Appendix B

Site Investigation Report

SITE INVESTIGATION AND DATA SUMMARY REPORT

Napo Concession Area
ORIENTE Region
Ecuador

In the Matter of BIT Arbitration
Chevron v. Government of Ecuador

Prepared by

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SUMMARY OF REPORT

Summary of Site Investigation Report

The Site Investigation (SI) Report presents the site history, field investigation objectives, field procedures, observations, environmental sample analytical data, and findings generated by The Louis Berger Group, Inc.'s (LBG's) investigation of five former Texpet oil exploration and production (E&P) facilities in the former Concession Area, Oriente Region, Republic of Ecuador. In response to criticisms leveled by Chevron at the *LBG 2013 Expert Report*, LBG conducted independent site investigations at five sites evaluated in the Judicial Inspections (JIs) for the Lago Agrio Trial. Given time constraints associated with the Bilateral Investment Treaty (BIT) Arbitration, these investigations were not intended to be comprehensive remedial investigations. Rather, they were intended to test in a focused way the broad assertions made by Chevron and their experts regarding the limited nature and extent of contamination resulting from Texpet's activities in the former Concession Area in their various documents submitted in the BIT Arbitration. In other words, the investigations were conducted to determine whether Chevron's assertions could stand up to independent scrutiny by capable investigators.

The following key findings of LBG's SI are briefly described in this Summary:

- At well site Lago Agrio 02 (LA-02), LBG documented the presence of soil, groundwater, and downgradient sediment and surface water contamination associated with Pit 3. Pit 3 was closed by Texpet in 1990, not remediated during the Remedial Action Plan (RAP) effort, was identified and investigated by Chevron during their Pre-Inspection (PI), but was not identified or discussed by Chevron in their Judicial Inspection (JI) report to the Lago Agrio Court. Groundwater contamination, including visible oil and concentrations of Total Petroleum Hydrocarbons (TPH) and chrysene above applicable standards, was detected in the area of Pit 3. The LBG SI determined that a sand layer saturated with groundwater, which discharges to the adjacent stream to the west, is present in the subsurface at LA-02. The sediment in the adjacent stream was contaminated with TPH and Total Polyaromatic Hydrocarbons (Total PAH). Pit 3 was a source of contamination to soil, groundwater, and stream sediments/surface water, and impacts to these environmental media persist more than 20 years after Texpet closed the pit.
- At well site Shushufindi 25 (SSF-25), LBG detected the presence of soil and groundwater contamination in the vicinity of Pit 1 and sediment contamination in a stream adjacent to the well site. The SI found that soil in and adjacent to Pit 1 was

contaminated with TPH, Total PAH, some volatile organic compounds (VOCs), and some metals above applicable standards. Groundwater was present in a sand layer beneath much of the site and was contaminated with TPH and chrysene near Pit 1. The stream located immediately to the west of SSF-25 contained oil-saturated sediment, and contaminants detected in the sediment and surface water above applicable standards included TPH, Total PAH, phenols, and metals.

- At well site Yuca 02 (YU-02), sediment samples collected by LBG from a marshy area located to the north of the wellhead confirmed the presence of TPH contamination also detected by Chevron during their PI and JI sampling efforts. Chevron attributed the detected contamination to a historical spill that occurred during the period of Texpet's operations. Sediment TPH detections in LBG's samples ranged from 470 milligrams per kilogram (mg/kg) to 51,100 mg/kg, with the highest detected concentration 51 times higher than the Ecuadorean Reglamento Sustitutivo del Reglamento Ambiental para las Operaciones Hidrocarburiferas en el Ecuador (RAOHE) Sensitive Ecosystem cleanup criterion of 1,000 mg/kg. In addition, LBG's investigations of Pit 1 at YU-02 detected soil contamination, including observations of visible oil and detections of TPH, Total PAH, individual PAHs, and metals above applicable standards and background concentrations. LBG encountered groundwater in a sand layer beneath Pit 1 and across the site (based on soil borings) and detected groundwater contamination including TPH and barium above standards.

- At well site Guanta 06 (GU-06), LBG investigated the location of former Pit A. Evaluation of historical aerial and satellite imagery indicates that Pit A was closed by Texpet circa 1990. LBG's SI detected TPH, Total PAH, and metals (including barium) contamination in the soil at Pit A. Visible oil contamination was encountered in groundwater samples, which were also contaminated with TPH, benzo[g,h,i]perylene, and chrysene. LBG observed visible crude oil contamination in sediments in a stream located downgradient of Pit A; the sediment contamination continues for nearly half a kilometer downstream. The SI confirmed that Pit A was a significant source of oil contamination to the stream and that contaminant impacts from GU-06 are persistent.

- At well site Aguarico 02 (AG-02), LBG detected contaminated sediment adjacent to a seep/spring located downgradient and west of Pits 2 and 3 that was visibly discharging oily water to the ground surface in 2013. The seep/spring was located in a drainage pathway for pit overflows identified by Chevron. The detected TPH concentration in LBG's sediment sample AG02-SD002 was 31,310 mg/kg and is more than 31 times higher than Ecuadorean regulatory criterion for TPH. This finding indicates that contamination from the well site's pits was likely historically transported via direct discharge and/or recurring overflows during rainfall (leading to overtopping of the former pit berms) down the slope and drainage paths to the west, leading to a stream that appears to be currently used for laundering clothes and bathing. In addition, it is likely that contaminants are migrating from the margin of the pits to seeps/springs on

> the slope along the same drainage pathway. The analysis of sediment sample AG02-SD002 confirms the persistence of TPH contamination originally documented by Chevron via one of their PI soil borings, and demonstrates continued contamination impacts from the closed pits to drainage pathways and downgradient resources in the rainforest.

This SI Report provides irrefutable scientific evidence that contamination is present today in the former Concession Area in soil, groundwater, sediment, and surface water. This SI Report also presents findings confirming that such contamination extends beyond the confines of the E&P facilities. This SI, combined with the Rejoinder expert report prepared at the direction of counsel on behalf of the Republic of Ecuador, support and supplement the findings presented in the *LBG Rejoinder Report* and responds to Chevron's position that the "Lago Agrio Judgment was not supported by any competent environmental evidence in the Concession Area".

Purpose

The SI served several purposes, including:

1. To assess whether Chevron's JI and PI data indicating contamination in the vicinity of the former Texpet sites are in fact associated with more extensive contamination, contrary to John Connor's statements regarding the limited extent of contamination[1].
2. To respond to Chevron's criticism that LBG's experts had not personally visited the E&P sites.[2]
3. To observe the basis for the Lago Agrio trial's judgment.
4. To delineate and confirm the presence of oil and petroleum hydrocarbons previously detected in the subsurface soils (via soil borings) during Chevron's JIs and PIs.
5. To assess the presence of oil and petroleum hydrocarbon contamination in the groundwater (via monitoring wells).
6. To assess the extent of migration of oil and petroleum hydrocarbon contamination in stream sediment (sediment sampling).
7. To assess the presence of oil-derived contamination in surface water resources (surface water grab sampling).
8. To assess potential for human exposure to contaminants at residences proximal to well sites and at access points in contaminated streams (*e.g.*, bathing and laundering locations).
9. To evaluate potential harm to the ecosystem including flora, fauna, and other natural resources.

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[1] Connor 2013, pgs. 2-3, item (i)

[2] Annex A to Claimants Reply Memorial, p. 2, item no. 4

Description of Site Selection Process

Identification and Reconnaissance of Study Sites

A team of professionals from LBG planned and implemented focused site investigations in the former Concession Area between July and October 2013. Since part of the purpose of the SI was to examine the basis for the Lago Agrio Court's judicial finding, site identification began with the review of available data for 45 well sites for which Chevron prepared JIs during the Lago Agrio Trial proceedings. A list of 22 candidate sites was developed, including alternates, based on review of PI and JI data. A series of site reconnaissance visits was planned to screen as many of these sites as possible, and ultimately 18 of them were visited, as shown on Table 1.2-1 (presented in Section 1, below, of this report) and Figure 1.1-1 (included in the Figures Section of this report).

Selection of Study Sites

To be selected for further detailed study, sites were evaluated against the following criteria:[3]

1. The presence of a Texpet structure (*i.e.*, pit) that was used and closed (or abandoned) by Texpet.
2. No remediation of the structure of interest after the 1995-1998 RAP activities.
3. Readily apparent crude oil contamination in the vicinity of the Texpet structure, which could be detected via minimally invasive sampling (*i.e.*, probing).
4. The potential for existence of a complete human or ecological exposure pathway related to the contamination under current or possible future land use conditions.

For the sites that satisfied these criteria, the following additional parameters were applied:

5. Accessibility: If sites were not sufficiently accessible (to permit the completion of investigations within a few weeks), they were excluded.
6. Spill History: If sites had a history of large spills subsequent to Petroecuador assuming responsibility for operations in June 1990, they were excluded.
7. Geography: If sites were not geographically dispersed, they were excluded. Sites that represented a range of locations operated by Texpet across the former Concession Area were retained.

The following sites were selected as satisfying the selection criteria:

- Lago Agrio 02 (LA-02)

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[3] These criteria were identified in response to assertions made by Chevron's experts in their various documents submitted in the BIT Arbitration.

- Shushufindi 25 (SSF-25)
- Yuca 02 (YU-02)
- Guanta 06 (GU-06)
- Aguarico 02 (AG-02)

Detailed scale maps of each site are provided in Section 3 of this SI Report.

Site-Specific Summary of Findings

Lago Agrio 02 (LA-02)

LA-02 Site History

The LA-02 well was drilled by Texpet in 1967.[4] Texpet dug several pits during drilling and operations LA-02;[5] however, Woodward-Clyde only identified and remediated Pit 1 during the RAP,[6] and that is the only pit acknowledged by Chevron to the Court during the Lago Agrio Trial.[7] However, Chevron did identify and investigate other pits during its PI.[8] One of the pits not acknowledged to the Lago Agrio Court was Pit 3, which was closed by Texpet in 1990[9] and therefore, most likely not used by Petroecuador during subsequent operations. Pit 3 is located at the northwest corner of the platform, on a neighboring property. During the PI in October 2005, Chevron determined that Pit 3 was "heavily impacted with petroleum",[10] based on borings that encountered oil-saturated sand (refer to Figure RS-1 and the sample results discussed below). The location of Pit 3 is clearly shown on the site map included in Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), January 31, 2006 (refer to Figure RS-2).

