Chlorobenzene	1.0	< 1.0	U
100-41-4	Ethylbenzene	1.0	< 1.0	U
100-42-5	Styrene	1.0	< 1.0	U
75-69-4	Trichlorofluoromethane	1.0	< 1.0	U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	2.0	< 2.0	U
179601-23-1	m,p-Xylene	1.0	< 1.0	U
95-47-6	o-Xylene	1.0	< 1.0	U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0	U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0	U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0	U
107-02-8	Acrolein	50	< 50	U
74-88-4	Iodomethane	1.0	< 1.0	U
74-96-4	Bromoethane	2.0	< 2.0	U
107-13-1	Acrylonitrile	5.0	< 5.0	U
563-58-6	1,1-Dichloropropene	1.0	< 1.0	U
74-95-3	Dibromomethane	1.0	< 1.0	U
630-20-6	1,1,1,2-Tetrachloroethane	1.0	< 1.0	U
96-12-8	1,2-Dibromo-3-chloropropane	5.0	< 5.0	U
96-18-4	1,2,3-Trichloropropane	2.0	< 2.0	U
110-57-6	trans-1,4-Dichloro-2-butene	5.0	< 5.0	U
108-67-8	1,3,5-Trimethylbenzene	1.0	< 1.0	U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: MB-082514A**
 METHOD BLANK

Lab Sample ID: MB-082514A
LIMS ID: 14-17113
Matrix: Soil
Date Analyzed: 08/25/14 15:29

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

CAS Number	Analyte	RL	Result	Q
95-63-6	1,2,4-Trimethylbenzene	1.0	< 1.0	U
87-68-3	Hexachlorobutadiene	5.0	< 5.0	U
106-93-4	1,2-Dibromoethane	1.0	< 1.0	U
74-97-5	Bromochloromethane	1.0	< 1.0	U
594-20-7	2,2-Dichloropropane	1.0	< 1.0	U
142-28-9	1,3-Dichloropropane	1.0	< 1.0	U
98-82-8	Isopropylbenzene	1.0	< 1.0	U
103-65-1	n-Propylbenzene	1.0	< 1.0	U
108-86-1	Bromobenzene	1.0	< 1.0	U
95-49-8	2-Chlorotoluene	1.0	< 1.0	U
106-43-4	4-Chlorotoluene	1.0	< 1.0	U
98-06-6	tert-Butylbenzene	1.0	< 1.0	U
135-98-8	sec-Butylbenzene	1.0	< 1.0	U
99-87-6	4-Isopropyltoluene	1.0	< 1.0	U
104-51-8	n-Butylbenzene	1.0	< 1.0	U
120-82-1	1,2,4-Trichlorobenzene	5.0	< 5.0	U
91-20-3	Naphthalene	5.0	< 5.0	U
87-61-6	1,2,3-Trichlorobenzene	5.0	< 5.0	U

Reported in µg/kg (ppb)

Volatile Surrogate Recovery

d4-1,2-Dichloroethane	100%
d8-Toluene	103%
Bromofluorobenzene	101%
d4-1,2-Dichlorobenzene	98.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-082214A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-082214A
LIMS ID: 14-17114
Matrix: Soil
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT15/PKC
LCSD: NT15/PKC
Date Analyzed LCS: 08/22/14 10:22
LCSD: 08/22/14 10:47

Sample Amount LCS: 5.00 g-dry-wt
LCSD: 5.00 g-dry-wt
Purge Volume LCS: 5.0 mL
LCSD: 5.0 mL
Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	42.4	50.0	84.8%	42.8	50.0	85.6%	0.9%
Bromomethane	40.3	50.0	80.6%	41.2	50.0	82.4%	2.2%
Vinyl Chloride	48.7	50.0	97.4%	48.6	50.0	97.2%	0.2%
Chloroethane	44.8	50.0	89.6%	48.8	50.0	97.6%	8.5%
Methylene Chloride	47.4 B	50.0	94.8%	48.6 B	50.0	97.2%	2.5%
Acetone	284	250	114%	268	250	107%	5.8%
Carbon Disulfide	53.8 Q	50.0	108%	51.9 Q	50.0	104%	3.6%
1,1-Dichloroethene	50.8 Q	50.0	102%	51.6 Q	50.0	103%	1.6%
1,1-Dichloroethane	47.5	50.0	95.0%	49.4	50.0	98.8%	3.9%
trans-1,2-Dichloroethene	48.1	50.0	96.2%	49.2	50.0	98.4%	2.3%
cis-1,2-Dichloroethene	47.2	50.0	94.4%	49.5	50.0	99.0%	4.8%
Chloroform	47.0	50.0	94.0%	48.5	50.0	97.0%	3.1%
1,2-Dichloroethane	47.3	50.0	94.6%	48.9	50.0	97.8%	3.3%
2-Butanone	302	250	121%	294	250	118%	2.7%
1,1,1-Trichloroethane	49.0	50.0	98.0%	50.7	50.0	101%	3.4%
Carbon Tetrachloride	40.3	50.0	80.6%	40.6	50.0	81.2%	0.7%
Vinyl Acetate	51.3	50.0	103%	56.3	50.0	113%	9.3%
Bromodichloromethane	50.2	50.0	100%	51.0	50.0	102%	1.6%
1,2-Dichloropropane	47.3	50.0	94.6%	49.0	50.0	98.0%	3.5%
cis-1,3-Dichloropropene	49.4	50.0	98.8%	50.8	50.0	102%	2.8%
Trichloroethene	50.8	50.0	102%	52.2	50.0	104%	2.7%
Dibromochloromethane	45.5	50.0	91.0%	45.7	50.0	91.4%	0.4%
1,1,2-Trichloroethane	46.4	50.0	92.8%	48.1	50.0	96.2%	3.6%
Benzene	47.8	50.0	95.6%	49.2	50.0	98.4%	2.9%
trans-1,3-Dichloropropene	51.6	50.0	103%	52.5	50.0	105%	1.7%
2-Chloroethylvinylether	57.6 Q	50.0	115%	59.9 Q	50.0	120%	3.9%
Bromoform	44.2	50.0	88.4%	42.9	50.0	85.8%	3.0%
4-Methyl-2-Pentanone (MIBK)	286	250	114%	286	250	114%	0.0%
2-Hexanone	296	250	118%	288	250	115%	2.7%
Tetrachloroethene	47.9	50.0	95.8%	48.8	50.0	97.6%	1.9%
1,1,2,2-Tetrachloroethane	53.5	50.0	107%	53.5	50.0	107%	0.0%
Toluene	46.8	50.0	93.6%	48.0	50.0	96.0%	2.5%
Chlorobenzene	47.4	50.0	94.8%	48.4	50.0	96.8%	2.1%
Ethylbenzene	48.7	50.0	97.4%	49.2	50.0	98.4%	1.0%
Styrene	49.2	50.0	98.4%	50.1	50.0	100%	1.8%
Trichlorofluoromethane	43.4	50.0	86.8%	44.2	50.0	88.4%	1.8%
1,1,2-Trichloro-1,2,2-trifluoroetha	51.9 Q	50.0	104%	52.5 Q	50.0	105%	1.1%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-082214A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-082214A QC Report No: YX19-Maul Foster & Alongi
LIMS ID: 14-17114 Project: Northern State Hospital IPG
Matrix: Soil 0624.04.02

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
m,p-Xylene	103	100	103%	104	100	104%	1.0%
o-Xylene	47.8	50.0	95.6%	49.0	50.0	98.0%	2.5%
1,2-Dichlorobenzene	47.0	50.0	94.0%	47.6	50.0	95.2%	1.3%
1,3-Dichlorobenzene	46.5	50.0	93.0%	47.0	50.0	94.0%	1.1%
1,4-Dichlorobenzene	46.2	50.0	92.4%	46.7	50.0	93.4%	1.1%
Acrolein	306	250	122%	298	250	119%	2.6%
Iodomethane	51.0 Q	50.0	102%	53.2 Q	50.0	106%	4.2%
Bromoethane	49.9	50.0	99.8%	51.3	50.0	103%	2.8%
Acrylonitrile	59.4	50.0	119%	62.6	50.0	125%	5.2%
1,1-Dichloropropene	46.6	50.0	93.2%	47.4	50.0	94.8%	1.7%
Dibromomethane	50.8	50.0	102%	52.6	50.0	105%	3.5%
1,1,1,2-Tetrachloroethane	50.9	50.0	102%	51.3	50.0	103%	0.8%
1,2-Dibromo-3-chloropropane	63.2	50.0	126%	61.1	50.0	122%	3.4%
1,2,3-Trichloropropane	56.5	50.0	113%	56.1	50.0	112%	0.7%
trans-1,4-Dichloro-2-butene	60.2	50.0	120%	58.6	50.0	117%	2.7%
1,3,5-Trimethylbenzene	51.0	50.0	102%	51.2	50.0	102%	0.4%
1,2,4-Trimethylbenzene	49.1	50.0	98.2%	49.3	50.0	98.6%	0.4%
Hexachlorobutadiene	45.5	50.0	91.0%	46.3	50.0	92.6%	1.7%
1,2-Dibromoethane	49.6	50.0	99.2%	50.6	50.0	101%	2.0%
Bromochloromethane	47.7	50.0	95.4%	50.1	50.0	100%	4.9%
2,2-Dichloropropane	51.4	50.0	103%	52.4	50.0	105%	1.9%
1,3-Dichloropropane	49.3	50.0	98.6%	50.4	50.0	101%	2.2%
Isopropylbenzene	50.8	50.0	102%	51.3	50.0	103%	1.0%
n-Propylbenzene	49.9	50.0	99.8%	49.9	50.0	99.8%	0.0%
Bromobenzene	47.3	50.0	94.6%	48.4	50.0	96.8%	2.3%
2-Chlorotoluene	48.6	50.0	97.2%	49.3	50.0	98.6%	1.4%
4-Chlorotoluene	48.4	50.0	96.8%	48.5	50.0	97.0%	0.2%
tert-Butylbenzene	50.0	50.0	100%	50.5	50.0	101%	1.0%
sec-Butylbenzene	50.2	50.0	100%	50.3	50.0	101%	0.2%
4-Isopropyltoluene	49.9	50.0	99.8%	50.3	50.0	101%	0.8%
n-Butylbenzene	48.0	50.0	96.0%	47.8	50.0	95.6%	0.4%
1,2,4-Trichlorobenzene	44.5	50.0	89.0%	44.5	50.0	89.0%	0.0%
Naphthalene	46.8	50.0	93.6%	46.9	50.0	93.8%	0.2%
1,2,3-Trichlorobenzene	45.9	50.0	91.8%	46.7	50.0	93.4%	1.7%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	96.7%	96.3%
d8-Toluene	100%	98.5%
Bromofluorobenzene	98.0%	98.6%
d4-1,2-Dichlorobenzene	99.6%	100%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-082514A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-082514A
LIMS ID: 14-17113
Matrix: Soil
Data Release Authorized:
Reported: 09/02/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Instrument/Analyst LCS: NT15/PKC
LCSD: NT15/PKC
Date Analyzed LCS: 08/25/14 14:39
LCSD: 08/25/14 15:04

Sample Amount LCS: 5.00 g-dry-wt
LCSD: 5.00 g-dry-wt
Purge Volume LCS: 5.0 mL
LCSD: 5.0 mL
Moisture: NA

Analyte	LCS		Spike Added-LCS	LCS Recovery	LCSD		Spike Added-LCSD	LCSD Recovery	RPD
Chloromethane	42.4		50.0	84.8%	46.2		50.0	92.4%	8.6%
Bromomethane	36.6	Q	50.0	73.2%	40.8	Q	50.0	81.6%	10.9%
Vinyl Chloride	50.3		50.0	101%	56.1		50.0	112%	10.9%
Chloroethane	51.5		50.0	103%	57.6		50.0	115%	11.2%
Methylene Chloride	54.2	B	50.0	108%	57.4	B	50.0	115%	5.7%
Acetone	233		250	93.2%	268		250	107%	14.0%
Carbon Disulfide	62.8	Q	50.0	126%	66.9	Q	50.0	134%	6.3%
1,1-Dichloroethene	61.6		50.0	123%	62.2		50.0	124%	1.0%
1,1-Dichloroethane	56.3		50.0	113%	58.2		50.0	116%	3.3%
trans-1,2-Dichloroethene	52.9		50.0	106%	56.4		50.0	113%	6.4%
cis-1,2-Dichloroethene	52.7		50.0	105%	54.3		50.0	109%	3.0%
Chloroform	53.1		50.0	106%	54.6		50.0	109%	2.8%
1,2-Dichloroethane	50.8		50.0	102%	51.5		50.0	103%	1.4%
2-Butanone	251		250	100%	269		250	108%	6.9%
1,1,1-Trichloroethane	54.1		50.0	108%	57.4		50.0	115%	5.9%
Carbon Tetrachloride	41.2		50.0	82.4%	43.7		50.0	87.4%	5.9%
Vinyl Acetate	53.4		50.0	107%	53.8		50.0	108%	0.7%
Bromodichloromethane	53.8		50.0	108%	54.5		50.0	109%	1.3%
1,2-Dichloropropane	51.2		50.0	102%	52.6		50.0	105%	2.7%
cis-1,3-Dichloropropene	52.9		50.0	106%	53.5		50.0	107%	1.1%
Trichloroethene	52.5		50.0	105%	56.2		50.0	112%	6.8%
Dibromochloromethane	42.7		50.0	85.4%	43.2		50.0	86.4%	1.2%
1,1,2-Trichloroethane	53.4		50.0	107%	49.7		50.0	99.4%	7.2%
Benzene	49.7		50.0	99.4%	52.7		50.0	105%	5.9%
trans-1,3-Dichloropropene	54.8		50.0	110%	55.6		50.0	111%	1.4%
2-Chloroethylvinylether	60.2	Q	50.0	120%	61.6	Q	50.0	123%	2.3%
Bromoform	37.5	Q	50.0	75.0%	37.2	Q	50.0	74.4%	0.8%
4-Methyl-2-Pentanone (MIBK)	256		250	102%	269		250	108%	5.0%
2-Hexanone	223		250	89.2%	241		250	96.4%	7.8%
Tetrachloroethene	43.9		50.0	87.8%	49.2		50.0	98.4%	11.4%
1,1,2,2-Tetrachloroethane	45.4		50.0	90.8%	46.2		50.0	92.4%	1.7%
Toluene	49.3		50.0	98.6%	52.1		50.0	104%	5.5%
Chlorobenzene	46.4		50.0	92.8%	48.7		50.0	97.4%	4.8%
Ethylbenzene	46.8		50.0	93.6%	50.3		50.0	101%	7.2%
Styrene	47.9		50.0	95.8%	50.2		50.0	100%	4.7%
Trichlorofluoromethane	50.1		50.0	100%	53.3		50.0	107%	6.2%
1,1,2-Trichloro-1,2,2-trifluoroetha	59.8		50.0	120%	64.5		50.0	129%	7.6%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Volatiles by Purge & Trap GC/MS-Method SW8260C **Sample ID: LCS-082514A**
 LAB CONTROL SAMPLE

Lab Sample ID: LCS-082514A QC Report No: YX19-Maul Foster & Alongi
LIMS ID: 14-17113 Project: Northern State Hospital IPG
Matrix: Soil 0624.04.02

Analyte	LCS		Spike Added-LCS	LCS Recovery	LCSD		Spike Added-LCSD	LCSD Recovery	RPD
m,p-Xylene	101		100	101%	108		100	108%	6.7%
o-Xylene	46.6		50.0	93.2%	49.0		50.0	98.0%	5.0%
1,2-Dichlorobenzene	45.1		50.0	90.2%	45.6		50.0	91.2%	1.1%
1,3-Dichlorobenzene	43.3		50.0	86.6%	45.6		50.0	91.2%	5.2%
1,4-Dichlorobenzene	43.5		50.0	87.0%	45.5		50.0	91.0%	4.5%
Acrolein	268	Q	250	107%	279	Q	250	112%	4.0%
Iodomethane	56.8		50.0	114%	61.1		50.0	122%	7.3%
Bromoethane	54.8		50.0	110%	57.6		50.0	115%	5.0%
Acrylonitrile	48.1		50.0	96.2%	55.0		50.0	110%	13.4%
1,1-Dichloropropene	47.5		50.0	95.0%	56.2		50.0	112%	16.8%
Dibromomethane	53.4		50.0	107%	54.2		50.0	108%	1.5%
1,1,1,2-Tetrachloroethane	49.1		50.0	98.2%	50.0		50.0	100%	1.8%
1,2-Dibromo-3-chloropropane	44.8		50.0	89.6%	46.8		50.0	93.6%	4.4%
1,2,3-Trichloropropane	46.5		50.0	93.0%	47.5		50.0	95.0%	2.1%
trans-1,4-Dichloro-2-butene	47.3		50.0	94.6%	48.8		50.0	97.6%	3.1%
1,3,5-Trimethylbenzene	47.9		50.0	95.8%	50.1		50.0	100%	4.5%
1,2,4-Trimethylbenzene	46.2		50.0	92.4%	48.6		50.0	97.2%	5.1%
Hexachlorobutadiene	42.5		50.0	85.0%	44.8		50.0	89.6%	5.3%
1,2-Dibromoethane	50.1		50.0	100%	50.9		50.0	102%	1.6%
Bromochloromethane	53.2		50.0	106%	53.4		50.0	107%	0.4%
2,2-Dichloropropane	53.4		50.0	107%	58.2		50.0	116%	8.6%
1,3-Dichloropropane	47.0		50.0	94.0%	47.8		50.0	95.6%	1.7%
Isopropylbenzene	46.8		50.0	93.6%	49.6		50.0	99.2%	5.8%
n-Propylbenzene	46.2		50.0	92.4%	49.0		50.0	98.0%	5.9%
Bromobenzene	43.6		50.0	87.2%	44.7		50.0	89.4%	2.5%
2-Chlorotoluene	45.7		50.0	91.4%	47.5		50.0	95.0%	3.9%
4-Chlorotoluene	44.8		50.0	89.6%	46.8		50.0	93.6%	4.4%
tert-Butylbenzene	46.5		50.0	93.0%	48.6		50.0	97.2%	4.4%
sec-Butylbenzene	46.4		50.0	92.8%	49.5		50.0	99.0%	6.5%
4-Isopropyltoluene	46.9		50.0	93.8%	49.8		50.0	99.6%	6.0%
n-Butylbenzene	45.3		50.0	90.6%	48.6		50.0	97.2%	7.0%
1,2,4-Trichlorobenzene	41.9		50.0	83.8%	44.5		50.0	89.0%	6.0%
Naphthalene	38.9		50.0	77.8%	40.5		50.0	81.0%	4.0%
1,2,3-Trichlorobenzene	42.3		50.0	84.6%	43.8		50.0	87.6%	3.5%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

Volatile Surrogate Recovery

	LCS	LCSD
d4-1,2-Dichloroethane	108%	106%
d8-Toluene	104%	103%
Bromofluorobenzene	101%	101%
d4-1,2-Dichlorobenzene	101%	99.0%

ANALYTICAL RESOURCES INCORPORATED

VOA SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

ARI ID	Client ID	Level	DCE	TOL	BFB	DCB	TOT OUT
MB-082514A	Method Blank	Low	100%	103%	101%	98.3%	0
LCS-082514A	Lab Control	Low	108%	104%	101%	101%	0
LCSD-082514A	Lab Control Dup	Low	106%	103%	101%	99.0%	0
YX19D	GP4-S-5.4	Low	118%	104%	99.8%	99.6%	0
MB-082214A	Method Blank	Low	96.3%	100%	103%	98.2%	0
LCS-082214A	Lab Control	Low	96.7%	100%	98.0%	99.6%	0
LCSD-082214A	Lab Control Dup	Low	96.3%	98.5%	98.6%	100%	0
YX19E	GP5-S-14.5	Low	113%	102%	101%	100%	0

	LCS/MB LIMITS		QC LIMITS	
SW8260C	Low	Med	Low	Med
(DCE) = d4-1,2-Dichloroethane	80-149	80-124	80-149	80-124
(TOL) = d8-Toluene	77-120	80-120	77-120	80-120
(BFB) = Bromofluorobenzene	80-120	80-120	80-120	80-120
(DCB) = d4-1,2-Dichlorobenzene	80-120	80-120	80-120	80-120

Log Number Range: 14-17113 to 14-17114

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt15.i
Lab File ID: cc0822.d
Analysis Type: SOIL
Lab Sample ID: CC0822
Method: /chem1/nt15.i/20140822.b/VO051314S.m

Injection Date: 22-AUG-2014 09:57
Init. Cal. Date(s): 21-AUG-2014 21-AUG-2014
Init. Cal. Times: 16:59 19:54
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF50	CCAL RRF50	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
1 Dichlorodifluoromethane	0.40295	0.44467	0.44467	0.100	10.35403	20.00000	Averaged	
2 Chloromethane	0.70096	0.61596	0.61596	0.100	-12.12590	20.00000	Averaged	
3 Vinyl Chloride	0.67265	0.70857	0.70857	0.100	5.34058	20.00000	Averaged	
4 Bromomethane	0.42045	0.38282	0.38282	0.100	-8.94944	20.00000	Averaged	
5 Chloroethane	0.21092	0.24491	0.24491	0.100	16.11785	20.00000	Averaged	
6 Trichlorofluoromethane	55.90559	50.00000	0.30220	0.100	11.81119	20.00000	Linear	
7 1,1-Dichloroethene	0.49682	0.62143	0.62143	0.100	25.08104	20.00000	Averaged	<-
8 Carbon Disulfide	1.77477	2.27733	2.27733	0.010	28.31635	20.00000	Averaged	<-
9 112Trichloro122Trifluoroeth	0.50963	0.61716	0.61716	0.010	21.10151	20.00000	Averaged	<-
10 Iodomethane	0.46021	0.67645	0.67645	0.010	46.98770	20.00000	Averaged	<-
11 Bromoethane	0.37024	0.43746	0.43746	0.010	18.15803	20.00000	Averaged	
12 Acrolein	0.10195	0.11320	0.11320	0.000	11.03165	20.00000	Averaged	
13 Methylene Chloride	52.84382	50.00000	0.66212	0.010	5.68764	20.00000	Linear	
14 Acetone	0.16634	0.16771	0.16771	0.001	0.82197	20.00000	Averaged	
15 Trans-1,2-Dichloroethene	0.60459	0.66369	0.66369	0.010	9.77644	20.00000	Averaged	
16 Methyl tert butyl ether	1.72211	1.84518	1.84518	0.100	7.14666	20.00000	Averaged	
17 1,1-Dichloroethane	1.01517	1.08582	1.08582	0.100	6.96012	20.00000	Averaged	
18 Acrylonitrile	0.20560	0.22115	0.22115	0.001	7.56396	20.00000	Averaged	
19 Vinyl Acetate	0.48471	0.52499	0.52499	0.010	8.30875	20.00000	Averaged	
20 Cis-1,2-Dichloroethene	0.59671	0.63430	0.63430	0.010	6.29854	20.00000	Averaged	
22 2,2-Dichloropropane	0.74597	0.88561	0.88561	0.010	18.72028	20.00000	Averaged	
23 Bromochloromethane	0.24635	0.26080	0.26080	0.050	5.86968	20.00000	Averaged	
24 Chloroform	0.92828	0.98070	0.98070	0.100	5.64668	20.00000	Averaged	
25 Carbon Tetrachloride	48.06420	50.00000	0.37985	0.100	-3.87160	20.00000	Linear	
$ 27 Dibromofluoromethane	0.46457	0.47005	0.47005	0.100	1.18007	20.00000	Averaged	
26 1,1,1-Trichloroethane	0.78494	0.87374	0.87374	0.100	11.31301	20.00000	Averaged	
28 1,1-Dichloropropene	0.48348	0.53991	0.53991	0.010	11.67144	20.00000	Averaged	
29 2-Butanone	0.08448	0.08828	0.08828	0.001	4.49601	20.00000	Averaged	
30 Benzene	1.40154	1.46817	1.46817	0.100	4.75351	20.00000	Averaged	
$ 32 d4-1,2-Dichloroethane	0.59827	0.59712	0.59712	0.010	-0.19068	20.00000	Averaged	
33 1,2-Dichloroethane	0.40077	0.40449	0.40449	0.100	0.92854	20.00000	Averaged	
34 Trichloroethene	0.33751	0.37633	0.37633	0.100	11.50061	20.00000	Averaged	
37 Dibromomethane	0.17717	0.17153	0.17153	0.010	-3.18019	20.00000	Averaged	
38 1,2-Dichloropropane	0.33656	0.34896	0.34896	0.100	3.68590	20.00000	Averaged	
39 Bromodichloromethane	0.37227	0.41144	0.41144	0.100	10.52185	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt15.i Injection Date: 22-AUG-2014 09:57
Lab File ID: cc0822.d Init. Cal. Date(s): 21-AUG-2014 21-AUG-2014
Analysis Type: SOIL Init. Cal. Times: 16:59 19:54
Lab Sample ID: CC0822 Quant Type: ISTD
Method: /chem1/nt15.i/20140822.b/VO051314S.m

COMPOUND	RRF / AMOUNT	RF50	CCAL RRF50	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
40 2-Chloroethyl Vinyl Ether	0.12209	0.15273	0.15273	0.000	25.10378	20.00000	Averaged	<-
41 Cis 1,3-dichloropropene	0.50394	0.55163	0.55163	0.100	9.46247	20.00000	Averaged	
$ 42 d8-Toluene	1.18747	1.19632	1.19632	0.010	0.74560	20.00000	Averaged	
43 Toluene	0.90462	0.93526	0.93526	0.100	3.38728	20.00000	Averaged	
44 Tetrachloroethene	0.34845	0.37056	0.37056	0.100	6.34436	20.00000	Averaged	
45 4-Methyl-2-Pentanone	0.14074	0.14756	0.14756	0.000	4.84054	20.00000	Averaged	
46 Trans 1,3-Dichloropropene	0.44349	0.50713	0.50713	0.010	14.35127	20.00000	Averaged	
47 1,1,2-Trichloroethane	0.27063	0.29255	0.29255	0.100	8.10228	20.00000	Averaged	
48 Chlorodibromomethane	49.00084	50.00000	0.30546	0.100	-1.99833	20.00000	Linear	
49 1,3-Dichloropropane	0.54226	0.55909	0.55909	0.100	3.10330	20.00000	Averaged	
50 1,2-Dibromoethane	0.25482	0.25883	0.25883	0.010	1.57400	20.00000	Averaged	
51 2-Hexanone	0.26447	0.26992	0.26992	0.010	2.06242	20.00000	Averaged	
53 Chlorobenzene	1.04099	1.08005	1.08005	0.300	3.75261	20.00000	Averaged	
54 Ethyl Benzene	1.87127	1.99974	1.99974	0.100	6.86505	20.00000	Averaged	
55 1,1,1,2-Tetrachloroethane	0.29144	0.32973	0.32973	0.010	13.13895	20.00000	Averaged	
56 m,p-xylene	0.68546	0.79114	0.79114	0.100	15.41842	20.00000	Averaged	
57 o-Xylene	0.67901	0.71914	0.71914	0.100	5.90985	20.00000	Averaged	
58 Styrene	1.13823	1.22896	1.22896	0.100	7.97092	20.00000	Averaged	
59 Bromoform	45.42035	50.00000	0.39780	0.100	-9.15930	20.00000	Linear	
60 Isopropyl Benzene	3.55422	3.94355	3.94355	0.010	10.95411	20.00000	Averaged	
$ 62 4-Bromofluorobenzene	0.50339	0.49644	0.49644	0.200	-1.37988	20.00000	Averaged	
63 Bromobenzene	0.78493	0.79630	0.79630	0.010	1.44847	20.00000	Averaged	
64 N-Propyl Benzene	4.27052	4.66014	4.66014	0.010	9.12355	20.00000	Averaged	
65 1,1,2,2-Tetrachloroethane	0.82358	0.85521	0.85521	0.300	3.84143	20.00000	Averaged	
66 2-Chloro Toluene	2.57944	2.75205	2.75205	0.010	6.69193	20.00000	Averaged	
67 1,3,5-Trimethyl Benzene	3.00133	3.34188	3.34188	0.010	11.34672	20.00000	Averaged	
68 1,2,3-Trichloropropane	0.24527	0.26196	0.26196	0.010	6.80474	20.00000	Averaged	
69 Trans-1,4-Dichloro 2-Butene	0.23162	0.27443	0.27443	0.001	18.48179	20.00000	Averaged	
70 4-Chloro Toluene	2.70587	2.85868	2.85868	0.010	5.64741	20.00000	Averaged	
71 T-Butyl Benzene	2.56236	2.75792	2.75792	0.010	7.63187	20.00000	Averaged	
72 1,2,4-Trimethylbenzene	3.00467	3.23191	3.23191	0.010	7.56290	20.00000	Averaged	
73 S-Butyl Benzene	3.95999	4.33009	4.33009	0.010	9.34599	20.00000	Averaged	
74 4-Isopropyl Toluene	3.18914	3.50865	3.50865	0.010	10.01865	20.00000	Averaged	
75 1,3-Dichlorobenzene	1.60296	1.62305	1.62305	0.100	1.25317	20.00000	Averaged	
77 1,4-Dichlorobenzene	1.71069	1.71990	1.71990	0.100	0.53849	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt15.i Injection Date: 22-AUG-2014 09:57
Lab File ID: cc0822.d Init. Cal. Date(s): 21-AUG-2014 21-AUG-2014
Analysis Type: SOIL Init. Cal. Times: 16:59 19:54
Lab Sample ID: CC0822 Quant Type: ISTD
Method: /chem1/nt15.i/20140822.b/VO051314S.m

COMPOUND	RRF / AMOUNT	RF50	CCAL RRF50	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
78 N-Butyl Benzene	3.25530	3.43250	3.43250	0.010	5.44332	20.00000	Averaged
$ 79 d4-1,2-Dichlorobenzene	0.93632	0.93298	0.93298	0.010	-0.35723	20.00000	Averaged
80 1,2-Dichlorobenzene	1.56806	1.58473	1.58473	0.100	1.06333	20.00000	Averaged
81 1,2-Dibromo 3-Chloropropane	0.15285	0.16960	0.16960	0.010	10.95963	20.00000	Averaged
82 Hexachloro 1,3-Butadiene	0.53425	0.49291	0.49291	0.010	-7.73891	20.00000	Averaged
83 1,2,4-Trichlorobenzene	1.11635	1.06732	1.06732	0.010	-4.39191	20.00000	Averaged
84 Naphthalene	3.13004	2.81125	2.81125	0.010	-10.18476	20.00000	Averaged
85 1,2,3-Trichlorobenzene	0.98269	0.93384	0.93384	0.010	-4.97103	20.00000	Averaged

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt15.i
Lab File ID: cc0825a.d
Analysis Type: SOIL
Lab Sample ID: CC0825
Method: /chem1/nt15.i/20140825.b/VO051314S.m

Injection Date: 25-AUG-2014 14:14
Init. Cal. Date(s): 21-AUG-2014 21-AUG-2014
Init. Cal. Times: 16:59 19:54
Quant Type: ISTD

COMPOUND	RRF / AMOUNT	RF50	CCAL RRF50	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
1 Dichlorodifluoromethane	0.40295	0.42648	0.42648	0.100	5.84136	20.00000	Averaged	
2 Chloromethane	0.70096	0.59217	0.59217	0.100	-15.51976	20.00000	Averaged	
3 Vinyl Chloride	0.67265	0.68316	0.68316	0.100	1.56243	20.00000	Averaged	
4 Bromomethane	0.42045	0.29778	0.29778	0.100	-29.17699	20.00000	Averaged	<-
5 Chloroethane	0.21092	0.22940	0.22940	0.100	8.76304	20.00000	Averaged	
6 Trichlorofluoromethane	49.76373	50.00000	0.26900	0.100	-0.47255	20.00000	Linear	
7 1,1-Dichloroethene	0.49682	0.57461	0.57461	0.100	15.65666	20.00000	Averaged	
8 Carbon Disulfide	1.77477	2.22388	2.22388	0.010	25.30483	20.00000	Averaged	<-
9 112Trichloro122Trifluoroeth	0.50963	0.60061	0.60061	0.010	17.85372	20.00000	Averaged	
10 Iodomethane	0.46021	0.46784	0.46784	0.010	1.65962	20.00000	Averaged	
11 Bromoethane	0.37024	0.39393	0.39393	0.010	6.39870	20.00000	Averaged	
12 Acrolein	0.10195	0.12688	0.12688	0.000	24.45124	20.00000	Averaged	<-
13 Methylene Chloride	51.48881	50.00000	0.64514	0.010	2.97761	20.00000	Linear	
14 Acetone	0.16634	0.19397	0.19397	0.001	16.60631	20.00000	Averaged	
15 Trans-1,2-Dichloroethene	0.60459	0.62845	0.62845	0.010	3.94653	20.00000	Averaged	
16 Methyl tert butyl ether	1.72211	1.77966	1.77966	0.100	3.34218	20.00000	Averaged	
17 1,1-Dichloroethane	1.01517	1.09045	1.09045	0.100	7.41547	20.00000	Averaged	
18 Acrylonitrile	0.20560	0.23462	0.23462	0.001	14.11658	20.00000	Averaged	
19 Vinyl Acetate	0.48471	0.55219	0.55219	0.010	13.92136	20.00000	Averaged	
20 Cis-1,2-Dichloroethene	0.59671	0.58798	0.58798	0.010	-1.46436	20.00000	Averaged	
22 2,2-Dichloropropane	0.74597	0.76431	0.76431	0.010	2.45872	20.00000	Averaged	
23 Bromochloromethane	0.24635	0.24364	0.24364	0.050	-1.09805	20.00000	Averaged	
24 Chloroform	0.92828	0.92512	0.92512	0.100	-0.34086	20.00000	Averaged	
25 Carbon Tetrachloride	40.90912	50.00000	0.32330	0.100	-18.18176	20.00000	Linear	
$ 27 Dibromofluoromethane	0.46457	0.49332	0.49332	0.100	6.18850	20.00000	Averaged	
26 1,1,1-Trichloroethane	0.78494	0.81824	0.81824	0.100	4.24216	20.00000	Averaged	
28 1,1-Dichloropropene	0.48348	0.49523	0.49523	0.010	2.42975	20.00000	Averaged	
29 2-Butanone	0.08448	0.09846	0.09846	0.001	16.55678	20.00000	Averaged	
30 Benzene	1.40154	1.35342	1.35342	0.100	-3.43350	20.00000	Averaged	
$ 32 d4-1,2-Dichloroethane	0.59827	0.64098	0.64098	0.010	7.14033	20.00000	Averaged	
33 1,2-Dichloroethane	0.40077	0.39075	0.39075	0.100	-2.50071	20.00000	Averaged	
34 Trichloroethene	0.33751	0.34650	0.34650	0.100	2.66356	20.00000	Averaged	
37 Dibromomethane	0.17717	0.18048	0.18048	0.010	1.87134	20.00000	Averaged	
38 1,2-Dichloropropane	0.33656	0.32746	0.32746	0.100	-2.70384	20.00000	Averaged	
39 Bromodichloromethane	0.37227	0.37890	0.37890	0.100	1.77996	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

nstrument ID: nt15.i Injection Date: 25-AUG-2014 14:14
ab File ID: cc0825a.d Init. Cal. Date(s): 21-AUG-2014 21-AUG-2014
nalysis Type: SOIL Init. Cal. Times: 16:59 19:54
ab Sample ID: CC0825 Quant Type: ISTD
ethod: /chem1/nt15.i/20140825.b/VO051314S.m

COMPOUND	RRF / AMOUNT	RF50	CCAL RRF50	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE	
40 2-Chloroethyl Vinyl Ether	0.12209	0.14671	0.14671	0.000	20.17174	20.00000	Averaged	<-
41 Cis 1,3-dichloropropene	0.50394	0.50516	0.50516	0.100	0.24203	20.00000	Averaged	
$ 42 d8-Toluene	1.18747	1.24016	1.24016	0.010	4.43714	20.00000	Averaged	
43 Toluene	0.90462	0.85630	0.85630	0.100	-5.34217	20.00000	Averaged	
44 Tetrachloroethene	0.34845	0.30899	0.30899	0.100	-11.32327	20.00000	Averaged	
45 4-Methyl-2-Pentanone	0.14074	0.16002	0.16002	0.000	13.69951	20.00000	Averaged	
46 Trans 1,3-Dichloropropene	0.44349	0.46958	0.46958	0.010	5.88337	20.00000	Averaged	
47 1,1,2-Trichloroethane	0.27063	0.25457	0.25457	0.100	-5.93166	20.00000	Averaged	
48 Chlorodibromomethane	42.12403	50.00000	0.26259	0.100	-15.75195	20.00000	Linear	
49 1,3-Dichloropropane	0.54226	0.50082	0.50082	0.100	-7.64309	20.00000	Averaged	
50 1,2-Dibromoethane	0.25482	0.25020	0.25020	0.010	-1.81438	20.00000	Averaged	
51 2-Hexanone	0.26447	0.28182	0.28182	0.010	6.56047	20.00000	Averaged	
53 Chlorobenzene	1.04099	0.94134	0.94134	0.300	-9.57282	20.00000	Averaged	
54 Ethyl Benzene	1.87127	1.74125	1.74125	0.100	-6.94818	20.00000	Averaged	
55 1,1,1,2-Tetrachloroethane	0.29144	0.27718	0.27718	0.010	-4.89147	20.00000	Averaged	
56 m,p-xylene	0.68546	0.68420	0.68420	0.100	-0.18263	20.00000	Averaged	
57 o-Xylene	0.67901	0.61055	0.61055	0.100	-10.08212	20.00000	Averaged	
58 Styrene	1.13823	1.06459	1.06459	0.100	-6.46946	20.00000	Averaged	
59 Bromoform	39.08770	50.00000	0.34234	0.100	-21.82460	20.00000	Linear	<-
60 Isopropyl Benzene	3.55422	3.36262	3.36262	0.010	-5.39075	20.00000	Averaged	
$ 62 4-Bromofluorobenzene	0.50339	0.50080	0.50080	0.200	-0.51496	20.00000	Averaged	
63 Bromobenzene	0.78493	0.66574	0.66574	0.010	-15.18489	20.00000	Averaged	
64 N-Propyl Benzene	4.27052	3.97826	3.97826	0.010	-6.84353	20.00000	Averaged	
65 1,1,2,2-Tetrachloroethane	0.82358	0.79559	0.79559	0.300	-3.39805	20.00000	Averaged	
66 2-Chloro Toluene	2.57944	2.31615	2.31615	0.010	-10.20734	20.00000	Averaged	
67 1,3,5-Trimethyl Benzene	3.00133	2.83718	2.83718	0.010	-5.46937	20.00000	Averaged	
68 1,2,3-Trichloropropane	0.24527	0.24482	0.24482	0.010	-0.18270	20.00000	Averaged	
69 Trans-1,4-Dichloro 2-Butene	0.23162	0.24591	0.24591	0.001	6.16768	20.00000	Averaged	
70 4-Chloro Toluene	2.70587	2.43738	2.43738	0.010	-9.92238	20.00000	Averaged	
71 T-Butyl Benzene	2.56236	2.33156	2.33156	0.010	-9.00715	20.00000	Averaged	
72 1,2,4-Trimethylbenzene	3.00467	2.76339	2.76339	0.010	-8.03018	20.00000	Averaged	
73 S-Butyl Benzene	3.95999	3.69619	3.69619	0.010	-6.66157	20.00000	Averaged	
74 4-Isopropyl Toluene	3.18914	2.97401	2.97401	0.010	-6.74584	20.00000	Averaged	
75 1,3-Dichlorobenzene	1.60296	1.35714	1.35714	0.100	-15.33498	20.00000	Averaged	
77 1,4-Dichlorobenzene	1.71069	1.47283	1.47283	0.100	-13.90441	20.00000	Averaged	

Analytical Resources, Inc.