Chevron described Pit 3 in the LA-02 JI Playbook as follows:[11]

The second feature was identified N-NW of the platform using the 1976, 1985, and 1990 aerial photos. The area is centered at X=293188, Y=10013725. Based on visual observations, there were no berms or other signs that indicated this area to be within a pit. Two soils (sic) borings (LA-02-PI-SB-1 and LA-02-PI-SB-2) were collected within the pit area to a depth of 6.0 and 2.4

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[4] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). January 31, 2006, LA-02, Environmental Site Summary Report Form: Part 1

[5] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). January 31, 2006, LA-02, Environmental Site Summary Report Form: Part 1

[6] Woodward Clyde, 2000, p. 3-21 and Table 3-16

[7] See generally Cuerpo – Chevron's JI report

[8] See generally Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). January 31, 2006, and LA-02 JI Playbook

[9] Based on last appearance in 1990 aerial photo. See JI Playbook for LA-02, p. GSI-0498196

[10] LA-02 JI Playbook, Executive Summary, p. 1 of 3

[11] LA-02 JI Playbook, p. GSI-0498202

m, respectively. Following a clean cover of 0.9 m, a petroleum-impacted interval was encountered to a depth of 5.6 m at LA-02-PI-SB-1, and the sample analyzed (LA-02-PI-SB-1-(0.9 m)) had detections of TPH DRO = 2400 mg/kg, TPH GRO = 60 mg/kg, and several PAHs. The soil sample analyzed from LA-02-PI-SB-2 had detections of TPH DRO = 4500 mg/kg, TPH GRO = 280 mg/kg, total BTEX = 147 mg/kg, and several PAHs above detection limits. This soil boring encountered 0.5 m of clean cover underlain by 1.9 m of impacted soil. Based on the field data, this area was given the tentative designation of Pit 3 following the October pre-inspection. The topography to the W of this pit drops off, collecting into a small stream that lies approximately 25 m W of the platform boundary. This stream flows from N to S, and visual observation of the embankment indicated the presence of petroleum along the face. An upstream surface water and sediment sample (LA-02-PI-SW/SED-3-1) did not have petroleum impacts based on analytical data.

It should be noted that the sample results described above are not consistent with the results entered for these samples in Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007 or Chevron's Ecuador Oriente Region Non-Analytical and Analytical Database (Access® Database), August 2013, which both present the following higher detections:[12]

- [redacted]
- [redacted]

During the PI, Chevron also determined that a stream approximately 25 meters west of the platform and downgradient of Pit 3 was contaminated with petroleum, as noted in the quote from the JI Playbook above ("visual observation of the embankment indicated the presence of petroleum along the face"). Sediment samples collected upstream of the pit by Chevron were free of contamination (DRO and GRO were not detected in sample LA-02-PI-SED-3-1); however, [redacted].[13] This data and information was not given to the Lago Agrio Court, and Chevron did not re-sample the contaminated stream during the JI.

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[12] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). April 27, 2007, LA-02 Analytical Results

[13] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). April 27, 2007, LA-02 Analytical Results

Pit 3 is not identified on the official map submitted to the Lago Agrio Court by Chevron (refer to Figure RS-3), nor is it discussed in the text of their JI report. Samples were not collected by Chevron during the JI from the same area of Pit 3 where contamination was detected during the PI; instead Chevron collected four JI surface soil samples to the east and west of Pit 3 (including JI-LA02-PIT3-SD1-0.0M and JI-LA02-PIT3-SD2-0.0M). The highest DRO detection in the JI surface soil samples (which appear to have been collected outside the boundaries of Pit 3) was 33 mg/kg in sample JI-LA02-PIT3-SD2-0.0M.[14]

Chevron did not report any sediment samples for the LA-02 JI; however, a composite sediment sample and its duplicate that Chevron collected as 'rebuttal samples' to represent three locations along the creek were highly contaminated [RB-LA02-A1-SE1 – 12,000 mg/kg (sum of DRO and GRO) and RB-LA02-A1-DUP1 – 9,300 mg/kg (sum of DRO and GRO)]. Our review of the rebuttal documents filed with the Lago Agrio court found that the analytical results were presented for these two samples, but no real discussion of the samples was presented.[15]

Figure RS-1: Photograph taken by Chevron of oil saturated sand in Pit 3 during their unofficial Pre-Inspection[16]

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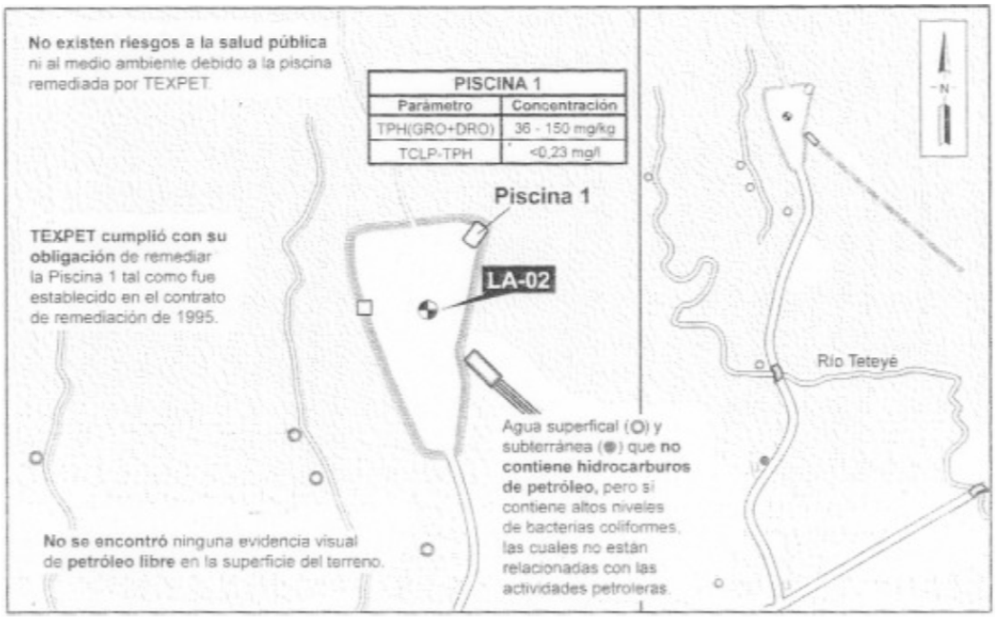
[14] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). April 27, 2007, LA-02 Sample Analytical Results

[15] See generally Chevron Rebuttal Report for LA-02 in Cuerpo 984, p. 107, 746

[16] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). January 31, 2006

[redacted]

Figure RS-2: Site LA-02 from Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), January 31, 2006, showing location of Pit 3.



No existen riesgos a la salud pública ni al medio ambiente debido a la piscina remediada por TEXPET.

PISCINA 1	
Parámetro	Concentración
TPH(GRO+DRO)	36 - 150 mg/kg
TCLP-TPH	<0,23 mg/l

TEXPET cumplió con su obligación de remediar la Piscina 1 tal como fue establecido en el contrato de remediación de 1995.

Agua superfical (○) y subterránea (●) que **no contiene hidrocarburos de petróleo,** pero si contiene altos niveles de bacterias coliformes, las cuales no están relacionadas con las actividades petroleras.

No se encontró ninguna evidencia visual de **petróleo libre** en la superficie del terreno.

Figure RS-3: Map depicting conclusions from Chevron's Judicial Inspection Report.

LBG Site Observations at LA-02

Trees have grown and died on the soil covering the pit since its closure and Pit 3 is currently part of a livestock area. There is no surface expression of Pit 3's existence except for a pipe sticking out of the stream bank to the west of the pit, which is likely the former siphon discharge for the pit. The soil on top of the pit is not visibly contaminated, but between the pit and stream (near the siphon), the soil is saturated with oil. Contamination in and adjacent to the stream is immediately apparent upon minimal probing; the sediments have a black, greasy appearance and smell strongly of petroleum. If the sediments are disturbed, oil globules are liberated and rise to the surface, creating a sheen. A residence was built immediately adjacent to the stream and the former pit, and the residents' animals and children were observed in the contaminated stream and pit area. Pit 3 and the contaminated stream sediment are not on the property encompassing the well pad, instead Pit 3 is on the property adjacent to the LA-02 well site.

LBG SI Findings at LA-02

LBG's investigations of LA-02 focused on Pit 3 and observable impacts associated with the pit. Our initial site visit found oil at both the ground surface between Pit 3 and the adjacent stream to the west, and in the stream for tens of meters downstream of the pit. A family had built their house near the pit and was living within about 10 meters of the detected contamination. Our investigation found that the subsurface included a layer of sand saturated with groundwater that discharges to the stream. Analytical results for samples collected during the SI are provided in Section 5.2 of this document. Our SI team detected oil contamination (as evidenced by visible oil and concentrations of TPH, Total PAH, and specific PAHs above applicable standards) in the soil both inside and outside of Pit 3. Furthermore, groundwater contamination was found in the pit area, including visible oil and concentrations of TPH and chrysene above applicable standards.[17] Figure RS-4 is a photo of a groundwater sampling bailer with oil on it following retrieval of the bailer from a monitoring well adjacent to Pit 3. Figure RS-5 shows purge water collected during sampling from the same location/monitoring well with oil floating on it. Our site investigation team found contamination of sediment by TPH and Total PAH (including suites of alkyl PAH typical of spilled, moderately-weathered crude oils lingering in the Concession Area[18]) for several hundred meters downstream of the pit, and contamination of surface water by TPH, select metals, and phenols. Both groundwater and surface water had detections of naphthenic acids, which are a water-soluble fraction of oil. It is plain that Pit 3 was a historical source of contamination to the stream, and soil, groundwater, surface water, and sediment remain impacted 24 years after Texpet closed the pit. This determination is based on the proximity of Pit 3 to the stream, the origin of the stream (*i.e.*, just upstream of the pit), and the hopane/sterane fingerprint[19] of the oil found in

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[17] Water samples from wells with visible oil were not analyzed

[18] Dr. Jeffrey Short Expert Report, 2013, pgs. 17 – 18

[19] See generally Dr. Jeffrey Short Expert Report, 2013

Pit 3 and in the sediments of the stream. These findings disprove Chevron expert Connor's theses that oil released to the environment is highly weathered and not mobile, that groundwater and surface water are nearly free of petroleum-related contamination, and contamination is limited to areas immediately adjacent to the E&P facility.[20]

Figure RS-4: Photo of oil on LBG groundwater sample bailer from well MW-01

Figure RS-5: Photo of purge water from well MW-01 at LA-02

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[20] Connor 2013, pgs. 2-3.

Shushufindi 25 (SSF-25)

SSF-25 Site History

Texpet drilled SSF-25 in March 1973; the well was subsequently converted to an injection well by Petroecuador.[21] Four pits were identified by Texpet during the RAP; three of these were remediated during the RAP and the fourth, Pit 2 (a water pit), was recently remediated by Petroecuador.[22] Pit 2 was initially declared "No Further Action" because it was supposedly "in use by the community." A hand drawing from Woodward-Clyde's remediation documents indicates that sludge was present in the bottom of Pit 2. Pit 3 was an oil pit that appears in a 1975 aerial photograph and was remediated by Texpet in 1996. Pit 4 was an oil pit that was remediated in 1997. Samples of groundwater collected by Chevron near Pit 1 during their PI indicated potential groundwater contamination. Pit 1 is also adjacent to a small stream used by local residents as a water resource. As discussed in our February 2013 Expert Report, all four pits, plus the additional pit not identified by Chevron, are visible on an aerial photograph from 1976, when Texpet was the operator constructing and using the pits.