CONTINUING CALIBRATION COMPOUNDS

Instrument ID: nt15.i Injection Date: 25-AUG-2014 14:14
Lab File ID: cc0825a.d Init. Cal. Date(s): 21-AUG-2014 21-AUG-2014
Analysis Type: SOIL Init. Cal. Times: 16:59 19:54
Lab Sample ID: CC0825 Quant Type: ISTD
Method: /chem1/nt15.i/20140825.b/VO051314S.m

COMPOUND	RRF / AMOUNT	RPSO	CCAL RRPSO	MIN RRF	%D / %DRIFT	MAX %D / %DRIFT	CURVE TYPE
78 N-Butyl Benzene	3.25530	2.97674	2.97674	0.010	-8.55721	20.00000	Averaged
$ 79 d4-1,2-Dichlorobenzene	0.93632	0.92742	0.92742	0.010	-0.95071	20.00000	Averaged
80 1,2-Dichlorobenzene	1.56806	1.34540	1.34540	0.100	-14.19940	20.00000	Averaged
81 1,2-Dibromo 3-Chloropropane	0.15285	0.16423	0.16423	0.010	7.44276	20.00000	Averaged
82 Hexachloro 1,3-Butadiene	0.53425	0.43393	0.43393	0.010	-18.77750	20.00000	Averaged
83 1,2,4-Trichlorobenzene	1.11635	0.90006	0.90006	0.010	-19.37496	20.00000	Averaged
84 Naphthalene	3.13004	2.57783	2.57783	0.010	-17.64232	20.00000	Averaged
85 1,2,3-Trichlorobenzene	0.98269	0.81291	0.81291	0.010	-17.27732	20.00000	Averaged

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-082614
METHOD BLANK

Lab Sample ID: MB-082614
LIMS ID: 14-17111
Matrix: Soil
Data Release Authorized:
Reported: 08/28/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 08/26/14
Date Analyzed: 08/27/14 14:20
Instrument/Analyst: NT8/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	5.0	< 5.0 U
90-12-0	1-Methylnaphthalene	5.0	< 5.0 U
208-96-8	Acenaphthylene	5.0	< 5.0 U
83-32-9	Acenaphthene	5.0	< 5.0 U
86-73-7	Fluorene	5.0	< 5.0 U
85-01-8	Phenanthrene	5.0	< 5.0 U
120-12-7	Anthracene	5.0	< 5.0 U
206-44-0	Fluoranthene	5.0	< 5.0 U
129-00-0	Pyrene	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	5.0	< 5.0 U
218-01-9	Chrysene	5.0	< 5.0 U
50-32-8	Benzo(a)pyrene	5.0	< 5.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	5.0	< 5.0 U
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
191-24-2	Benzo(g,h,i)perylene	5.0	< 5.0 U
132-64-9	Dibenzofuran	5.0	< 5.0 U
TOTBFA	Total Benzofluoranthenes	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	113%
d10-2-Methylnaphthalene	87.0%
d14-Dibenzo(a,h)anthracen	97.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: GP2-S-3.0
SAMPLE

Lab Sample ID: YX19B
LIMS ID: 14-17111
Matrix: Soil
Data Release Authorized:
Reported: 08/28/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 08/26/14
Date Analyzed: 08/27/14 15:44
Instrument/Analyst: NT8/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 10.29 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 27.3%

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**4.9**	**60**
91-57-6	**2-Methylnaphthalene**	**4.9**	**18**
90-12-0	**1-Methylnaphthalene**	**4.9**	**13**
208-96-8	**Acenaphthylene**	**4.9**	**6.5**
83-32-9	Acenaphthene	4.9	< 4.9 U
86-73-7	**Fluorene**	**4.9**	**8.9**
85-01-8	**Phenanthrene**	**4.9**	**79**
120-12-7	**Anthracene**	**4.9**	**14**
206-44-0	**Fluoranthene**	**4.9**	**97**
129-00-0	**Pyrene**	**4.9**	**89**
56-55-3	**Benzo(a)anthracene**	**4.9**	**41**
218-01-9	**Chrysene**	**4.9**	**70**
50-32-8	**Benzo(a)pyrene**	**4.9**	**46**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**4.9**	**28**
53-70-3	**Dibenz(a,h)anthracene**	**4.9**	**7.0**
191-24-2	**Benzo(g,h,i)perylene**	**4.9**	**51**
132-64-9	**Dibenzofuran**	**4.9**	**11**
TOTBFA	**Total Benzofluoranthenes**	**4.9**	**87**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	112%
d10-2-Methylnaphthalene	94.0%
d14-Dibenzo(a,h)anthracen	71.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: GP3-S-7.0
SAMPLE

Lab Sample ID: YX19C
LIMS ID: 14-17112
Matrix: Soil
Data Release Authorized: MW
Reported: 08/28/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 08/26/14
Date Analyzed: 08/27/14 16:11
Instrument/Analyst: NT8/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 10.35 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 27.0%

CAS Number	Analyte	LOQ	Result	
91-20-3	Naphthalene	4.8	380	
91-57-6	2-Methylnaphthalene	4.8	560	E
90-12-0	1-Methylnaphthalene	4.8	510	E
208-96-8	Acenaphthylene	4.8	52	
83-32-9	Acenaphthene	4.8	86	
86-73-7	Fluorene	4.8	23	
85-01-8	Phenanthrene	4.8	210	
120-12-7	Anthracene	4.8	52	
206-44-0	Fluoranthene	4.8	68	
129-00-0	Pyrene	4.8	71	
56-55-3	Benzo(a)anthracene	4.8	51	
218-01-9	Chrysene	4.8	57	
50-32-8	Benzo(a)pyrene	4.8	30	
193-39-5	Indeno(1,2,3-cd)pyrene	4.8	12	
53-70-3	Dibenz(a,h)anthracene	4.8	7.4	
191-24-2	Benzo(g,h,i)perylene	4.8	19	
132-64-9	Dibenzofuran	4.8	110	
TOTBFA	Total Benzofluoranthenes	4.8	62	

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	90.3%
d10-2-Methylnaphthalene	93.7%
d14-Dibenzo(a,h)anthracen	61.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: GP3-S-7.0
DILUTION

Lab Sample ID: YX19C
LIMS ID: 14-17112
Matrix: Soil
Data Release Authorized:
Reported: 08/28/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 08/26/14
Date Analyzed: 08/27/14 17:35
Instrument/Analyst: NT8/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 10.35 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 27.0%

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	14	420
91-57-6	2-Methylnaphthalene	14	600
90-12-0	1-Methylnaphthalene	14	560
208-96-8	Acenaphthylene	14	50
83-32-9	Acenaphthene	14	110
86-73-7	Fluorene	14	24
85-01-8	Phenanthrene	14	260
120-12-7	Anthracene	14	69
206-44-0	Fluoranthene	14	78
129-00-0	Pyrene	14	85
56-55-3	Benzo(a)anthracene	14	59
218-01-9	Chrysene	14	62
50-32-8	Benzo(a)pyrene	14	36
193-39-5	Indeno(1,2,3-cd)pyrene	14	15
53-70-3	Dibenz(a,h)anthracene	14	< 14 U
191-24-2	Benzo(g,h,i)perylene	14	21
132-64-9	Dibenzofuran	14	130
TOTBFA	Total Benzofluoranthenes	14	60

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	105%
d10-2-Methylnaphthalene	96.0%
d14-Dibenzo(a,h)anthracen	66.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: GP4-S-5.4
SAMPLE

Lab Sample ID: YX19D
LIMS ID: 14-17113
Matrix: Soil
Data Release Authorized:
Reported: 08/28/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 08/26/14
Date Analyzed: 08/27/14 16:39
Instrument/Analyst: NT8/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 10.42 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 32.0%

CAS Number	Analyte	LOQ	Result
91-20-3	**Naphthalene**	**4.8**	**19**
91-57-6	**2-Methylnaphthalene**	**4.8**	**9.1**
90-12-0	**1-Methylnaphthalene**	**4.8**	**7.6**
208-96-8	Acenaphthylene	4.8	< 4.8 U
83-32-9	Acenaphthene	4.8	< 4.8 U
86-73-7	Fluorene	4.8	< 4.8 U
85-01-8	**Phenanthrene**	**4.8**	**21**
120-12-7	**Anthracene**	**4.8**	**5.8**
206-44-0	**Fluoranthene**	**4.8**	**28**
129-00-0	**Pyrene**	**4.8**	**24**
56-55-3	**Benzo(a)anthracene**	**4.8**	**9.9**
218-01-9	**Chrysene**	**4.8**	**14**
50-32-8	**Benzo(a)pyrene**	**4.8**	**11**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**4.8**	**6.4**
53-70-3	Dibenz(a,h)anthracene	4.8	< 4.8 U
191-24-2	**Benzo(g,h,i)perylene**	**4.8**	**9.1**
132-64-9	**Dibenzofuran**	**4.8**	**8.8**
TOTBFA	**Total Benzofluoranthenes**	**4.8**	**17**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	94.7%
d10-2-Methylnaphthalene	75.0%
d14-Dibenzo(a,h)anthracen	71.3%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: GP5-S-14.5
SAMPLE

Lab Sample ID: YX19E
LIMS ID: 14-17114
Matrix: Soil
Data Release Authorized:
Reported: 08/28/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 08/26/14
Date Analyzed: 08/27/14 17:07
Instrument/Analyst: NT8/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 10.92 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: 24.9%

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	4.6	< 4.6 U
91-57-6	2-Methylnaphthalene	4.6	< 4.6 U
90-12-0	1-Methylnaphthalene	4.6	< 4.6 U
208-96-8	Acenaphthylene	4.6	< 4.6 U
83-32-9	Acenaphthene	4.6	< 4.6 U
86-73-7	Fluorene	4.6	< 4.6 U
85-01-8	Phenanthrene	4.6	< 4.6 U
120-12-7	Anthracene	4.6	< 4.6 U
206-44-0	Fluoranthene	4.6	< 4.6 U
129-00-0	Pyrene	4.6	< 4.6 U
56-55-3	Benzo(a)anthracene	4.6	< 4.6 U
218-01-9	Chrysene	4.6	< 4.6 U
50-32-8	Benzo(a)pyrene	4.6	< 4.6 U
193-39-5	Indeno(1,2,3-cd)pyrene	4.6	< 4.6 U
53-70-3	Dibenz(a,h)anthracene	4.6	< 4.6 U
191-24-2	Benzo(g,h,i)perylene	4.6	< 4.6 U
132-64-9	Dibenzofuran	4.6	< 4.6 U
TOTBFA	Total Benzofluoranthenes	4.6	< 4.6 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	94.7%
d10-2-Methylnaphthalene	89.0%
d14-Dibenzo(a,h)anthracen	78.3%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

Client ID	FLN	MNP	DBA	TOT OUT
MB-082614	113%	87.0%	97.3%	0
LCS-082614	106%	82.7%	94.0%	0
GP2-S-3.0	112%	94.0%	71.3%	0
GP3-S-7.0	90.3%	93.7%	61.3%	0
GP3-S-7.0 DL	105%	96.0%	66.0%	0
GP4-S-5.4	94.7%	75.0%	71.3%	0
GP5-S-14.5	94.7%	89.0%	78.3%	0

	LCS/MB LIMITS	QC LIMITS
(FLN) = d10-Fluoranthene	(36-134)	(36-134)
(MNP) = d10-2-Methylnaphthalene	(32-120)	(32-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(21-133)	(21-133)

Prep Method: SW3546
Log Number Range: 14-17111 to 14-17114

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: LCS-082614
LAB CONTROL SAMPLE

Lab Sample ID: LCS-082614
LIMS ID: 14-17111
Matrix: Soil
Data Release Authorized:
Reported: 08/28/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 08/26/14
Date Analyzed LCS: 08/27/14 14:48
Instrument/Analyst LCS: NT8/JZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 0.50 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Naphthalene	91.2	150	60.8%
2-Methylnaphthalene	93.6	150	62.4%
1-Methylnaphthalene	93.3	150	62.2%
Acenaphthylene	92.8	150	61.9%
Acenaphthene	83.6	150	55.7%
Fluorene	98.4	150	65.6%
Phenanthrene	103	150	68.7%
Anthracene	108	150	72.0%
Fluoranthene	116	150	77.3%
Pyrene	111	150	74.0%
Benzo(a)anthracene	118	150	78.7%
Chrysene	113	150	75.3%
Benzo(a)pyrene	114	150	76.0%
Indeno(1,2,3-cd)pyrene	117	150	78.0%
Dibenz(a,h)anthracene	109	150	72.7%
Benzo(g,h,i)perylene	126	150	84.0%
Dibenzofuran	92.7	150	61.8%
Total Benzofluoranthenes	355	450	78.9%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate	Recovery
d10-Fluoranthene	106%
d10-2-Methylnaphthalene	82.7%
d14-Dibenzo(a,h)anthracene	94.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-082614
METHOD BLANK

Lab Sample ID: MB-082614
LIMS ID: 14-17111
Matrix: Soil
Data Release Authorized:
Reported: 08/29/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 08/26/14
Date Analyzed: 08/28/14 20:52
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g
Final Extract Volume: 4.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	87.5%
Tetrachlorometaxylene	64.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: GP2-S-3.0
SAMPLE

Lab Sample ID: YX19B
LIMS ID: 14-17111
Matrix: Soil
Data Release Authorized: MW
Reported: 08/29/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 08/26/14
Date Analyzed: 08/28/14 22:20
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.4 g-dry-wt
Final Extract Volume: 4.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 27.3%

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	Aroclor 1254	32	< 32 U
11096-82-5	Aroclor 1260	32	< 32 U
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	64.2%
Tetrachlorometaxylene	65.5%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-082614	87.5%	59-115	64.8%	58-112	0
LCS-082614	92.0%	59-115	70.2%	58-112	0
LCSD-082614	79.2%	59-115	65.5%	58-112	0
GP2-S-3.0	64.2%	47-120	65.5%	53-116	0

Microwave (MARS) Control Limits PCBSMI
Prep Method: SW3546
Log Number Range: 14-17111 to 14-17111

FORM-II SW8082

YX19.00037

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Page 1 of 1

Sample ID: LCS-082614
LCS/LCSD

Lab Sample ID: LCS-082614
LIMS ID: 14-17111
Matrix: Soil
Data Release Authorized:
Reported: 08/29/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 08/26/14
Date Analyzed LCS: 08/28/14 21:14
LCSD: 08/28/14 21:36
Instrument/Analyst LCS: ECD7/JGR
LCSD: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount LCS: 12.0 g-dry-wt
LCSD: 12.0 g-dry-wt
Final Extract Volume LCS: 4.00 mL
LCSD: 4.00 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	128	167	76.6%	117	167	70.1%	9.0%
Aroclor 1260	164	167	98.2%	140	167	83.8%	15.8%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	92.0%	79.2%
Tetrachlorometaxylene	70.2%	65.5%

Results reported in µg/kg (ppb)
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPH-HCID Method by GC/FID
Extraction Method: SW3580A

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Matrix: Soil

Data Release Authorized: MW
Reported: 08/25/14

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-082214	Method Blank	08/22/14	08/22/14	1.0	Gas	< 20 U
14-17110					Diesel	< 50 U
					Oil	< 100 U
					o-Terphenyl	99.8%
YX19A	GP1-S-1.4	08/22/14	08/22/14	1.0	Gas	< 20 U
14-17110	HC ID: ---				Diesel	< 50 U
					Oil	< 100 U
					o-Terphenyl	104%
YX19B	GP2-S-3.0	08/22/14	08/22/14	1.0	Gas	< 20 U
14-17111	HC ID: ---				Diesel	< 50 U
					Oil	< 100 U
					o-Terphenyl	104%
YX19C	GP3-S-7.0	08/22/14	08/22/14	1.0	Gas	< 20 U
14-17112	HC ID: ---				Diesel	< 50 U
					Oil	< 100 U
					o-Terphenyl	110%
YX19D	GP4-S-5.4	08/22/14	08/22/14	1.0	Gas	< 20 U
14-17113	HC ID: ---				Diesel	< 50 U
					Oil	< 100 U
					o-Terphenyl	100%
YX19E	GP5-S-14.5	08/22/14	08/22/14	1.0	Gas	< 20 U
14-17114	HC ID: ---				Diesel	< 50 U
					Oil	< 100 U
					o-Terphenyl	100%
YX19G	GP9-S-0.5	08/22/14	08/23/14	1.0	Gas	< 20 U
14-17116	HC ID: **DIESEL/MOTOR OIL**				**Diesel**	**> 50**
					Oil	**> 100**
					o-Terphenyl	93.3%
YX19H	GP10-S-0.5	08/22/14	08/23/14	1.0	Gas	< 20 U
14-17117	HC ID: **DIESEL/MOTOR OIL**				**Diesel**	**> 50**
					Oil	**> 100**
					o-Terphenyl	93.3%

Reported in mg/kg (ppm)

Gas value based on total peaks in the range from Toluene to C12.
Diesel value based on the total peaks in the range from C12 to C24.
Oil value based on the total peaks in the range from C24 to C38.

HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

HCID SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Client ID	O-TER	TOT OUT
082214MB	99.8%	0
GP1-S-1.4	104%	0
GP2-S-3.0	104%	0
GP3-S-7.0	110%	0
GP4-S-5.4	100%	0
GP5-S-14.5	100%	0
GP9-S-0.5	93.3%	0
GP10-S-0.5	93.3%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3580A
Log Number Range: 14-17110 to 14-17117

ANALYTICAL RESOURCES INCORPORATED

TOTAL HCID RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 08/20/14

ARI Job: YX19
Project: Northern State Hospital IPG
0624.04.02

ARI ID	Client ID	Sample Amt	Final Vol	Basis	Prep Date
14-17110-082214MB	Method Blank	10.0 g	5.00 mL	-	08/22/14
14-17110-YX19A	GP1-S-1.4	7.34 g	5.00 mL	D	08/22/14
14-17111-YX19B	GP2-S-3.0	7.56 g	5.00 mL	D	08/22/14
14-17112-YX19C	GP3-S-7.0	7.58 g	5.00 mL	D	08/22/14
14-17113-YX19D	GP4-S-5.4	6.90 g	5.00 mL	D	08/22/14
14-17114-YX19E	GP5-S-14.5	7.59 g	5.00 mL	D	08/22/14
14-17116-YX19G	GP9-S-0.5	8.25 g	5.00 mL	D	08/22/14
14-17117-YX19H	GP10-S-0.5	7.74 g	5.00 mL	D	08/22/14

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: GP1-S-1.4
SAMPLE

Lab Sample ID: YX19A
LIMS ID: 14-17110
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Percent Total Solids: 71.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	08/22/14	200.8	08/25/14	**7440-38-2**	**Arsenic**	0.3	**7.4**	
3050B	08/22/14	200.8	08/25/14	**7440-39-3**	**Barium**	0.7	**162**	
3050B	08/22/14	200.8	08/25/14	**7440-43-9**	**Cadmium**	0.1	**0.1**	
3050B	08/22/14	200.8	08/25/14	**7440-47-3**	**Chromium**	3	**106**	
3050B	08/22/14	200.8	08/25/14	**7440-50-8**	**Copper**	0.7	**42.7**	
3050B	08/22/14	200.8	08/25/14	**7439-92-1**	**Lead**	0.1	**13.1**	
CLP	08/22/14	7471A	08/25/14	**7439-97-6**	**Mercury**	0.03	**0.07**	
3050B	08/22/14	200.8	08/25/14	7782-49-2	Selenium	0.7	0.7	U
3050B	08/22/14	200.8	08/25/14	7440-22-4	Silver	0.3	0.3	U
3050B	08/22/14	200.8	08/25/14	**7440-66-6**	**Zinc**	5	**107**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: GP1-S-1.4
DUPLICATE

Lab Sample ID: YX19A
LIMS ID: 14-17110
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	200.8	7.4	8.3	11.5%	+/- 20%	
Barium	200.8	162	168	3.6%	+/- 20%	
Cadmium	200.8	0.1	0.1	0.0%	+/- 0.1	L
Chromium	200.8	106	113	6.4%	+/- 20%	
Copper	200.8	42.7	43.6	2.1%	+/- 20%	
Lead	200.8	13.1	12.8	2.3%	+/- 20%	
Mercury	7471A	0.07	0.08	13.3%	+/- 0.03	L
Selenium	200.8	0.7 U	0.7 U	0.0%	+/- 0.7	L
Silver	200.8	0.3 U	0.3 U	0.0%	+/- 0.3	L
Zinc	200.8	107	106	0.9%	+/- 20%	

Reported in mg/kg-dry

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: GP1-S-1.4
MATRIX SPIKE

Lab Sample ID: YX19A
LIMS ID: 14-17110
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	200.8	7.4	41.8	33.9	101%	
Barium	200.8	162	198	33.9	106%	H
Cadmium	200.8	0.1	33.0	33.9	97.1%	
Chromium	200.8	106	140	33.9	100%	
Copper	200.8	42.7	76.6	33.9	100%	
Lead	200.8	13.1	48.2	33.9	104%	
Mercury	7471A	0.07	0.48	0.343	120%	
Selenium	200.8	0.7 U	90.5	108	83.8%	
Silver	200.8	0.3 U	27.9	33.9	82.3%	
Zinc	200.8	107	208	108	93.5%	

Reported in mg/kg-dry

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: GP2-S-3.0
SAMPLE

Lab Sample ID: YX19B
LIMS ID: 14-17111
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Percent Total Solids: 73.4%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	08/22/14	200.8	08/25/14	**7440-38-2**	**Arsenic**	0.3	**13.0**	
3050B	08/22/14	200.8	08/25/14	**7440-39-3**	**Barium**	0.7	**180**	
3050B	08/22/14	200.8	08/25/14	**7440-43-9**	**Cadmium**	0.1	**0.2**	
3050B	08/22/14	200.8	08/25/14	**7440-47-3**	**Chromium**	3	**107**	
3050B	08/22/14	200.8	08/25/14	**7440-50-8**	**Copper**	0.7	**55.1**	
3050B	08/22/14	200.8	08/25/14	**7439-92-1**	**Lead**	0.1	**19.9**	
CLP	08/22/14	7471A	08/25/14	**7439-97-6**	**Mercury**	0.03	**0.09**	
3050B	08/22/14	200.8	08/25/14	7782-49-2	Selenium	0.7	0.7	U
3050B	08/22/14	200.8	08/25/14	7440-22-4	Silver	0.3	0.3	U
3050B	08/22/14	200.8	08/25/14	**7440-66-6**	**Zinc**	5	**122**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: GP3-S-7.0
SAMPLE

Lab Sample ID: YX19C
LIMS ID: 14-17112
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Percent Total Solids: 72.6%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	08/22/14	200.8	08/25/14	**7440-38-2**	**Arsenic**	0.3	**4.0**	
3050B	08/22/14	200.8	08/25/14	**7440-39-3**	**Barium**	3	**388**	
3050B	08/22/14	200.8	08/25/14	7440-43-9	Cadmium	0.1	0.1	U
3050B	08/22/14	200.8	08/25/14	**7440-47-3**	**Chromium**	0.7	**38.4**	
3050B	08/22/14	200.8	08/25/14	**7440-50-8**	**Copper**	0.7	**52.2**	
3050B	08/22/14	200.8	08/25/14	**7439-92-1**	**Lead**	0.1	**15.3**	
CLP	08/22/14	7471A	08/25/14	**7439-97-6**	**Mercury**	0.03	**0.06**	
3050B	08/22/14	200.8	08/25/14	7782-49-2	Selenium	0.7	0.7	U
3050B	08/22/14	200.8	08/25/14	7440-22-4	Silver	0.3	0.3	U
3050B	08/22/14	200.8	08/25/14	**7440-66-6**	**Zinc**	5	**66**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: GP4-S-5.4
SAMPLE

Lab Sample ID: YX19D
LIMS ID: 14-17113
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Percent Total Solids: 71.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	08/22/14	200.8	08/25/14	**7440-38-2**	**Arsenic**	0.3	**6.2**	
3050B	08/22/14	200.8	08/25/14	**7440-39-3**	**Barium**	0.7	**141**	
3050B	08/22/14	200.8	08/25/14	**7440-43-9**	**Cadmium**	0.1	**0.2**	
3050B	08/22/14	200.8	08/25/14	**7440-47-3**	**Chromium**	0.7	**108**	
3050B	08/22/14	200.8	08/25/14	**7440-50-8**	**Copper**	0.7	**28.4**	
3050B	08/22/14	200.8	08/25/14	**7439-92-1**	**Lead**	0.1	**28.3**	
CLP	08/22/14	7471A	08/25/14	**7439-97-6**	**Mercury**	0.02	**0.08**	
3050B	08/22/14	200.8	08/25/14	7782-49-2	Selenium	0.7	0.7	U
3050B	08/22/14	200.8	08/25/14	**7440-22-4**	**Silver**	0.3	**0.4**	
3050B	08/22/14	200.8	08/25/14	**7440-66-6**	**Zinc**	6	**143**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: GP5-S-14.5
SAMPLE

Lab Sample ID: YX19E
LIMS ID: 14-17114
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Percent Total Solids: 70.2%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	08/22/14	200.8	08/25/14	**7440-38-2**	**Arsenic**	0.3	**6.1**	
3050B	08/22/14	200.8	08/25/14	**7440-39-3**	**Barium**	0.7	**58.4**	
3050B	08/22/14	200.8	08/25/14	**7440-43-9**	**Cadmium**	0.1	**0.2**	
3050B	08/22/14	200.8	08/25/14	**7440-47-3**	**Chromium**	0.7	**170**	
3050B	08/22/14	200.8	08/25/14	**7440-50-8**	**Copper**	0.7	**53.6**	
3050B	08/22/14	200.8	08/25/14	**7439-92-1**	**Lead**	0.1	**10.0**	
CLP	08/22/14	7471A	08/25/14	**7439-97-6**	**Mercury**	0.03	**0.09**	
3050B	08/22/14	200.8	08/25/14	**7782-49-2**	**Selenium**	0.7	**0.7**	
3050B	08/22/14	200.8	08/25/14	7440-22-4	Silver	0.3	0.3	U
3050B	08/22/14	200.8	08/25/14	**7440-66-6**	**Zinc**	5	**96**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: YX19MB
LIMS ID: 14-17114
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	08/22/14	200.8	08/25/14	7440-38-2	Arsenic	0.2	0.2	U
3050B	08/22/14	200.8	08/25/14	7440-39-3	Barium	0.5	0.5	U
3050B	08/22/14	200.8	08/25/14	7440-43-9	Cadmium	0.1	0.1	U
3050B	08/22/14	200.8	08/25/14	7440-47-3	Chromium	0.5	0.5	U
3050B	08/22/14	200.8	08/25/14	7440-50-8	Copper	0.5	0.5	U
3050B	08/22/14	200.8	08/25/14	7439-92-1	Lead	0.1	0.1	U
CLP	08/22/14	7471A	08/25/14	7439-97-6	Mercury	0.02	0.02	U
3050B	08/22/14	200.8	08/25/14	7782-49-2	Selenium	0.5	0.5	U
3050B	08/22/14	200.8	08/25/14	7440-22-4	Silver	0.2	0.2	U
3050B	08/22/14	200.8	08/25/14	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: YX19LCS
LIMS ID: 14-17114
Matrix: Soil
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

BLANK SPIKE/BLANK SPIKE DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Dup Found	Spike Added	Spike Recovery	Spike Dup Recovery	RPD	Q
Arsenic	200.8	27.8	26.9	25.0	111%	108%	3.3%	
Barium	200.8	24.7	24.0	25.0	98.8%	96.0%	2.9%	
Cadmium	200.8	24.9	24.1	25.0	99.6%	96.4%	3.3%	
Chromium	200.8	25.2	25.8	25.0	101%	103%	2.4%	
Copper	200.8	26.5	25.7	25.0	106%	103%	3.1%	
Lead	200.8	27.0	26.5	25.0	108%	106%	1.9%	
Mercury	7471A	0.54	0.55	0.50	108%	110%	1.8%	
Selenium	200.8	75.9	74.2	80.0	94.9%	92.8%	2.3%	
Silver	200.8	25.8	25.4	25.0	103%	102%	1.6%	
Zinc	200.8	81	80	80	101%	100%	1.2%	

Reported in mg/kg-dry

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

3 September 2014

Heather Hirsch
Maul, Foster and Alongi, Inc
1329 North State Street, Suite 301
Bellingham, WA 98225

RE: Project: Northern State Hospital, 0624.04.02
ARI Job No.: YX19

Dear Heather:

Please find enclosed additional final reports for the samples from the project referenced above.

The reports for the BETX/NWTPH-G analyses were not included in the report mailed earlier this morning.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file YX19

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: MB-082814
METHOD BLANK

Lab Sample ID: MB-082814
LIMS ID: 14-17115
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Analyzed: 08/28/14 11:29
Instrument/Analyst: PID1/PKC

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	12	< 12 U
108-88-3	Toluene	12	< 12 U
100-41-4	Ethylbenzene	12	< 12 U
179601-23-1	m,p-Xylene	25	< 25 U
95-47-6	o-Xylene	12	< 12 U

			GAS ID
Gasoline Range Hydrocarbons	5.0	< 5.0 U	---

BETX Surrogate Recovery

Trifluorotoluene	83.9%
Bromobenzene	84.5%

Gasoline Surrogate Recovery

Trifluorotoluene	86.1%
Bromobenzene	85.5%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
TPHG by Method NWTPHG
Page 1 of 1

Sample ID: GP7-S-0.8
SAMPLE

Lab Sample ID: YX19F
LIMS ID: 14-17115
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Analyzed: 08/28/14 17:33
Instrument/Analyst: PID1/PKC

Purge Volume: 5.0 mL
Sample Amount: 92 mg-dry-wt
Percent Moisture: 8.8%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	14	< 14 U
108-88-3	Toluene	14	< 14 U
100-41-4	Ethylbenzene	14	< 14 U
179601-23-1	m,p-Xylene	27	< 27 U
95-47-6	o-Xylene	14	< 14 U

			GAS ID
Gasoline Range Hydrocarbons	5.4	< 5.4 U	---

BETX Surrogate Recovery

Trifluorotoluene	79.2%
Bromobenzene	81.2%

Gasoline Surrogate Recovery

Trifluorotoluene	81.2%
Bromobenzene	83.3%

BETX values reported in µg/kg (ppb)
Gasoline values reported in mg/kg (ppm)

GAS: Indicates the presence of gasoline or weathered gasoline.
GRO: Positive result that does not match an identifiable gasoline pattern.

Quantitation on total peaks in the gasoline range from Toluene to Naphthalene.

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod

Sample ID: LCS-082814
LAB CONTROL SAMPLE

Lab Sample ID: LCS-082814
LIMS ID: 14-17115
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 08/28/14 10:31
LCSD: 08/28/14 11:00
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	308	350	88.0%	312	350	89.1%	1.3%
Toluene	2310	2470	93.5%	2350	2470	95.1%	1.7%
Ethylbenzene	562	615	91.4%	579	615	94.1%	3.0%
m,p-Xylene	1850	2000	92.5%	1880	2000	94.0%	1.6%
o-Xylene	724	765	94.6%	738	765	96.5%	1.9%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	83.0%	87.8%
Bromobenzene	83.5%	89.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TPHG by Method NWTPHG

Sample ID: LCS-082814
LAB CONTROL SAMPLE

Lab Sample ID: LCS-082814
LIMS ID: 14-17115
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 08/28/14 10:31
LCSD: 08/28/14 11:00
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Gasoline Range Hydrocarbons	46.6	50.0	93.2%	45.8	50.0	91.6%	1.7%

Reported in mg/kg (ppm)

RPD calculated using sample concentrations per SW846.

TPHG Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	85.0%	89.7%
Bromobenzene	84.3%	90.7%

ANALYTICAL RESOURCES INCORPORATED

BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: YX19
Matrix: Soil

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02

Client ID	TFT	BBZ	TOT OUT
MB-082814	83.9%	84.5%	0
LCS-082814	83.0%	83.5%	0
LCSD-082814	87.8%	89.8%	0
GP7-S-0.8	79.2%	81.2%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(69-126)
(BBZ) = Bromobenzene	(80-120)	(49-143)

Log Number Range: 14-17115 to 14-17115

ANALYTICAL RESOURCES INCORPORATED

TPHG SOIL SURROGATE RECOVERY SUMMARY

ARI Job: YX19
Matrix: Soil

QC Report No: YX19-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02

Client ID	BFB	TFT	BBZ	TOT OUT
MB-082814	NA	86.1%	85.5%	0
LCS-082814	NA	85.0%	84.3%	0
LCSD-082814	NA	89.7%	90.7%	0
GP7-S-0.8	NA	81.2%	83.3%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(65-128)
(BBZ) = Bromobenzene	(80-120)	(52-149)

Log Number Range: 14-17115 to 14-17115

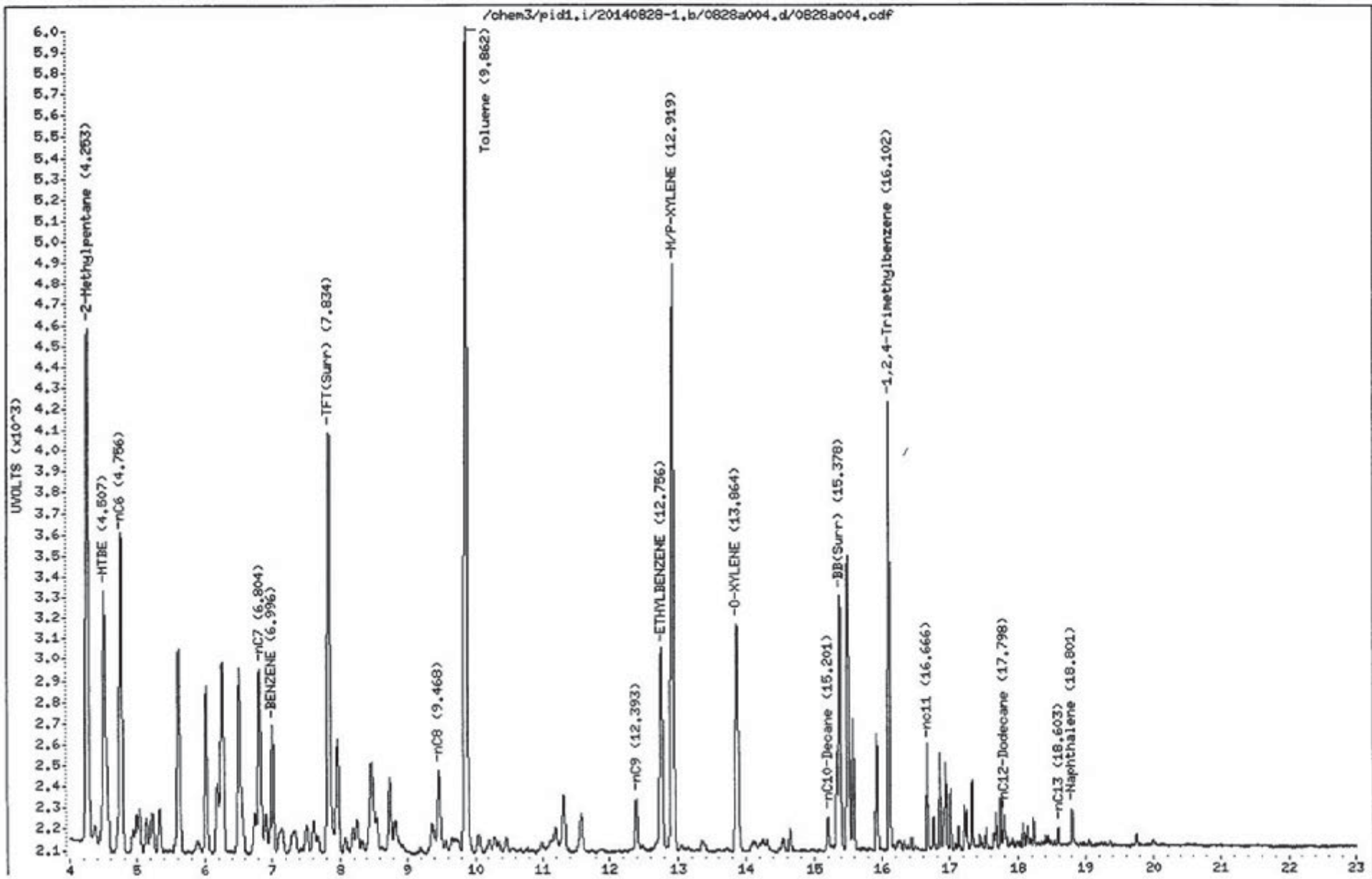
YX19-ADD.000037

Data File: /chem3/pid1.i/20140828-1.b/0828a004.d
Date : 28-AUG-2014 10:31
Client ID:
Sample Info: LCS0828

Instrument: pid1.i

Operator: LH/PC
Column diameter: 0.18

Column phase: RTX 502-2 FID



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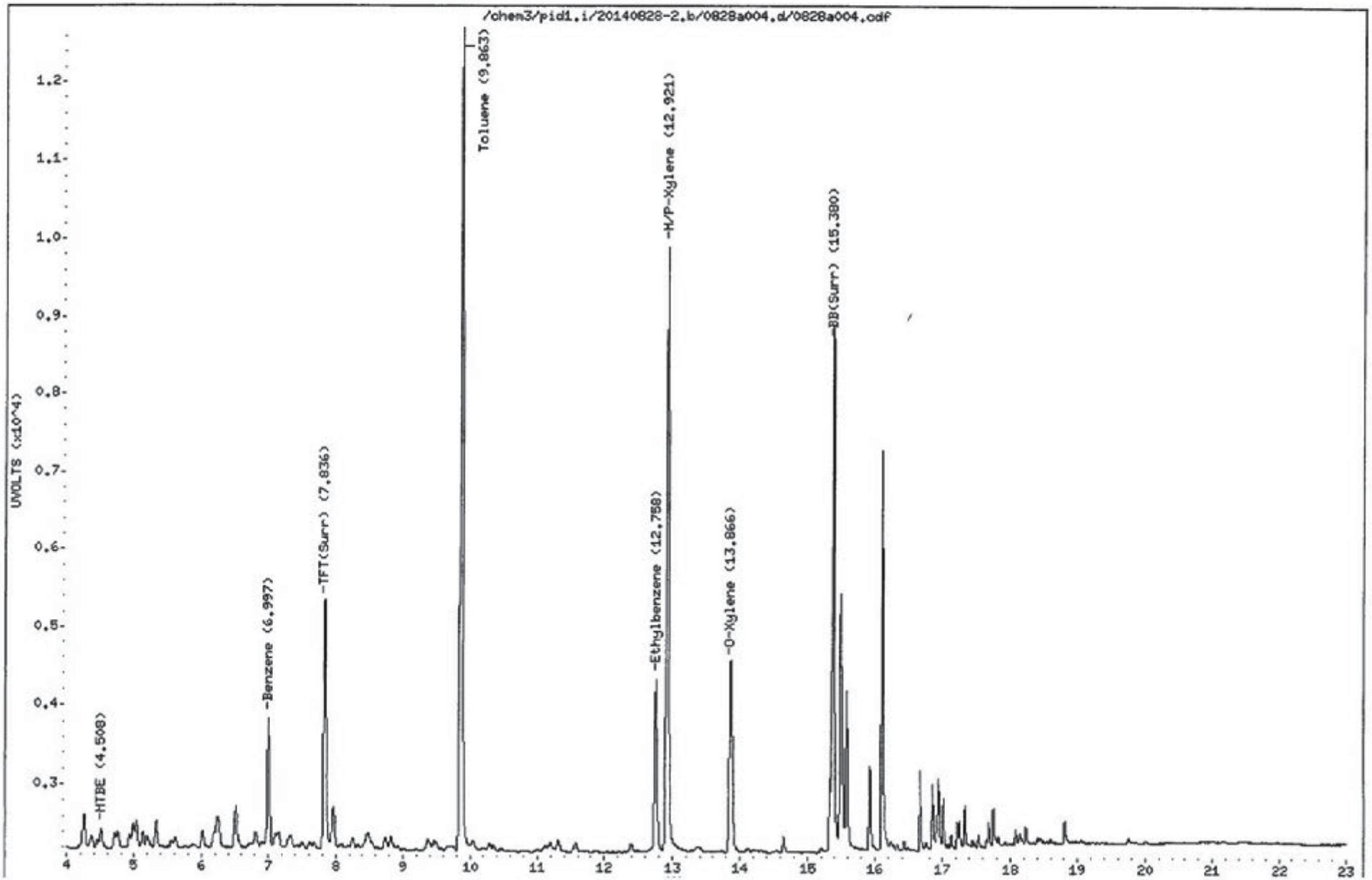
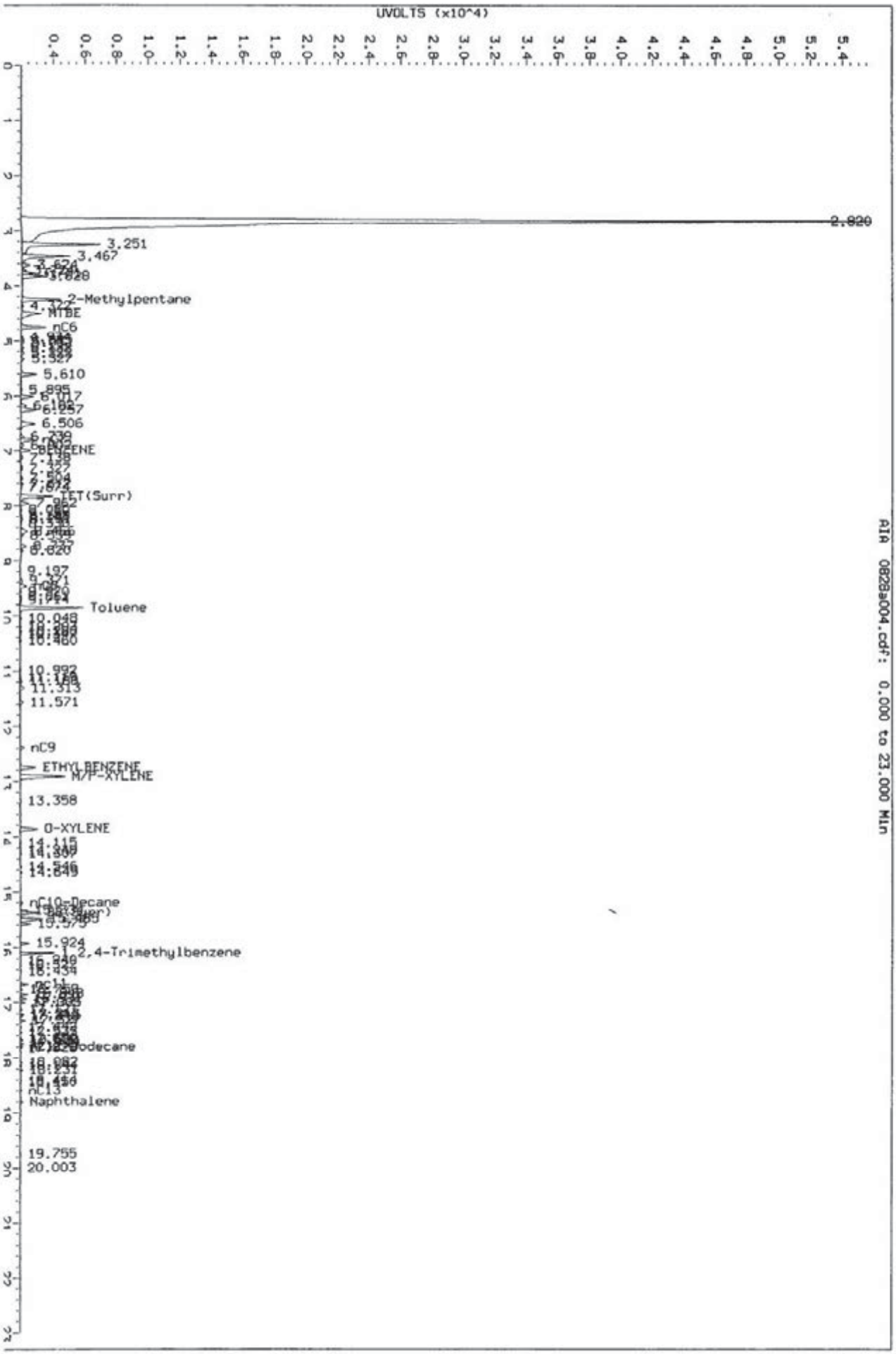
Date : 28-AUG-2014 10:31
Client ID:
Sample Info: LCS0828

Column phase: RTX 502-2 PID

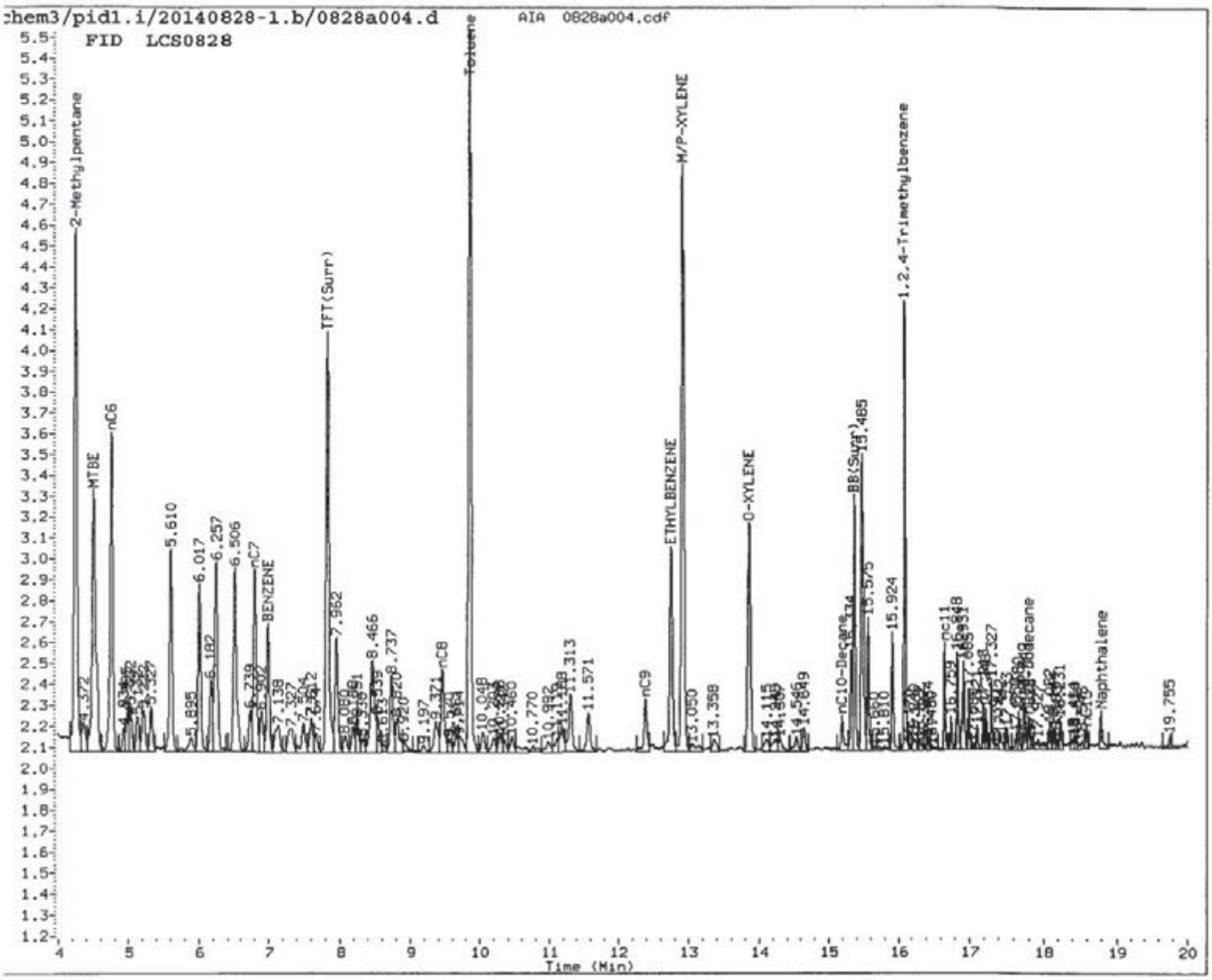
Instrument: pid1.i

Operator: LH/PC
Column diameter: 0.18




UVOLTS (x10^4)
Data File: /chem3/pid1.i/20140828-1.b/0828a004.d/0828a004.cdf
Injection Date: 28-AUG-2014 10:31
Instrument: pid1.i
Client Sample ID:
AIA 0828a004.cdf: 0.000 to 23.000 Min
2.820
3.251
3.467
2-Methylpentane
MTBE
nC6
5.610
6.506
BENZENE
TFT(Surr)
Toluene
nC9
ETHYLBENZENE
M/P-XYLENE
13.358
O-XYLENE
nC10-Decane
15.924
1,2,4-Trimethylbenzene
nC13
Naphthalene
19.755
20.003

KC 8/29/14



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: PC Date: 8/29/14

YX19-ADD.00011

Data File: /chem3/pid1.i/20140828-1.b/0828a005.d

Date : 28-AUG-2014 11:00

Client ID:

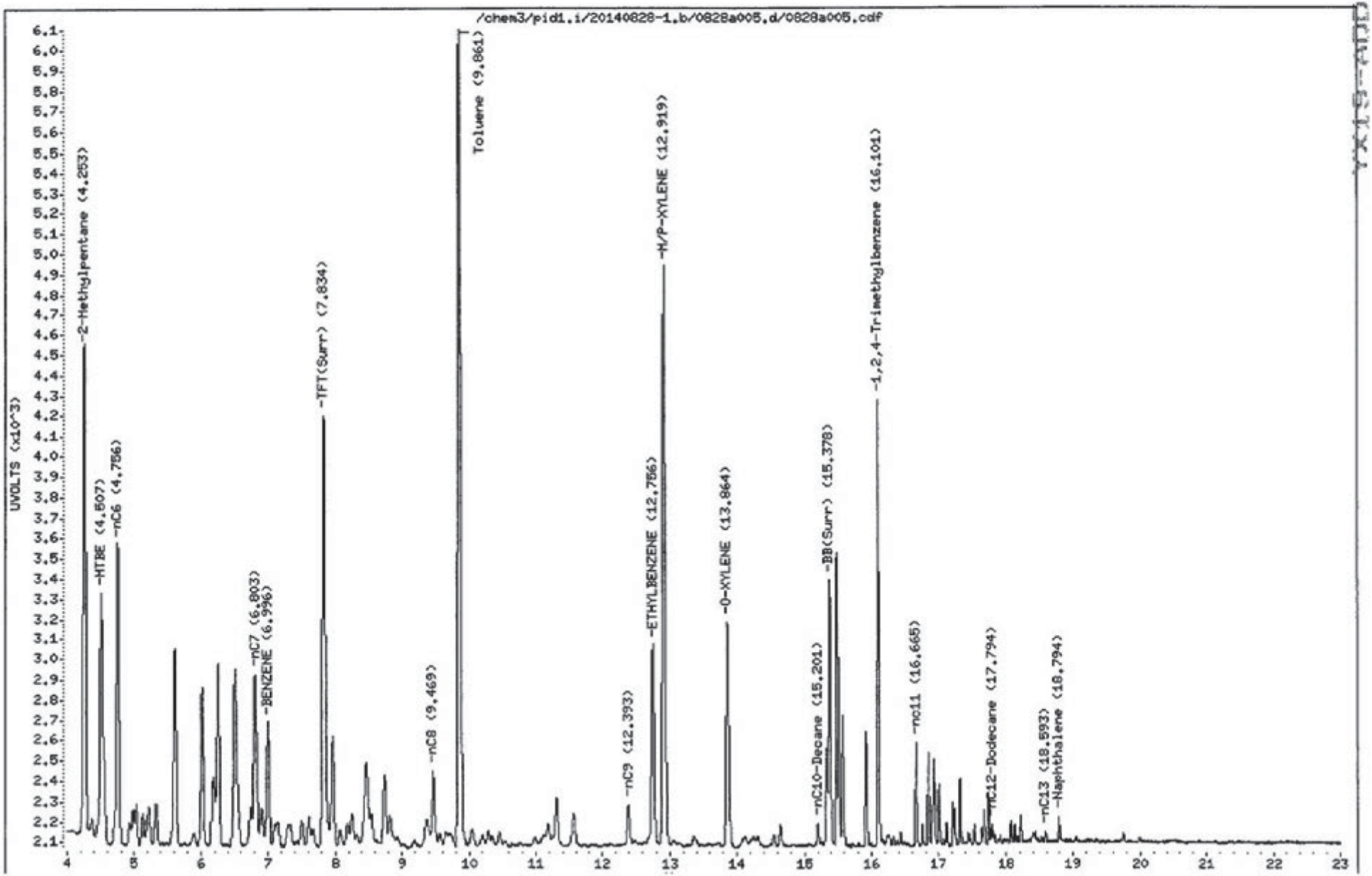
Sample Info: LCSD0828

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: LH/PC

Column diameter: 0.18

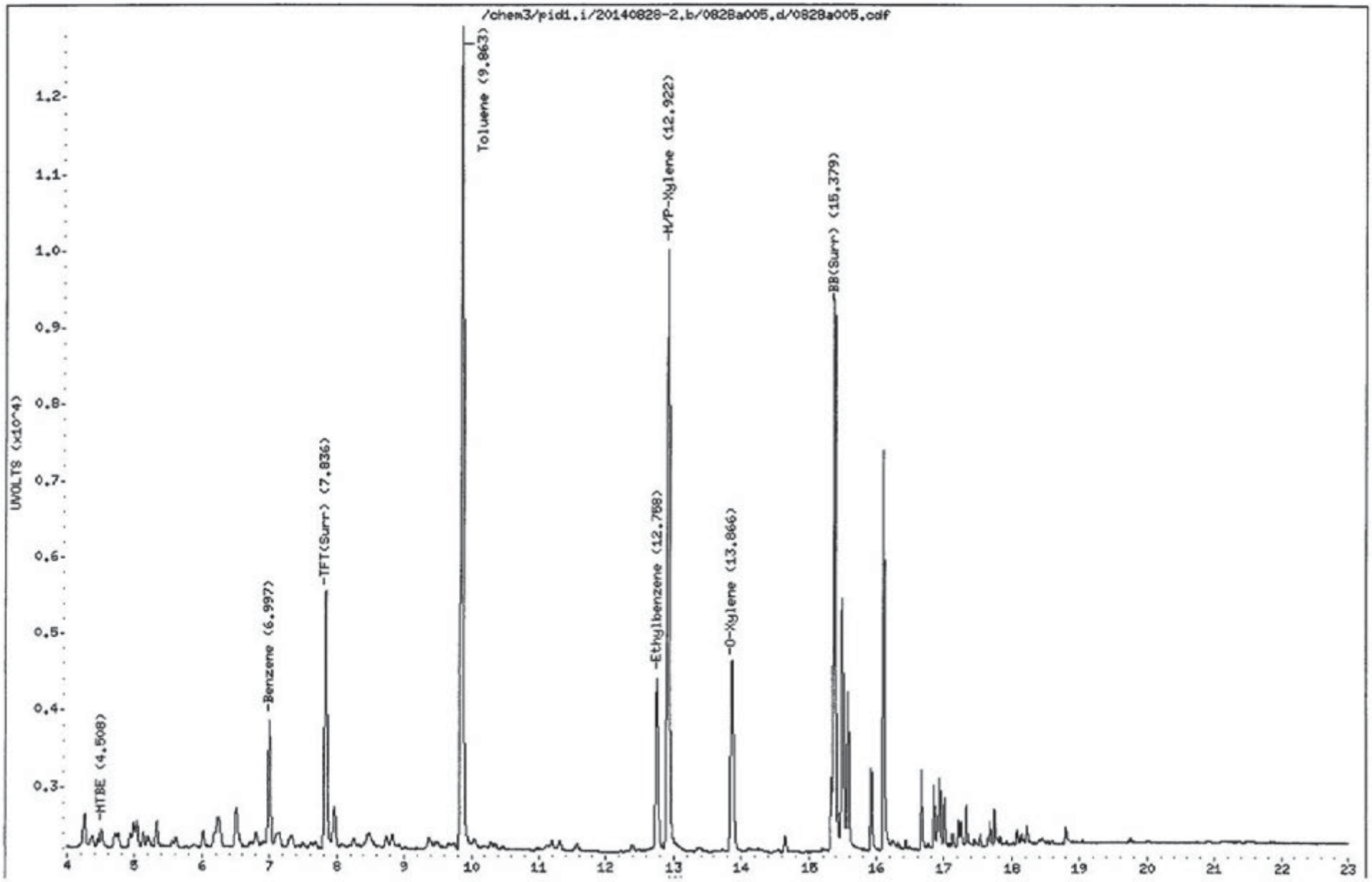


Data File: /chem3/pid1.i/20140828-2.b/0828a005.d
Date : 28-AUG-2014 11:00
Client ID:
Sample Info: LCSD0828

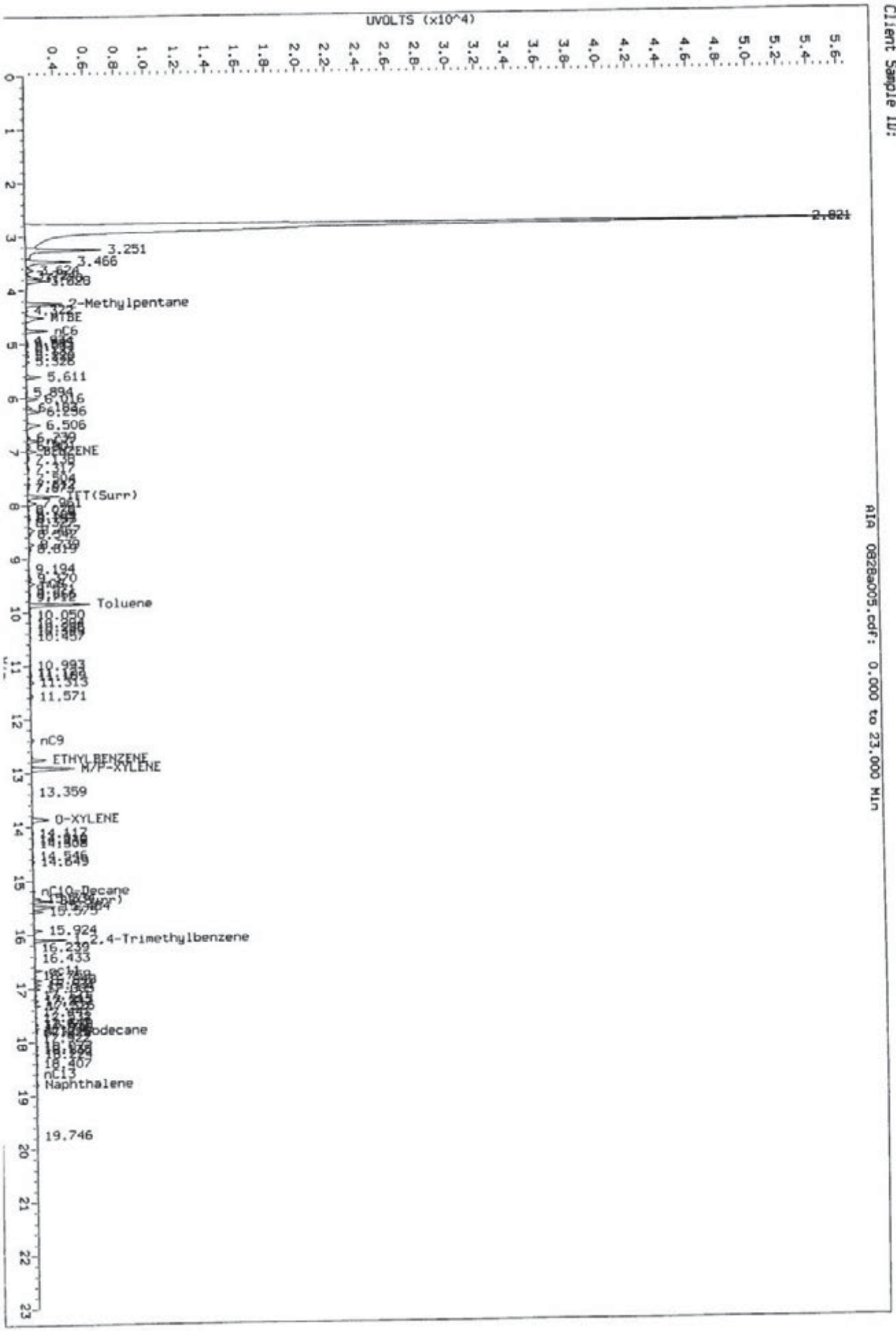
Column phase: RTX 502-2 PID

Instrument: pid1.i

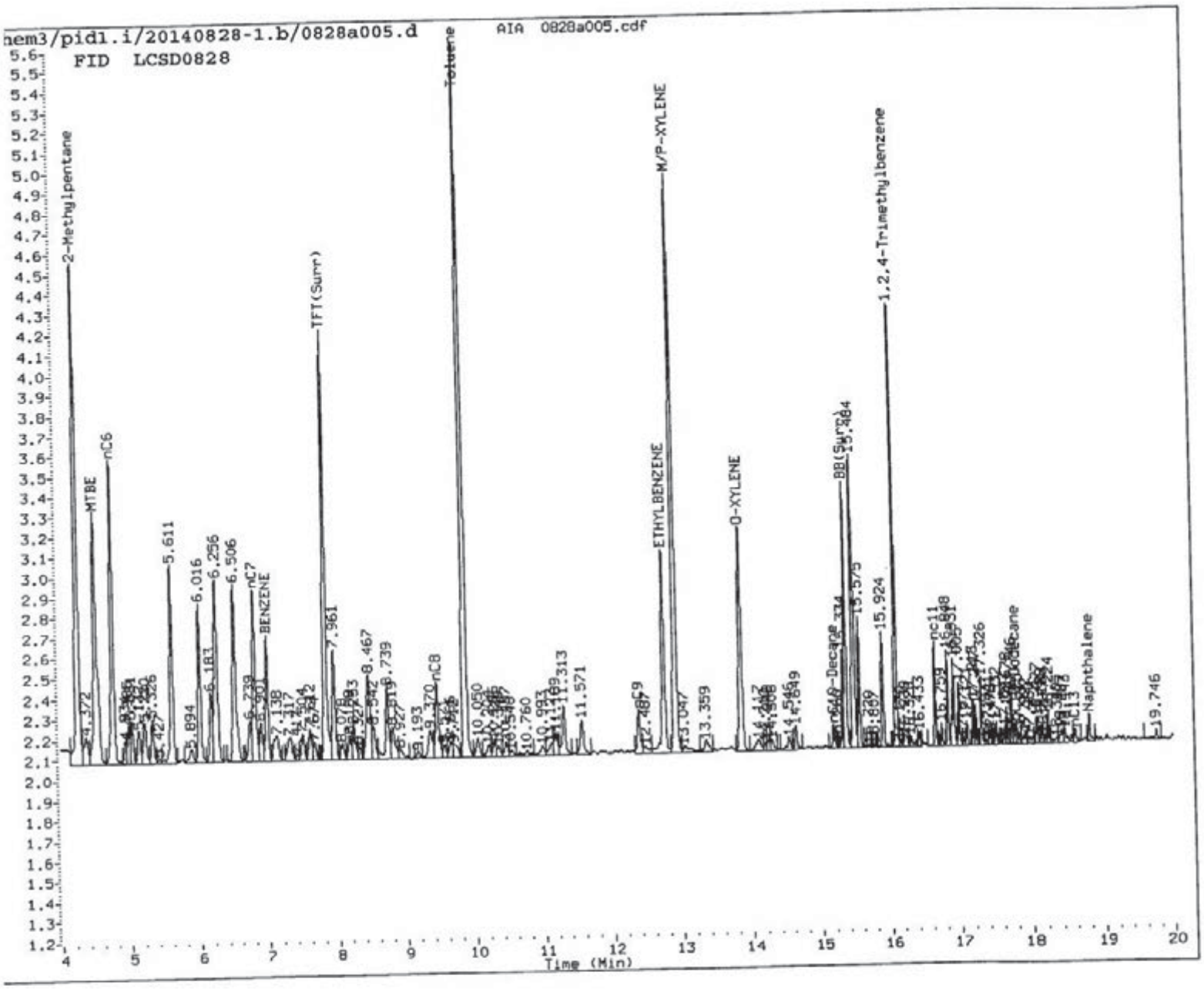
Operator: LH/PC
Column diameter: 0.18



RC
8/29/14



YX19-ADD:00014



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation

5. Other _____

Analyst: PC Date: 8/29/14

Data File: /chem3/pid1.i/20140828-1.b/0828a006.d

Date : 28-AUG-2014 11:29

Client ID:

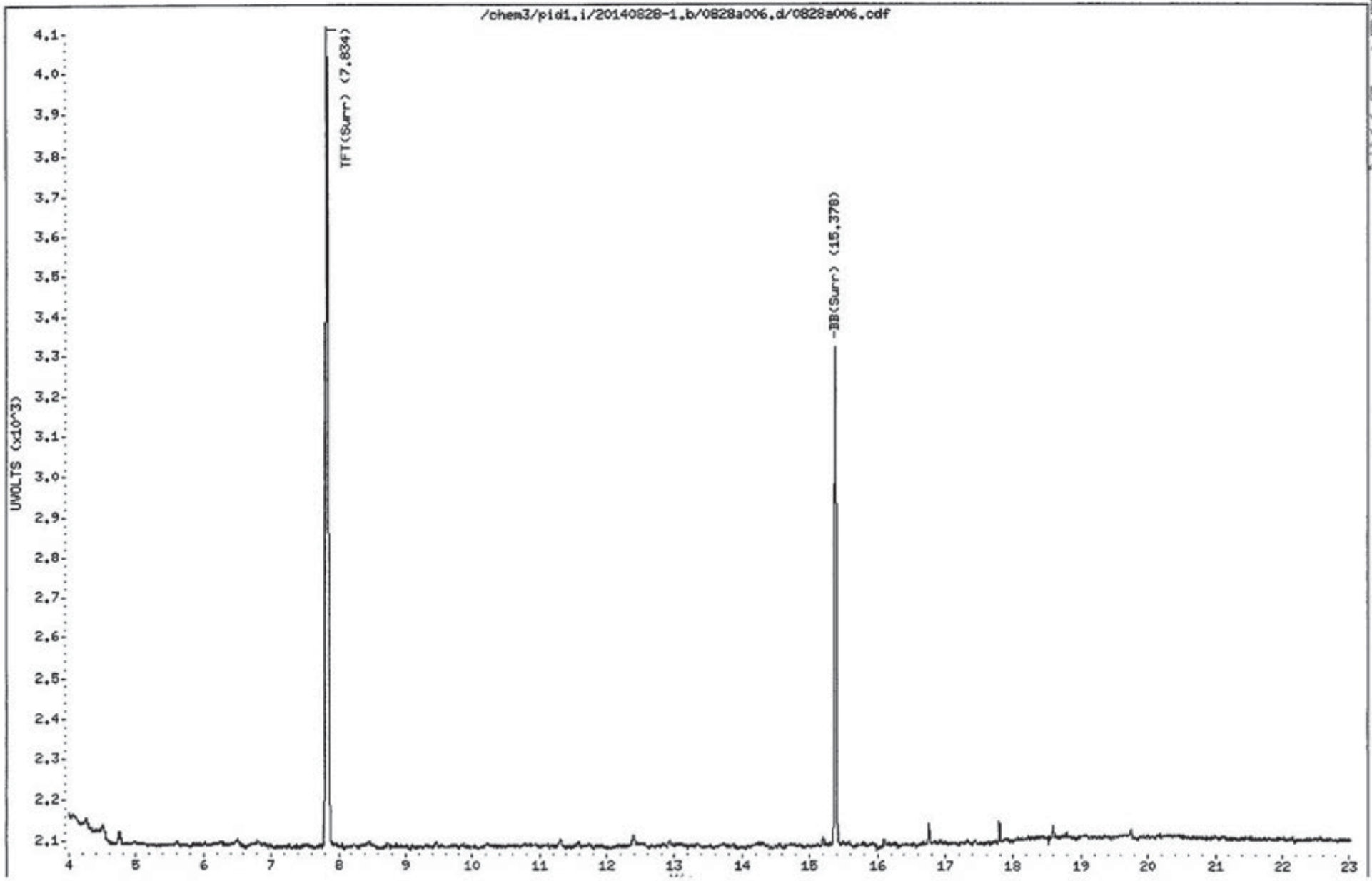
Sample Info: MB0828

Column phase: RTX 502-2 FID

Instrument: pid1.i

Operator: LH/PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140828-2.b/0828a006.d

Date : 28-AUG-2014 11:29

Client ID:

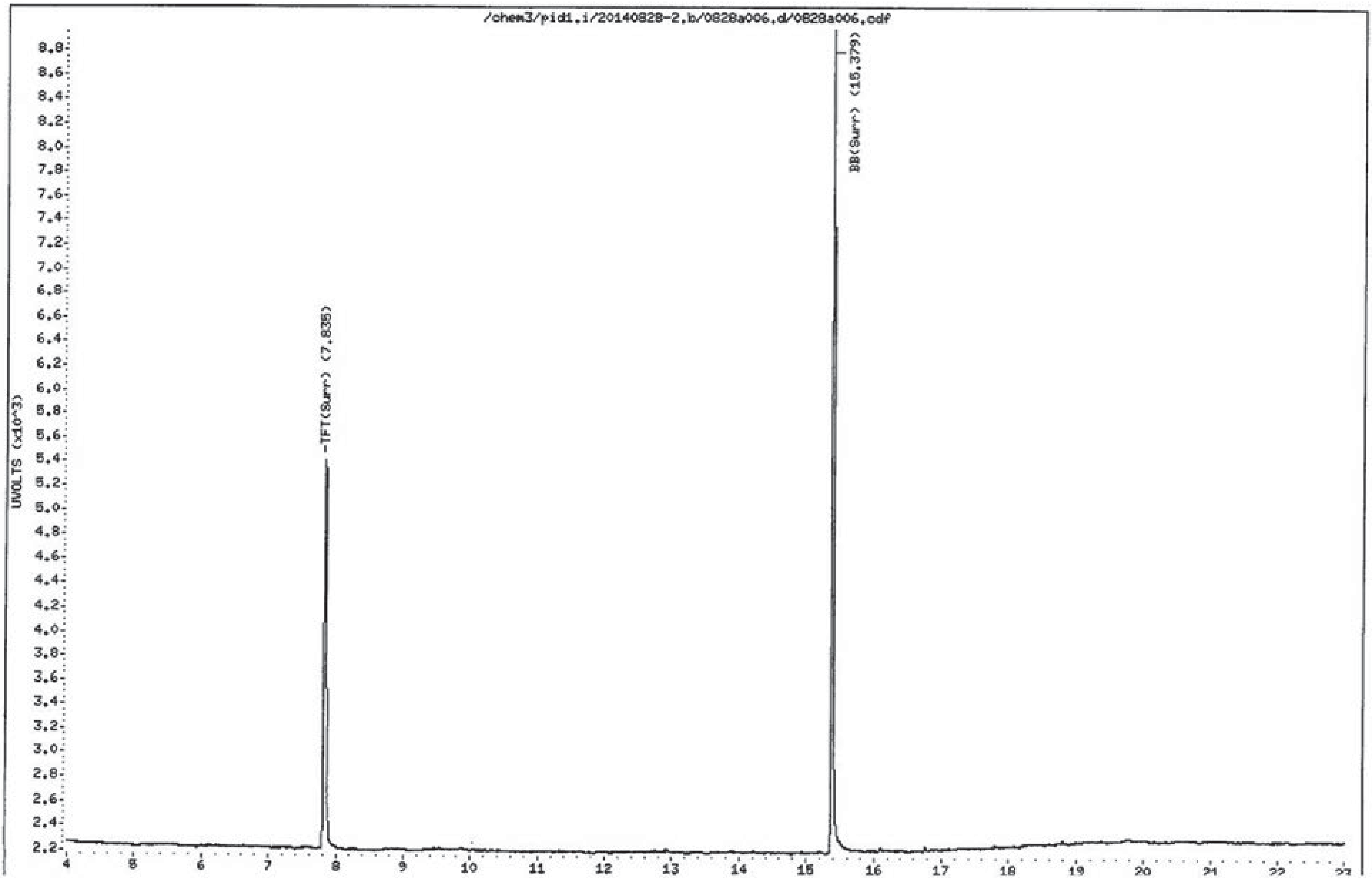
Sample Info: MB0828

Column phase: RTX 502-2 PID

Instrument: pid1.i

Operator: LH/PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140828-1.b/0828a016.d