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[21] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). April 27, 2007

[22] On-site discussion with PetroAmazonas employee

[redacted]

Figure RS-6: Map of SSF-25 from Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), January 31, 2006; note that Pit 3 and Pit 4 are reversed.

LBG's review of Chevron's PI and JI data identified that a groundwater sample collected from a temporary monitoring well installed adjacent to Pit 1, [redacted][23] A groundwater sample collected near the same location during the JI, sample JI-SSF-25-TGW4, contained chloride levels (517 mg/L) that exceeded the groundwater standard.[24]

Chevron's JI Playbook for SSF-25 notes:

> [redacted]

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[23] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). April 27, 2007, SSF-25 Analytical Results

[24] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). April 27, 2007, SSF-25 Analytical Results

> *that Pit 1 frequently overflowed into the nearby stream and caused animal deaths.*[25]

These Chevron PI and JI sample results are contrary to Chevron experts Connor's and Hinchee's assertion that groundwater is nearly free of oil contamination.[26]

LBG Site Observations at SSF-25

During LBG's initial site reconnaissance in July 2013, a PetroAmazonas representative informed LBG that Pit 2 was remediated by Petroecuador. We also observed that an additional pit to the north of the well pad, seen in the 1976 aerial photo and not identified in the RAP, still exists as a bermed pit (as predicted in the *LBG February 2013 Expert Report.)*[27].

LBG found that a stream immediately to the west of the platform contained oil-saturated sediment. The oil-saturated sediment was first observed near a residence at a point that apparently was used to gather water (a path from the house to the stream and wooden structures for gathering water were both observed).[28] A spring was noted about 46 m (150 feet) upstream of the wooden structure, in the stream bank. Probing in the sediment at the spring produced small globules of what appeared to be oil. LBG then excavated a small hole in the spring feeding into the stream. There was obvious sheen on the water as it filled the hole from the bottom (refer to Figure RS-7). These locations were downstream of Pit 1. The PetroAmazonas representative present at the time of the site visit noted that drinking water has been supplied to the house since approximately 2004 (a spigot and meter are present in the yard).

LBG SI Findings at SSF-25

LBG focused its investigation on contamination associated with Pit 1. While drilling at the SSF-25 well site, LBG encountered groundwater in a sand layer beneath much of the site. By examining water level elevations, LBG determined that the groundwater flow direction is from the platform and pit area toward the small stream. SI sample analytical results are presented in Section 5.5 of this document. The limited SI found that soil in and adjacent to the pit was contaminated with TPH, Total PAH, some volatile organic compounds,[29] and some metals[30]

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[25] JI Playbook for SSF-25, p. GSI_0488822
[26] Connor 2013, p. 3, item iii and Hinchee 2013, p. 9, Section 4.1.3
[27] LBG, 2013, p. 57
[28] See generally H. Strauss Expert Report, 2013.
[29] Ethylbenzene and total xylenes
[30] Barium, chromium, copper, lead, nickel and vanadium

above applicable standards.[31] We found contaminated groundwater (with TPH and chrysene) near the pit. We also found contaminated sediment downstream of Pit 1. These sediments were contaminated with TPH and Total PAH (including suites of alkyl PAH typical of spilled, moderately-weathered crude oils lingering in the former Concession Area[32]), while surface water in the stream was contaminated with TPH, phenols, and metals[33] above applicable standards. Both groundwater and surface water had detections of naphthenic acids. Hopane/sterane fingerprint analyses[34] of oil contamination detected both in soil samples from near Pit 1 and sediment in the adjacent stream show that the contamination in the pit and the stream are related. Therefore, groundwater, soil, sediment, and surface water contamination related to a Texpet-remediated pit (addressed during the RAP) is persistent at SSF-25 and is found at locations where people can be exposed.

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[31] A review of Chevron's 88 background samples has found that for all nine metals tested, the average concentration is below the Ecuadorian standards (both TULSMA and RAOHE). The TULSMA in Section 4.1.3.3 states: "*The more reliable background values are those derived from the samples taken in those areas outside the area under study which are considered unaffected by local contamination. In the total absence of background values of the immediate area outside the study area these values may be obtained from applicable regional or national areas. To determine the background or reference value, at least 5 samples should be collected, if taken from 5 to 20 samples, <u>the averaged value must be selected as the background value</u>.*" For this reason we compare the metals to the appropriate standard, understanding if it is above the standard it is also above background. (TULSMA English translation by LBG.)

[32] Dr. Jeffrey Short Expert Report 2013, pgs. 17 - 18

[33] Aluminum, iron, manganese, and thallium

[34] Dr. Jeffrey Short Expert Report 2013, p. 14

Figure RS-7: Borehole in sediment with oil droplets coming to water surface at SSF-25

These findings are in direct contradiction to Connor's and Hinchee's thesis that oil contamination is not mobile, that groundwater and surface water are not impacted, and that contamination is limited to small areas on the E&P facility.

Yuca 02 (YU-02)

YU-02 Site History

There are two wells at Yuca 02, designated 2A and 2B. Well 2A was abandoned due to drilling problems in June 1979 and exploration activity was shifted to Well 2B, which was completed in July 1979[35]. Well 2B was inactive when Chevron visited it for the PIs, but is now an active production well. There are four pits located at the site. Two pits, Pit 1 to the south and Pit 2 to the southeast of the platform (see Figure RS-8),[36] were used by Texpet at YU-02B and were addressed under the RAP in 1996. Two additional pits, Pits A and B, were water pits; neither pit was included in the RAP.[37]

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[35] JI Playbook, Executive Summary, pg. 1 of 3

[36] Based on JI Playbook for YU-02; descriptions vary in other Chevron sources

[37] Ibid.

During the PI, [redacted][38]

The JI Playbook[39] acknowledged that [redacted]

During the JI, Chevron collected sediment sample JI-YU2B-A1-SD1, a split sediment sample of the Lago Agrio plaintiffs' sample located in the swamp 46.5 meters north of Yuca 2B. The TPH-DRO concentration in this sample was detected at 11,000 mg/kg.[41]

[redacted]

Figure RS-8: Map of YU-02 Site from Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007.

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[38] JI Playbook, Executive Summary, page 1 of 3.

[39] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007, Environmental Summary Report Form 1 YU-02

[40] *"An impacted swamp borders the well platform to the N, and was apparently impacted from a spill 20 years ago according to local residents."*

[41] YU-02 Analytical Results, JI Test Results, Sediments Part A, Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007

LBG Site Observations at YU-02

LBG initially visited the site to assess whether contamination found by Chevron in 2006 was still apparent seven years later. During the site visit, we found sediment at the Chevron-sampled location saturated with oil. Figure RS-9 is a photograph of sediment LBG collected at the same location indicated by Chevron.

Louis Berger staff walked into the marsh area located to the north of Well Yuca 2B, excavated the sediment with a post-hole digger, and encountered oily soil beginning at 15 cm (6 inches) below ground surface. The observed oil contamination became significantly greater with depth. At 0.61 m (two feet) below the ground surface there appeared to be the zone of heaviest contamination. Black globules of oil that came out of the soil are visible in photographs (see Figure RS-9). A photoionization detector was used to screen the sediment removed using the post-hole digger. Measured values of organic constituents off-gassing from the sediment ranged above 29 parts per million in air, confirming the presence of organic compounds in the marsh sediment.

The LBG staff subsequently walked to the edge of the site and found a small stream that flows into the marsh. The Louis Berger team noted oil sheen on the water adjacent to the stream bank. This sheen may be discharging into the stream along with groundwater.

Figure RS-9: Oil-saturated sediment from wetland just north of YU-02.

LBG SI Findings at YU-02

LBG's investigations at YU-02 focused on former Pit 1 and on the wetland to the north of the platform. While drilling at the site, we encountered groundwater in a sand layer beneath Pit 1 and across the site in other soil borings. Sample analytical results are presented in Section 5.6 of this document. LBG's investigations detected soil contamination both in and around Pit 1 that included observations of oil in soil, as well as detections of TPH, Total PAH, some individual PAHs,[42] and some metals[43] above applicable standards and background levels. We also found groundwater contamination, including TPH and barium; sediment contamination, including TPH, Total PAH (including suites of alkyl PAH typical of spilled, moderately-weathered crude oils lingering in the Concession Area[44]), and lead; and surface water contamination, including TPH, phenols, and some metals.[45] Hopane/sterane fingerprinting[46] shows that sediment contamination and soil contamination near Pit 1 are related.

LBG collected sediment samples from the marshy area to the north of Well YU-02B to further investigate the historical crude oil spill reported to have occurred during Texpet's operations (approximately 20 years prior to the JI) and the comparatively elevated petroleum hydrocarbon concentrations reported in sediment samples collected by Chevron during PI and JI field investigations. Detections of TPH in the Louis Berger samples collected in 2013 ranged from 15 mg/kg to 51,100 mg/kg TPH, with an average detected TPH of 17,710 mg/kg detected in 6 samples (YU02-SD001, SD002, SD005, SD006, SD007, and SD008). These TPH detections confirm the presence of an un-remediated crude oil contamination impact to the wetland area located to the north of the platform. The highest detected TPH results are an order of magnitude greater than the RAOHE Sensitive Ecosystem criterion of 1,000 mg/kg.

Groundwater, soil, sediment, and surface water contamination related to a pit remediated by Texpet during the RAP and a spill that occurred in the mid-1980s still exists at YU-02 and is found at locations where people can potentially be exposed.

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[42] Benzo(a)anthracene and pyrene

[43] Barium, copper, and nickel

[44] See Dr. Jeffrey Short Expert Report, 2013, p. 17 - 18

[45] Aluminum, barium, cadmium, copper, iron, manganese, nickel, thallium,vanadium, and zinc

[46] See Dr. Jeffrey Short Expert Report, 2013, p. 14

Guanta 6 (GU-06)

GU-06 Site History

GU-06 is an active production well that began production in March 1987.[47] The well is situated on a plateau between two small hills and there is a relatively significant topographic drop-off to the north to an adjacent stream[48].

On the far side of the hill to the west of GU-06 is a drainage swale, and at the bottom of that slope is one of Texpet's former pits (Pit A). Pit A was apparently closed in the 1990s, and a flare was constructed on its location. This site was not addressed by Chevron during the 1990s RAP. Chevron collected a soil sample between the pit and an adjacent stream during their PI that had a DRO concentration of 7,000 mg/kg; however, they did not collect samples between the pit and the stream during the JI.[49]

There is no visual evidence of the former Pit A at present, but several drainage channels were observed leading to the area, as well as away from the former pit to a nearby swamp. Remnants of an old flare structure exist on top of what is likely the former pit. Large trees are growing in the area, as observed in aerial photographs taken as early as 2001, indicating that the pit has been closed since before that time. According to Chevron's Ecuador Oriente Region Environmental Database (Clickable Database). April 27, 2007 and JI Playbook, [redacted] [redacted][50]. According to Chevron's records, Pit A is at the bottom of the slope to the west of the well where the former flare is located. The site was not included in the 1995 SOW or 1995-1998 RAP. According to the Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007:

[redacted]

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[47] JI Playbook for GU-06, p. GSI-0455061

[48] Chevron's documents incorrectly indicate that the topography slopes gently downward at the south end of the well platform, when actually there is a hill that rises abruptly from the platform to the south.