Date : 28-AUG-2014 17:33

Client ID: GP7-S-0.8

Sample Info: YX19F

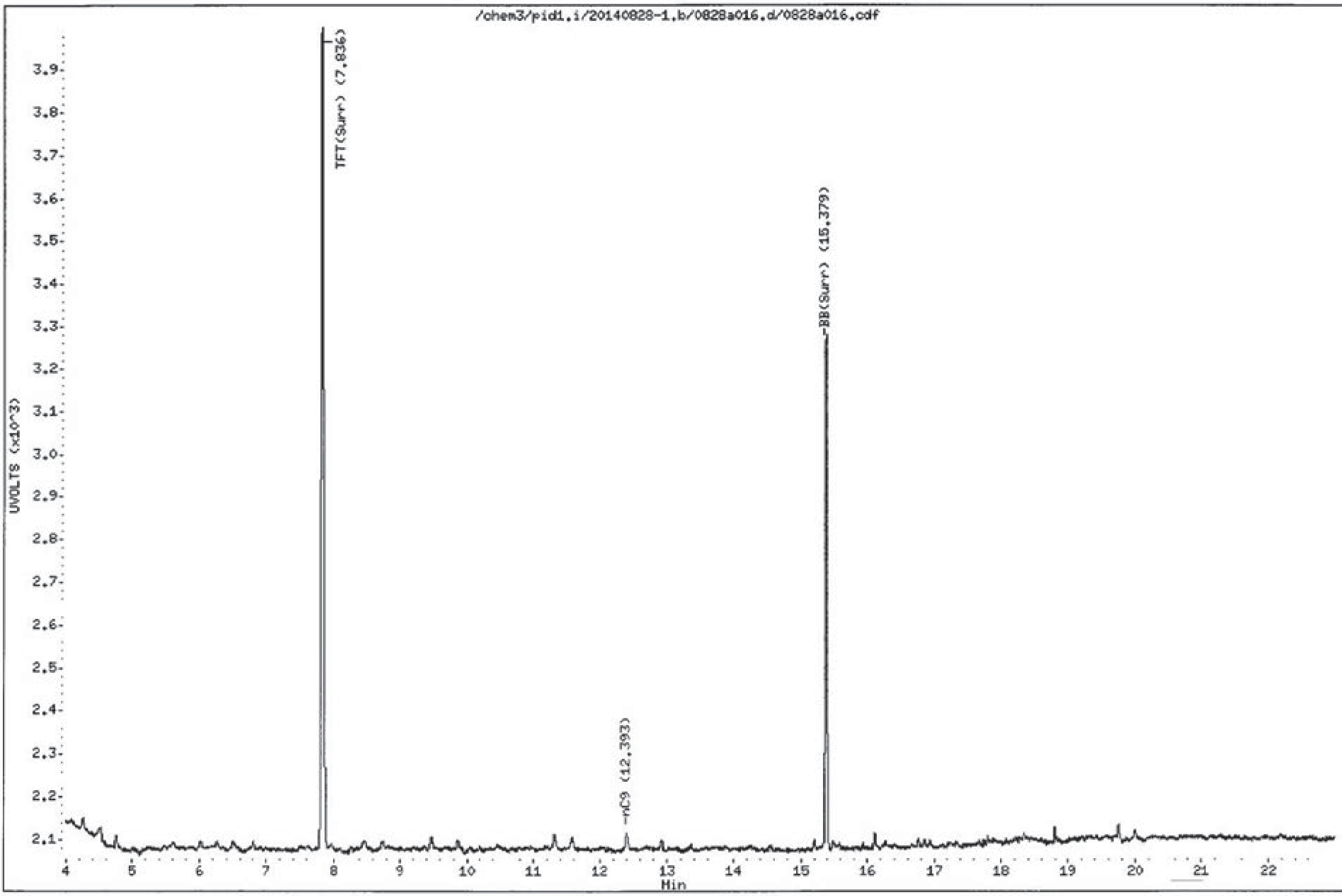
Column phase: RTX 502-2 FID

Page 1

Instrument: pid1.i

Operator: LH/PC

Column diameter: 0.18



Data File: /chem3/pid1.i/20140828-2.b/0828a016.d

Date : 28-AUG-2014 17:33

Client ID: GP7-S-0.8

Sample Info: YX19F

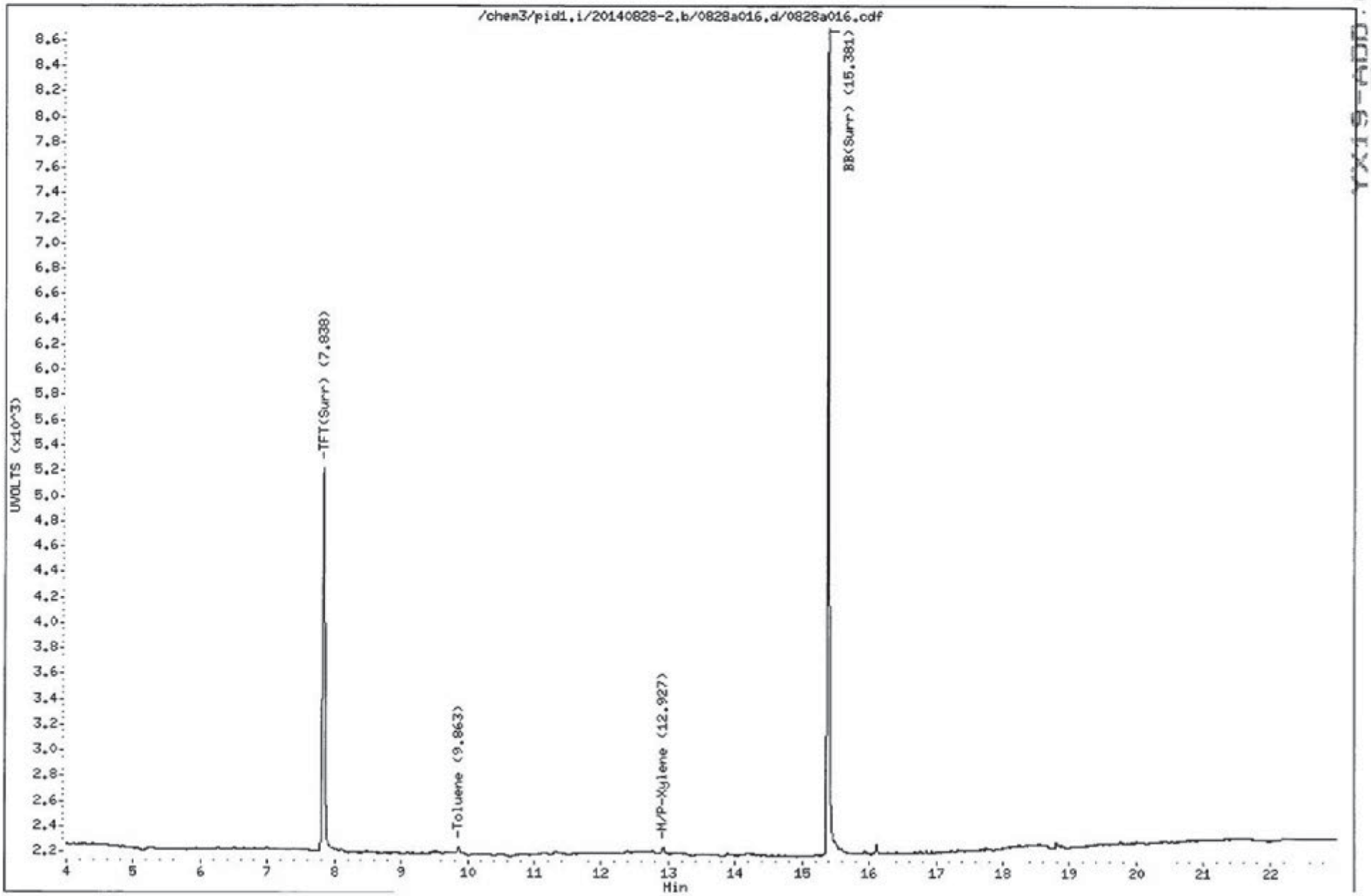
Column phase: RTX 502-2 PID

Instrument: pid1.i

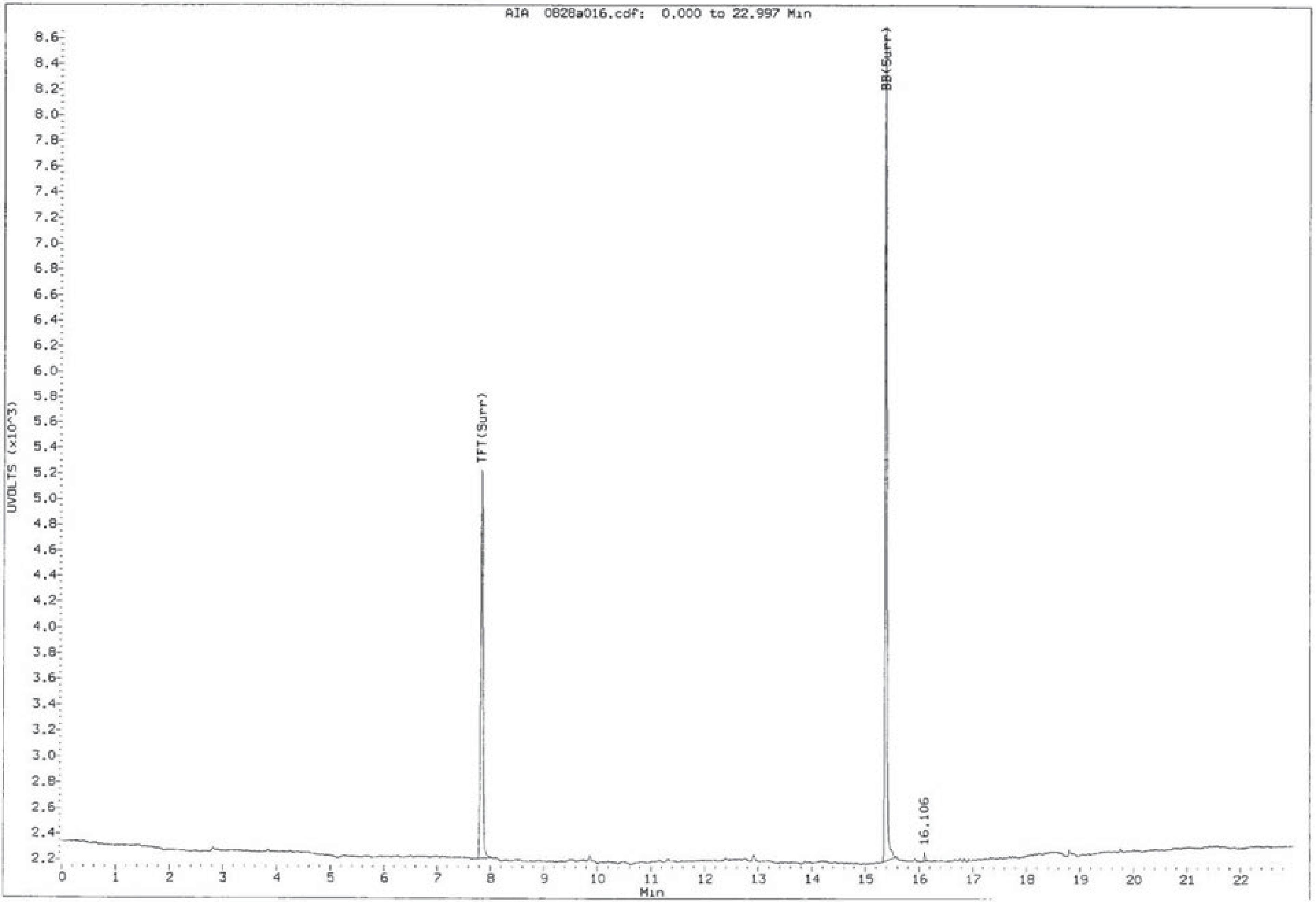
Operator: LH/PC

Column diameter: 0.18

YX19-ADD.000015

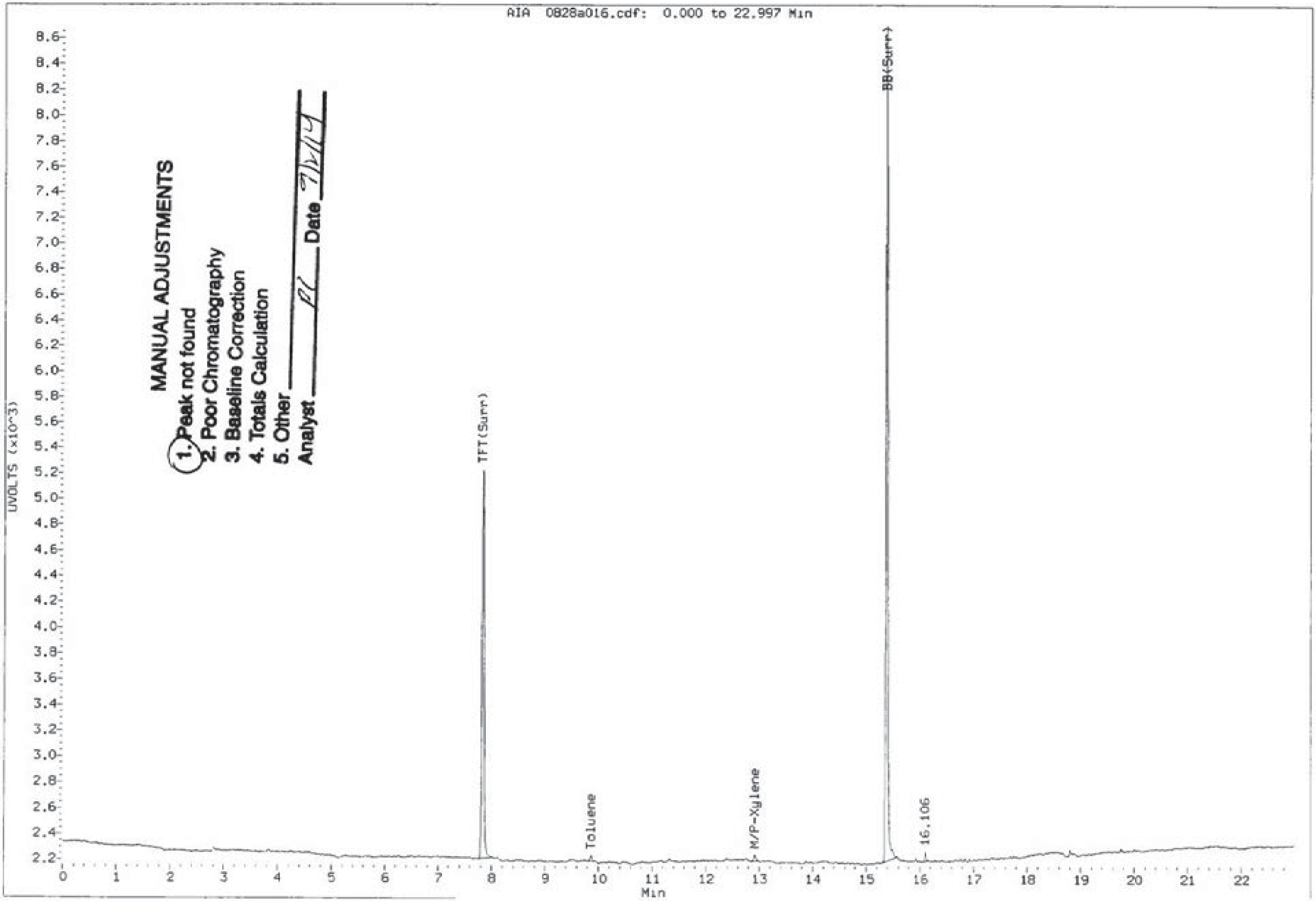


Data File: /chem3/pid1.i/20140828-2.b/0828a016.d/0828a016.cdf
Injection Date: 28-AUG-2014 17:33
Instrument: pid1.i
Client Sample ID: GP7-5-0.8



YX19-ADO:00020

Data File: /chem3/pid1.i/20140828-2.b/0828a016.d/0828a016.cdf
Injection Date: 28-AUG-2014 17:33
Instrument: pid1.i
Client Sample ID: GP7-S-0.8



MANUAL ADJUSTMENTS
1. Peak not found (circled)
2. Poor Chromatography
3. Baseline Correction
4. Totals Calculation
5. Other ______
Analyst PL Date 9/2/14

Analytical Resources, Incorporated
Analytical Chemists and Consultants

3 September 2014

Heather Hirsch
Maul, Foster and Alongi, Inc
1329 North State Street, Suite 301
Bellingham, WA 98225

RE: Project: Northern State Hospital, 0624.04.02
ARI Job No.: YX71

Dear Heather:

Please find enclosed the final results for the sample from the project referenced above. Analytical Resources, Inc. (ARI) originally received this sample on August 20, 2014. The sample was analyzed for NWTPH-Dx as instructed.

This analysis proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file YX71

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: YX71
Client: Maul Foster & Alongi
Project Event: 0624.04.02
Project Name: Northern State Hospital IPG

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	GP2-W-10.0	YX71A	14-17446	Water	08/19/14 11:10	08/20/14 11:25

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

YX71 : 00003

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

YX71 . 00004

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

YX71 . 00005

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3510C
Page 1 of 1

QC Report No: YX71-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Matrix: Water

Date Received: 08/20/14

Data Release Authorized: MW
Reported: 08/26/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DF	Range/Surrogate	RL	Result
MB-082114	Method Blank	08/21/14	08/21/14	1.00	Diesel Range	0.10	< 0.10 U
14-17446	HC ID: ---		FID9	1.0	Motor Oil Range	0.20	< 0.20 U
					o-Terphenyl		82.4%
YX71A	GP2-W-10.0	08/21/14	08/21/14	1.00	**Diesel Range**	**0.10**	**0.54**
14-17446	HC ID: **DRO/MOTOR OIL**		FID9	1.0	**Motor Oil Range**	**0.20**	**1.2**
					o-Terphenyl		71.5%

Reported in mg/L (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
RL-Reporting limit.

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: YX71-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Client ID	OTER	TOT OUT
MB-082114	82.4%	0
LCS-082114	81.5%	0
LCSD-082114	80.2%	0
GP2-W-10.0	71.5%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3510C
Log Number Range: 14-17446 to 14-17446

FORM-II TPHD

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-082114
LCS/LCSD

Lab Sample ID: LCS-082114
LIMS ID: 14-17446
Matrix: Water
Data Release Authorized:
Reported: 08/26/14

QC Report No: YX71-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 08/21/14

Date Analyzed LCS: 08/21/14 19:39
LCSD: 08/21/14 20:00
Instrument/Analyst LCS: FID9/JGR
LCSD: FID9/JGR

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	2.59	3.00	86.3%	2.59	3.00	86.3%	0.0%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	81.5%	80.2%

Results reported in mg/L
RPD calculated using sample concentrations per SW846.

FORM III

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

ARI Job: YX71
Matrix: Water
Project: Northern State Hospital IPG
Date Received: 08/20/14
0624.04.02

ARI ID	Client ID	Samp Amt	Final Vol	Prep Date
14-17446-082114MB1	Method Blank	500 mL	1.00 mL	08/21/14
14-17446-082114LCS1	Lab Control	500 mL	1.00 mL	08/21/14
14-17446-082114LCSD1	Lab Control Dup	500 mL	1.00 mL	08/21/14
14-17446-YX71A	GP2-W-10.0	500 mL	1.00 mL	08/21/14

Data File: /chem2/fid9.i/20140821.b/0821a019.d

Date : 21-AUG-2014 19:18

Client ID: YX18MBW1

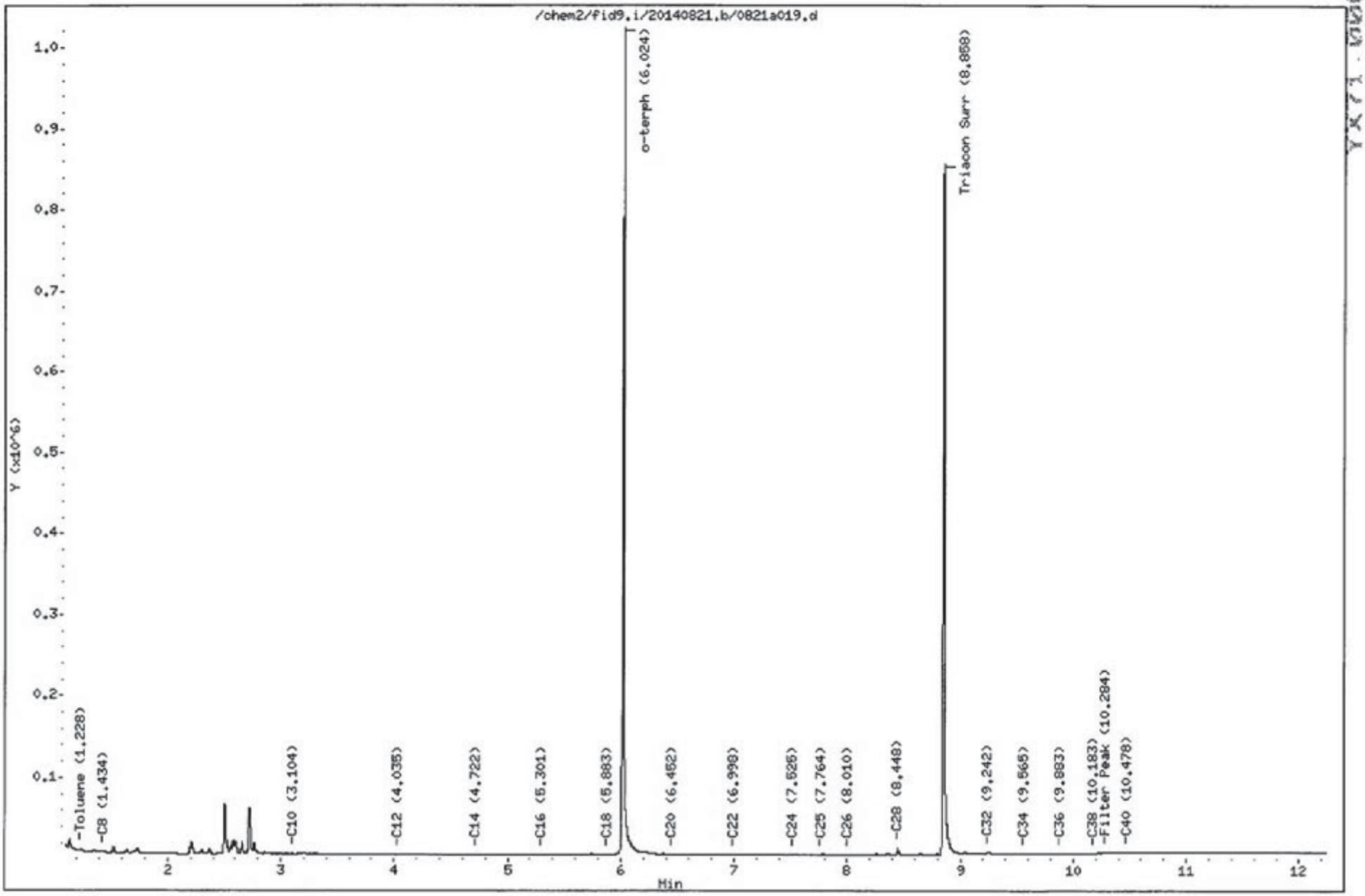
Sample Info: YX18MBW1

Column phase: RTX-1

Instrument: fid9.i

Operator: JR

Column diameter: 0.25



Data File: /chem2/fid9.i/20140821.b/0821a020.d

Date : 21-AUG-2014 19:39

Client ID: YX18LCSW1

Sample Info: YX18LCSW1

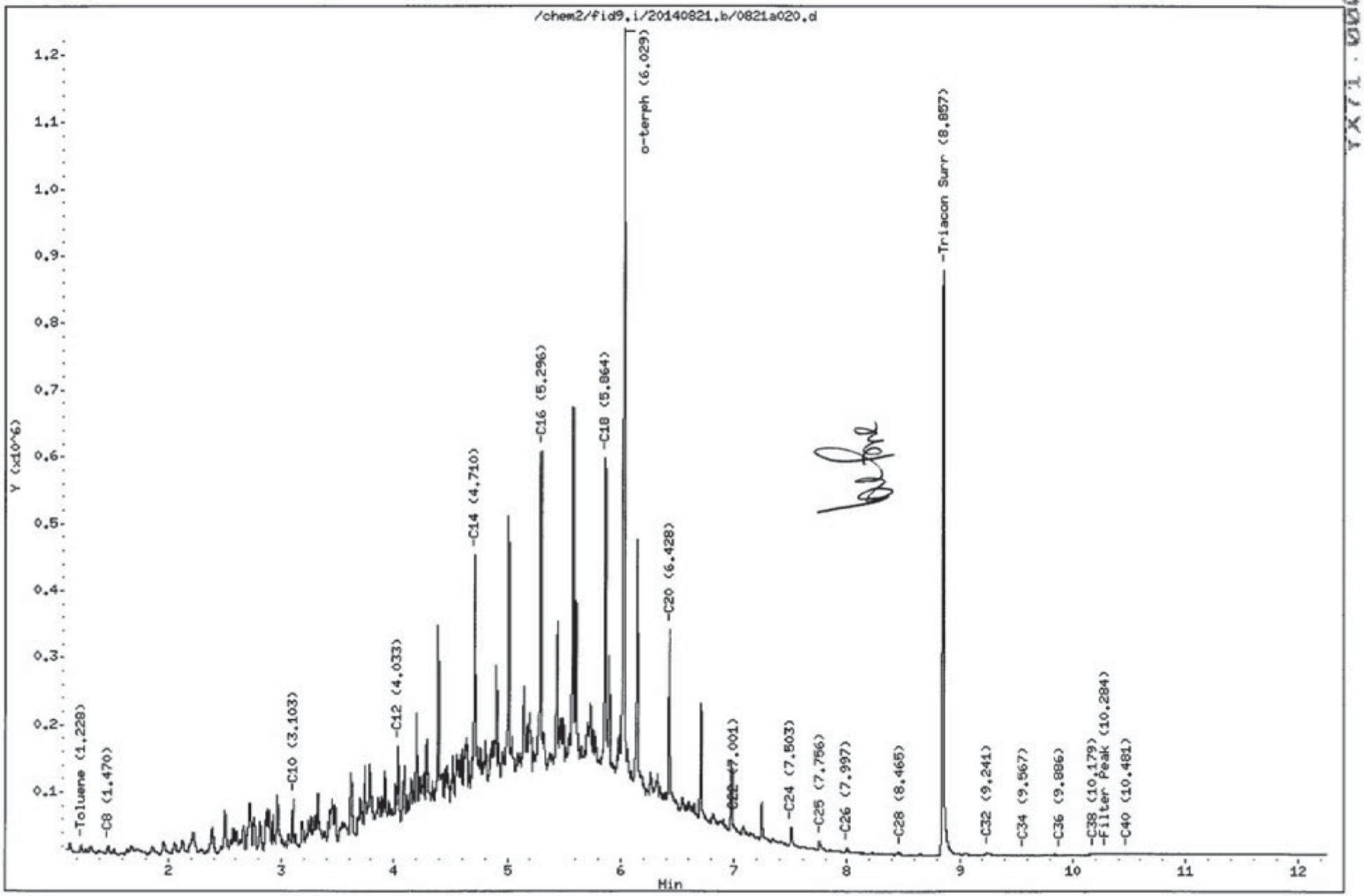
Instrument: fid9.i

Operator: JR

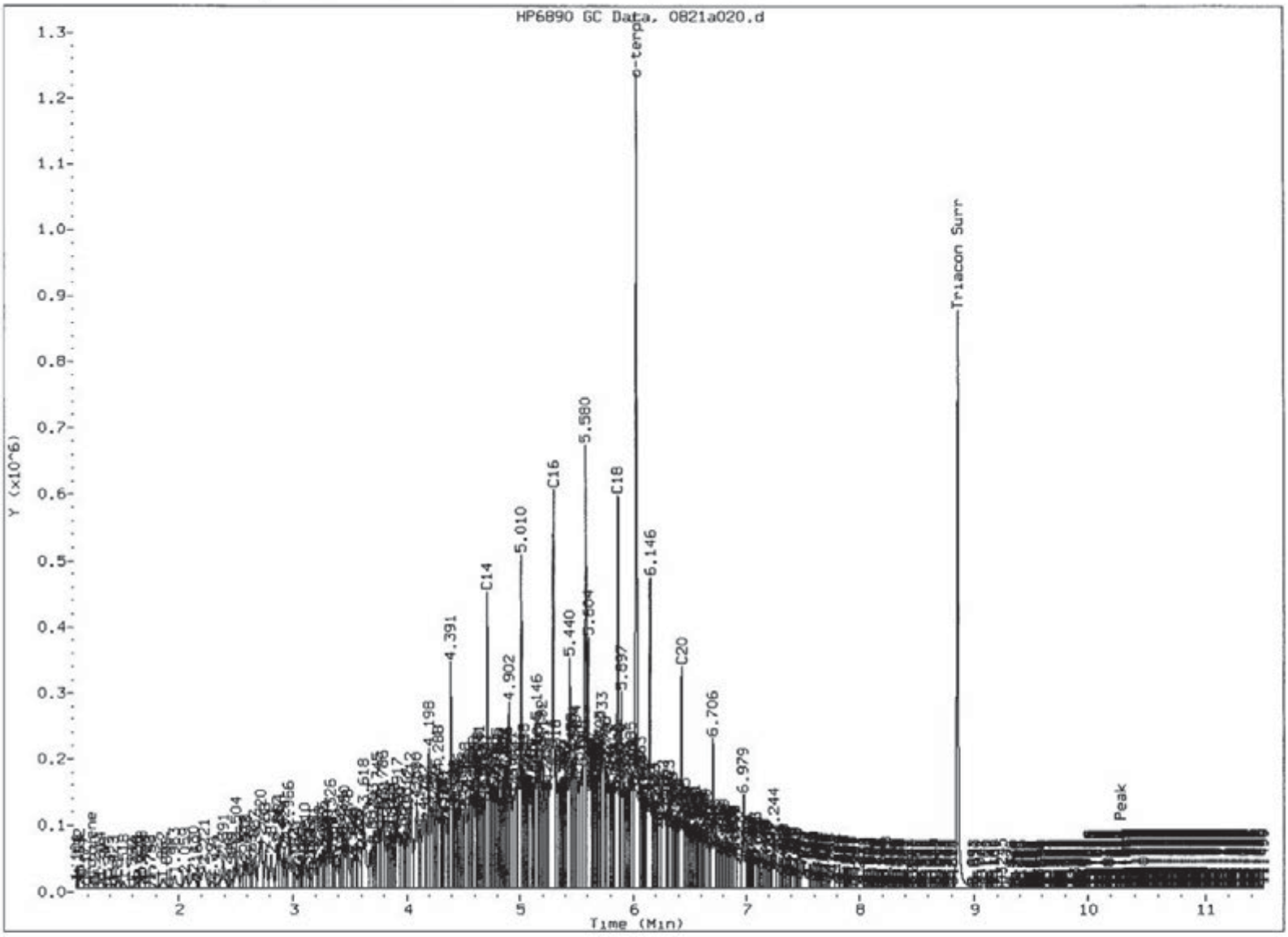
Column phase: RTX-1

Column diameter: 0.25

YX71-000111



FID:9A-2C/RTX-1 YX18LCSW1 FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

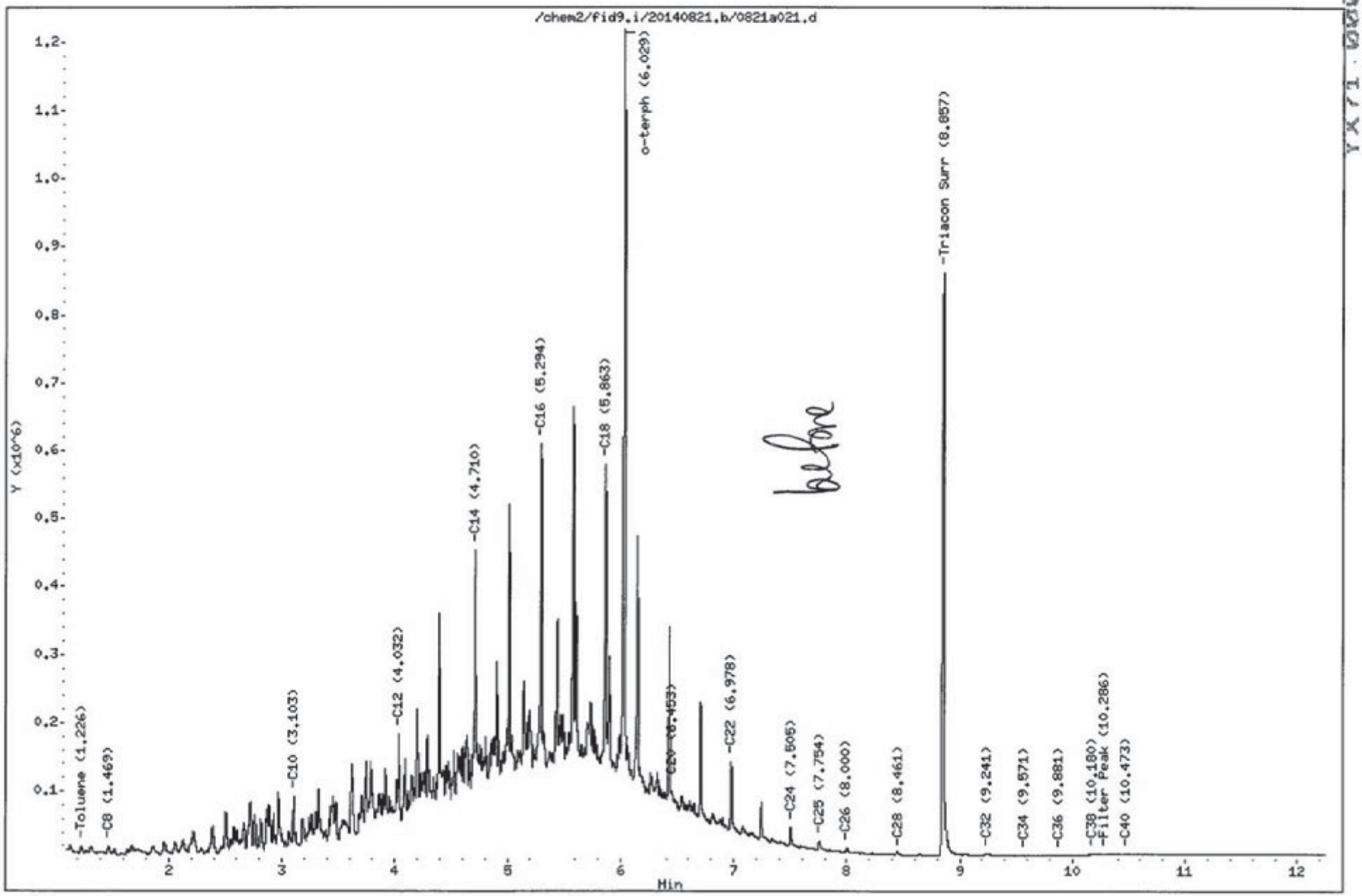
Analyst: _____ Date: 03/26/14

Data File: /chem2/fid9.i/20140821.b/0821a021.d
Date : 21-AUG-2014 20:00
Client ID: YX18LCSDW1
Sample Info: YX18LCSDW1

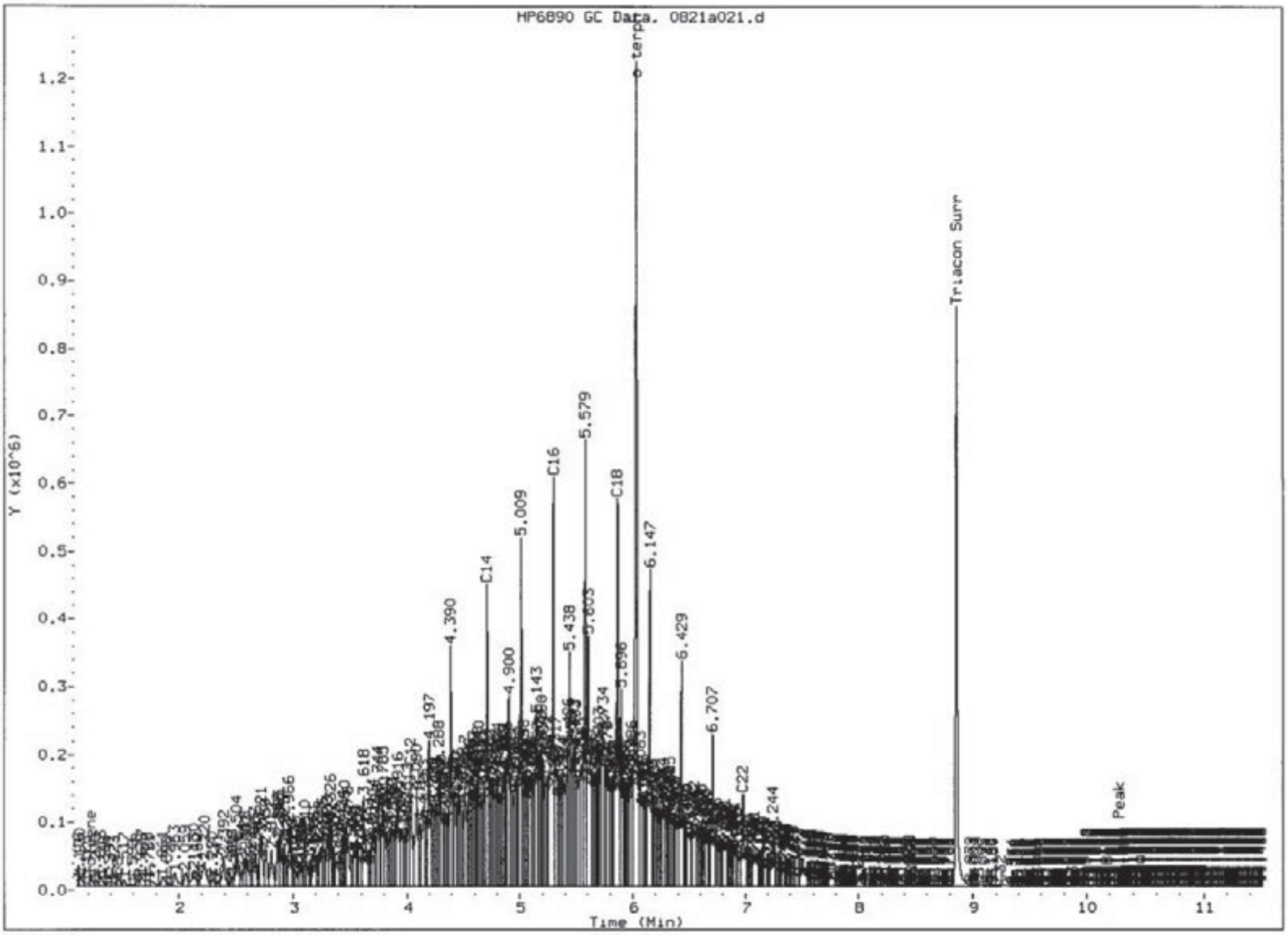
Instrument: fid9.i

Operator: JR
Column diameter: 0.25

Column phase: RTX-1



FID:9A-2C/RTX-1 YX18LCSDW1 FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

Analyst: _____ Date: 03/26/14

Data File: /chem2/fid9.i/20140821.b/0821a022.d

Date : 21-AUG-2014 20:21

Client ID: GP2-W-10.0

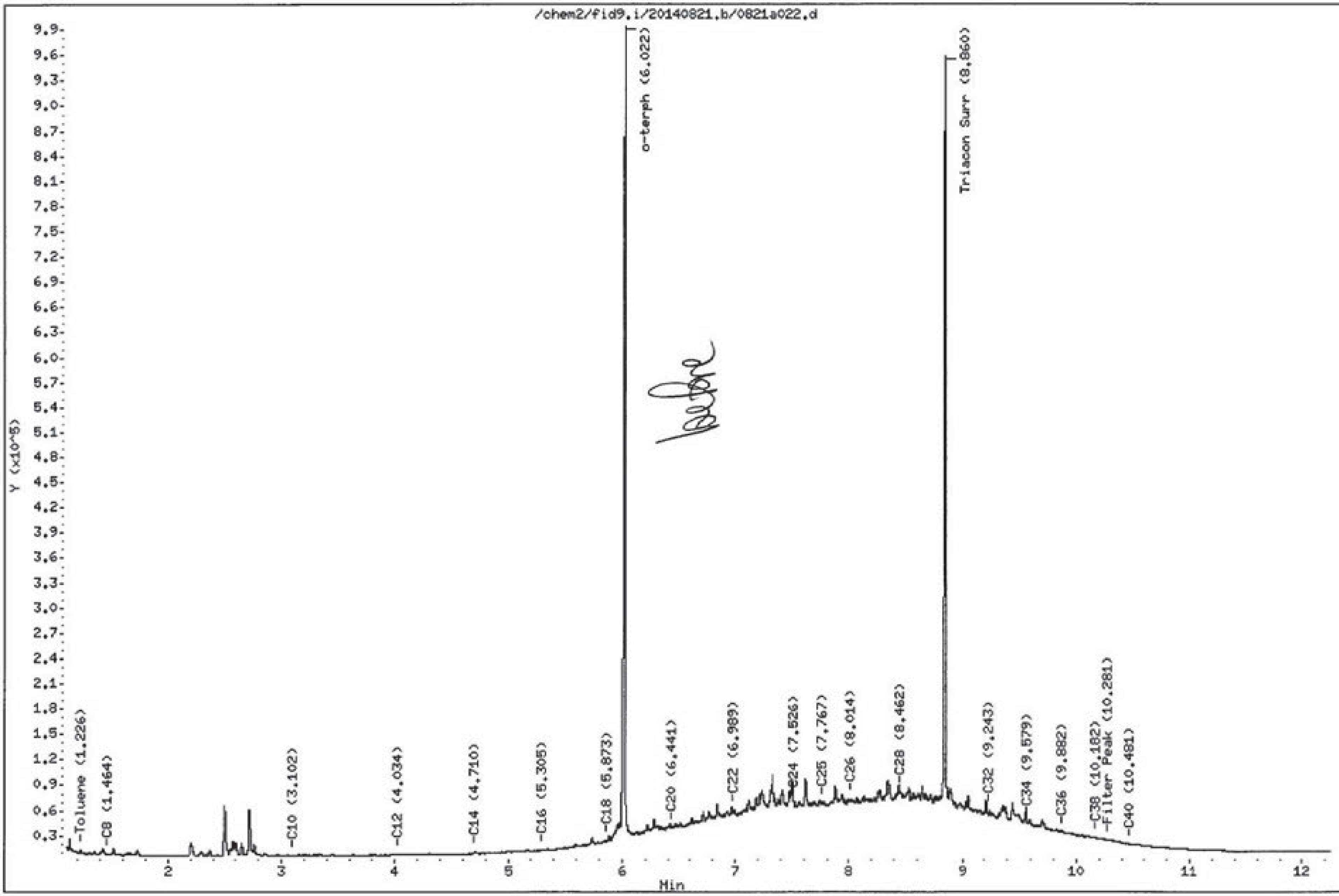
Sample Info: YX18A

Column phase: RTX-1

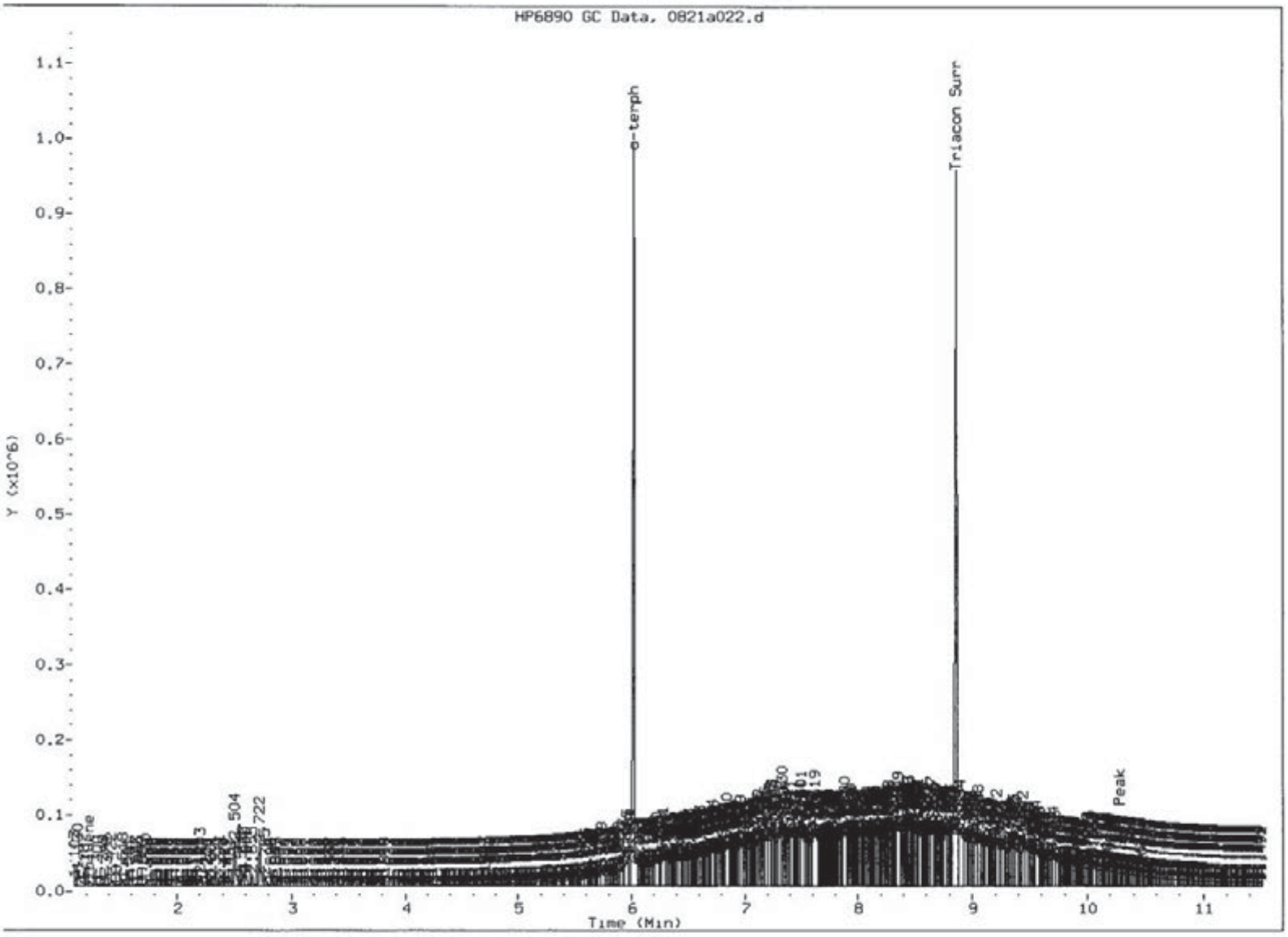
Instrument: fid9.i

Operator: JR

Column diameter: 0.25



FID:9A-2C/RTX-1 YX18A FID:9A SIGNAL



MANUAL INTEGRATION

1. Baseline correction
2. Poor chromatography
3. Peak not found
4. Totals calculation
5. Surrogate Skimmed

Analyst: JL Date: 08/26/14

Analytical Resources, Incorporated
Analytical Chemists and Consultants

3 September 2014

Heather Hirsch
Maul, Foster and Alongi, Inc
1329 North State Street, Suite 301
Bellingham, WA 98225

RE: Project: Northern State Hospital, 0624.04.02
ARI Job No.: YX72

Dear Heather:

Please find enclosed the final results for the samples from the project referenced above. These samples were originally received on August 20, 2014. These samples were analyzed for NWTPH-Dx as requested.

These analyses proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file YX72

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: YX72
Client: Maul Foster & Alongi
Project Event: 0624.04.02
Project Name: Northern State Hospital IPG

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	GP9-S-0.5	YX72A	14-17450	Soil	08/19/14 15:25	08/20/14 11:25
2.	GP10-S-0.5	YX72B	14-17451	Soil	08/19/14 15:40	08/20/14 11:25

YX72 00002

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

YXTZ:00003

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

YXTZ:00004

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

YXTZ.00005

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
TOTAL DIESEL RANGE HYDROCARBONS
NWTPHD by GC/FID
Extraction Method: SW3546
Page 1 of 1

QC Report No: YX72-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Matrix: Soil

Date Received: 08/20/14

Data Release Authorized:
Reported: 09/03/14

ARI ID	Sample ID	Extraction Date	Analysis Date	EFV DL	Range/Surrogate	LOQ	Result
MB-082914	Method Blank	08/29/14	09/02/14	1.00	Diesel Range	5.0	< 5.0 U
14-17450	HC ID: ---		FID3B	1.0	Motor Oil Range	10	< 10 U
					o-Terphenyl		91.3%
YX72A	GP9-S-0.5	08/29/14	09/02/14	5.00	**Diesel Range**	**150**	**220**
14-17450	HC ID: **DIESEL/MOTOR OIL**		FID3B	5.0	**Motor Oil Range**	**300**	**2,700**
					o-Terphenyl		67.2%
YX72B	GP10-S-0.5	08/29/14	09/02/14	5.00	**Diesel Range**	**170**	**220**
14-17451	HC ID: **DIESEL/MOTOR OIL**		FID3B	5.0	**Motor Oil Range**	**340**	**2,300**
					o-Terphenyl		82.8%

Reported in mg/kg (ppm)

EFV-Effective Final Volume in mL.
DL-Dilution of extract prior to analysis.
LOQ-Limit of Quantitation

Diesel range quantitation on total peaks in the range from C12 to C24.
Motor Oil range quantitation on total peaks in the range from C24 to C38.
HC ID: DRO/RRO indicates results of organics or additional hydrocarbons in ranges are not identifiable.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPHD by GC/FID
Page 1 of 1

Sample ID: LCS-082914
LCS/LCSD

Lab Sample ID: LCS-082914
LIMS ID: 14-17450
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX72-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 08/29/14

Date Analyzed LCS: 09/02/14 17:52
LCSD: 09/02/14 18:17

Instrument/Analyst LCS: FID3B/JLW
LCSD: FID3B/JLW

Sample Amount LCS: 10.0 g-dry-wt
LCSD: 10.0 g-dry-wt

Final Extract Volume LCS: 1.0 mL
LCSD: 1.0 mL

Dilution Factor LCS: 1.00
LCSD: 1.00

Range	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Diesel	137	150	91.3%	134	150	89.3%	2.2%

TPHD Surrogate Recovery

	LCS	LCSD
o-Terphenyl	89.5%	85.4%

Results reported in mg/kg
RPD calculated using sample concentrations per SW846.

ANALYTICAL RESOURCES INCORPORATED

TOTAL DIESEL RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Soil
Date Received: 08/20/14

ARI Job: YX72
Project: Northern State Hospital IPG
0624.04.02

ARI ID	Client ID	Client Amt	Final Vol	Basis	Prep Date
14-17450-082914MB1	Method Blank	10.0 g	1.00 mL	-	08/29/14
14-17450-082914LCS1	Lab Control	10.0 g	1.00 mL	-	08/29/14
14-17450-082914LCSD1	Lab Control Dup	10.0 g	1.00 mL	-	08/29/14
14-17450-YX72A	GP9-S-0.5	8.28 g	5.00 mL	D	08/29/14
14-17451-YX72B	GP10-S-0.5	7.45 g	5.00 mL	D	08/29/14

Basis: D=Dry Weight W=As Received

ANALYTICAL RESOURCES INCORPORATED

TPHD SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: YX72-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Client ID	OTER	TOT OUT
082914MBS	91.3%	0
082914LCS	89.5%	0
082914LCSD	85.4%	0
GP9-S-0.5	67.2%	0
GP10-S-0.5	82.8%	0

	LCS/MB LIMITS	QC LIMITS
(OTER) = o-Terphenyl	(50-150)	(50-150)

Prep Method: SW3546
Log Number Range: 14-17450 to 14-17451

FORM-II TPHD

YX72.00005

Data File: /chem3/fid3b.i/20140902.b/09020015.d

Date : 02-SEP-2014 17:26

Client ID: YX72MBS1

Sample Info: YX72MBS1

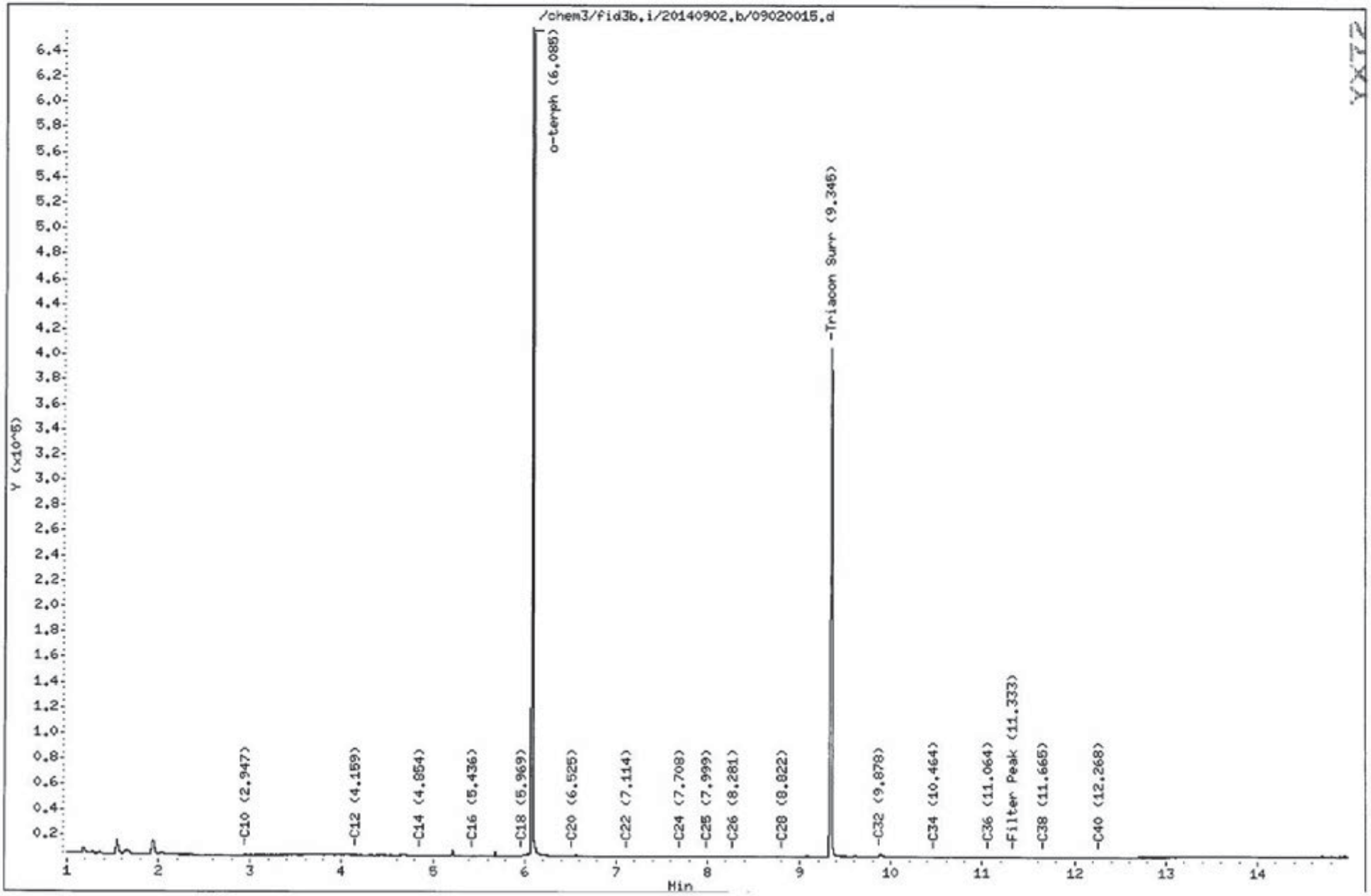
Column phase: RTX-1

Instrument: fid3b.i

Operator: JW

Column diameter: 0.25

YX72 09020015



Data File: /chem3/fid3b.i/20140902.b/09020016.d

Date : 02-SEP-2014 17:52

Client ID: YX72LCSS1

Sample Info: YX72LCSS1

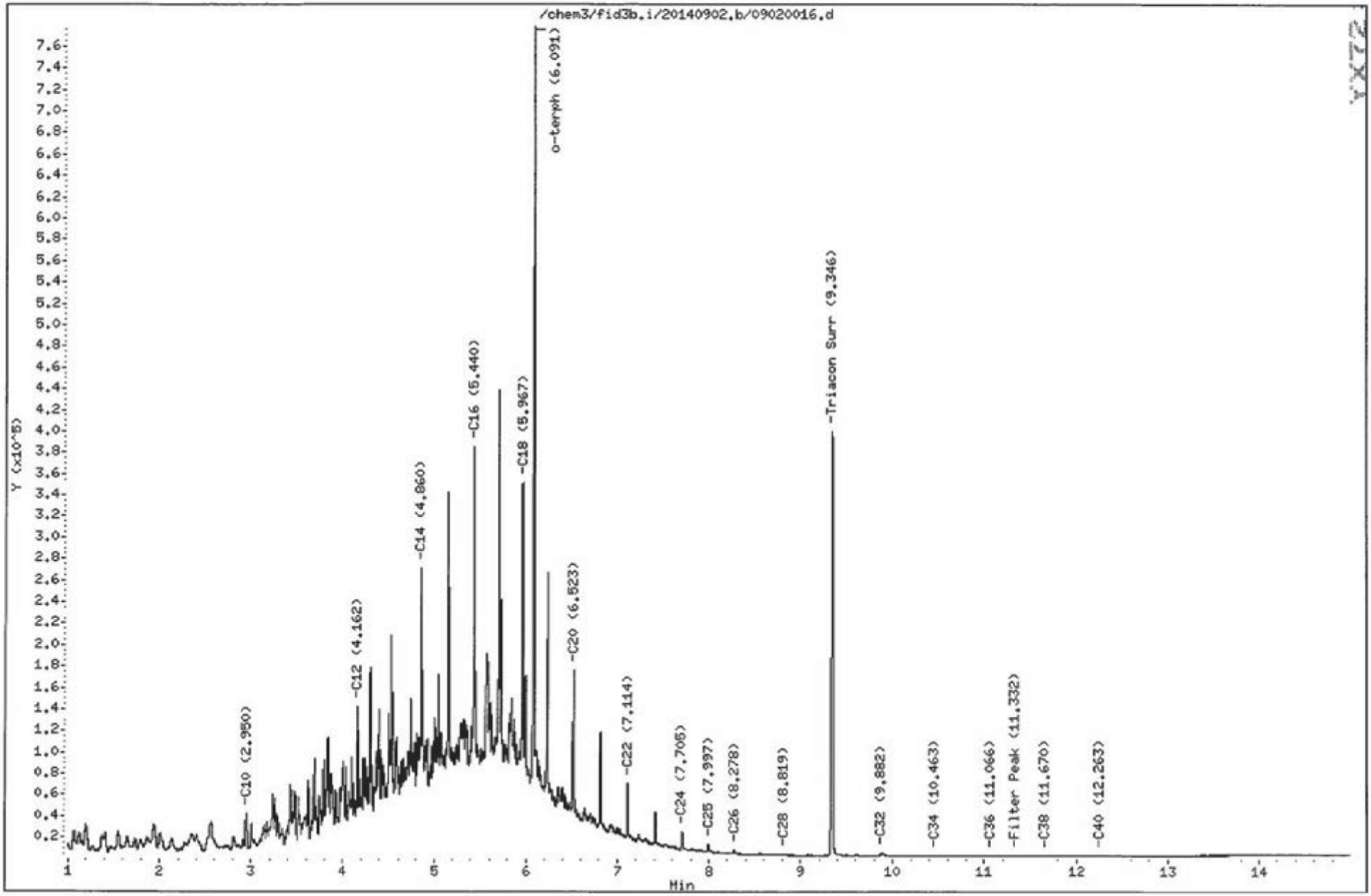
Column phase: RTX-1

Instrument: fid3b.i

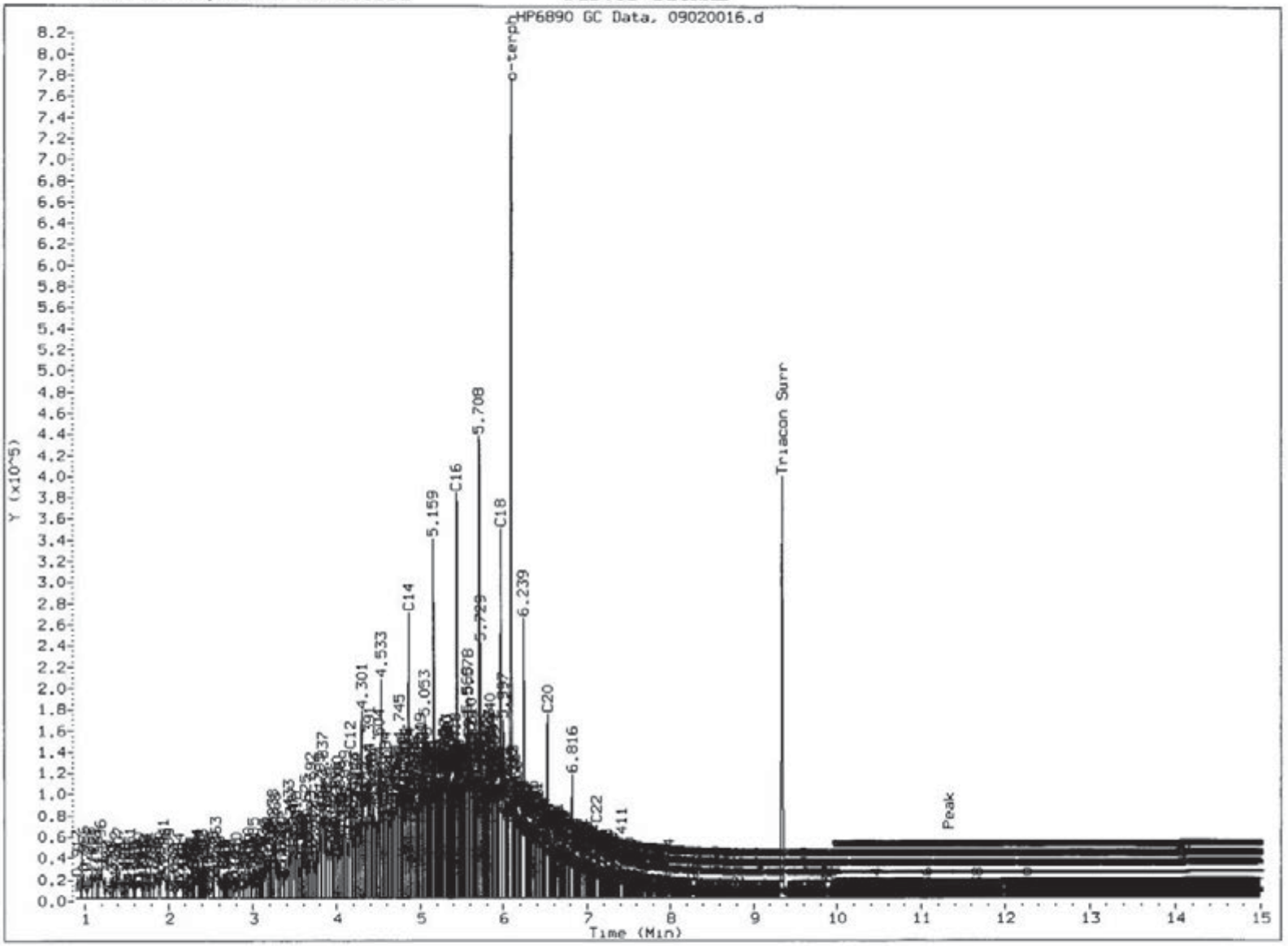
Operator: JW

Column diameter: 0.25

YX72 09020016.d



FID:3B-2C/RTX-1 YX72LCSS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: JW Date: 9/3/14

Data File: /chem3/fid3b.i/20140902.b/09020017.d

Date : 02-SEP-2014 18:17

Client ID: YX72LCSDS1

Sample Info: YX72LCSDS1

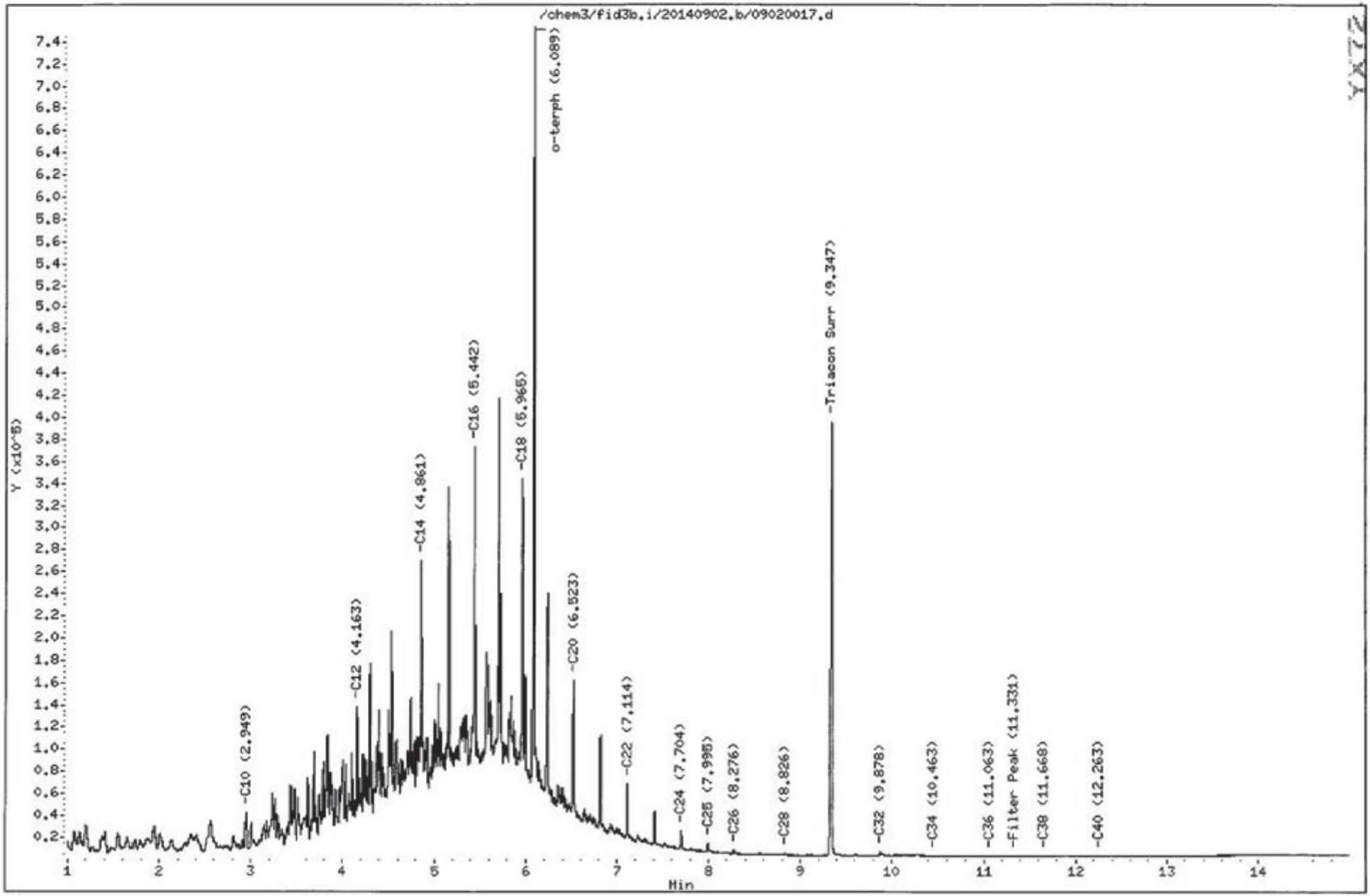
Column phase: RTX-1

Instrument: fid3b.i

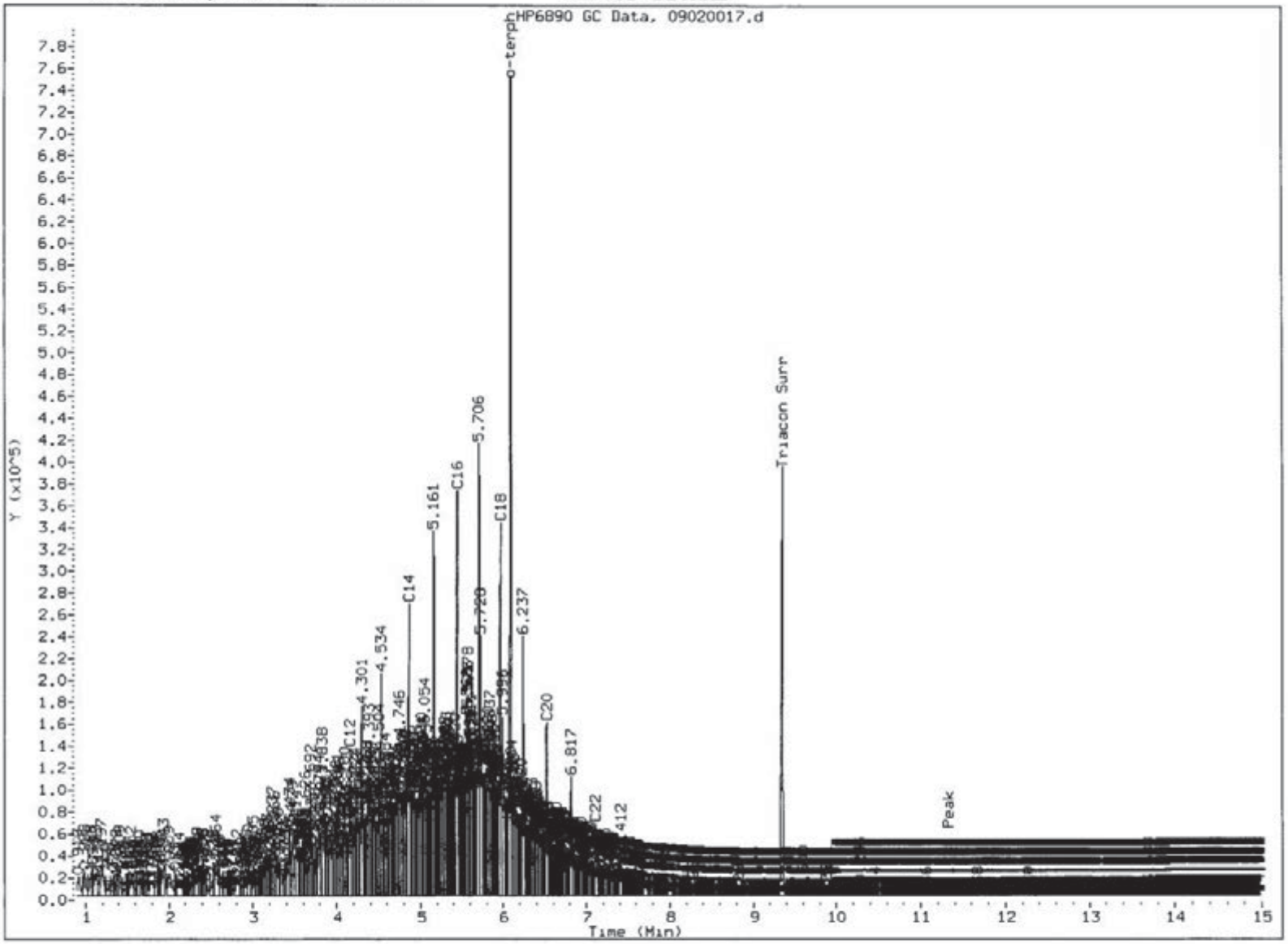
Operator: JW

Column diameter: 0.25

YX72 09013



FID:3B-2C/RTX-1 YX72LCSDS1 FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: JW Date: 9/3/14