[49] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007

[50] JI Playbook for GU-06, p. GSI-0455061

> [redacted].[51]

[redacted]

Figure RS-10: Map of GU-06 Site from Chevron’s Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007.

[redacted] Chevron’s sampling included [redacted] and nine soil samples (and one duplicate) and two surface water samples (and one duplicate) during the JI, and detections of TPH and other contaminants in the stream were noted.[52] Chevron collected samples either uphill and/or upstream from observable contamination sources. For example, Chevron tested surface water on the other side of the valley from GU-06 (upper left most purple and yellow diamonds in Figure RS-10) Pit A, in a spring claimed by Chevron to be used as a drinking water source.[53] This spring was located across the stream and significantly higher topographically from the Pit. Our observation at the site is that the spring receives its water from

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[51] Chevron’s Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007

[52] Chevron’s Ecuador Oriente Region Analytical Database (Access® Database), May 2007

[53] Chevron’s Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007

farther uphill to the north, away from the well site and would not likely be impacted by contamination from GU-06.

Aerial and satellite photographs from 1990, 2001, and 2004 document the history of Pit A's development and subsequent abandonment. The Pit A location was clear of vegetation in 1990 (refer to Figure RS-11), but is densely vegetated in the 2001 aerial photo (Figure RS-12), with an estimated size of <200 m^2, which may include scorched earth due to the flare. These photos indicate that the pit was closed by 1990. The 2004 satellite image also shows dense vegetation surrounding Pit A and between Pit A and the well platform; however, it is likely that Chevron misinterpreted some features in that imagery. Chevron's interpretation of the satellite image notes that *"Several very dark features in the 2004 satellite image represent surface impacts from recent spills or dumping attributable to on site equipment."*[54] This conclusion is a misinterpretation of the 2004 satellite imagery, which shows only tree shadows around Pit A's location and a vegetated slope between Pit A and the well platform (refer to Figure RS-13).

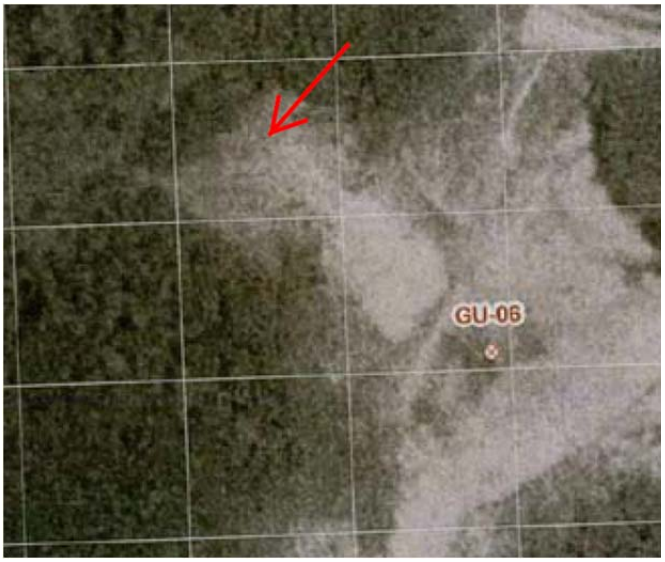

Figure RS-11: 1990 Aerial Photograph showing that the location of Pit A was cleared and graded; however, there is no indication of the flare structure. The presence of the cleared area on the 1990 photo, which becomes a densely vegetated area on the subsequent photos in 2001 (Figure RS-12) and 2004 (Figure RS-13), confirms the conclusion that Pit A was closed in 1990 and that the flare was subsequently constructed atop the closed pit.

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[54] See GU-06 JI Playbook, p. GSI-0455061

Figure RS-12: 2001 Aerial Photograph showing dense vegetation surrounding the former Pit A (it is possible that the bright white spot on the photo represents the flame from the flare structure).

Figure RS-13: 2004 IKONOS Satellite Photograph (1 meter resolution, panchromatic image) showing the location of former Pit A (denoted by larger arrow) completely overgrown with vegetation. The two smaller arrows denote "tree shadows" and do not indicate surface impacts associated with former pits. The image coloration denotes vegetation.

LBG Site Observations at GU-06

LBG observed the flare structure located on top of the closed pit; it was obviously constructed and used after the pit was closed, as we found cinders on the soil surface underneath and around the flare. There was significant undergrowth beneath the flare by 2006 (see photos presented as

Figures RS-14 and RS-15 from Chevron's documents[55]), indicating that the flare had not been used for many years. Chevron's documents claim that use of the flare was discontinued in 2005, but this claim is questionable given the state of the flare and the vegetation growth around it.

During the initial visit, LBG observed that the well site pad/platform is graded gravel. Residents had claimed[56] that multiple pits were at the same level as the platform; presently, they are graded over. A small path/drainage ditch leads to the west and ends at Pit A. LBG observed two pipes sticking out of the west side of the pit that were likely drainage pipes.[57] Asphalt is present on the downslope side of the pit. Directly below the pit is a wetland area adjacent to a stream. Observations indicated that the area where the Chevron PI sample was collected and the sediment in the adjacent stream were both saturated with oil. Oil is present just beneath the surface in the sediments of the wetland and adjacent stream. A small amount of disturbance causes oil to rise to the surface of the sediment. Figure RS-16 is a photograph taken in July 2013 in the wetland showing the oil coming to the sediment surface. Sheens were observed on the stream in places where the stream bottom had not been disturbed.

[redacted]

Figure RS-14 and RS-15 - Photographs taken by Chevron's Team in 2006 of derelict flare from Chevron's JI Playbook

The stream is used by people farther downstream. When Chevron conducted PI tests, they found high TPH concentrations in samples taken from locations downstream used by people as drinking

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[55] Photos are taken from Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007 and the GU-06 JI Playbook

[56] JI Playbook for GU-06, p. GSI-0455062 ("Two closed pits…are underneath the re-graded platform.")

[57] JI Playbook for GU-06, p. GSI-0455061 ("A discharge pipe leading west from the pit area to the swamp was evident...")

water[58]. On the other side of the stream from Pit A is a farm with coffee, papaya, and yucca. Farther uphill[59] is a tilapia pond and a spring that was being used for washing clothes and bathing, among other activities. During the site reconnaissance, a migration pathway for oil contamination to enter the environment was indicated from Pit A to the adjacent stream and wetland below. A Chevron sediment sample collected 300 m (1,000 feet) farther downstream indicated high concentrations of TPH[60].

Figure RS-16: Oil seeping from saturated sediment downhill from Pit A toward adjacent stream, July 2013.

LBG SI Findings at GU-06

The GU-06 SI found that soil at Pit A was contaminated with TPH, Total PAH, and some metals above background levels.[61] Sample analytical results are presented in Section 5.4 of this document. Groundwater displayed visible oil and was contaminated with TPH and individual PAHs[62]. Sediment showed contamination by TPH, Total PAH (including suites of alkyl PAH typical of spilled, moderately-weathered crude oils lingering in the Concession Area[63]), and cadmium above RAOHE Sensitive Ecosystem criteria, while surface water was contaminated with visible oil (when sediment is disturbed, oil droplets and sheens rise to the water's surface), phenols, and some metals[64]. Stream sediments remain heavily contaminated with crude oil nearly a half-kilometer downstream of the likely point of entry.[65] Hopane/sterane fingerprint analyses[66]

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[58] JI Playbook for GU-06, p. GSI-0455061, 'Drinking Water'.

[59] This location is not likely hydraulically connected to the contamination. This is where Chevron collected a "delineation sample" as noted above.

[60] GU-06 JI Playbook, p. GSI-0455061, 'Surface Water and Sediments'.

[61] Barium, copper, and vanadium

[62] Benz[g,h,i]perylene and chrysene

[63] See Dr. Jeffrey Short Expert Report, 2013, p. 17 - 18

[64] Aluminum, iron and manganese

[65] See Dr. Jeffrey Short Expert Report, 2013, p. 15 - 18

show that oil contamination near the pit matched oil contamination in the stream. Both groundwater and surface water had detections of naphthenic acids, which are a water-soluble fraction of oil. The observable oil in the soil and sediment and the confirmed contaminants from sample analyses show that Pit A was a significant source of oil contamination to the stream at one time (while continuing migration cannot be ruled out), and that the contamination at GU-06 associated with Pit A is persistent.

Figure RS-17: Oil on groundwater sample bailer from GU-06 Monitoring Well MW-4.

Aguarico 02 (AG-02)

AG-02 Site History

Texpet drilled well AG-02 in 1970;[67] the well is still active. There are three pits at the site (designated nos. 1, 2, and 3); all are former oil pits. The remarks provided in Table 6-4, Well Site Pit Summary,[68] indicate that Pits 1 and 2 were burned circa 1990. All three were included in the RAP, although Pit 3 was only included after it was found during remediation of Pits 1 and 2.[69] Pits 1 and 2 were remediated via soil flushing during August through October 1996[70]. Pit 3 was

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[66] See Dr. Jeffrey Short Expert Report, 2013, p. 14

[67] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), January 31, 2006; Environmental Summary Report: Form 1 for AG-02

[68] Fugro-McClelland, 1992, Table 6-4

[69] JI Playbook for AG-02, p. GSI-0459415

[70] Woodward Clyde, 2000, Table 3-4

remediated via encapsulation in July 1997[71]. The pits descend from the platform in a stair-step fashion to the west; Pit 3 is the farthest downgradient from the platform. Pit 1 is partially covered by the regraded platform. A path descends from the platform to the west past each of the pits and ends at the river below the platform.

Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007 for AG-02 includes [redacted]

Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007 provides [redacted].[73]

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[71] Ibid.

[72] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), January 31, 2006

[73] Soil Sample Analysis Results, Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007

[redacted]

Figure RS-18: Map of AG-02 Site from Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007.

LBG Site Observations at AG-02

After walking around the platform, the field team proceeded northwest off of the platform (through the jungle), across the likely location of Pit 1, and to what was likely Pit 2. In Pit 2, the field team inserted a probe about one meter (three feet) into the soil and a petroleum odor was detected emanating from the probe when it was removed. The field team then proceeded toward Pit 3, although the location was unclear based on available maps. When the field team returned to Pit 2, they proceeded to the southwest corner and found a small depression filled with water that exhibited a visible, non-bacterial sheen. Digging revealed oily sediment and the team observed crude oil on the water's surface. There were also significant deposits of asphalt (degraded crude). As they continued toward the edge of the pit (to the southwest), the field team followed a likely discharge path that could transport contaminated water during rain events to the drainage/path and then down to the stream. The field team followed the discharge path to the river and saw signs of recent use, including laundering.[74] The stream was fast-moving and exhibited high volume at the time of the site visit.