Data File: /chem3/fid3b.i/20140902.b/09020018.d

Date : 02-SEP-2014 18:42

Client ID: GP9-S-0.5

Sample Info: YX72A,5

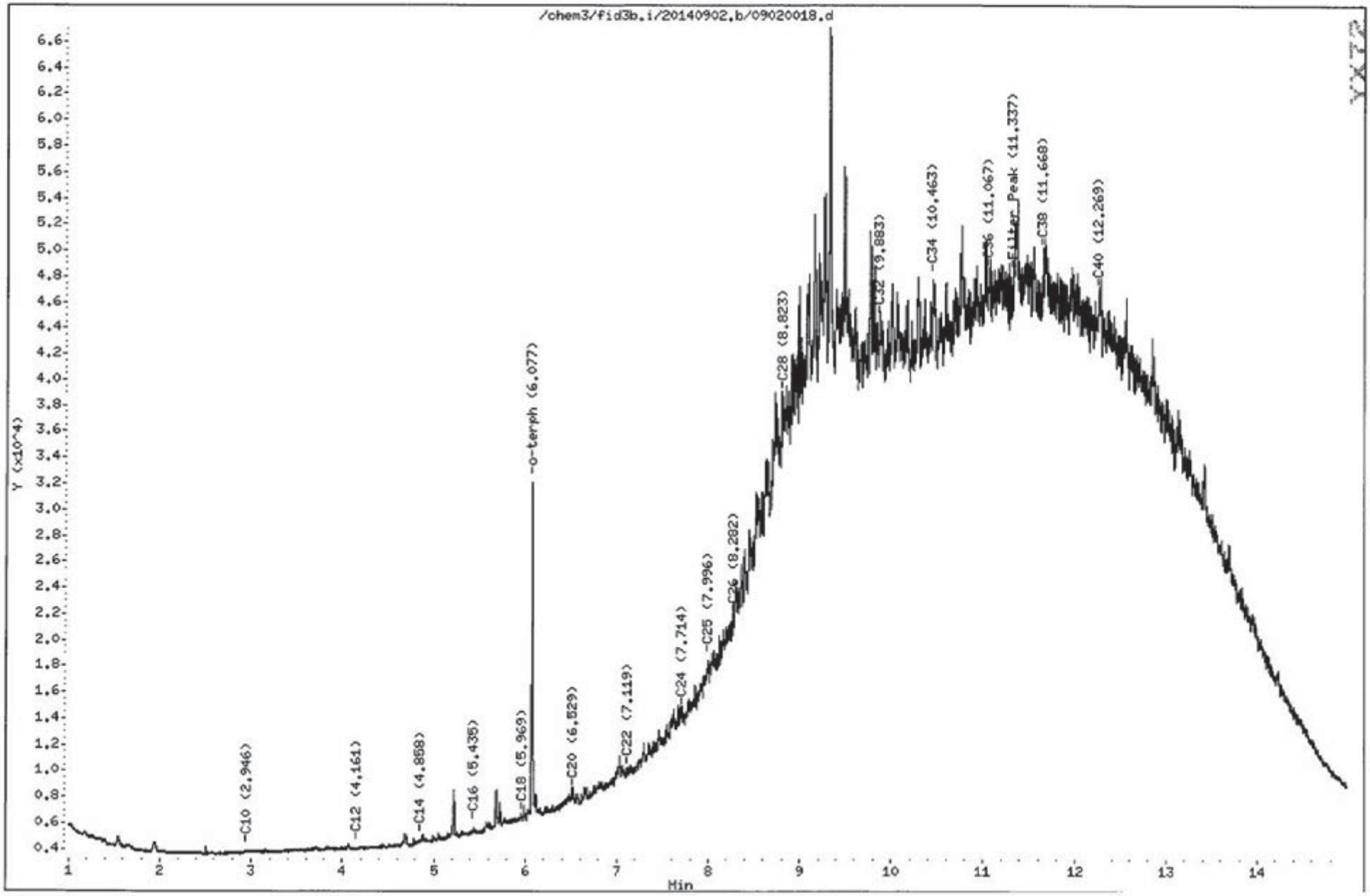
Column phase: RTX-1

Instrument: fid3b.i

Operator: JW

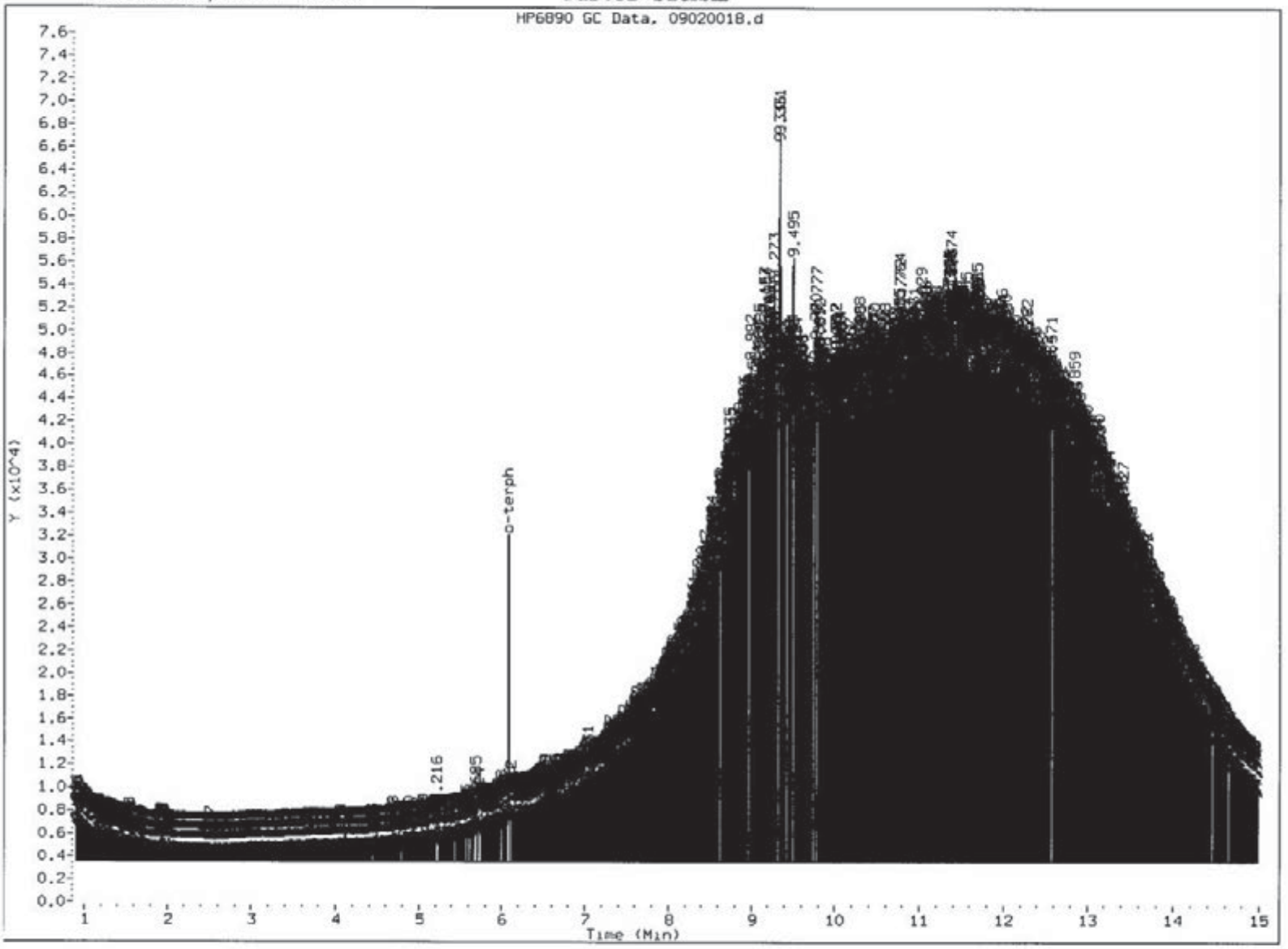
Column diameter: 0.25

GP9-S-0.5 YX72A



FID:3B-2C/RTX-1 YX72A

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
(5.) Skimmed surrogate

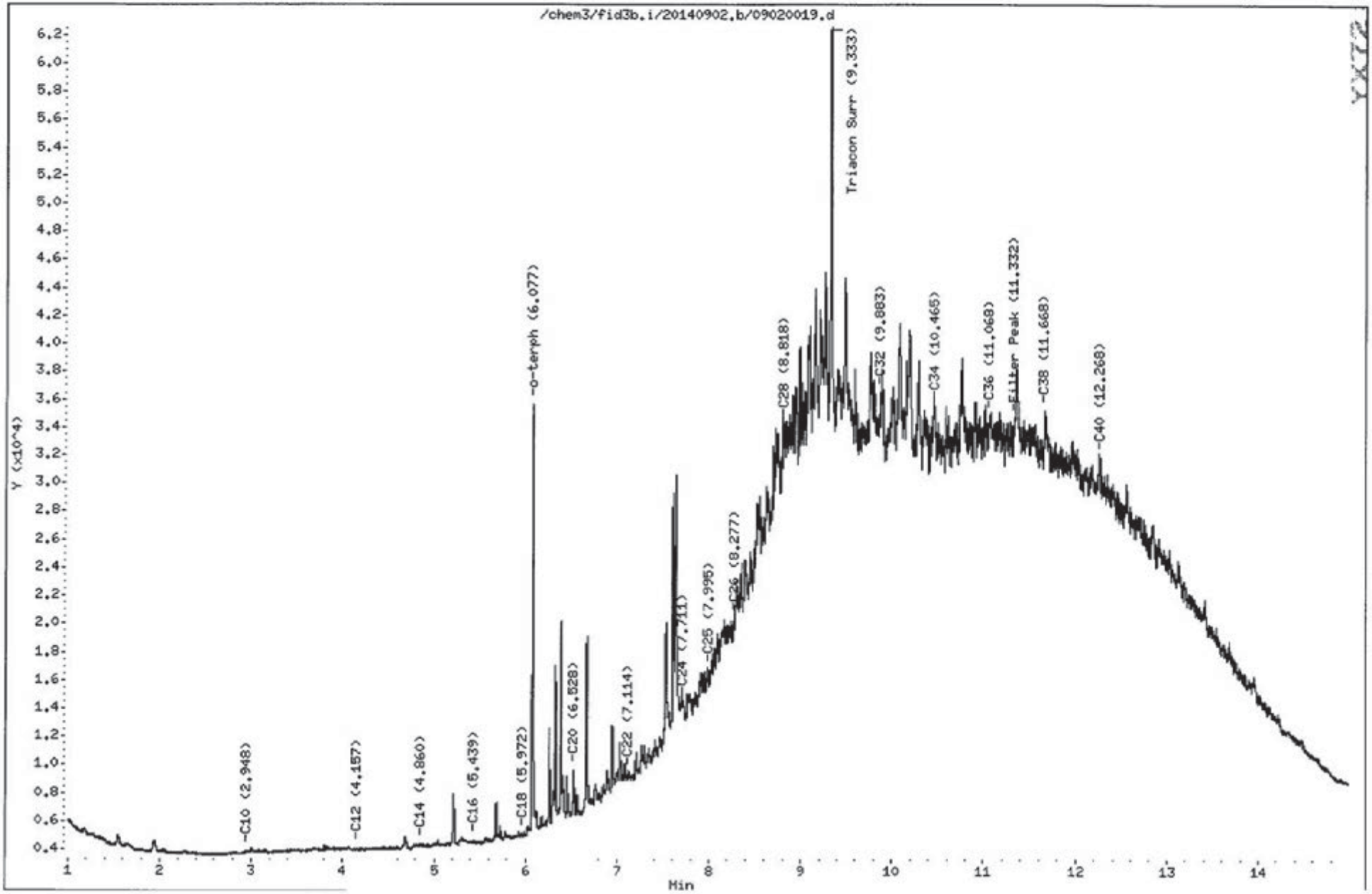
Analyst: JW Date: 9/3/14

Data File: /chem3/fid3b.i/20140902.b/09020019.d
Date : 02-SEP-2014 19:07
Client ID: GP10-S-0.5
Sample Info: YX72B,5

Instrument: fid3b.i
Operator: JW
Column diameter: 0.25

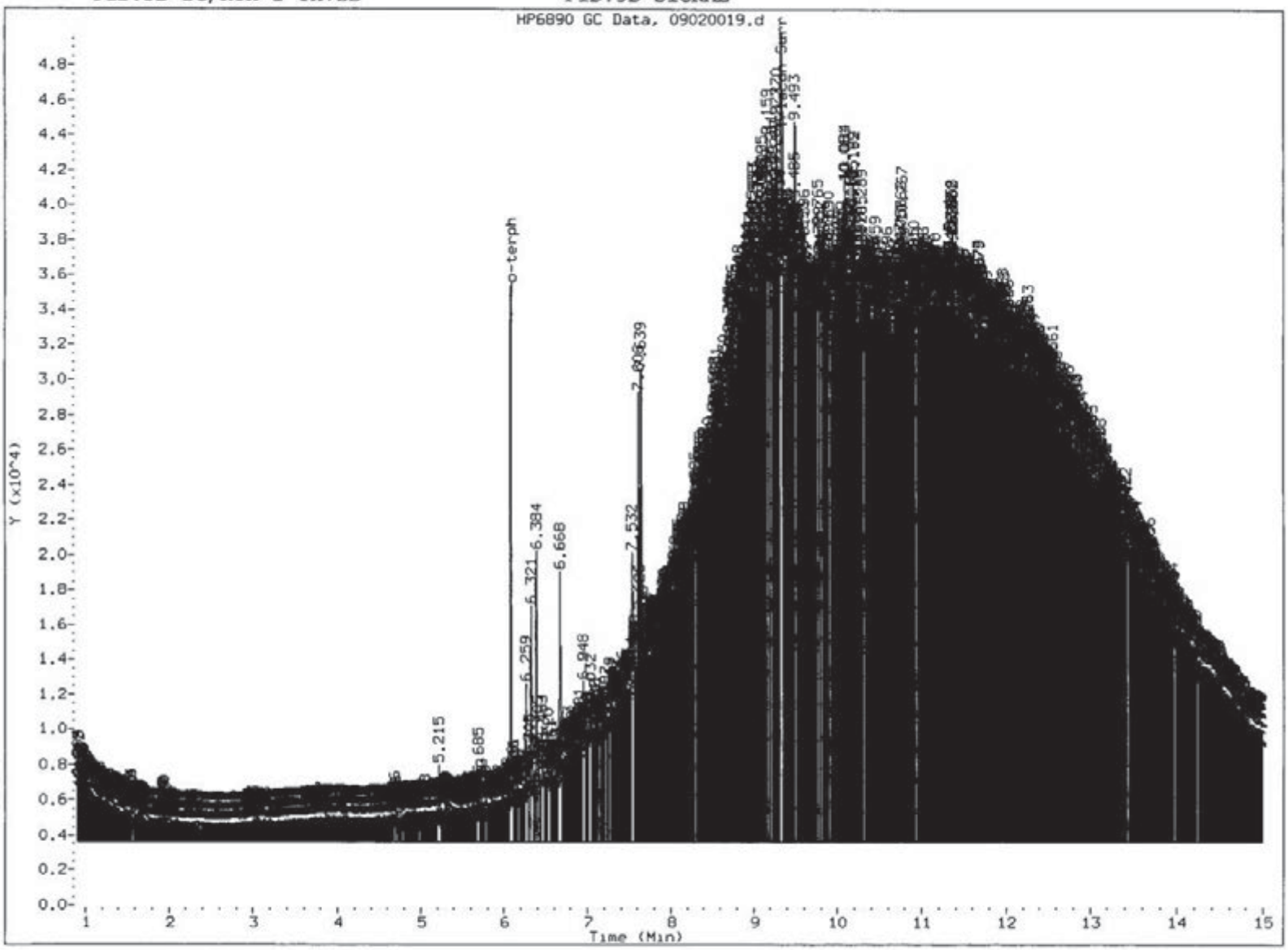
Column phase: RTX-1

YX72 09020017



FID:3B-2C/RTX-1 YX72B

FID:3B SIGNAL



MANUAL INTEGRATION

1. Baseline correction
3. Peak not found
5. Skimmed surrogate

Analyst: JW Date: 9/3/14

Analytical Resources, Incorporated
Analytical Chemists and Consultants

8 September 2014

Heather Hirsch
Maul, Foster and Alongi, Inc
1329 North State Street, Suite 301
Bellingham, WA 98225

RE: Project: Northern State Hospital, 0624.04.02
ARI Job No.: YX94

Dear Heather:

Please find enclosed the final results for the samples from the project referenced above. These samples were originally received on August 20, 2014. These samples were analyzed for BETX and PCBs as requested.

These analyses proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file YX94

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Subject: RE: YX18, YX19-Northern State Hospital
From: Heather Hirsch <hhirsch@maulfoster.com>
Date: 8/25/2014 4:42 PM
To: Mark Harris <markh@arilabs.com>
CC: Carolyn Wise <cwise@maulfoster.com>

Mark,

Please also run BTEX by 8021B on the following samples:

GP9-S-0.5
GP10-S-0.5

And PCBs by 8082 on the following sample:

GP3-S-7.0

We may have additional follow ups to request pending results of the requested analyses.

Thanks,

HEATHER HIRSCH LHG | MAUL FOSTER & ALONGI, INC.
d. 360 594 6257| c. 360 927 1309 | p. 360 594 6262 | f. 360 594 6270

-----Original Message-----
From: Heather Hirsch
Sent: Monday, August 25, 2014 3:39 PM
To: 'Mark Harris'
Cc: Carolyn Wise
Subject: RE: YX18, YX19-Northern State Hospital

Yes, please run the TPH-Dx follow ups on these. Thanks,

HEATHER HIRSCH LHG | MAUL FOSTER & ALONGI, INC.
d. 360 594 6257| c. 360 927 1309 | p. 360 594 6262 | f. 360 594 6270

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Monday, August 25, 2014 2:49 PM
To: Heather Hirsch
Subject: YX18, YX19-Northern State Hospital

Heather:

Attached are the HCID finals for the samples from the project referenced

above. I think you want TPH-Dx follow-ups on these. Let me know if that's wrong. Otherwise we'll get those going.

I should be seeing more data for these samples soon.

Mark H.

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey<https://www.surveymonkey.com/s/WPDBVJK>.

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If you have received this correspondence in error, please notify sender immediately. Thank you.

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: YX94
Client: Maul Foster & Alongi
Project Event: 0624.04.02
Project Name: Northern State Hospital IPG

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	GP3-S-7.0	YX94A	14-17575	Soil	08/19/14 11:00	08/20/14 11:25
2.	GP9-S-0.5	YX94B	14-17576	Soil	08/19/14 15:25	08/20/14 11:25
3.	GP10-S-0.5	YX94C	14-17577	Soil	08/19/14 15:40	08/20/14 11:25

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

YX94 : 00005

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

YXSH 00006

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

YX34 : 00007

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod

Sample ID: GP9-S-0.5
SAMPLE

Lab Sample ID: YX94B
LIMS ID: 14-17576
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Analyzed: 08/28/14 18:02
Instrument/Analyst: PID1/PKC

Purge Volume: 5.0 mL
Sample Amount: 77 mg-dry-wt
Percent Moisture: 17.9%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	16	< 16 U
108-88-3	Toluene	16	< 16 U
100-41-4	Ethylbenzene	16	< 16 U
179601-23-1	m,p-Xylene	32	< 32 U
95-47-6	o-Xylene	16	< 16 U

BETX Surrogate Recovery

Trifluorotoluene	86.1%
Bromobenzene	88.4%

BETX values reported in µg/kg (ppb)

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: GP10-S-0.5
SAMPLE

Lab Sample ID: YX94C
LIMS ID: 14-17577
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Analyzed: 08/28/14 18:32
Instrument/Analyst: PID1/PKC

Purge Volume: 5.0 mL
Sample Amount: 60 mg-dry-wt
Percent Moisture: 26.0%

CAS Number	Analyte	RL	Result
71-43-2	Benzene	21	< 21 U
108-88-3	Toluene	21	< 21 U
100-41-4	Ethylbenzene	21	< 21 U
179601-23-1	m,p-Xylene	42	< 42 U
95-47-6	o-Xylene	21	< 21 U

BETX Surrogate Recovery

Trifluorotoluene	81.1%
Bromobenzene	83.5%

BETX values reported in µg/kg (ppb)

Results corrected for soil moisture content per Section 11.10.5 of EPA Method 8000C.

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod

Sample ID: MB-082814
METHOD BLANK

Lab Sample ID: MB-082814
LIMS ID: 14-17576
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Analyzed: 08/28/14 11:29
Instrument/Analyst: PID1/PKC

Purge Volume: 5.0 mL
Sample Amount: 100 mg-dry-wt

CAS Number	Analyte	RL	Result
71-43-2	Benzene	12	< 12 U
108-88-3	Toluene	12	< 12 U
100-41-4	Ethylbenzene	12	< 12 U
179601-23-1	m,p-Xylene	25	< 25 U
95-47-6	o-Xylene	12	< 12 U

BETX Surrogate Recovery

Trifluorotoluene	83.9%
Bromobenzene	84.5%

BETX values reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
BETX by Method SW8021BMod
Page 1 of 1

Sample ID: LCS-082814
LAB CONTROL SAMPLE

Lab Sample ID: LCS-082814
LIMS ID: 14-17576
Matrix: Soil
Data Release Authorized:
Reported: 09/03/14

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Analyzed LCS: 08/28/14 10:31
LCSD: 08/28/14 11:00
Instrument/Analyst LCS: PID1/PKC
LCSD: PID1/PKC

Purge Volume: 5.0 mL

Sample Amount LCS: 100 mg-dry-wt
LCSD: 100 mg-dry-wt

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Benzene	308	350	88.0%	312	350	89.1%	1.3%
Toluene	2310	2470	93.5%	2350	2470	95.1%	1.7%
Ethylbenzene	562	615	91.4%	579	615	94.1%	3.0%
m,p-Xylene	1850	2000	92.5%	1880	2000	94.0%	1.6%
o-Xylene	724	765	94.6%	738	765	96.5%	1.9%

Reported in µg/kg (ppb)

RPD calculated using sample concentrations per SW846.

BETX Surrogate Recovery

	LCS	LCSD
Trifluorotoluene	83.0%	87.8%
Bromobenzene	83.5%	89.8%

ANALYTICAL RESOURCES INCORPORATED

BETX SOIL SURROGATE RECOVERY SUMMARY

ARI Job: YX94
Matrix: Soil

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02

Client ID	TFT	BBZ	TOT OUT
MB-082814	83.9%	84.5%	0
LCS-082814	83.0%	83.5%	0
LCSD-082814	87.8%	89.8%	0
GP9-S-0.5	86.1%	88.4%	0
GP10-S-0.5	81.1%	83.5%	0

	LCS/MB LIMITS	QC LIMITS
(TFT) = Trifluorotoluene	(80-120)	(69-126)
(BBZ) = Bromobenzene	(80-120)	(49-143)

Log Number Range: 14-17576 to 14-17577

YX94 : 00012

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: GP3-S-7.0
SAMPLE

Lab Sample ID: YX94A
LIMS ID: 14-17575
Matrix: Soil
Data Release Authorized:
Reported: 09/05/14

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 09/01/14
Date Analyzed: 09/04/14 13:17
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.2 g-dry-wt
Final Extract Volume: 4.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: 28.3%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	77.8%
Tetrachlorometaxylene	70.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-090114
METHOD BLANK

Lab Sample ID: MB-090114
LIMS ID: 14-17575
Matrix: Soil
Data Release Authorized: VB
Reported: 09/05/14

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 09/01/14
Date Analyzed: 09/04/14 12:34
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g
Final Extract Volume: 4.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	80.5%
Tetrachlorometaxylene	72.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A

Sample ID: LCS-090114
LAB CONTROL

Lab Sample ID: LCS-090114
LIMS ID: 14-17575
Matrix: Soil
Data Release Authorized:
Reported: 09/05/14

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 09/01/14
Date Analyzed: 09/04/14 12:55
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g-dry-wt
Final Extract Volume: 4.00 mL
Dilution Factor: 1.00
Silica Gel: No

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	120	167	71.9%
Aroclor 1260	143	167	85.6%

PCB Surrogate Recovery

Decachlorobiphenyl	78.8%
Tetrachlorometaxylene	73.2%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: YX94-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-090114	80.5%	59-115	72.8%	58-112	0
LCS-090114	78.8%	59-115	73.2%	58-112	0
GP3-S-7.0	77.8%	47-120	70.5%	53-116	0

Microwave (MARS) Control Limits PCBSMI
Prep Method: SW3546
Log Number Range: 14-17575 to 14-17575

Analytical Resources, Incorporated
Analytical Chemists and Consultants

15 September 2014

Heather Hirsch
Maul, Foster and Alongi, Inc
1329 North State Street, Suite 301
Bellingham, WA 98225

RE: Project: Northern State Hospital, 0624.04.02
ARI Job No.: YY70

Dear Heather:

Please find enclosed the final results for the sample from the project referenced above. This sample was originally received on August 20, 2014. This sample was analyzed for PAHs, PCBs and total metals as requested.

These analyses proceeded without incident of note.

An electronic copy of this report and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mark D. Harris
Project Manager
206/695-6210
markh@arilabs.com

Enclosures

cc: file YY70

MDH/mdh

4611 South 134th Place, Suite 100 • Tukwila WA 98168 • **206-695-6200** • **206-695-6201** fax

Subject: RE: YX18, YX19, YX71-Northern State Hospital
From: Heather Hirsch <hhirsch@maulfoster.com>
Date: 9/3/2014 2:45 PM
To: Mark Harris <markh@arilabs.com>

Thanks, Mark. Based on these results, please run metals, PAHs, and PCBs on soil sample GP9-S-0.5.

HEATHER HIRSCH LHG | MAUL FOSTER & ALONGI, INC.
d. 360 594 6257| c. 360 927 1309 | p. 360 594 6262 | f. 360 594 6270

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Wednesday, September 03, 2014 2:38 PM
To: Heather Hirsch; Carolyn Wise
Subject: Re: YX18, YX19, YX71-Northern State Hospital

Here's the final report for the diesels.

On 9/3/2014 12:16 PM, Heather Hirsch wrote:

> Hi Mark,
>
> I don't see a final report for PCBs for GP3-S-7.0. And, I haven't yet seen prelims (or a final report) for the NWTPH-Dx and BETX (by 8021B) follow ups on samples GP9-S-0.5 and GP10-S-0.5. Are those still in the works? I was considering running metals, PAHs, and PCBs one on of either the GP9 or the GP10 sample, depending on the Dx/BETX results for those samples.
>
> Finally, I would like to run the following analyses on the DRUM samples that we have on hold (see attached COC):
>
> DRUM1 (soil) - TCLP-volatiles, TCLP-metals, and PAHs
>
> DRUM2 (water) - metals and VOCs
>
> Please, continue to hold the DRUM1 sample for possible PCB analysis (pending PCB results from the samples listed above).
>
> And, please let me know if you have questions. Thanks!
>
> HEATHER HIRSCH LHG | MAUL FOSTER & ALONGI, INC.

d. 360 594 6257| c. 360 927 1309 | p. 360 594 6262 | f. 360 594 6270

-----Original Message-----
From: Mark Harris [mailto:markh@arilabs.com]
Sent: Wednesday, September 03, 2014 11:21 AM
To: Heather Hirsch; Carolyn Wise
Subject: Re: YX18, YX19, YX71-Northern State Hospital

Ooops.

On 9/3/2014 8:39 AM, Mark Harris wrote:

> Heather/Carolyn:
>
> Attached are three final reports for samples from the project referenced above.
>
> Let me know if you have any questions regarding these results.
>
> Mark H.

--
Mark Harris
Project Manager
Analytical Resources, Inc.
206/695-6210
markh@arilabs.com

How was your customer experience?
Please take our 5 minute online customer survey <https://www.surveymonkey.com/s/WPDBVJK>.

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If you have received this correspondence in error, please notify sender immediately. Thank you.

Sample ID Cross Reference Report

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: YY70
Client: Maul Foster & Alongi
Project Event: 0624.04.02
Project Name: Northern State Hospital IPG

	Sample ID	ARI Lab ID	ARI LIMS ID	Matrix	Sample Date/Time	VTSR
1.	GP9-S-0.5	YY70A	14-17896	Soil	08/19/14 15:25	08/20/14 11:25

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Data Reporting Qualifiers

Effective 12/31/13

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

YY70 : 00005

Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20%Drift or minimum RRF).
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NR	Spiked compound recovery is not reported due to chromatographic interference
NS	The flagged analyte was not spiked into the sample
M	Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"
Y	The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
EMPC	Estimated Maximum Possible Concentration (EMPC) defined in EPA Statement of Work DLM02.2 as a value "calculated for 2,3,7,8-substituted isomers for which the quantitation and /or confirmation ion(s) has signal to noise in excess of 2.5, but does not meet identification criteria" **(Dioxin/Furan analysis only)**
C	The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column
P	The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference
X	Analyte signal includes interference from polychlorinated diphenyl ethers. **(Dioxin/Furan analysis only)**
Z	Analyte signal includes interference from the sample matrix or perfluorokerosene ions. **(Dioxin/Furan analysis only)**

YY70 : 00006

Geotechnical Data

A	The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.
F	Samples were frozen prior to particle size determination
SM	Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations
SS	Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis
W	Weight of sample in some pipette aliquots was below the level required for accurate weighting

YY70:00007

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546

Sample ID: GP9-S-0.5
SAMPLE

Lab Sample ID: YY70A
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/15/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 09/09/14
Date Analyzed: 09/11/14 17:26
Instrument/Analyst: NT8/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 2.51 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 3.00
Percent Moisture: 16.3%

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	60	< 60 U
91-57-6	2-Methylnaphthalene	60	< 60 U
90-12-0	1-Methylnaphthalene	60	< 60 U
208-96-8	**Acenaphthylene**	**60**	**120**
83-32-9	Acenaphthene	60	< 60 U
86-73-7	Fluorene	60	< 60 U
85-01-8	**Phenanthrene**	**60**	**120**
120-12-7	**Anthracene**	**60**	**110**
206-44-0	**Fluoranthene**	**60**	**260**
129-00-0	**Pyrene**	**60**	**290**
56-55-3	**Benzo(a)anthracene**	**60**	**260**
218-01-9	**Chrysene**	**60**	**350**
50-32-8	**Benzo(a)pyrene**	**60**	**390**
193-39-5	**Indeno(1,2,3-cd)pyrene**	**60**	**200**
53-70-3	**Dibenz(a,h)anthracene**	**60**	**69**
191-24-2	**Benzo(g,h,i)perylene**	**60**	**250**
132-64-9	Dibenzofuran	60	< 60 U
TOTBFA	**Total Benzofluoranthenes**	**60**	**680**

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	84.0%
d10-2-Methylnaphthalene	73.0%
d14-Dibenzo(a,h)anthracen	56.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SIM SW8270D-SIM GC/MS
Extraction Method: SW3546
Page 1 of 1

Sample ID: MB-090914
METHOD BLANK

Lab Sample ID: MB-090914
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/15/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 09/09/14
Date Analyzed: 09/11/14 15:54
Instrument/Analyst: NT8/JZ
GPC Cleanup: No
Silica Gel Cleanup: Yes
Alumina Cleanup: No

Sample Amount: 10.00 g-dry-wt
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00
Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
91-20-3	Naphthalene	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	5.0	< 5.0 U
90-12-0	1-Methylnaphthalene	5.0	< 5.0 U
208-96-8	Acenaphthylene	5.0	< 5.0 U
83-32-9	Acenaphthene	5.0	< 5.0 U
86-73-7	Fluorene	5.0	< 5.0 U
85-01-8	Phenanthrene	5.0	< 5.0 U
120-12-7	Anthracene	5.0	< 5.0 U
206-44-0	Fluoranthene	5.0	< 5.0 U
129-00-0	Pyrene	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	5.0	< 5.0 U
218-01-9	Chrysene	5.0	< 5.0 U
50-32-8	Benzo(a)pyrene	5.0	< 5.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	5.0	< 5.0 U
53-70-3	Dibenz(a,h)anthracene	5.0	< 5.0 U
191-24-2	Benzo(g,h,i)perylene	5.0	< 5.0 U
132-64-9	Dibenzofuran	5.0	< 5.0 U
TOTBFA	Total Benzofluoranthenes	5.0	< 5.0 U

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate Recovery

d10-Fluoranthene	82.0%
d10-2-Methylnaphthalene	60.7%
d14-Dibenzo(a,h)anthracen	66.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS

Sample ID: LCS-090914
LAB CONTROL SAMPLE

Lab Sample ID: LCS-090914
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/15/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG
Event: 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 09/09/14
Date Analyzed LCS: 09/11/14 16:22
Instrument/Analyst LCS: NT8/JZ

Sample Amount LCS: 10.00 g-dry-wt
Final Extract Volume LCS: 0.50 mL
Dilution Factor LCS: 1.00

Analyte	LCS	Spike Added	Recovery
Naphthalene	87.0	150	58.0%
2-Methylnaphthalene	88.2	150	58.8%
1-Methylnaphthalene	91.9	150	61.3%
Acenaphthylene	98.2	150	65.5%
Acenaphthene	84.8	150	56.5%
Fluorene	102	150	68.0%
Phenanthrene	110	150	73.3%
Anthracene	115	150	76.7%
Fluoranthene	126	150	84.0%
Pyrene	121	150	80.7%
Benzo(a)anthracene	130	150	86.7%
Chrysene	124	150	82.7%
Benzo(a)pyrene	120	150	80.0%
Indeno(1,2,3-cd)pyrene	109	150	72.7%
Dibenz(a,h)anthracene	106	150	70.7%
Benzo(g,h,i)perylene	116	150	77.3%
Dibenzofuran	95.5	150	63.7%
Total Benzofluoranthenes	376	450	83.6%

Reported in µg/kg (ppb)

SIM Semivolatile Surrogate	Recovery
d10-Fluoranthene	82.7%
d10-2-Methylnaphthalene	58.7%
d14-Dibenzo(a,h)anthracene	66.0%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02

Client ID	FLN	MNP	DBA	TOT OUT
MB-090914	82.0%	60.7%	66.0%	0
LCS-090914	82.7%	58.7%	66.0%	0
GP9-S-0.5	84.0%	73.0%	56.0%	0

	LCS/MB LIMITS	QC LIMITS
(FLN) = d10-Fluoranthene	(36-134)	(36-134)
(MNP) = d10-2-Methylnaphthalene	(32-120)	(32-120)
(DBA) = d14-Dibenzo(a,h)anthracene	(21-133)	(21-133)

Prep Method: SW3546
Log Number Range: 14-17896 to 14-17896

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546

Sample ID: GP9-S-0.5
SAMPLE

Lab Sample ID: YY70A
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/15/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Date Extracted: 09/09/14
Date Analyzed: 09/12/14 23:09
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.6 g-dry-wt
Final Extract Volume: 4.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: 16.3%

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	32	< 32 U
53469-21-9	Aroclor 1242	32	< 32 U
12672-29-6	Aroclor 1248	32	< 32 U
11097-69-1	Aroclor 1254	32	< 32 U
11096-82-5	Aroclor 1260	32	< 32 U
11104-28-2	Aroclor 1221	32	< 32 U
11141-16-5	Aroclor 1232	32	< 32 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	70.0%
Tetrachlorometaxylene	72.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A
Extraction Method: SW3546

Sample ID: MB-090914
METHOD BLANK

Lab Sample ID: MB-090914
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/15/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 09/09/14
Date Analyzed: 09/12/14 23:52
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g
Final Extract Volume: 4.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

CAS Number	Analyte	LOQ	Result
12674-11-2	Aroclor 1016	33	< 33 U
53469-21-9	Aroclor 1242	33	< 33 U
12672-29-6	Aroclor 1248	33	< 33 U
11097-69-1	Aroclor 1254	33	< 33 U
11096-82-5	Aroclor 1260	33	< 33 U
11104-28-2	Aroclor 1221	33	< 33 U
11141-16-5	Aroclor 1232	33	< 33 U

Reported in µg/kg (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	75.5%
Tetrachlorometaxylene	61.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082A

Sample ID: LCS-090914
LAB CONTROL

Lab Sample ID: LCS-090914
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/15/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Date Extracted: 09/09/14
Date Analyzed: 09/13/14 00:14
Instrument/Analyst: ECD7/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes
Florisil Cleanup: No

Sample Amount: 12.0 g-dry-wt
Final Extract Volume: 4.00 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	121	167	72.5%
Aroclor 1260	144	167	86.2%

PCB Surrogate Recovery

Decachlorobiphenyl	77.5%
Tetrachlorometaxylene	66.8%

Results reported in µg/kg (ppb)

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SOIL/SOLID/SEDIMENT SURROGATE RECOVERY SUMMARY

Matrix: Soil

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG
0624.04.02

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-090914	75.5%	59-115	61.2%	58-112	0
LCS-090914	77.5%	59-115	66.8%	58-112	0
GP9-S-0.5	70.0%	47-120	72.0%	53-116	0

Microwave (MARS) Control Limits PCBSMI
Prep Method: SW3546
Log Number Range: 14-17896 to 14-17896

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: GP9-S-0.5
SAMPLE

Lab Sample ID: YY70A
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/11/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: 08/19/14
Date Received: 08/20/14

Percent Total Solids: 84.0%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	09/05/14	200.8	09/10/14	**7440-38-2**	**Arsenic**	0.2	**9.1**	
3050B	09/05/14	200.8	09/10/14	**7440-39-3**	**Barium**	0.6	**178**	
3050B	09/05/14	200.8	09/10/14	**7440-43-9**	**Cadmium**	0.1	**0.2**	
3050B	09/05/14	200.8	09/10/14	**7440-47-3**	**Chromium**	3	**62**	
3050B	09/05/14	200.8	09/10/14	**7440-50-8**	**Copper**	0.6	**59.4**	
3050B	09/05/14	200.8	09/10/14	**7439-92-1**	**Lead**	0.1	**43.9**	
CLP	09/05/14	7471A	09/05/14	**7439-97-6**	**Mercury**	0.02	**0.05**	
3050B	09/05/14	200.8	09/10/14	7782-49-2	Selenium	0.6	0.6	U
3050B	09/05/14	200.8	09/10/14	7440-22-4	Silver	0.2	0.2	U
3050B	09/05/14	200.8	09/10/14	**7440-66-6**	**Zinc**	5	**121**	

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: YY70MB
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/11/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	LOQ	mg/kg-dry	Q
3050B	09/05/14	200.8	09/10/14	7440-38-2	Arsenic	0.2	0.2	U
3050B	09/05/14	200.8	09/10/14	7440-39-3	Barium	0.5	0.5	U
3050B	09/05/14	200.8	09/10/14	7440-43-9	Cadmium	0.1	0.1	U
3050B	09/05/14	200.8	09/10/14	7440-47-3	Chromium	0.5	0.5	U
3050B	09/05/14	200.8	09/10/14	7440-50-8	Copper	0.5	0.5	U
3050B	09/05/14	200.8	09/10/14	7439-92-1	Lead	0.1	0.1	U
CLP	09/05/14	7471A	09/05/14	7439-97-6	Mercury	0.02	0.02	U
3050B	09/05/14	200.8	09/10/14	7782-49-2	Selenium	0.5	0.5	U
3050B	09/05/14	200.8	09/10/14	7440-22-4	Silver	0.2	0.2	U
3050B	09/05/14	200.8	09/10/14	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given LOQ
LOQ-Limit of Quantitation

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: YY70LCS
LIMS ID: 14-17896
Matrix: Soil
Data Release Authorized:
Reported: 09/11/14

QC Report No: YY70-Maul Foster & Alongi
Project: Northern State Hospital IPG 0624.04.02
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	200.8	25.7	25.0	103%	
Barium	200.8	24.0	25.0	96.0%	
Cadmium	200.8	25.0	25.0	100%	
Chromium	200.8	24.3	25.0	97.2%	
Copper	200.8	26.1	25.0	104%	
Lead	200.8	25.5	25.0	102%	
Mercury	7471A	0.55	0.50	110%	
Selenium	200.8	77.8	80.0	97.2%	
Silver	200.8	25.6	25.0	102%	
Zinc	200.8	80	80	100%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

APPENDIX D

DATA VALIDATION MEMORANDUM

DATA QUALITY ASSURANCE/QUALITY CONTROL REVIEW

PROJECT NO. 0624.04.02 | SEPTEMBER 16, 2014 | PORT OF SKAGIT

This report reviews the analytical results for groundwater and soil samples collected by Maul Foster & Alongi, Inc. on the Northern State Hospital property located in Sedro-Woolley, Washington. The samples were collected on August 19, 2014.