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[74] Discussions with local resident indicated that the platform observed at the river was used as a place to do laundry.

During the initial site visit, LBG investigated the location downgradient of Pit 3 that is shown in the Chevron video discussed previously. At that location, LBG observed oil and groundwater seeping out of the ground surface and flowing down the side of the hill into the adjacent river. At the location where the oil meets the river, local residents have built platforms into the river to wash their clothing (see Figure RS-20).

LBG identified the following complete pathways for human exposure to crude oil contamination during the site visit: (1) use of the stream located steeply downhill and to the west of the pits as a water supply for domestic needs and (2) direct contact with stream sediments. Based on the presence of a platform for washing clothes and five interviews conducted by Chevron in 2006, a reasonable person can conclude that this is a current exposure pathway for bathing and washing clothes. It is known locally as Rio Guara,[75] is used primarily in the summer when there is not enough rainwater to meet all domestic needs, and is believed to ultimately discharge into the Rio Aguarico.

[redacted] Jose Guam'an, who has lived there 30 years, provided a site history from his perspective. He reported a slick that looks like gasoline sometimes appears on the small stream near the platform, and the stream discharges to the Rio Guara (Guar'an). He asserted that cannot even grow pasture grass in the area north of the platform, which he considers very contaminated.

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[75] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007

[76] Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007

Figure RS-19: Oily Surface Water at a Seep Observed by LBG

We observed that Pit 3, remediated by Texpet, appears to be breached by erosion and discharging oil down a slope. Downhill from the breach is the Rio Guara with nearby use (*i.e.*, local clothes washing and stream access).

LBG SI Findings at AG-02

Borings installed during investigations at AG-02 encountered clay, but did not encounter shallow groundwater or sand layers; consequently no monitoring wells were installed. LBG collected five samples from AG-02: a sediment sample from the seep area, a sediment sample from a stream immediately to the south of the pits, and three soil samples (two of which were screened in the field and not sent to the laboratory). Sample analytical results are presented in Section 5.3 of this document. LBG's investigation found elevated hydrocarbon concentrations in a sediment sample collected adjacent to a seep/spring located downgradient and to the west of Pits 2 and 3 that was discharging oily water during sample collection.

Sediment sample AG02-SD002 was collected from a location downgradient of Pits 2 and 3 to explore the drainage pathway for pit overflows identified by John Connor in the previously-described video from the Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007. The detected TPH concentration in sample AG02-SD002 was 31,310 mg/kg and is 31 times higher than the Ecuadorean regulatory standard for TPH. This result indicates that it is probable that contamination from the closed pits was historically transported via direct discharge and/or recurring overflows during rainfall (leading to overtopping of the former pit berms) along the slope and drainage paths to the west, leading to the stream. In addition, it is likely that precipitation infiltrating the closed pits is transporting contaminants through the pit berms to seeps/springs on the downgradient slope along the same drainage pathway. The analysis of sample AG02-SD002 by LBG confirms the persistence of petroleum hydrocarbon contamination originally documented by Chevron via PI soil boring SB-21, and documents continued contamination impacts from the closed pits to downgradient drainage pathways in the rainforest.

Figure RS-20 - Platform built by local residents for laundry downhill from oil seep at AG-02.

1. INTRODUCTION

1.1. Scope and Objectives

This Site Investigation and Data Summary Report documents the field activities and resulting data associated with a focused site investigation program which encompassed several petroleum exploration and production (E&P) well sites located in the Oriente region of the Republic of Ecuador (Figure 1.1-1). Sampling was conducted from July 5 to August 31, 2013 (Round I), with additional sampling performed from September 28 to October 17, 2013 (Round II). All sampling was performed by Louis Berger Group, Inc. (LBG) personnel. The investigation was conducted at the direction of Winston & Strawn, LLP (Winston) as technical consultants on behalf of the Republic of Ecuador (Republic). The effort was conducted in support of the Bilateral Investment Treaty (BIT) arbitration between Chevron Corporation (Chevron) and the GOE regarding the *Aguinda et al. v. Chevron* lawsuit (Lago Agrio Lawsuit) that was litigated in the Superior Court in Lago Agrio, Sucumbíos Province, Ecuador (Court) between 2003 and 2011. The Louis Berger Group, Inc. reserves the right to update this report and any statements, interpretations, or conclusions drawn based on the contents of this report in the event that new information becomes available, including but not limited to the completion of data validation of analytical result.

Objectives of this investigation include efforts to:

- Supplement primarily qualitative historical data with quantitative data to characterize contaminant concentrations and further support the basis for the Lago Agrio Court decision.
- Evaluate the potential for adverse environmental impacts related to the release of crude oil, produced water, and other wastes generated by facility operations to soils, former unlined pits, proximal surface water and wetland features, sediment, and groundwater.

Detailed Data Quality Objectives (DQOs) for the investigation are presented in Attachment 1. The DQOs were prepared in accordance with United States Environmental Protection Agency (USEPA) Guidance for the Data Quality Objectives Process, QA/G-4, August 2000.

Field activities were conducted in accordance with the following planning documentation:

- Field Sampling Plan (FSP), Oriente Well Sites. In the Matter of BIT Arbitration, Chevron v. Government of Ecuador. Prepared by the Louis Berger Group, Inc. for Winston & Strawn, LLP. July 2013.
- Health and Safety Plan for Site Reconnaissance and Investigation. Lago Agrio and El Coca, Ecuador. Prepared by the Louis Berger Group, Inc. July 2013.
- Quality Assurance Worksheets. Prepared by the Louis Berger Group, Inc. August 2013.

Field modifications to the initial planning documents were required to address a variety of circumstances, including site setting, equipment availability, and schedule. A total of seven field modifications were developed over the course of the field program:

- Field Modification No. 1, Revision No. 1: Contingency Plan. Prepared by the Louis Berger Group, Inc. October 2013.
- Field Modification No. 2, Revision No. 1: Reporting of Steranes and Hopanes. Prepared by the Louis Berger Group, Inc. September 2013
- Field Modification No. 3, Revision No. 2: Equipment Blanks. Prepared by the Louis Berger Group, Inc. December 2013.
- Field Modification No. 4: Crude Oil. Prepared by the Louis Berger Group, Inc. October 2013.
- Field Modification No. 5, Revision No. 2: Deviations from the Field Standard Operating Procedures. Prepared by the Louis Berger Group, Inc. November 2013.
- Field Modification No. 6: Conducting Slug Testing and Mini-Pumping Testing. Prepared by the Louis Berger Group, Inc. October 2013.
- Field Modification No. 7, Revision No. 1: Data Validation. Prepared by the Louis Berger Group, Inc. November 2013.
- Field Modification No. 8, Revision No. 1: Round 2 Deviations from Field Standard Operating Procedures. Prepared by the Louis Berger Group, Inc., November 2013
- Field Modification No. 9: Data Validation. Prepared by the Louis Berger Group, Inc. November 2013.
- Field Modification No. 10: Additional Data Requests. Prepared by the Louis Berger Group, Inc. November 2013.

Field modifications are summarized in Table 1.1-1, below, and are included in Attachment 2.

Table 1.1-1: Summary of Field Modifications

Modification Number	Description
1 Contingency Plan	Documents acceptable modifications in analytical methods by the laboratories and acceptable field contingency plans implemented by the field crew to collect samples. Implemented due to a shortage of sample containers at the site and an effort to minimize the shipment of extra sample volume to conserve the number of available bottles. This modification restricts laboratory's ability to perform reanalysis of a sample.
2 Reporting of Steranes and Hopanes	Documents the addition of steranes and hopanes to the analytical parameter list. Adds collection of oil from production wells; adds analytical processing to select samples.
3 Equipment Blanks	Documents preparation and analysis of equipment blanks by the laboratories for the first and second rounds of field sampling.
4 Crude Oil	Documents the analysis of crude oil collected from production wells.
5 Deviations from Field SOPs	Documents deviations from the field Standard Operating Procedures (SOPs) or Quality Assurance Worksheets and corrective action implemented, including revisions to the field SOPs for field work that occurred between July 24, 2013 and August 31, 2013.
6 Slug and Mini- Pumping Testing	In-situ testing to estimate the horizontal hydraulic conductivity at the site, and to measure drawdown and recharge that occurs in response to pumping.
7 Data Validation	Provides clarification on the Round I data validation process to the data validation company and issues corrections to QAPP Worksheet. No. 36.
8 Round 2 Deviations from Field SOPs	Documents deviations from the field SOPs or Quality Assurance Worksheets during the Round 2 field program.
9 Data Validation	Provides supplemental information on the data validation process, specifically for the Round 2 sampling that occurred between September 30, 2012 and October 15, 2013. All data validation decisions stated in Field Modification No. 7 will be adhered to in this field modification.
10 Additional Data Requests	Documents additional groundwater data requested by technical experts outside the scope of the Round II sampling program.

It should be noted that the field modifications were finalized after the Round I and Round II fieldwork had been completed. For the purposes of modifications which address field activities (Modifications 1, 2, 3, 4, 6, 7, 9, and 10), the technical content presented in each modification material to those activities was finalized prior to the initiation of the work. The completion date on these modifications reflects the date the modification was signed by the project manager. For the purposes of modifications which summarize deviations from field activities (Modifications 5 and 8), the technical content presented in each modification was finalized after the work was completed. For these modifications, the completion date also reflects the date the modification was signed by the project manager.

In addition, a number of Standard Operating Procedures (SOPs) required modification based on the materials available in the field. All SOPs are presented in Table 1.1-2, below, and are included in Attachment 3.

Table 1.1-2: Summary of Standard Operating Procedures

SOP Number	Date and Revision	SOP Title	Description of Revisions
SOP No. 1	July 2013 Revision 0	Procedure for the Calibration and Operation of a Photoionization Detector	No revisions.
SOP No. 2	July 2013 Revision 0	Procedure for the Calibration and Operation of a Water Quality Probe	No revisions.
SOP No. 3	Sept 2013 Revision 1	Procedure for Collection and Processing of Surface Water Samples	Revised to allow for groundwater sampling with peristaltic pumps and to allow for field crew to hold dedicated tubing at water surface (instead of using rope and tethered weight). Revised to allow for an optional "dip method" for collection of surface water samples. Editorial changes to update SOP for site conditions.
SOP No. 4	Sept 2013 Revision 1	Procedure for the Decontamination of Sediment and Soil Sampling Equipment	Revised to account for available cleaning supplies.
SOP No. 5	Sept 2013 Revision 1	Procedure for the Collection and Processing of Surface Sediment (Push Cores)	Revised to allow for hand auger sampling to geologically classify the surface sediment and to modify acceptance criteria for percent recovery of 50 percent (with a maximum of three coring attempts). Editorial changes to update SOP for site conditions.
SOP No. 6	Sept 2013 Revision 1	Procedure for the Classification of Soil and Sediment	Edited to clarify that soil boring and sediment cores can be geologically logged using the log form provided in Attachment 1 of SOP No. 6. Recording geological notes in a field notebook is also acceptable practice.
SOP No. 7	Sept 2013 Revision 1	Procedure for the Collection and Processing of Direct Push Soil Borings	Revised to allow for sampling from open borehole (no borehole casing installed). Editorial changes to update SOP for site conditions.
SOP No. 8	Sept 2013 Revision 1	Procedure for the Collection and Processing of Hollow Stem Auger Soil Borings	Edited to clarify that hollow stem augering is used to install monitoring wells; it is an optional technique for collection of soil boring samples.
SOP No. 9	Sept 2013 Revision 1	Procedure for Groundwater Well Installation and Development	Revised to remove recording of blow counts (not applicable since penetration tests were not recorded during well installation), to remove the monitoring water quality parameters to assess the effectiveness of the well development procedure, and to clarify managing groundwater IDW. Editorial changes to update SOP for site conditions.
SOP No. 10	Sept 2013 Revision 1	Procedure for the Decontamination of Groundwater Sampling Equipment	Revised to account for available cleaning supplies. Editorial changes to update SOP for site conditions.

SOP Number	Date and Revision	SOP Title	Description of Revisions
SOP No. 11	Sept 2013 Revision 1	Procedure for Low-Flow, Minimal-Drawdown Groundwater Sample Collection	Revised to include a cross-reference to SOP No. 3, which allows for groundwater sampling with a peristaltic pump and to clarify managing groundwater IDW. Edited to clarify that if free product is observed, a water-interface probe will be used to measure the product thickness but no groundwater sampling would occur. Editorial changes to update SOP for site conditions.
SOP No. 12	July 2013 Revision 0	Procedure for the Collection of Non-Aqueous Phase Liquids	No revisions.
SOP No. 13	July 2013 Revision 0	Procedure to Conduct Sample Management	No revisions.
SOP No. 14	July 2013 Revision 0	Procedure for Sample Preservation	No revisions.
SOP No. 15	July 2013 Revision 0	Procedure for the Collection of Field Blanks and Equipment Blanks	No revisions.
SOP No. 16	July 2013 Revision 0	Procedure to Locate Sample Points Using GPS	No revisions.
SOP No. 17	Sept 2013 Revision 0	Procedure for the Manual Collection and Processing of Soil Samples	New SOP; created to document manual sampling of soil samples.
SOP No. 18	Sept 2013 Revision 0	Procedure for Conducting Slug Testing and Mini-Pumping Testing	New SOP; Created to document testing of fluctuation in groundwater level and recharge.

SOP revisions which affect field activities (SOPs 3 through 11, 17, and 18), the technical content presented in each SOP material to those activities was finalized prior to the initiation of the work. The completion date on these modifications reflects the date the modification was signed by the project manager.

1.2. Identification and Reconnaissance of Study Sites

As indicated above, the purpose of this field investigation was to assess the continued presence of oil exploration and/or production-related contamination in areas where Texpet previously operated in the Oriente. In particular, the investigation focused on areas where Texpet structures were closed as part of the implementation of the September 1995 Remedial Action Plan (RAP) or closed or abandoned prior to the completion of the RAP.

Site identification began with the review of available data for the 45 well sites for which Chevron prepared reports as part of the Judicial Inspection (JI). An initial list of 16 candidate sites was developed based on data from the Preliminary Inspections (PIs) and JIs, indicating the potential for readily apparent contamination.

This list ultimately grew to encompass 22 candidate sites, including alternate sites, based on further review and some initial reconnaissance findings, such as significant recent changes to certain sites which eliminated them from further consideration. A series of site reconnaissance visits were planned to screen as many of these sites as possible. Ultimately, 18 E&P facilities Chevron investigated during the JI were visited. A summary of the initial site reconnaissance findings is presented in Table 1.2-1, below; the locations of the sites selected for reconnaissance and field investigation are depicted on Figure 1.1-1.

Table 1.2-1: Site Reconnaissance Summary

Site	Visit Date	Description
Yuca 02	7/7/2013	Visible signs of contamination, potential pathways, and suitable access. Site selected for field investigation.
Sacha Norte 2	7/8/2013	Pits at the south end of the production station (PS) are in close proximity to a neighborhood but with little sign of use. The soil near former pits was found to be saturated with water to the ground surface. Local water source is not known. Dense forest at the confluence of the stream and Rio Eno makes access difficult. At the north end of the PS, recent activities significantly modified the landscape, obscuring areas investigated during the PI and JI.
Sacha 57	7/8/2013	Pits are located near a stream used by farmer. Potential for complete pathway; however site is overgrown with difficult access that would require significant clearing.
Sacha 65	NA	Significant recent site changes were apparent during a brief stop at the location.
Shushufindi Sur Oeste	7/9/2013	Difficult access at production station facility; change in operations and the layout of the facility may affect the ability to investigate features that were identified in the Lago Agrio Lawsuit. Other production stations were removed from the list after visiting this facility.
Shushufindi 25	7/9/2013	Visible signs of contamination, potential pathways, and suitable access. Site selected for field investigation.
Shushufindi 69	7/9/2013	Thick inaccessible undergrowth.
Lago Agrio 02	7/10/2013	Visible signs of contamination, potential pathways, and suitable access. Site selected for field investigation.
Lago Agrio 15	7/10/2013	Steep slope, bottom wetlands, poor access and no visible signs of petroleum.
Lago Agrio 11	7/10/2013	Poor access and no visible signs of petroleum.
Guanta 06	7/11/2013	Visible signs of contamination, potential pathways, and suitable access. Site selected for field investigation.
Guanta 07	7/11/2013	Limited evidence of petroleum at two locations observed.
Dureno 01	7/11/2013	Site appears recently remediated; no access to stream.
Aguarico 02	7/12/2013	Visible signs of contamination, potential pathways, and suitable access. Site selected for field investigation.
Aguarico 03	7/12/2013	Active station with adjacent development.
Shushufindi 18	7/12/2013	Pit was recently remediated.

Site	Visit Date	Description
Shushufindi 04	7/13/2013	Pit southwest from Pit #3 showed some signs of weathered crude and petroleum odor. Pit #5 area was difficult to access, with steep slope and thick brush.
Shushufindi 48	7/13/2013	Thick brush and trees. Access to pit and spring is poor. Spring is vigorously flowing, but Petro Amazonas reported it is no longer used by the community.

A reconnaissance of the 18 potential study sites was conducted from July 7, 2013 to July 13, 2013 and was attended by Shane McDonald, P.G., of LBG; Gregory Ewing of Winston & Strawn, LLP; Harlee Strauss, Ph.D., an independent contractor retained by LBG; as well as Thalia Loor and Teresa Walton of LBG as support staff. The goal of the reconnaissance was to select up to five former Texpet sites for investigation, and to identify site features such as wellheads, pits, wetlands, drainage features, residential potable water wells, and surface water bodies.

Activities conducted during the reconnaissance included:

- A survey of adjacent land use, including sources of water supply for residents and animals;
- Evaluation of surface water bodies and adjacent vegetation for signs of visible petroleum impact or stress; and
- Use of a two meter (six foot) steel rod to probe soil and sediment, the advancement of boreholes via decontaminated hand auger and posthole digger for visual inspection of subsurface soils and sediments, and screening with a photoionization detector (PID).

1.2.1. Selection of Study Sites

To be selected for study, an area was required to meet the following criteria:

- The presence of a Texpet structure that was used and closed (or abandoned) by Texpet.
- No remediation of the structure of interest after the 1995-1998 RAP period.
- Readily apparent crude oil contamination in the vicinity of the Texpet structure, which could be detected via minimally invasive sampling (*i.e.*, probing).
- The potential for existence of a complete human or ecological exposure pathway related to the oil under current or possible future land use conditions.

In addition to satisfying these criteria, the study areas were also required to meet the following practical considerations:

- The site must be sufficiently accessible so as to permit the completion of the investigation within a few weeks.
- The site must not have a history of large spills subsequent to Petroecuador assuming responsibility for operations in June 1990.

- Sites must represent a range of locations operated by Texpet across the former Concession area.

The following five well sites were identified as meeting the selection criteria, based on the field reconnaissance (refer to Table 1.2-1):

- Lago Agrio 02 (LA-02)
- Aguarico 02 (AG-02)
- Guanta 06 (GU-06)
- Shushufindi 25 (SSF-25)
- Yuca 02 (YU-02)

Each of the selected sites had visible signs of petroleum contamination, adjacent human activities (*e.g.*, farming, residence, stream use, wells), and suitable access for field teams and equipment. Further, the selected sites were spatially distributed over the former Concession area, from Nueva Loja Parish in the north to Taracoa Parish in the south.

1.3. Investigative Approach

As indicated in Section 2.1, the objectives of this investigation were to supplement qualitative historical data with quantitative data intended to characterize contaminant concentrations as well as to evaluate the potential for adverse environmental impacts related to the release of crude oil, produced water, and other wastes generated by facility operations to soils, former unlined pits, proximal surface water and wetland features, groundwater, and sediment. Specific goals of this study include:

- Assess contaminant nature and extent in and around the Texpet structures;
- Assess where contaminant concentrations exceed regulatory standards or criteria, or where unregulated petroleum constituents are detected;
- Determine if there are upstream sources of contamination to proximal surface water bodies other than the former Texpet operations;
- For detected contamination, explore the likely mechanism for release and the approximate timeframe/history for the origin of the material.

Investigation activities conducted in support of these goals included collection of sediment, surface water, soil, oil, and groundwater samples for visual inspection and quantitative chemical analysis from the five E&P well sites. Groundwater slug and pumping tests were also conducted for estimation of hydraulic conductivity of subsurface strata.

Originally, the field investigation was planned for a single round of sampling from July 5 to August 31, 2013 (Round I). Due to delays moving equipment and sample containers through Ecuadorian Customs, Round I field efforts were curtailed, necessitating a second round of sampling performed from September 28 to October 17, 2013 (Round II). Round II completed the activities planned for Round I, and included additional activities based on observations made during Round I.

A summary of the field activities performed is included in Section 3, including number of samples collected, matrices sampled, field observations, and any site-specific deviations from the SOPs.

1.4. Quality Assurance/Quality Control

The Quality Assurance/Quality Control (QA/QC) requirements were documented in select worksheets that are part of the Uniform Federal Policy for Quality Assurance Project Plans (Final Version March 2005). These worksheets include WS12, 19, 20, 23, 24, and 28. The QA/QC requirements for these investigations are included as Attachment 4.

QA/QC requirements describe the policy, organization, functional activities, and QA/QC protocols necessary to achieve confidence in the data generated. Detailed procedures for each QC-related field activity including:

- Sampling methods, including QA/QC samples
- Chain of custody procedures.
- Sample packaging and shipment procedures.
- QA/QC of sampling/procedures for field changes and corrective action.
- Parameters to be analyzed and analytical methods.

1.5. Chemicals of Potential Concern

Based on known historical activities at the selected well sites, laboratory analysis was performed on sediment, soil, surface water, and groundwater for associated chemicals of potential concern (COPCs). These COPCs are summarized in Table 1.5-1, below.