Analytical Resources, Inc. (ARI) performed the analyses. ARI report numbers YX18, YX19 (delivered as two reports), YX71, XY72, YX94, and YY70 were reviewed. Reports YX71, YX72, and YX94 contain additional results for samples originally submitted with YX18 and YX19. The analyses performed and samples analyzed are listed below. Some analyses may not have been performed on all samples. Data validation tracking sheets documenting the data review associated with these analyses are attached (Attachment 1).

Analysis	Reference
BTEX	USEPA 8021B Modified
Diesel- and Motor-Oil-Range Hydrocarbons	NWTPH-Dx
Dissolved and Total Mercury	USEPA 7470A/7471A
Dissolved and Total Metals	USEPA 200.8
Gasoline-Range Hydrocarbons	NWTPH-Gx
HCID	NWTPH-HCID
PCBs	USEPA 8082A
PAHs	USEPA 8270D SIM
VOCs	USEPA 8260C

BTEX = benzene, toluene, ethylbenzene, and xylenes.
HCID = hydrocarbon identification.
NWTPH = Northwest Total Petroleum Hydrocarbons.
PAH = polycyclic aromatic hydrocarbon.
PCB = polychlorinated biphenyl.
SIM = selective ion monitoring.
USEPA = U.S. Environmental Protection Agency.
VOC = volatile organic compound.

Samples Analyzed					
Report YX18	**Report YX19**	**Report YX71**	**Report YX72**	**Report YX94**	**Report YY70**
GP2-W-10.0	GP1-S-1.4	GP2-W-10.0	GP9-S-0.5	GP3-S-7.0	GP9-S-0.5
GP8-W-12.5	GP2-S-3.0	-	GP10-S-0.5	GP9-S-0.5	-
TRIP BLANKS	GP3-S-7.0	-	-	GP10-S-0.5	-
-	GP4-S-5.4	-	-	-	-
-	GP5-S-14.5	-	-	-	-
-	GP7-S-0.8	-	-	-	-
-	GP9-S-0.5	-	-	-	-
-	GP10-S-0.5	-	-	-	-

DATA QUALIFICATIONS

Analytical results were evaluated according to applicable sections of USEPA procedures (USEPA, 2008, 2010) and appropriate laboratory and method-specific guidelines (ARI, 2012; USEPA, 1986). Quality control limits not included in the reports were provided separately by ARI and are attached (Attachment 2).

Data validation procedures were modified, as appropriate, to accommodate quality control requirements for methods not specifically addressed by the USEPA procedures (i.e., NWTPH analyses).

The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned.

HOLDING TIMES, PRESERVATION, AND SAMPLE STORAGE

Holding Times

In report YY70, sample GP9-S-0.5 was extracted for USEPA Method 8270D SIM and USEPA Method 8082A seven days after the recommended 14-day holding time. Ten days after collection, the laboratory moved the sample to -18 degrees Celsius storage. Frozen storage holding times have not been established for PAHs; however, frozen storage likely reduces the loss of lower-molecular-weight compounds by preventing microbiological degradation. All USEPA 8270D SIM results for GP9-S-0.5 were qualified as estimated, with "J" for detected results and "UJ" for non-detect results. USEPA Method 8082A Aroclors are relatively stable in soil; thus, no PCB Aroclor results were qualified.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
YY70	GP9-S-0.5	Naphthalene	60 U	60 UJ
YY70	GP9-S-0.5	2-Methylnaphthalene	60 U	60 UJ
YY70	GP9-S-0.5	1-Methylnaphthalene	60 U	60 UJ
YY70	GP9-S-0.5	Acenaphthylene	120	120 J
YY70	GP9-S-0.5	Acenaphthene	60 U	60 UJ
YY70	GP9-S-0.5	Fluorene	60 U	60 UJ
YY70	GP9-S-0.5	Phenanthrene	120	120 J
YY70	GP9-S-0.5	Anthracene	110	110 J
YY70	GP9-S-0.5	Fluoranthene	260	260 J
YY70	GP9-S-0.5	Pyrene	290	290 J
YY70	GP9-S-0.5	Benzo(a)anthracene	260	260 J
YY70	GP9-S-0.5	Chrysene	350	350 J
YY70	GP9-S-0.5	Benzo(a)pyrene	390	390 J
YY70	GP9-S-0.5	Indeno(1,2,3-cd)pyrene	200	200 J
YY70	GP9-S-0.5	Dibenz(a,h)anthracene	69	69 J
YY70	GP9-S-0.5	Benzo(g,h,i)perylene	250	250 J
YY70	GP9-S-0.5	Dibenzofuran	60 U	60 UJ
YY70	GP9-S-0.5	Total Benzofluoranthenes	680	680 J

ug/kg = micrograms per kilogram.

All remaining extractions and analyses were performed within the recommended holding time criteria.

Preservation and Sample Storage

In report YX18, ARI noted the presence of air bubbles in sample containers submitted for VOC and BTEX analysis. The air bubbles ranged from 2 to 4 millimeters in size and two to five per container in quantity. USEPA guidelines for VOC data review (USEPA, 2008) do not include specific recommendations for data qualification based on presence of air bubbles. The results were not qualified by the reviewer.

The remaining samples were preserved and stored appropriately.

BLANKS

Method Blanks

Laboratory method blank analyses were performed at the required frequencies. For purposes of data qualification, the method blanks were associated with all samples prepared in the analytical batch. If an analyte was detected above the method reporting limit (MRL) in a sample and in the associated method blank, and the concentration was less than ten times the method blank concentration, the sample result was qualified. MRLs were elevated to the concentration detected in the samples, and results were qualified as not detected, "U," at the elevated MRL.

In report YX18, hexachlorobutadiene was detected in the USEPA Method 8260C method blank. The associated samples were non-detect; thus, no results were qualified.

In report YX19, methylene chloride was detected in the USEPA Method 8260C method blanks (MB-082214A and MB-082514A) at 2.5 and 2.8 ug/kg, respectively. In the following table, the associated samples are qualified as not detected.

Report	Sample	Component	Original Result (ug/kg)	Qualified Result (ug/kg)
YX19	GP4-S-5.4	Methylene Chloride	9.9	9.9 U
YX19	GP5-S-14.5	Methylene Chloride	7.1	7.1 U

All remaining laboratory method blanks were non-detect.

Continuing Calibration Blanks

ARI did not report continuing calibration blanks.

Trip Blanks

A trip blank was submitted with YX18 for USEPA Method 8260C analysis. The trip blank was non-detect for all target analytes.

Equipment Rinsate Blanks

Equipment rinsate blanks were not required for this sampling event, as all samples were collected using dedicated, single-use equipment.

SURROGATE RECOVERY RESULTS

The samples were spiked with surrogate compounds to evaluate laboratory performance on individual samples. The laboratory appropriately documented and qualified surrogate outliers.

In report YX18, USEPA Method 8270D SIM surrogate d10-fluoranthene results exceeded the upper percent recovery limit for the laboratory control sample/laboratory control sample duplicate (LCS/LCSD). The exceedances were minor, remaining surrogates had acceptable percent recovery, and all LCS/LCSD target analytes met acceptance criteria for percent recovery and relative percent difference (RPD). No results were qualified by the reviewer.

All remaining surrogate recoveries were within acceptance limits.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

Matrix spike/matrix spike duplicate (MS/MSD) results are used to evaluate laboratory precision and accuracy. All MS/MSD samples were extracted and analyzed at the required frequency.

All MS/MSD recoveries were within acceptance limits for percent recovery and RPD.

LABORATORY DUPLICATE RESULTS

Duplicate results are used to evaluate laboratory precision. All laboratory duplicate samples were extracted and analyzed at the required frequency. The reviewer did not qualify minor laboratory duplicate RPD exceedances or exceedances for results near the reporting limit. All remaining laboratory duplicate RPDs were within acceptance limits.

LCS/LCSD RESULTS

An LCS/LCSD is spiked with target analytes to provide information on laboratory precision and accuracy. The LCS/LCSD samples were extracted and analyzed at the required frequency.

In report YX19, the USEPA Method 8260C LCSD (LCSD-082214A) exceeded the upper percent recovery acceptance limit for acrylonitrile at 125 percent. The LCS had acceptable recovery and the exceedance was minor; thus, no results were qualified.

All remaining LCS/LCSD analyte results were within acceptance limits for percent recovery and RPD.

FIELD DUPLICATE RESULTS

Field duplicate samples measure both field and laboratory precision. Field duplicates were not submitted for analysis.

CONTINUING CALIBRATION VERIFICATION

Continuing calibration verification (CCV) results are used to demonstrate instrument precision and accuracy through the end of the sample batch. ARI reported results for CCVs with percent drift exceedances. The reviewer assumes that unreported recoveries were within acceptance limits.

In report YX19, USEPA Method 8260C CCVs analyzed on August 22, 2014, and August 25, 2014, exceeded percent difference criteria for some target analytes. The CCV results were reported and associated detected results, which were limited to the LCS/LCSDs, were flagged with "Q" by the laboratory. All associated samples results were non-detect; thus, no results were qualified.

Based on available information, all remaining CCVs and initial calibration verifications met acceptance criteria.

REPORTING LIMITS

ARI used routine reporting limits for non-detect results, except when samples required dilutions because of high analyte concentrations and/or matrix interferences.

DATA PACKAGE

The data packages were reviewed for transcription errors, omissions, and anomalies.

In report YX18, the trip blank was identified by the laboratory as "TRIP BLANKS" instead of "TRIP BLANK." The trip blank collection date was incorrectly identified on the chain of custody as August 11, 2014, but was correctly reported in the report as August 19, 2014.

No additional issues were found.

REFERENCES

ARI. 2012. Quality assurance plan. Analytical Resources, Inc., Tukwila, Washington. April 2.

USEPA. 1986. Test methods for evaluating solid waste: physical/chemical methods. EPA-530/SW-846. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. September (revision 6, February 2007).

USEPA. 2008. USEPA contract laboratory program, national functional guidelines for organics data review. EPA 540/R-08/01. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. June.

USEPA. 2010. USEPA contract laboratory program national functional guidelines for inorganic superfund data review. EPA 540/R-10/011. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation. January.

ATTACHMENT 1

DATA VALIDATION TRACKING

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX18
Analysis/Method	VOCs/USEPA 8260C
Batch Number(s)	082314A

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	No	Hexachlorobutadiene = 0.70 ug/L, samples are non-detect.	
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP2-W-10.0	-	-	-
GP8-W-12.5	-	-	-
TRIP BLANKS	-	-	-
-	-	-	-

Notes:

Definitions:

Calibr. = calibration.
CCB = continuing calibration blank.
EMPC = estimated maximum potential concentration.
ICV = initial calibration verification.
MDL = method detection limit.
NA = not applicable.
NR = not reported.
ug/L = micrograms per liter.
Q = qualifier.

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX18
Analysis/Method	BTEX/ USEPA 8021 modified
Batch Number(s)	082814

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP2-W-10.0	-	-	-
GP8-W-12.5	-	-	-
TRIP BLANKS	-	-	-
-	-	-	-

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX18
Analysis/Method	PAHs/USEPA 8270D SIM (water)
Batch Number(s)	082614

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	No	See notes below.	
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP2-W-10.0	-	-	-
GP8-W-12.5	-	-	-
TRIP BLANKS	-	-	-
-	-	-	-

Notes:

d10-fluoranthene 123%, 124% in LCS/LCSD. All LCS/LCSD results meet acceptance limits and RPD criteria. Remaining LCS/LCSD surrogates have acceptable percent recovery. d10-fluoranthene exceedances are minor; no results qualified.

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX18
Analysis/Method	HCID/NWTPH-HCID
Batch Number(s)	082114

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP2-W-10.0	-	-	-
GP8-W-12.5	-	-	-
TRIP BLANKS	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX18
Analysis/Method	Dissolved Metals and Mercury/USEPA 200.8/7470A
Batch Number(s)	082114

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	Yes		
	MS/MSD %	Yes		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP2-W-10.0	-	-	-
GP8-W-12.5	-	-	-
TRIP BLANKS	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX19
Analysis/Method	USEPA 8260C (soil)
Batch Number(s)	082214A, 082514A

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	No	See notes below.	
Batch	Method Blank	No	See notes below.	
	LCS/LCSD %	No	LCSD Acrylonitrile = 125%, LCS is OK. Exceedance is minor.	
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP1-S-1.4	**GP5-S-14.5**	-	-
GP2-S-3.0	GP7-S-0.8	-	-
GP3-S-7.0	GP9-S-0.5	-	-
GP4-S-5.4	GP10-S-0.5	-	-

Notes:

Method blanks—082214A and 082514A methylene chloride = 2.5 ug/kg and 2.8 ug/kg. Associated samples are less than 10 times the method blank detections. Raise reporting limits in associated samples with low detections.

CCV for both batches exceeded percent difference acceptance criteria. All associated detected results flagged with "Q" by laboratory. No sample target analytes are flagged. Only LCS/LCSD results are flagged, and all were within acceptance limits for percent recovery and RPD. No results qualified by reviewer.

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX19
Analysis/Method	PAHs/ USEPA 8270D SIM (soil)
Batch Number(s)	082614A

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP1-S-1.4	**GP5-S-14.5**	-	-
GP2-S-3.0	GP7-S-0.8	-	-
GP3-S-7.0	GP9-S-0.5	-	-
GP4-S-5.4	GP10-S-0.5	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX19
Analysis/Method	PCBs/ USEPA 8082A
Batch Number(s)	082614

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	N		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP1-S-1.4	GP5-S-14.5	-	-
GP2-S-3.0	GP7-S-0.8	-	-
GP3-S-7.0	GP9-S-0.5	-	-
GP4-S-5.4	GP10-S-0.5	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX19
Analysis/Method	HCID/ NWTPH-HCID
Batch Number(s)	082214

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	NA		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	NA		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP1-S-1.4	**GP5-S-14.5**	-	-
GP2-S-3.0	GP7-S-0.8	-	-
GP3-S-7.0	**GP9-S-0.5**	-	-
GP4-S-5.4	**GP10-S-0.5**	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX19
Analysis/Method	Total Metals and Mercury/ USEPA 200.8, 7471A
Batch Number(s)	082214

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	Yes		
	MS/MSD %	Yes		
	MS/MSD RPD	Yes		
General	Dilution	Yes		
	Reporting Limit	NA		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP1-S-1.4	**GP5-S-14.5**	-	-
GP2-S-3.0	GP7-S-0.8	-	-
GP3-S-7.0	GP9-S-0.5	-	-
GP4-S-5.4	GP10-S-0.5	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX19/YX94
Analysis/Method	Gasoline and BTEX/USEPA 8021B Modified
Batch Number(s)	082814

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	Na		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	NA		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font): (report YX19)			
GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4
GP5-S-14.5	**GP7-S-0.8**	GP9-S-0.5	GP10-S-0.5
Samples reviewed (in bold font): (report YX94)			
GP9-S-0.5	**GP10-S-0.5**	GP3-S-7.0	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX71
Analysis/Method	Diesel and Motor Oil/NWTPH-Dx (water)
Batch Number(s)	082114

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	NA		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP2-W-10.0	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Notes:

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX72
Analysis/Method	Diesel and Motor Oil/NWTPH-Dx (soil)
Batch Number(s)	082914

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	NA		
General	Dilution	Yes		
	Reporting Limit	NA		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP9-S-0.5	-	-	-
GP10-S-0.5	-	-	-
-	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YX94
Analysis/Method	PCBs/ USEPA 8082A
Batch Number(s)	090114

Reviewer	MEB
Date	9/12/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	Yes		
	Lab Dup RPD	NA		
	MS/MSD %	NA		
	MS/MSD RPD	N		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP9-S-0.5	-	-	-
GP10-S-0.5	-	-	-
GP3-S-7.0	-	-	-
-	-	-	-

Notes:
Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YY70
Analysis/Method	PAH/8270D SIM
Batch Number(s)	090914

Reviewer	MEB
Date	9/16/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	No	Extracted seven days past 14-day hold time. See notes.	J/UJ
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP9-S-0.5	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Notes:

Sample collected 8/19/14. Request for analysis on 9/3/14. Fourteen-day hold time for 8270D SIM ends 9/2/14. Reviewer confirmed with ARI that sample was frozen after NWTPH extraction on 8/29/14 and that PAH results are not significantly affected by the seven-day hold time exceedance. All PAH results qualified by reviewer as estimated for detected results (J) and non-detect results (UJ).

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YY70
Analysis/Method	PCB/8082A
Batch Number(s)	090914

Reviewer	MEB
Date	9/16/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	No	Extracted seven days past 14-day holding time. See notes.	
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	Yes		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP9-S-0.5	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Notes:

PCBs are relatively stable in soil; seven-day hold time exceedance is minor. No qualification is necessary.

Definitions:

DATA VALIDATION TRACKING

This document tracks Stage 2A validation completion for the analysis indicated below.

Lab Report	YY70
Analysis/Method	Total Metals and Mercury/USEPA 200.8, 7471A
Batch Number(s)	-

Reviewer	MEB
Date	9/16/2014

	Validation Area	Acceptable Yes/No/NA/NR	Comments	Q
Sample	Temperature	Yes		
	Holding Time	Yes		
	Trip Blank	Yes		
	Field/Eq. Blank	NA		
	Field Dup RPD	NA		
Calibr.	CCB	NR		
	ICV	NR		
	CCV	NR		
Batch	Method Blank	Yes		
	LCS/LCSD %	Yes		
	LCS/LCSD RPD	NA		
	Lab Dup RPD	NR		
	MS/MSD %	NR		
	MS/MSD RPD	NR		
General	Dilution	Yes		
	Reporting Limit	Yes		
	MDL	NA		
	Surrogates	NA		
Dioxins	Labeled Analog	NA		
	EMPC	NA		
	2378-TCDF	NA		

Samples reviewed (in bold font):			
GP9-S-0.5	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Notes:
Definitions:

ATTACHMENT 2

ARI CONTROL LIMITS

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8260C VOA (EPA 8260C) in Water								
Preservation: pH<2; HCL, Cool <6°C								
Container: VOA Vial, Clear, 40 mL, HCL		**Minimum Sample Volume:** 120 mL				**Hold Time:** 14 days		
Chloromethane	0.0948	0.500 ug/L		30	77 - 122	30	77 - 122	30
Vinyl Chloride	0.0572	0.200 ug/L		30	74 - 123	30	74 - 123	30
Bromomethane	0.252	1.00 ug/L		30	68 - 130	30	68 - 130	30
Chloroethane	0.0861	0.200 ug/L		30	68 - 133	30	68 - 133	30
Trichlorofluoromethane	0.0375	0.200 ug/L		30	74 - 135	30	74 - 135	30
Acrolein	2.48	5.00 ug/L		30	60 - 124	30	60 - 124	30
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.0429	0.200 ug/L		30	76 - 124	30	76 - 124	30
Acetone	2.06	5.00 ug/L		30	64 - 125	30	64 - 125	30
1,1-Dichloroethene	0.0540	0.200 ug/L		30	74 - 120	30	74 - 120	30
Bromoethane	0.0412	0.200 ug/L		30	77 - 122	30	77 - 122	30
Iodomethane	0.227	1.00 ug/L		30	76 - 123	30	76 - 123	30
Methylene Chloride	0.485	1.00 ug/L		30	71 - 125	30	71 - 125	30
Acrylonitrile	0.604	1.00 ug/L		30	76 - 123	30	76 - 123	30
Carbon Disulfide	0.0370	0.200 ug/L		30	77 - 124	30	77 - 124	30
trans-1,2-Dichloroethene	0.0485	0.200 ug/L		30	75 - 120	30	75 - 120	30
Vinyl Acetate	0.0688	0.200 ug/L		30	74 - 120	30	74 - 120	30
1,1-Dichloroethane	0.0533	0.200 ug/L		30	80 - 120	30	80 - 120	30
2-Butanone	0.814	5.00 ug/L		30	73 - 123	30	73 - 123	30
2,2-Dichloropropane	0.0518	0.200 ug/L		30	72 - 133	30	72 - 133	30
cis-1,2-Dichloroethene	0.0427	0.200 ug/L		30	78 - 120	30	78 - 120	30
Chloroform	0.0273	0.200 ug/L		30	80 - 120	30	80 - 120	30
Bromochloromethane	0.0607	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,1,1-Trichloroethane	0.0408	0.200 ug/L		30	79 - 124	30	79 - 124	30
1,1-Dichloropropene	0.0340	0.200 ug/L		30	80 - 120	30	80 - 120	30
Carbon tetrachloride	0.0439	0.200 ug/L		30	71 - 139	30	71 - 139	30
1,2-Dichloroethane	0.0717	0.200 ug/L		30	80 - 121	30	80 - 121	30
Benzene	0.0266	0.200 ug/L		30	80 - 120	30	80 - 120	30
Trichloroethene	0.0489	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2-Dichloropropane	0.0352	0.200 ug/L		30	80 - 120	30	80 - 120	30
Bromodichloromethane	0.0506	0.200 ug/L		30	80 - 122	30	80 - 122	30
Dibromomethane	0.145	0.200 ug/L		30	80 - 120	30	80 - 120	30
2-Chloroethyl vinyl ether	0.250	1.00 ug/L		30	62 - 130	30	62 - 130	30
4-Methyl-2-Pentanone	0.974	5.00 ug/L		30	80 - 125	30	80 - 125	30
cis-1,3-Dichloropropene	0.0610	0.200 ug/L		30	80 - 127	30	80 - 127	30
Toluene	0.0399	0.200 ug/L		30	80 - 120	30	80 - 120	30
trans-1,3-Dichloropropene	0.0815	0.200 ug/L		30	79 - 132	30	79 - 132	30
2-Hexanone	0.902	5.00 ug/L		30	80 - 129	30	80 - 129	30
1,1,2-Trichloroethane	0.129	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,3-Dichloropropane	0.0622	0.200 ug/L		30	80 - 120	30	80 - 120	30
Tetrachloroethene	0.0474	0.200 ug/L		30	80 - 120	30	80 - 120	30
Dibromochloromethane	0.0481	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2-Dibromoethane	0.0745	0.200 ug/L		30	80 - 120	30	80 - 120	30
Chlorobenzene	0.0230	0.200 ug/L		30	80 - 120	30	80 - 120	30

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Ethylbenzene	0.0371	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,1,1,2-Tetrachloroethane	0.0396	0.200 ug/L		30	80 - 128	30	80 - 128	30
m,p-Xylene	0.0522	0.400 ug/L		30	80 - 120	30	80 - 120	30
o-Xylene	0.0349	0.200 ug/L		30	80 - 120	30	80 - 120	30
Styrene	0.0454	0.200 ug/L		30	80 - 121	30	80 - 121	30
Bromoform	0.0618	0.200 ug/L		30	62 - 149	30	62 - 149	30
1,1,2,2-Tetrachloroethane	0.0598	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2,3-Trichloropropane	0.131	0.500 ug/L		30	80 - 120	30	80 - 120	30
trans-1,4-Dichloro 2-Butene	0.324	1.00 ug/L		30	47 - 147	30	47 - 147	30
n-Propylbenzene	0.0235	0.200 ug/L		30	80 - 120	30	80 - 120	30
Bromobenzene	0.0605	0.200 ug/L		30	80 - 120	30	80 - 120	30
Isopropyl Benzene	0.0212	0.200 ug/L		30	80 - 120	30	80 - 120	30
2-Chlorotoluene	0.0236	0.200 ug/L		30	80 - 120	30	80 - 120	30
4-Chlorotoluene	0.0159	0.200 ug/L		30	80 - 120	30	80 - 120	30
t-Butylbenzene	0.0256	0.200 ug/L		30	80 - 121	30	80 - 121	30
1,3,5-Trimethylbenzene	0.0150	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2,4-Trimethylbenzene	0.0243	0.200 ug/L		30	80 - 122	30	80 - 122	30
s-Butylbenzene	0.0237	0.200 ug/L		30	80 - 121	30	80 - 121	30
4-Isopropyl Toluene	0.0263	0.200 ug/L		30	80 - 124	30	80 - 124	30
1,3-Dichlorobenzene	0.0362	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,4-Dichlorobenzene	0.0397	0.200 ug/L		30	80 - 120	30	80 - 120	30
n-Butylbenzene	0.0248	0.200 ug/L		30	80 - 125	30	80 - 125	30
1,2-Dichlorobenzene	0.0365	0.200 ug/L		30	80 - 120	30	80 - 120	30
1,2-Dibromo-3-chloropropane	0.366	0.500 ug/L		30	79 - 129	30	79 - 129	30
1,2,4-Trichlorobenzene	0.107	0.500 ug/L		30	77 - 127	30	77 - 127	30
Hexachloro-1,3-Butadiene	0.0734	0.500 ug/L		30	80 - 135	30	80 - 135	30
Naphthalene	0.118	0.500 ug/L		30	80 - 128	30	80 - 128	30
1,2,3-Trichlorobenzene	0.110	0.500 ug/L		30	80 - 125	30	80 - 125	30
Dichlorodifluoromethane	0.0521	0.200 ug/L		30	68 - 133	30	68 - 133	30
Methyl-tert-butyl ether	0.0729	0.500 ug/L		30	79 - 121	30	79 - 121	30
n-Hexane	0.100	0.200 ug/L						
surr: 1,2-Dichloroethane-d4			80 - 120					
surr: 1,2-Dichlorobenzene-d4			80 - 120					
surr: Toluene-d8			80 - 120					
surr: 4-Bromofluorobenzene			80 - 120					
surr: Dibromofluoromethane			80 - 120					
Pentafluorobenzene								
Chlorobenzene-d5								
1,4-Difluorobenzene								
1,4-Dichlorobenzene-d4								

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8260C VOA Solid (EPA 8260C) in Solid								
Preservation: NaHSO4, MeOH, Cool <6°C								
Container: VOA Vial, Clear, 40 mL, Na2S2O3		**Minimum Sample Weight:** 15 g			**Hold Time:** 14 days			
Dichlorodifluoromethane	0.207	1.00 ug/kg		30	67 - 142	30	67 - 142	30
Chloromethane	0.263	1.00 ug/kg		30	65 - 129	30	65 - 129	30
Vinyl Chloride	0.235	1.00 ug/kg		30	74 - 134	30	74 - 134	30
Bromomethane	0.187	1.00 ug/kg		30	40 - 172	30	40 - 172	30
Chloroethane	0.462	1.00 ug/kg		30	53 - 154	30	53 - 154	30
Trichlorofluoromethane	0.266	1.00 ug/kg		30	57 - 161	30	57 - 161	30
Acrolein	3.81	50.0 ug/kg		30	60 - 130	30	60 - 130	30
Acetone	0.482	5.00 ug/kg		30	48 - 132	30	48 - 132	30
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.287	2.00 ug/kg		30	72 - 142	30	72 - 142	30
1,1-Dichloroethene	0.336	1.00 ug/kg		30	73 - 138	30	73 - 138	30
Bromoethane	0.440	2.00 ug/kg		30	74 - 132	30	74 - 132	30
Iodomethane	0.215	1.00 ug/kg		30	34 - 181	30	34 - 181	30
Methylene Chloride	0.635	2.00 ug/kg		30	61 - 128	30	61 - 128	30
Carbon Disulfide	0.559	1.00 ug/kg		30	72 - 146	30	72 - 146	30
Acrylonitrile	1.03	5.00 ug/kg		30	59 - 124	30	59 - 124	30
Methyl-tert-butyl ether	0.231	1.00 ug/kg		30	68 - 124	30	68 - 124	30
trans-1,2-Dichloroethene	0.266	1.00 ug/kg		30	73 - 131	30	73 - 131	30
Vinyl Acetate	0.381	5.00 ug/kg		30	54 - 138	30	54 - 138	30
1,1-Dichloroethane	0.203	1.00 ug/kg		30	65 - 139	30	65 - 139	30
2-Butanone	0.513	5.00 ug/kg		30	64 - 120	30	64 - 120	30
2,2-Dichloropropane	0.292	1.00 ug/kg		30	77 - 137	30	77 - 137	30
cis-1,2-Dichloroethene	0.240	1.00 ug/kg		30	75 - 124	30	75 - 124	30
Chloroform	0.234	1.00 ug/kg		30	75 - 126	30	75 - 126	30
Bromochloromethane	0.323	1.00 ug/kg		30	69 - 133	30	69 - 133	30
1,1,1-Trichloroethane	0.226	1.00 ug/kg		30	78 - 133	30	78 - 133	30
1,1-Dichloropropene	0.312	1.00 ug/kg		30	80 - 123	30	80 - 123	30
Carbon tetrachloride	0.213	1.00 ug/kg		30	76 - 136	30	76 - 136	30
1,2-Dichloroethane	0.191	1.00 ug/kg		30	77 - 120	30	77 - 120	30
Benzene	0.296	1.00 ug/kg		30	80 - 120	30	80 - 120	30
Trichloroethene	0.212	1.00 ug/kg		30	80 - 120	30	80 - 120	30
1,2-Dichloropropane	0.162	1.00 ug/kg		30	74 - 120	30	74 - 120	30
Bromodichloromethane	0.254	1.00 ug/kg		30	80 - 122	30	80 - 122	30
Dibromomethane	0.147	1.00 ug/kg		30	80 - 120	30	80 - 120	30
2-Chloroethyl vinyl ether	0.276	5.00 ug/kg		30	20 - 157	30	20 - 157	30
4-Methyl-2-Pentanone	0.420	5.00 ug/kg		30	70 - 124	30	70 - 124	30
cis-1,3-Dichloropropene	0.226	1.00 ug/kg		30	80 - 124	30	80 - 124	30
Toluene	0.151	1.00 ug/kg		30	78 - 120	30	78 - 120	30
trans-1,3-Dichloropropene	0.216	1.00 ug/kg		30	80 - 126	30	80 - 126	30
1,1,2-Trichloroethane	0.286	1.00 ug/kg		30	77 - 120	30	77 - 120	30
1,2-Dibromoethane	0.176	1.00 ug/kg		30	79 - 120	30	79 - 120	30
2-Hexanone	0.439	5.00 ug/kg		30	62 - 128	30	62 - 128	30
1,3-Dichloropropane	0.209	1.00 ug/kg		30	77 - 120	30	77 - 120	30
Tetrachloroethene	0.257	1.00 ug/kg		30	76 - 131	30	76 - 131	30

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Dibromochloromethane	0.266	1.00 ug/kg		30	77 - 123	30	77 - 123	30
Chlorobenzene	0.219	1.00 ug/kg		30	80 - 120	30	80 - 120	30
1,1,1,2-Tetrachloroethane	0.233	1.00 ug/kg		30	80 - 120	30	80 - 120	30
Ethylbenzene	0.202	1.00 ug/kg		30	80 - 120	30	80 - 120	30
m,p-Xylene	0.392	1.00 ug/kg		30	80 - 123	30	80 - 123	30
o-Xylene	0.224	1.00 ug/kg		30	80 - 120	30	80 - 120	30
Styrene	0.138	1.00 ug/kg		30	80 - 122	30	80 - 122	30
Bromoform	0.297	1.00 ug/kg		30	63 - 120	30	63 - 120	30
Isopropyl Benzene	0.233	1.00 ug/kg		30	77 - 127	30	77 - 127	30
1,1,2,2-Tetrachloroethane	0.253	1.00 ug/kg		30	71 - 120	30	71 - 120	30
1,2,3-Trichloropropane	0.517	2.00 ug/kg		30	75 - 120	30	75 - 120	30
trans-1,4-Dichloro 2-Butene	0.437	5.00 ug/kg		30	62 - 127	30	62 - 127	30
n-Propylbenzene	0.272	1.00 ug/kg		30	76 - 126	30	76 - 126	30
Bromobenzene	0.153	1.00 ug/kg		30	75 - 120	30	75 - 120	30
1,3,5-Trimethylbenzene	0.254	1.00 ug/kg		30	77 - 126	30	77 - 126	30
2-Chlorotoluene	0.300	1.00 ug/kg		30	76 - 120	30	76 - 120	30
4-Chlorotoluene	0.277	1.00 ug/kg		30	75 - 121	30	75 - 121	30
t-Butylbenzene	0.306	1.00 ug/kg		30	77 - 125	30	77 - 125	30
1,2,4-Trimethylbenzene	0.230	1.00 ug/kg		30	77 - 125	30	77 - 125	30
s-Butylbenzene	0.240	1.00 ug/kg		30	77 - 127	30	77 - 127	30
4-Isopropyl Toluene	0.236	1.00 ug/kg		30	78 - 131	30	78 - 131	30
1,3-Dichlorobenzene	0.227	1.00 ug/kg		30	76 - 120	30	76 - 120	30
1,4-Dichlorobenzene	0.232	1.00 ug/kg		30	75 - 120	30	75 - 120	30
n-Butylbenzene	0.262	1.00 ug/kg		30	75 - 134	30	75 - 134	30
1,2-Dichlorobenzene	0.293	1.00 ug/kg		30	77 - 120	30	77 - 120	30
1,2-Dibromo-3-Chloropropane	0.586	5.00 ug/kg		30	61 - 128	30	61 - 128	30
1,2,4-Trichlorobenzene	0.332	5.00 ug/kg		30	75 - 130	30	75 - 130	30
Hexachloro-1,3-Butadiene	0.410	5.00 ug/kg		30	72 - 135	30	72 - 135	30
Naphthalene	0.429	5.00 ug/kg		30	71 - 122	30	71 - 122	30
1,2,3-Trichlorobenzene	0.305	5.00 ug/kg		30	76 - 122	30	76 - 122	30
surr: 1,2-Dichloroethane-d4			80 - 149					
surr: 1,2-Dichlorobenzene-d4			80 - 120					
surr: Toluene-d8			77 - 120					
surr: 4-Bromofluorobenzene			80 - 120					
surr: Dibromofluoromethane			80 - 120					
Pentafluorobenzene								
Chlorobenzene-d5								
1,4-Difluorobenzene								
1,4-Dichlorobenzene-d4								

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8021B BETX (EPA 8021B) in Water								
Preservation: pH<2; HCL, Cool <6°C								
Container: VOA Vial, Clear, 40 mL, HCL		**Minimum Sample Volume:** 80 mL			**Hold Time:** 14 days			
Benzene	0.0941	0.250 ug/L		30	76 - 120	30	76 - 120	30
Ethylbenzene	0.113	0.250 ug/L		30	77 - 122	30	77 - 122	30
Toluene	0.117	0.250 ug/L		30	68 - 120	30	68 - 120	30
m,p-Xylene	0.265	0.500 ug/L		30	75 - 120	30	75 - 120	30
o-Xylene	0.136	0.250 ug/L		30	75 - 121	30	75 - 121	30
Methyl tert-Butyl Ether		0.500 ug/L		30		30		30
surr: Trifluorotoluene			80 - 120					
surr: Bromobenzene			77 - 120					

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8021B BETX Solid (EPA 8021B) in Solid								
Preservation: MeOH, Cool <6°C								
Container: VOA Vial, Clear, 40 mL, MeOH		**Minimum Sample Weight:** 15 g			**Hold Time:** 14 days			
Benzene	4.59	12.5 ug/kg		30	78 - 120	30	78 - 120	30
Ethylbenzene	7.13	12.5 ug/kg		30	80 - 120	30	80 - 120	30
Toluene	4.98	12.5 ug/kg		30	73 - 120	30	73 - 120	30
m,p-Xylene	11.9	25.0 ug/kg		30	79 - 120	30	79 - 120	30
o-Xylene	6.23	12.5 ug/kg		30	80 - 120	30	80 - 120	30
Methyl tert-Butyl Ether		25.0 ug/kg		30		30		30
surr: Trifluorotoluene			69 - 126					
surr: Bromobenzene			49 - 143					

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
TPH (Volatiles) (NWTPHg) in Solid								
Preservation: pH<2; HCL, Cool <6°C								
Container: VOA Vial, Clear, 40 mL, HCL		**Minimum Sample Weight:** 80 mL				**Hold Time:** 14 days		
Gasoline Range Organics (NW Tol-N:	0.0574	0.250 mg/L		30	80 - 120	30	80 - 120	30
Gasoline Range Organics (8015 2MP·	0.0308	0.250 mg/L		30	80 - 120	30	80 - 120	30
Gasoline Range Organics (WA Tol-C1	0.0874	0.250 mg/L		30	80 - 120	30	80 - 120	30
Gasoline Range Organics (AK101 C6	0.0324	0.100 mg/L		30	80 - 120	30	80 - 120	30
Gasoline Range Organics (CA C6-C1:				30		30		30
surr: Trifluorotoluene			80 - 120					
surr: Bromobenzene			80 - 120					