Table 1.5-1: Chemicals of Potential Concern

Solid Media
Target Compound List Volatile Organic Compounds +15
Semivolatile Organic Compounds
Alkanes
Polycyclic Aromatic Hydrocarbons [1]
Alkylated Polycyclic Aromatic Hydrcarbons
Napthenic Acids
Biomarkers (Hopane, Stimastane, C2-Chrysene, C3-Chrysene)
Diesel Range Organics
Extended Diesel Range Organics
Heavy Diesel Range Organics
Gasoline Range Organics
Extractable Petroleum Hydrocarbons
Volatile Petroleum Hydrocarbons
Metals
Lipid Phosphate
Total Organic Carbon
Total Solids
Aqueous Media
Target Compound List Volatile Organic Compounds +15
Semivolatile Organic Compounds
Alkanes
Polycyclic Aromatic Hydrocarbons [1]
Alkylated Polycyclic Aromatic Hydrcarbons
Napthenic Acids
Diesel Range Organics
Extended Diesel Range Organics
Heavy Diesel Range Organics
Gasoline Range Organics
Extractable Petroleum Hydrocarbons
Volatile Petroleum Hydrocarbons
Metals
Phenols
Hardness
Nutrients (Nitrates & Phosphates)
Sulfate
Iron (III and II)

[1] In addition to Standard Method 8270 for polyaromatic hydrocarbons in both solid and aqueous media, a high resolution modified analysis was performed by Axys Anaytical Services. This modified method [AXYS SOP MLA-21 (8270)] is capable of detecting specific compounds when detection by the standard Method 8270 is obscured by very high concentrations of hydrocarbons.

1.6. Contents of the Document

This document is composed of the following sections:

- Executive Summary

- Section 1 – Introduction
- Section 2 – Site Background and Description
- Section 3 –Field Activities
- Section 4 – Geology and Hydrogeology
- Section 5 – Data Summary
- Section 6 - References
- Section 7 – Glossary of Abbreviations
- Appendix A – Lithographic Logs
- Appendix B – Site Photographs
- Appendix C – Slug Testing Results
- Appendix D – Drawdown/Recovery Analysis Results
- Attachment 1 – Data Quality Objectives
- Attachment 2 – Field Modifications
- Attachment 3 – Standard Operating Procedures
- Attachment 4 – QA/QC Procedures
- Attachment 5 – Technical Memo SW-846 Method 8270

2. SITE BACKGROUND AND DESCRIPTION

A brief description and history of each of the investigation sites, as well as summaries of the LBG July 2013 field reconnaissance activities, are presented in the following sub-sections. Photographs taken at each site during the field reconnaissance are included in Appendix B.

2.1.1. Lago Agrio 02 (LA-02)

LA-02 is a moderately vegetated site in the Nueva Loja Parish of the Sucumbíos Province located in the north portion of the study area (Louis Berger Field Observations, July 2013). The platform itself is open area surrounded by tall trees on all sides. An inactive oil well is located in the north-central portion of the platform, and a power transmission station is located on the eastern edge of the platform, with overhead power lines running in the east-southeast direction away from the platform. The existing well at LA-02, the second production well drilled and operated by Texpet, went into production in June 1967 and is currently abandoned (Chevron JI Playbook LA-02, 2005).

The site topography is relatively flat (Louis Berger Field Observations, July 2013). A small path leads in the north-northeasterly direction into the woods from the center of the north edge of the platform, and a second path, located at the northeastern corner of the platform, leads to the north-northeast to an area where a local resident runs a small lumber/board operation (was not present when LBG investigated the site in 2013). Small surface water stream to the west of the platform flows from north to south into the Rio Teteye, located approximately 300 meters south of the platform (Chevron JI Playbook LA-02, 2005).

[redacted]

Pit 2 was identified in a 1991 aerial photo and is situated at the north end of the eastern half of the well platform (Chevron JI Playbook LA-02, 2005; Louis Berger Field Observations, July 2013).

[redacted].

Pit 3 was identified in aerial photos obtained in 1976, 1985, and 1990. During the PI, Chevron observed petroleum impacts on the side of Pit 3, but then tested sediment *upstream* to confirm no impacts. The current data suggests that Chevron never tested downstream of Pit 3 during the JIs, despite [redacted] (Chevron JI Playbook LA-02, 2005; Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007). A residence is situated in the area of Pit 3 adjacent to the platform with unrestricted access to the pit areas by the residents. Young children and free range poultry were observed in the area of the former pit (Louis Berger Field Observations, July 2013).

[redacted] Chevron JI Playbook LA-02, 2005; Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007).

Louis Berger July 2013 Field Reconnaissance

During the site reconnaissance conducted in July 2013, the team met a resident who gave permission to enter his property. Once on his property, the team walked north off of the pad and over Pit 3. Pit 1, located in the northeast corner, and Pit 2 situated directly to the north, were both covered by trees and filled with water. Pit 3 had been partially cleared and there were trees on top that appeared to have been there for a long time. The team walked off of Pit 3 to the north and into a swampy area. A hole was dug in this area, but no visible indications of contamination were observed.

The team then followed the wetlands downstream until arriving at a point just off the northwest corner of Pit 3. Black-stained mud and asphalt were clearly visible on the bank and in the swampy area. The team dug another hole there and immediately observed oil sheen and free product bubbling up. These field observations suggested the presence of light non-aqueous phase liquid (LNAPL) on the groundwater table. A Photoionization Detector (PID) reading of approximately 10 ppm was recorded. The team also observed the presence of a drain protruding from the side of Pit 3, but there was no observation of oil coming out of it.

At this point, the team was downhill and just upstream from the dwelling on the property. The group followed the stream around the house and dug another hole in a location where it appeared that the residents accessed the water. The team immediately observed oil sheen in this hole. The team then dug a hole back upstream, approximately one-quarter of the way back to where obvious contamination was initially observed, and immediately observed sheen and petroleum dripping into the hole. A PID reading of over 40 ppm was recorded at this hole. The team then checked farther downstream, and observed sheen when probing the sediment.

[redacted] (Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007).

2.1.2. Aguarico-02 (AG-02)

AG-02 is a thickly vegetated site located in the Dureno Parish of the Sucumbíos Province located in the north east portion of the study area (Louis Berger Field Observations, July 2013). The platform itself is an open area composed of gravel and is located in the northern portion of the Aguarico field. The northern and western sides of the platform are bordered by tall trees and vegetation. An inactive oil well is located near the western end, and debris is scattered on the perimeter of the platform. No open pits were present at this location, and that east of the site a large underground pipeline corridor runs from the north to the south. No homes are present adjacent to the platform, but several houses are located east of the well, and one dwelling lies approximately 300 meters south of the site. AG-02 is a well that was completed in July 1970, but is currently abandoned. (Chevron JI Playbook AG-02, 2006).

The land to the west drops steeply to a northerly-flowing stream. Beyond the platform to the north, the heavy vegetation continues, sloping down to a small stream that flows in a westerly direction to join with the stream on the west side of the platform. The southern side of the platform drops over cleared farmland into a ravine with a small stream at the base of the hill, and the eastern side is bordered by a road which ultimately bends further to the east and runs away from the platform (Chevron JI Playbook AG-02, 2006).

The site contains three former oil pits: Pit 1, Pit 2, and Pit 3 (Chevron JI Playbook AG-02, 2006; Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007).

All pits are located west of the platform (Louis Berger, 2013). Pits 1 and 2 were discovered initially and included in the RAP, while Pit 3 was discovered during the remediation of Pits 1 and 2 and added to the RAP at that time. Pits 1 and 2 were cleaned by soil flushing, while Pit 3 was remediated by in-situ stabilization and encapsulation. The pits descend from the platform in a stair-step fashion, with Pit 3 at the lowest point. Pit 1 is partially covered by the re-graded platform. A path that acts as a drainage ditch descends from the platform past each of the pits, divides, and runs in to the river below (Chevron JI Playbook AG-02, 2006; Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007).

Louis Berger July 2013 Field Reconnaissance

During site reconnaissance performed in July 2013, the LBG team walked around the AG-02 platform. After completing examination of the platform, the team proceeded northwest off of the platform, across the likely location of Pit 1, and down to the probable location of Pit 2. The team probed the soil at that location, and detected a petroleum odor emanating from the probe rod when it was removed from the soil. The team then proceeded towards Pit 3, though the location was unclear as the available maps contain conflicting information. All pits were found by looking at areas defined on the maps and locating features that agreed with Chevron's descriptions. After visiting Pit 3, the team returned to Pit 2, specifically the southwest corner. A small hole filled with water that had a visible, non-bacterial sheen was observed there. Digging in the area revealed oily sediment, and crude oil could be seen on the water's surface. Significant deposits of asphalt were also present near the seep. The team continued toward the southwest edge of the pit, following a likely discharge path that would convey contaminated water to the stream during rain events. The team followed the discharge path to the stream and saw signs of recent human use including laundering. The stream was fast-moving and had a high volume of water at the time of observation.

2.1.3. Guanta-06 (GU-06)

GU-06 is a thickly vegetated site in the El Eno Parish of the Sucumbíos Province in the north-central portion of the study area (Louis Berger Field Observations, July 2013). GU-06 is an active well that went into production in March 1987. The well is active and aided by a power-oil system to run a hydraulic submersible pump. Power oil is supplied through a pipeline from the station that runs parallel to the main pipeline. Crude from GU-06 flows into the main pipeline and north to the station. A small concrete sump is located adjacent to one of the generators contains diesel and crude, and an open straight line pipe discharges the contents if the sump fills (Chevron JI Playbook GU-06, 2006).

A small shack is located near the northern part of the platform. There is also a small substation which includes several pieces of equipment. The equipment is concentrated on the northwest side of the platform, and is comprised of two generators and several transformers. The purpose of the equipment is to run a pump as well as to supply power for the nearby GU-09 and GU-15 wells. In addition, a diesel tank is located near the wellhead to provide fuel to the generators (Chevron JI Playbook GU-06, 2006).

The well site is located in the southern portion of the Guanta field, south of the production station. The well platform is situated between two small hills, is composed of gravel, and has been re-graded. It has a relatively significant drop off to the north to an adjacent stream (Chevron JI Playbook GU-06, 2006). A farm is located on the opposite side of the stream with a tilapia pond and what appeared to be a domestic well (Louis Berger Field Observations, July 2013).

A drainage pathway runs down that side, and at the bottom lies one of Texpet's former pits, Pit A. The pit is a plateaued area at the bottom of the pathway, and an old flare is located in the middle. On the platform, there is a sump located next to two generators. There is a main road running in the north-south direction through the field that also passes through the platform after circumventing a large hill that borders the northern portion of the site (Chevron JI Playbook GU-06, 2006).

Finally, the JI Playbook indicates that patches of petroleum were observed over large areas adjacent to the sump and throughout the grassy slope northwest of the platform. A path leads northwest from the platform down the steep slope, eventually expanding into a cleared area containing an inactive flare. There is also an indistinct drainage channel leading from the platform to the flare area, and a drainage pipe connecting the flare area to an adjacent swamp (Chevron JI Playbook GU-06, 2006).