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
TPH (Volatiles) (NWTPHg) in Water								
Preservation: pH<2; HCL, Cool <6°C								
Container: VOA Vial, Clear, 40 mL, HCL		**Minimum Sample Volume:** 80 mL			**Hold Time:** 14 days			
Gasoline Range Organics (NW Tol-Ni	0.0574	0.250 mg/L		30	80 - 120	30	80 - 120	30
Gasoline Range Organics (8015 2MP·	0.0308	0.250 mg/L		30	80 - 120	30	80 - 120	30
Gasoline Range Organics (WA Tol-C1	0.0874	0.250 mg/L		30	80 - 120	30	80 - 120	30
Gasoline Range Organics (AK101 C6	0.0324	0.100 mg/L		30	80 - 120	30	80 - 120	30
Gasoline Range Organics (CA C6-C1				30		30		30
surr: Trifluorotoluene			80 - 120					
surr: Bromobenzene			80 - 120					

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8082A PCB (EPA 8082A) in Solid								
Preservation: Cool <6°C								
Container: Glass WM, Clear, 8 oz		**Minimum Sample Weight:** 150 g			**Hold Time:** 14 days			
Aroclor 1016	10.7	33.0 ug/kg		30	51 - 120	30	51 - 120	30
Aroclor-1016 (1)				30				
Aroclor-1016 (2)				30				
Aroclor-1016 (3)				30				
Aroclor-1016 (4)				30				
Aroclor 1016 [2C]	10.7	33.0 ug/kg		30	51 - 120	30	51 - 120	30
Aroclor-1016 (1) [2C]				30				
Aroclor-1016 (2) [2C]				30				
Aroclor-1016 (3) [2C]				30				
Aroclor-1016 (4) [2C]				30				
Aroclor 1221	10.7	33.0 ug/kg		30				
Aroclor-1221 (1)				30				
Aroclor-1221 (2)				30				
Aroclor-1221 (3)				30				
Aroclor 1221 [2C]	10.7	33.0 ug/kg		30				
Aroclor-1221 (1) [2C]				30				
Aroclor-1221 (2) [2C]				30				
Aroclor-1221 (3) [2C]				30				
Aroclor-1221 (4) [2C]				30				
Aroclor 1232	10.7	33.0 ug/kg		30				
Aroclor-1232 (1)				30				
Aroclor-1232 (2)				30				
Aroclor-1232 (3)				30				
Aroclor-1232 (4)				30				
Aroclor 1232 [2C]	10.7	33.0 ug/kg		30				
Aroclor-1232 (1) [2C]				30				
Aroclor-1232 (2) [2C]				30				
Aroclor-1232 (3) [2C]				30				
Aroclor-1232 (4) [2C]				30				
Aroclor 1242	10.7	33.0 ug/kg		30				
Aroclor-1242 (1)				30				
Aroclor-1242 (2)				30				
Aroclor-1242 (3)				30				
Aroclor-1242 (4)				30				
Aroclor 1242 [2C]	10.7	33.0 ug/kg		30				
Aroclor-1242 (1) [2C]				30				
Aroclor-1242 (2) [2C]				30				
Aroclor-1242 (3) [2C]				30				
Aroclor-1242 (4) [2C]				30				
Aroclor 1248	10.7	33.0 ug/kg		30				
Aroclor-1248 (1)				30				
Aroclor-1248 (2)				30				
Aroclor-1248 (3)				30				

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Aroclor-1248 (4)				30				
Aroclor 1248 [2C]	10.7	33.0 ug/kg		30				
Aroclor-1248 (1) [2C]				30				
Aroclor-1248 (2) [2C]				30				
Aroclor-1248 (3) [2C]				30				
Aroclor-1248 (4) [2C]				30				
Aroclor 1254	10.7	33.0 ug/kg		30				
Aroclor-1254 (1)				30				
Aroclor-1254 (2)				30				
Aroclor-1254 (3)				30				
Aroclor-1254 (4)				30				
Aroclor-1254 (5)				30				
Aroclor 1254 [2C]	10.7	33.0 ug/kg		30				
Aroclor-1254 (1) [2C]				30				
Aroclor-1254 (2) [2C]				30				
Aroclor-1254 (3) [2C]				30				
Aroclor-1254 (4) [2C]				30				
Aroclor-1254 (5) [2C]				30				
Aroclor 1260	14.4	33.0 ug/kg		30	59 - 120	30	59 - 120	30
Aroclor-1260 (1)				30				
Aroclor-1260 (2)				30				
Aroclor-1260 (3)				30				
Aroclor-1260 (4)				30				
Aroclor-1260 (5)				30				
Aroclor 1260 [2C]	14.4	33.0 ug/kg		30	59 - 120	30	59 - 120	30
Aroclor-1260 (1) [2C]				30				
Aroclor-1260 (2) [2C]				30				
Aroclor-1260 (3) [2C]				30				
Aroclor-1260 (4) [2C]				30				
Aroclor 1262	14.4	33.0 ug/kg		30				
Aroclor-1262 (1)				30				
Aroclor-1262 (2)				30				
Aroclor-1262 (3)				30				
Aroclor-1262 (4)				30				
Aroclor-1262 (5)				30				
Aroclor 1262 [2C]	14.4	33.0 ug/kg		30				
Aroclor-1262 (1) [2C]				30				
Aroclor-1262 (2) [2C]				30				
Aroclor-1262 (3) [2C]				30				
Aroclor-1262 (4) [2C]				30				
Aroclor-1262 (5) [2C]				30				
Aroclor 1268	14.4	33.0 ug/kg		30				
Aroclor-1268 (1)				30				
Aroclor-1268 (2)				30				
Aroclor-1268 (3)				30				
Aroclor-1268 (4)				30				
Aroclor 1268 [2C]	14.4	33.0 ug/kg		30				

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
Aroclor-1268 (1) [2C]				30				
Aroclor-1268 (2) [2C]				30				
Aroclor-1268 (3) [2C]				30				
Aroclor-1268 (4) [2C]				30				
surr: Decachlorobiphenyl			45 - 138					
surr: Tetrachlorometaxylene			52 - 120					
surr: Decachlorobiphenyl [2C]			45 - 138					
surr: Tetrachlorometaxylene [2C]			52 - 120					
surr: DCB			45 - 138					
surr: TCX			52 - 120					
surr: DCB [2C]			45 - 138					
surr: TCX [2C]			52 - 120					
1-Bromo-2-Nitrobenzene								
Hexabromobiphenyl								
1-Bromo-2-Nitrobenzene [2C]								
Hexabromobiphenyl [2C]								

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8270D-SIM PAH (5 ug/kg) (EPA 8270D-SIM) in Solid								
Preservation: Cool <6°C								
Container: Glass WM, Clear, 8 oz		**Minimum Sample Weight:** 150 g			**Hold Time:** 14 days			
Naphthalene	2.26	5.00 ug/kg		30	36 - 120	30	36 - 120	30
2-Methylnaphthalene	1.69	5.00 ug/kg		30	35 - 120	30	35 - 120	30
1-Methylnaphthalene	1.61	5.00 ug/kg		30	39 - 120	30	39 - 120	30
Biphenyl	1.44	5.00 ug/kg		30	30 - 160	30	30 - 160	30
2,6-Dimethylnaphthalene	0.750	5.00 ug/kg		30	30 - 160	30	30 - 160	30
Acenaphthylene	1.61	5.00 ug/kg		30	35 - 120	30	35 - 120	30
Acenaphthene	1.49	5.00 ug/kg		30	39 - 120	30	39 - 120	30
Dibenzofuran	1.41	5.00 ug/kg		30	38 - 120	30	38 - 120	30
2,3,5-Trimethylnaphthalene	0.419	5.00 ug/kg		30		30		30
Fluorene	1.47	5.00 ug/kg		30	41 - 120	30	41 - 120	30
Dibenzothiophene	0.425	5.00 ug/kg		30		30		30
Phenanthrene	1.58	5.00 ug/kg		30	46 - 120	30	46 - 120	30
Anthracene	1.78	5.00 ug/kg		30	36 - 120	30	36 - 120	30
Carbazole	0.189	5.00 ug/kg		30	30 - 160	30	30 - 160	30
1-Methylphenanthrene	0.700	5.00 ug/kg		30	30 - 160	30	30 - 160	30
Fluoranthene	1.87	5.00 ug/kg		30	46 - 120	30	46 - 120	30
Pyrene	2.26	5.00 ug/kg		30	49 - 120	30	49 - 120	30
Benzo(a)anthracene	2.22	5.00 ug/kg		30	42 - 120	30	42 - 120	30
Chrysene	1.92	5.00 ug/kg		30	48 - 120	30	48 - 120	30
Benzo(b)fluoranthene	2.11	5.00 ug/kg		30	35 - 127	30	35 - 127	30
Benzo(k)fluoranthene	2.28	5.00 ug/kg		30	37 - 129	30	37 - 129	30
Benzo(j)fluoranthene	1.75	5.00 ug/kg		30	40 - 120	30	40 - 120	30
Benzo(e)pyrene	0.647	5.00 ug/kg		30	30 - 160	30	30 - 160	30
Benzo(a)pyrene	2.38	5.00 ug/kg		30	36 - 120	30	36 - 120	30
Perylene	3.56	5.00 ug/kg		30	44 - 120	30	44 - 120	30
Indeno(1,2,3-cd)pyrene	3.01	5.00 ug/kg		30	40 - 120	30	40 - 120	30
Dibenzo(a,h)anthracene	2.56	5.00 ug/kg		30	38 - 120	30	38 - 120	30
Benzo(g,h,i)perylene	2.79	5.00 ug/kg		30	38 - 120	30	38 - 120	30
surr: 2-Methylnaphthalene-d10			32 - 120					
surr: Dibenzo[a,h]anthracene-d14			21 - 133					
surr: Fluoranthene-d10			36 - 134					
Naphthalene-d8								
Acenaphthene-d10								
Phenanthrene-d10								
Chrysene-d12								
Perylene-d12								

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
8270D-SIM PAH (0.1 ug/L) (EPA 8270D-SIM) in Water								
Preservation: Cool <6°C								
Container: Glass NM, Amber, 500 mL		**Minimum Sample Volume:** 1000			**Hold Time:** 7 days			
Naphthalene	0.0296	0.100 ug/L		30	33 - 120	30	33 - 120	30
2-Methylnaphthalene	0.0302	0.100 ug/L		30	29 - 120	30	29 - 120	30
1-Methylnaphthalene	0.0289	0.100 ug/L		30	37 - 120	30	37 - 120	30
Biphenyl				30	30 - 160	30	30 - 160	40
2,6-Dimethylnaphthalene				30	30 - 160	30	30 - 160	40
Acenaphthylene	0.0380	0.100 ug/L		30	32 - 120	30	32 - 120	30
Acenaphthene	0.0304	0.100 ug/L		30	38 - 120	30	38 - 120	30
Dibenzofuran	0.0280	0.100 ug/L		30	38 - 120	30	38 - 120	30
2,3,5-Trimethylnaphthalene				30				
Fluorene	0.0278	0.100 ug/L		30	41 - 120	30	41 - 120	30
Dibenzothiophene				30				
Phenanthrene	0.0279	0.100 ug/L		30	49 - 120	30	49 - 120	30
Anthracene	0.0352	0.100 ug/L		30	39 - 120	30	39 - 120	30
Carbazole				30	30 - 160	30	30 - 160	40
1-Methylphenanthrene				30	30 - 160	30	30 - 160	40
Fluoranthene	0.0347	0.100 ug/L		30	48 - 120	30	48 - 120	30
Pyrene	0.0434	0.100 ug/L		30	48 - 120	30	48 - 120	30
Benzo(a)anthracene	0.0399	0.100 ug/L		30	37 - 120	30	37 - 120	30
Chrysene	0.0321	0.100 ug/L		30	48 - 120	30	48 - 120	30
Benzo(b)fluoranthene	0.0417	0.100 ug/L		30	38 - 128	30	38 - 128	30
Benzo(k)fluoranthene	0.0433	0.100 ug/L		30	36 - 130	30	36 - 130	30
Benzo(j)fluoranthene	0.0376	0.100 ug/L		30	49 - 120	30	49 - 120	30
Benzo(e)pyrene				30	30 - 160	30	30 - 160	30
Benzo(a)pyrene	0.0429	0.100 ug/L		30	25 - 120	30	25 - 120	30
Perylene	0.0420	0.100 ug/L		30	30 - 160	30	30 - 160	30
Indeno(1,2,3-cd)pyrene	0.0422	0.100 ug/L		30	32 - 120	30	32 - 120	30
Dibenzo(a,h)anthracene	0.0535	0.100 ug/L		30	21 - 120	30	21 - 120	30
Benzo(g,h,i)perylene	0.0388	0.100 ug/L		30	28 - 120	30	28 - 120	30
surr: 2-Methylnaphthalene-d10			31 - 120					
surr: Dibenzo[a,h]anthracene-d14			10 - 125					
surr: Fluoranthene-d10			46 - 121					
Naphthalene-d8								
Acenaphthene-d10								
Phenanthrene-d10								
Chrysene-d12								
Perylene-d12								

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
TPH (Extractables) (NWTPH-Dx) in Solid								
Preservation: Cool <6°C								
Container: Glass WM, Clear, 8 oz		**Minimum Sample Weight:** 15 g				**Hold Time:** 14 days		
Diesel Range Organics (NW C12-C24	1.35	5.00 mg/kg		30		30	62 - 120	30
Diesel Range Organics (Diesel#1 Tol-				30		30		30
Diesel Range Organics (CAL C10-24)				30		30	30 - 160	30
Diesel Range Organics (AK C10-C25	2.43	5.00 mg/kg		30		30	75 - 125	30
Diesel Range Organics (8015 C10-C2				30		30	30 - 160	30
Motor Oil Range Organics (NW C24-	2.48	10.0 mg/kg		30		30		30
Motor Oil Range Organics (CAL C24				30		30		30
Motor Oil Range Organics (AK C25-(	0.665	10.0 mg/kg		30		30	60 - 120	30
Mineral Oil Range Organics (C24-C3				30		30		30
Mineral Spirits Range Organics (Tol-(				30		30		30
JP8 Range Organics (C8-C18)				30		30		30
JP5 Range Organics (C10-C16)				30		30		30
JP4 Range Organics (Tol-C14)				30		30		30
Jet-A Range Organics (C10-C18)	2.22	5.00 mg/kg		30		30		30
Kerosene Range Organics (Tol-C18)				30		30		30
Stoddard Range Organics (C8-C12)				30		30		30
Creosote Range Organics (C8-C22)				30		30		30
Bunker C Range Organics (C10-C38)				30		30		30
Transformer Oil Range Organics (C12				30		30		30
surr: o-Terphenyl			50 - 150					
surr: n-Triacontane			50 - 150					

Analytical Method Information

Analyte	DL	LOQ	Surrogate %R	Duplicate RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike / LCS %R	Blank Spike / LCS RPD
TPH (Extractables) (NWTPH-Dx) in Water								
Preservation: Cool <6°C								
Container: Glass NM, Amber, 500 mL		**Minimum Sample Volume:** 1000 mL			**Hold Time:** 7 days			
Diesel Range Organics (NW C12-C24	0.0217	0.100 mg/L		30	64 - 120	30	64 - 120	30
Diesel Range Organics (AK C10-C25	0.0222	0.100 mg/L		30	75 - 125	30	75 - 125	30
Diesel Range Organics (Diesel#1 Tol-				30		30		30
Diesel Range Organics (CAL C10-24)				30	30 - 160	30	30 - 160	30
Diesel Range Organics (8015 C10-C2				30	30 - 160	30	30 - 160	30
Motor Oil Range Organics (NW C24-	0.0443	0.200 mg/L		30		30		30
Motor Oil Range Organics (AK C25-(	0.0300	0.200 mg/L		30	60 - 120	30	60 - 120	30
Motor Oil Range Organics (CAL C24				30		30		30
Mineral Spirits Range Organics (Tol-(				30		30		30
Mineral Oil Range Organics (C24-C3				30		30		30
Kerosene Range Organics (Tol-C18)				30		30		30
JP8 Range Organics (C8-C18)				30		30		30
JP5 Range Organics (C10-C16)				30		30		30
JP4 Range Organics (Tol-C14)				30		30		30
Jet-A Range Organics (C10-C18)				30		30		30
Creosote Range Organics (C8-C22)				30		30		30
Bunker C Range Organics (C10-C38)				30		30		30
Stoddard Range Organics (C8-C12)				30		30		30
Transformer Oil Range Organics (C1				30		30		30
surr: o-Terphenyl			50 - 150					
surr: n-Triacontane			50 - 150					

APPENDIX E

TERRESTRIAL ECOLOGICAL EVALUATION

TERRESTRIAL ECOLOGICAL EVALUATION

A site-specific terrestrial ecological evaluation (TEE) for the site located at the Northern State Hospital property at 24909 Hub Drive, Sedro-Woolley, Washington (herein referred to as the Property), following the procedures outlined in Washington Administrative Code (WAC) 173-340-7490 and WAC 173-340-7493. The purpose of this TEE is to present sufficient information to evaluate the ecological protectiveness of remedial alternatives that will be evaluated for the Property (see WAC 173-340-7490(1)(b)). The TEE includes problem formulation and an ecological screening evaluation (WAC 173-340-7493(1)(c)). Concentrations of chemicals in soil were evaluated against ecological screening levels, as described in Model Toxics Control Act (MTCA) Table 749-3, for the following terrestrial receptors: plants, soil biota, and wildlife. This TEE provides an initial, preliminary screening of potential terrestrial ecological risks. A revised TEE will be conducted, as necessary, following completion of additional environmental investigation and remedy evaluation and selection.

PROBLEM FORMULATION

One of the early steps in any ecological evaluation is problem formulation (USEPA, 1997). Problem formulation involves identifying chemicals of ecological concern (CECs), describing pathways by which ecological receptors may contact CECs in soil, and identifying current or potential future terrestrial ecological receptors that may contact soil (WAC 173-340-7493(2)). The conceptual site model is described in the focused site assessment report Section 5, and other aspects of problem formulation are described below.

Site Setting and Exposure Pathways

The approximately 217-acre Property includes the main campus of the former Northern State Hospital. The Property is currently occupied by the North Cascade Job Corps, the Pioneer Center, and the National Guard. Future use of the Property potentially includes expanded residential use of the existing infrastructure. Hansen Creek is located to the north and east of the Property and supports salmon habitat. To the north, east, and south, the Property abuts the Northern State Recreation Area, which includes more than 700 acres of open vegetated space. The Property is bordered by Fruitdale Road and residential areas to the west and southwest.

The investigation conducted on August 19, 2014, focused on primary areas of environmental concern on the northeastern portion of the Property, including current and former fuel-handling and -storage areas and a former laundry building. The Olmsted Brothers landscape architects laid out the original planting plan for the Property, which includes thousands of trees and shrubs and approximately 14 acres of lawn. The Northern State Recreation Area, which is in close proximity to the Property, includes heavily vegetated forestland and wetlands that have the potential to support a wide variety of wildlife.

The exposure routes assessed for this TEE include plant uptake of chemicals in soil, ingestion of chemically-impacted soil by soil biota and terrestrial wildlife, and ingestion of bioaccumulated chemicals in plant material or prey by terrestrial wildlife.

This TEE provides a preliminary screening; therefore, specific species and habitat types were not identified for the Property.

Exposure Points

The standard point of compliance for terrestrial ecological screening levels is from the ground surface to 15 feet below ground surface. Note that when used in conjunction with institutional controls to prevent excavation of deeper soils, a conditional point of compliance may be set to a depth of 6 feet, the depth to which the biologically active zone is assumed to extend. For this TEE, soil samples collected at the Property from between 0 to 15 feet below ground surface were included (WAC 173-340-7490 (4)(b)).

Chemicals of Ecological Concern

According to WAC 173-340-7493(2)(a)(i), chemicals detected in soil may be eliminated from consideration as CECs if the maximum or the upper 95 percent upper confidence limit soil concentration found at the site does not exceed ecological indicator concentrations (EICs) for plants, soil biota, and wildlife described in Table 749-3. For this initial, screening-level TEE, the maximum soil concentrations were compared to EICs.

MTCA also allows substitution of natural background concentrations for the EICs provided in Table 749-3, thereby eliminating chemicals detected below natural background concentrations as CECs.

Note that WAC 173-340-7493(2)(a)(i) further specifies that EICs are not cleanup levels and that concentrations that exceed EICs do not necessarily require remediation.

ECOLOGICAL SCREENING

An ecological screening evaluation was performed to identify locations where chemicals in soil were detected at concentrations greater than the EICs from MTCA Table 749-3 (see the attached screening summary table) and natural background concentrations. These chemicals are potential CECs and may be evaluated further during the CEC selection process to be completed following additional site characterization and remedy selection.

The following seven chemicals were detected in soil above the EICs:

- **Arsenic.** Concentrations are generally consistent with the Washington statewide natural background concentration (7 milligrams per kilogram [mg/kg]). Arsenic exceeded the plant EIC of 10 mg/kg in one soil location (GP2) and the wildlife EIC of 7 mg/kg in three locations (GP1, GP2, and GP9). However, the arsenic EICs are for arsenic III or V and the analytical results are reported for total arsenic. Arsenic III or V concentrations at the Property may be less than the detected total arsenic concentrations.
- **Barium.** Five out of six soil samples analyzed exceeded the wildlife EIC of 102 mg/kg. The Washington State Department of Ecology (Ecology) does not provide a natural background concentration in their metals natural background document (Ecology, 1994); however, barium may occur naturally in the Pacific Northwest at concentrations well above the EICs.

- **Chromium.** Five out of six soil samples analyzed exceeded the plant, soil biota, and wildlife EICs of 42 mg/kg, 42 mg/kg, and 67 mg/kg, respectively.
- **Copper.** Four out of six soil samples analyzed marginally exceeded the soil biota EIC of 50 mg/kg.
- **Selenium.** Method reporting limits for selenium exceeded the wildlife EIC in five out of six samples analyzed. Selenium was detected in one sample above the wildlife EIC.
- **Zinc.** Five out of six of the soil samples analyzed exceeded the plant EIC of 86 mg/kg.
- **Diesel-range organics.** Diesel- and motor-oil-range hydrocarbon detections were summed and reported as total heavy oils for comparison to the diesel-range organics EICs. Both soil samples analyzed exceeded the soil biota EIC of 200 mg/kg. However, note that the reported diesel-range fraction only marginally exceeds the soil biota EIC, and additional site characterization may determine that the diesel and motor oil fractions may be reported separately.

Volatile organic compounds, polycyclic aromatic hydrocarbons, and polychlorinated biphenyls were not detected at concentrations above EICs.

In summary:

- Metals were detected at concentrations above at least one EIC in all six samples analyzed.
- Total heavy oils exceeded the soil biota EIC in both samples analyzed.

NEXT STEPS

Metals detected at the Property were relatively low concentrations, do not exceed human health cleanup levels (see Section 6.1), and concentrations were relatively consistent across all sample locations (see attached table). The distribution of metals concentrations suggests that metals in soil may be a background condition and not associated with any specific releases at the Property. An area-wide background metals assessment is recommended to evaluate whether a background condition of elevated concentrations of metals exists at the Property.

WAC 173-340-7493(1)(d) specifies that Ecology may determine that no further site-specific TEE is necessary if the cleanup action developed for the protection of human health will eliminate ecological exposure pathways of concern to contaminated soil. A determination has not yet been made for the future use of the Property; therefore, this exclusion does not currently apply.

This preliminary TEE will be revised following completion of additional site characterization, including evaluation of area wide background metals concentrations, the extent of heavy oils in near surface soils, and identification of potential remedial options.

REFERENCES

Ecology. 1994. Natural background soil metals concentrations in Washington State. Publication No. 94-115. Prepared by Washington State Department of Ecology. October.

USEPA. 1997. Ecological risk assessment guidance for Superfund: process for designing and conducting ecological risk assessments. Interim final. EPA 540-R-97-006. Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington DC. June.

TABLE

Table
Terrestrial Ecological Screening Summary
Northern State Hospital
Port of Skagit
Sedro-Woolley, Washington

					Location:	GP1	GP2	GP3	GP4	GP5	GP7	GP9	GP10
					Sample Name:	GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4	GP5-S-14.5	GP7-S-0.8	GP9-S-0.5	GP10-S-0.5
					Collection Date:	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014
					Collection Depth (ft bgs):	1.1 - 1.7	1.3 - 4.8	5.7 - 8.3	4.6 - 6.4	13.9 - 15.1	0 - 1.6	0 - 1.0	0 - 1.1
	Ecological Indicator Concentration[a]			Natural Background Metals[b]									
	Plants	Soil Biota	Wildlife										
Metals (mg/kg)													
Arsenic[c]	10	60	7	7		**7.4**	**13**	**4.0**	**6.2**	**6.1**	--	**9.1**	--
Barium	500	NV	102	NV		**162**	**180**	**388**	**141**	**58.4**	--	**178**	--
Cadmium	4	20	14	1		**0.1**	**0.2**	0.1 U	**0.2**	**0.2**	--	**0.2**	--
Chromium[d]	42	42	67	42		**106**	**107**	**38.4**	**108**	**170**	--	**62**	--
Copper	100	50	217	36		**42.7**	**55.1**	**52.2**	**28.4**	**53.6**	--	**59.4**	--
Lead	50	500	118	17		**13.1**	**19.9**	**15.3**	**28.3**	**10**	--	**43.9**	--
Mercury[e]	0.3	0.1	5.5	0.07		**0.07**	**0.09**	**0.06**	**0.08**	**0.09**	--	**0.05**	--
Selenium	1	70	0.3	NV		0.7 U	0.7 U	0.7 U	0.7 U	**0.7**	--	0.6 U	--
Silver	2	NV	NV	NV		0.3 U	0.3 U	0.3 U	**0.4**	0.3 U	--	0.2 U	--
Zinc	86	200	360	86		**107**	**122**	**66**	**143**	**96**	--	**121**	--
PCBs (mg/kg)													
Aroclor 1016	NV	NV	NV	NA		--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1221	NV	NV	NV	NA		--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1232	NV	NV	NV	NA		--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1242	NV	NV	NV	NA		--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1248	NV	NV	NV	NA		--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1254	NV	NV	NV	NA		--	0.032 U	0.033 U	--	--	--	0.032 U	--
Aroclor 1260	NV	NV	NV	NA		--	0.032 U	0.033 U	--	--	--	0.032 U	--
Total PCB Aroclors	40	NV	0.65	NA		--	ND	ND	--	--	--	ND	--
VOCs (mg/kg)													
1,1,1,2-Tetrachloroethane	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,1,1-Trichloroethane	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,1,2,2-Tetrachloroethane	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,1,2-Trichloroethane	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,1-Dichloroethane	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,1-Dichloroethene	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,1-Dichloropropene	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,2,3-Trichlorobenzene	NV	20	NV	NA		--	--	--	0.0087 U	0.0074 U	--	--	--
1,2,3-Trichloropropane	NV	NV	NV	NA		--	--	--	0.0035 U	0.003 U	--	--	--
1,2,4-Trichlorobenzene	NV	20	NV	NA		--	--	--	0.0087 U	0.0074 U	--	--	--
1,2,4-Trimethylbenzene	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,2-Dibromo-3-chloropropane	NV	NV	NV	NA		--	--	--	0.0087 U	0.0074 U	--	--	--
1,2-Dibromoethane	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--
1,2-Dichlorobenzene	NV	NV	NV	NA		--	--	--	0.0017 U	0.0015 U	--	--	--

Table
Terrestrial Ecological Screening Summary
Northern State Hospital
Port of Skagit
Sedro-Woolley, Washington

					Location:	GP1	GP2	GP3	GP4	GP5	GP7	GP9	GP10
					Sample Name:	GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4	GP5-S-14.5	GP7-S-0.8	GP9-S-0.5	GP10-S-0.5
					Collection Date:	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014
					Collection Depth (ft bgs):	1.1 - 1.7	1.3 - 4.8	5.7 - 8.3	4.6 - 6.4	13.9 - 15.1	0 - 1.6	0 - 1.0	0 - 1.1
	Ecological Indicator Concentration[a]			Natural Background Metals[b]									
	Plants	Soil Biota	Wildlife										
1,2-Dichloroethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
1,2-Dichloropropane	NV	700	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
1,3,5-Trimethylbenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
1,3-Dichlorobenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
1,3-Dichloropropane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
1,4-Dichlorobenzene	NV	20	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
2,2-Dichloropropane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
2-Butanone	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
2-Chloroethylvinyl ether	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
2-Chlorotoluene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
2-Hexanone	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
4-Chlorotoluene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
4-Isopropyltoluene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
4-Methyl-2-pentanone	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
Acetone	NV	NV	NV	NA	--	--	--	**0.16**	**0.055**	--	--	--
Acrolein	NV	NV	NV	NA	--	--	--	0.087 U	0.074 U	--	--	--
Acrylonitrile	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
Benzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	0.014 U	0.016 U	0.021 U
Bromobenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Bromodichloromethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Bromoethane	NV	NV	NV	NA	--	--	--	0.0035 U	0.003 U	--	--	--
Bromoform	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Bromomethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Carbon disulfide	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Carbon tetrachloride	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Chlorobenzene	NV	40	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Chlorobromomethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Chloroethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Chloroform	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Chloromethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
cis-1,2-Dichloroethene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
cis-1,3-Dichloropropene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Dibromochloromethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Dibromomethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Ethylbenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	0.014 U	0.016 U	0.021 U

Table
Terrestrial Ecological Screening Summary
Northern State Hospital
Port of Skagit
Sedro-Woolley, Washington

					Location:	GP1	GP2	GP3	GP4	GP5	GP7	GP9	GP10
					Sample Name:	GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4	GP5-S-14.5	GP7-S-0.8	GP9-S-0.5	GP10-S-0.5
					Collection Date:	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014
					Collection Depth (ft bgs):	1.1 - 1.7	1.3 - 4.8	5.7 - 8.3	4.6 - 6.4	13.9 - 15.1	0 - 1.6	0 - 1.0	0 - 1.1
	Ecological Indicator Concentration[a]			Natural Background Metals[b]									
	Plants	Soil Biota	Wildlife										
Freon 113	NV	NV	NV	NA	--	--	--	0.0035 U	0.003 U	--	--	--
Hexachlorobutadiene	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
Isopropylbenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
m,p-Xylene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	0.027 U	0.032 U	0.042 U
Methyl iodide	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Methylene chloride	NV	NV	NV	NA	--	--	--	0.0099 U	0.0071 U	--	--	--
Naphthalene	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
n-Butylbenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
n-Propylbenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
o-Xylene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	0.014 U	0.016 U	0.021 U
sec-Butylbenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Styrene	300	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
tert-Butylbenzene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Tetrachloroethene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Toluene	200	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	0.014 U	0.016 U	0.021 U
trans-1,2-dichloroethene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
trans-1,3-Dichloropropene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
trans-1,4-Dichloro-2-butene	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
Trichloroethene	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Trichlorofluoromethane	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Vinyl Acetate	NV	NV	NV	NA	--	--	--	0.0087 U	0.0074 U	--	--	--
Vinyl Chloride	NV	NV	NV	NA	--	--	--	0.0017 U	0.0015 U	--	--	--
Xylenes, Total	NV	NV	NV	NA	--	--	--	ND	ND	ND	ND	ND
PAHs (mg/kg)												
1-Methylnaphthalene	NV	NV	NV	NA	--	**0.013**	**0.56**	**0.0076**	0.0046 U	--	0.06 UJ	--
2-Methylnaphthalene	NV	NV	NV	NA	--	**0.018**	**0.6**	**0.0091**	0.0046 U	--	0.06 UJ	--
Acenaphthene	20	NV	NV	NA	--	0.0049 U	**0.086**	0.0048 U	0.0046 U	--	0.06 UJ	--
Acenaphthylene	NV	NV	NV	NA	--	**0.0065**	**0.052**	0.0048 U	0.0046 U	--	**0.12** J	--
Anthracene	NV	NV	NV	NA	--	**0.014**	**0.052**	**0.0058**	0.0046 U	--	**0.11** J	--
Benzo(a)anthracene	NV	NV	NV	NA	--	**0.041**	**0.051**	**0.0099**	0.0046 U	--	**0.26** J	--
Benzo(a)pyrene	NV	NV	12	NA	--	**0.046**	**0.03**	**0.011**	0.0046 U	--	**0.39** J	--
Benzo(ghi)perylene	NV	NV	NV	NA	--	**0.051**	**0.019**	**0.0091**	0.0046 U	--	**0.25** J	--
Chrysene	NV	NV	NV	NA	--	**0.07**	**0.057**	**0.014**	0.0046 U	--	**0.35** J	--
Dibenzo(a,h)anthracene	NV	NV	NV	NA	--	**0.007**	**0.0074**	0.0048 U	0.0046 U	--	**0.069** J	--
Dibenzofuran	NV	NV	NV	NA	--	**0.011**	**0.11**	**0.0088**	0.0046 U	--	0.06 UJ	--

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Port of Skagit
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					Location:	GP1	GP2	GP3	GP4	GP5	GP7	GP9	GP10
					Sample Name:	GP1-S-1.4	GP2-S-3.0	GP3-S-7.0	GP4-S-5.4	GP5-S-14.5	GP7-S-0.8	GP9-S-0.5	GP10-S-0.5
					Collection Date:	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014	08/19/2014
					Collection Depth (ft bgs):	1.1 - 1.7	1.3 - 4.8	5.7 - 8.3	4.6 - 6.4	13.9 - 15.1	0 - 1.6	0 - 1.0	0 - 1.1
	Ecological Indicator Concentration[a]			Natural Background Metals[b]									
	Plants	Soil Biota	Wildlife										
Fluoranthene	NV	NV	NV	NA	--	**0.097**	**0.068**	**0.028**	0.0046 U	--	**0.26** J	--
Fluorene	NV	30	NV	NA	--	**0.0089**	**0.023**	0.0048 U	0.0046 U	--	0.06 UJ	--
Indeno(1,2,3-cd)pyrene	NV	NV	NV	NA	--	**0.028**	**0.012**	**0.0064**	0.0046 U	--	**0.2** J	--
Naphthalene	NV	NV	NV	NA	--	**0.06**	**0.38**	**0.019**	0.0046 U	--	0.06 UJ	--
Phenanthrene	NV	NV	NV	NA	--	**0.079**	**0.21**	**0.021**	0.0046 U	--	**0.12** J	--
Pyrene	NV	NV	NV	NA	--	**0.089**	**0.071**	**0.024**	0.0046 U	--	**0.29** J	--
Total Benzofluoranthenes	NV	NV	NV	NA	--	**0.087**	**0.062**	**0.017**	0.0046 U	--	**0.68** J	--
Total Naphthalenes	NV	NV	NV	NA	--	**0.091**	**1.54**	**0.0357**	0.0046 U	--	0.06 UJ	--
cPAH TEQ	NV	NV	NV	NA	--	**0.063**	**0.044**	**0.015**	ND	--	**0.51** J	--
TPH Identification (Presence/Absence)												
Gasoline	NV	NV	NV	NA	ND	ND	ND	ND	ND	--	ND	ND
Diesel	NV	NV	NV	NA	ND	ND	ND	ND	ND	--	**DETECT**	**DETECT**
Motor-Oil Range	NV	NV	NV	NA	ND	ND	ND	ND	ND	--	**DETECT**	**DETECT**
TPH (mg/kg)												
Gasoline	NV	100	5000	NA	--	--	--	--	--	5.4 U	--	--
Diesel	NV	200	6000	NA	--	--	--	--	--	--	**220**	**220**
Motor-Oil Range	NV	NV	NV	NA	--	--	--	--	--	--	**2700**	**2300**
Total Heavy Oils (Diesel + Motor Oil)	NV	200	6000	NA	--	--	--	--	--	--	**2920**	**2520**

Table
Terrestrial Ecological Screening Summary
Northern State Hospital
Port of Skagit
Sedro-Woolley, Washington

NOTES:
Detected concentrations in **bold.**
Ecological indicator concentration exceedances are highlighted as follows:

Plants
Soil Biota
Wildlife
MRL exceeds one or more of the ecological indicator concentrations
Value exceeds more than one ecological indicator concentration

-- = not analyzed.
cPAH TEQ = carcinogenic PAH toxic equivalency quotient.
ft bgs = feet below ground surface.
J = result is an estimated value.
mg/kg = milligrams per kilogram.
MRL = method reporting limit.
NA = not applicable.
ND = not detected.
NV = no value.
PCB = polychlorinated biphenyl.
PAH = polycyclic aromatic hydrocarbon.
Total PCB Aroclors = sum of all PCB Aroclors.
Total Naphthalenes = sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.
TPH = total petroleum hydrocarbon.
U = Analyte not detected at or above specified MRL.
VOC = volatile organic compound.
[a]Ecological indicator concentrations were obtained from Model Toxics Control Act Table 749-3.
[b]Natural background metals concentrations in soil are the Washington State, statewide 90th percentile concentrations obtained from Ecology, 1994.
[c]Plants and soil biota screening levels are for arsenic V and the wildlife screening level is for arsenic III. Reported results are for total arsenic.
[d]Trivalent chromium (chromium III) screening level.
[e]Inorganic mercury screening level.