Only one house existed in the GU-06 area prior to 1990, however, several have been built in the area since then. The road at the site was built between 1985 and 1987. GU-06 was not a well site included in the remedial action program (Chevron JI Playbook GU-06, 2006; Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007).

Louis Berger July 2013 Field Reconnaissance

Site reconnaissance performed in July 2013 indicated that the well site is covered with graded gravel. Residents claimed that multiple pits were present at the same level as the platform, but those pits have since been re-graded and are now under the platform. A small path/drainage ditch leads in the westerly direction and ends in Pit A. There are no pipes on top of the pit, but the team observed two pipes protruding out of the west side of Pit A that were likely drainage siphons. Asphalt was observed on the side of the pit, and directly below Pit A is a swampy area that leads to a stream. The team proceeded into the swampy area and dug a small hole. Black specks of oil could be seen rising to the surface upon completion of digging. Water present on the excavated sediment had a sheen, and oil was observed dripping out of the material. The team then walked towards the stream, probing the soil on the way. Crude oil was observed bubbling up when the probe rod was removed.

The group proceeded to the stream, and upon arrival at the water encountered a sheen that was not bacterial in nature. The stream continued around the site and is used by residents at a downstream location. When Chevron performed PI testing, high total petroleum hydrocarbon (TPH) results were detected farther downstream than the areas visited. On the other side of the stream, residents farm coffee, papaya, and yucca. This area is where Chevron tested water farther uphill, and therefore not likely hydraulically connected to the contamination, Residents had a tilapia pond that was full of fish and a spring used for laundering and possibly for drinking water at the location indicated by Chevron to be where delineation samples were collected during the PI and the JI.

2.1.4. Shushufindi 25 (SSF-25)

SSF-25 is a moderately-vegetated site in the Limoncocha Parish of the Sucumbíos Province located in the center of the study area (Louis Berger Field Observations, July 2013). The SSF-25 area contains a former production well that was converted into an injection well in January 2005. The well is located on an open platform area covered with medium to tall grass, with young trees lining the east side. A road runs in the east-west direction through the platform just north of the well. On the western side of the platform, the terrain slopes downward to a small stream that flows to the north underneath the platform access road. The JI Playbook also indicates that a house is present on the northwest corner of the property. No groundwater wells are located at this residence; drinking water is obtained from the stream on the west side of the house (Chevron JI Playbook SSF-25, 2005).

The site topography is flat with Pit 1 at the southwest quadrant of the platform area, RAP and non-RAP remediated pits 2, 3, and 4 located along the eastern side of the platform area, and an unconfirmed pit north of the platform area (Louis Berger Field Observations, July 2013). Pit 1 is an oil pit visible in satellite photography as early as 1985 and remediated by Texpet in 1996. Pit 2 is defined as a water pit which was declared as requiring no further action due to supposed community use. Pit 3 is an oil pit that appeared in a 1975 aerial photograph and was remediated by Texpet in 1996. Pit 4 is an oil pit not visible in aerial photography, but which was remediated in 1997 (Chevron JI Playbook SSF-25, 2005; Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007).

Residences surround the site beyond the pit areas, and farm animals, including cattle and pigs, were observed in the area of the platform and pits (Louis Berger Field Observations, July 2013).

Louis Berger July 2013 Field Reconnaissance

Site reconnaissance performed in July 2013 indicated that well SSF-25 is situated in the middle of a large, graded gravel well pad. The team first walked over Pit 1, a pit that has been remediated in recent years by Petroecuador. Soil probing showed a clean cap; no additional investigation was performed.

The team then proceeded around the site through what appeared, based on aerial images and visual inspection, to be an old, un-remediated pit. This pit was not included in Chevron's remediation or in any of their reports. The team continued around the outside of the platform to a small stream running beside an abandoned house. Probing of the stream sediments produced small droplets of what appeared to be oil. Sheen was observed on water filling a small hole dug in the spring feeding into the stream.

2.1.5. Yuca 02 (YU-02)

YU-02 is situated in the Taracoa Parish of the Orellana Province located in the south of the study area (Louis Berger Field Observations, July 2013).Two inactive wells are present at the Yuca-02 site: 2A, located on the eastern side of the platform, and 2B, located on the western half of the platform. Well 2A was abandoned during drilling, and effort was shifted to Well 2B. In 1995 Well 2B was converted to an active production well; however, at the time of the PI, Well 2B was inactive, with all discharge piping removed. Two buildings are situated just southwest of the entrance road at the western edge of the platform. (Chevron JI Playbook YU-02, 2006; Chevron's

Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007).

The site topography is flat and surrounded by wetlands vegetated with grasses and low shrubs (Louis Berger Field Observations, July 2013). An open marsh with scattered trees lies on the northern side of the platform, and a marsh with tall trees on the eastern side. A field of tall grass is located to the south. Further to the south and west is agricultural land used by the local agricultural cooperative. (Chevron JI Playbook YU-02, 2006). An east-west road transects the site, and there are residences along the road east and west of the platform area (Louis Berger Field Observations, July 2013).

There are four pits at the YU-02 site: Pits 1 and 2, and Pits A and B. Pits 1 and 2 were oil pits that were remediated by in-situ stabilization as part of the RAP, while Pits A and B were water pits and neither was included in the RAP (Chevron JI Playbook YU-02, 2006; Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007). Pit 1 is located south of the platform, and Pit 2 is located northwest of the platform. The area around Pit 2 appears to have been filled, and there is a residence located in this vicinity. Pit A is located east of the platform area, while Pit B is situated south of Pit 1 in a wetland area. (Louis Berger Field Observations, July 2013). Chevron confirmed during the PI that a spill which occurred 20 years prior continued to impact the marsh on the side of the platform. Chevron determined that they could not evaluate the full effect of the spill because the marsh was impassable (Chevron JI Playbook YU-02, 2006; Chevron's Ecuador Oriente Region Environmental Database (Clickable Database), April 27, 2007; Chevron's Ecuador Oriente Region Analytical Database (Access® Database), May 2007).

Louis Berger July 2013 Field Reconnaissance

During the PI sampling, Chevron verified the presence of a decades-old oil spill extending off the YU-02 platform to the north into a marshy area. While performing site reconnaissance at YU-02 during July 2013, the team walked into the marsh and dug into the sediments, encountering oily soil in the first 6 inches. The visible contamination worsened with depth until approximately 24 inches. At this depth, droplets of oil seeped out of the sediment. A PID reading of 29 ppm was recorded for the material from this location in the soil column.

The team then proceeded to the eastern edge of the site and found a small stream that flows into the marsh where the oil was encountered. An oil sheen was observed on water flowing in from the side of the stream and as a sheen on the stream. It was hypothesized that this probably represents groundwater discharging into the stream, potentially indicating that the contamination is flowing off the site via the groundwater.

3. FIELD ACTIVITIES

The following sections describe the field activities conducted at each well site during Rounds I and II of the site investigation. Deviations from the FSP and SOPs described in Section 1.1 are noted. It should be noted that only normal environmental field samples are discussed in the sections below.

3.1. Site Access and Mobilization

The support required to gain access to the well sites and any adjacent properties as needed was facilitated by PetroAmazonas, the unit of Petroecuador which operates well fields in the Oriente Region.

Mobilization activities included the acquisition of the necessary equipment, either through purchase or rental, and the transportation of that equipment to the field. Equipment components shipped to Ecuador from outside the country experienced significant delays coming through Ecuadorian Customs. These delays affected the availability of sampling equipment and containers, resulting in the need to reduce the number of samples taken and alter sampling procedures, especially during Round 1. These changes to the program did not impact the goal or outcome of the sampling event. Additional mobilization activities included the initial decontamination of field equipment, field personnel orientation, and the marking/staking of proposed boring and well locations using the sample location map and associated global positioning system (GPS) coordinates. Finally, each field team member attended an orientation meeting conducted by PetroAmazonas to become familiar with health and safety requirements at the sites. In addition, each member reviewed the field SOPs and site-specific health and safety requirements.

3.2. General Procedures

Field instruments were calibrated at the start of each field day and subsequently as per the manufacturer's instructions. As appropriate, site and sample screening measurements were obtained using a PID, in accordance with SOP No. 01 – Procedure for Calibration and Operation of a Photoionization Detector.

The following items were recorded in the field logbook on a daily (or as-occurring) basis:

- Date
- Start Time

- Weather
- Names of sampling team members present
- Visitors to the site (managed by PetroAmazonas escort personnel)
- Daily and subsequent calibration results for field instruments.
- All field measurements (*e.g.,* PID readings)
- The equipment used to collect samples
- Sample details (*i.e.,* description, depth, volume, number of containers)
- Observations (*i.e.,* sampling conditions, problems encountered).

At the end of each day, the Technical Field Team Leader (or designee) filled out a daily summary of activities performed during the day, noting observations and any issues that arose.

Field activities were conducted in accordance with the SOPs developed for the investigation. As discussed in Section 1.1, some SOPs were modified based on experience and conditions in the field. All SOPs are presented on Table 1.1-2.

Equipment that came into direct contact with sample material was decontaminated based on field-modified SOPs that accounted for locally-available cleaning supplies. These procedures included SOP No. 4 - Procedure for the Decontamination of Sediment and Soil Sampling Equipment, and SOP No. 10 - Procedure for the Decontamination of Groundwater Sampling Equipment.

Sampling grid node and transect locations were marked out by the field team at each well site using site-specific sample location maps and the associated (Universal Transverse Mercator) UTM coordinates. Sampling and transect points were located using hand-held GPS equipment in accordance with SOP No. 16 – Procedure to Locate Sample Points Using GPS. Locations were identified at each well site with flags or colored surveyor ribbon. Any planned sampling location that proved to be inaccessible or unsuitable after detailed field inspection (*e.g.,* due to obstruction) was adjusted or abandoned in consultation with the Technical Field Team Leader and in accordance with established DQOs. The rationale for field decisions was noted in the field logbook. In some cases, additional sampling locations were chosen to fully investigate areas of concern (*e.g.,* six boring locations were added at LA-02). New sampling locations were chosen after discussions within the field team and with the client.

3.3. Impacts to Field Investigation Activities Due to Customs Delays

It should be noted that the following sample collection activities were hindered during Round 1 due to the delays in moving equipment and sample containers through Ecuadorian Customs:

- Surface Water Sampling
- Sediment Sampling

- Soil Boring and Soil Sample Collection
- Groundwater Sampling

3.3.1. Surface Water Sampling

Surface water sample collection was significantly reduced because of limitations in bottle availability and scheduling constraints.

Field measurement of selected physical water quality parameters was planned using the equipment and procedures detailed in SOP No. 02 – Procedure for the Calibration and Operation of Water Quality Probe; however, the probe equipment was delayed in Customs and not used in Round I or Round II sampling. To conserve bottles, water samples were obtained from only one discrete depth at the locations specified and in the quantities defined in each Site Investigation Plan (SIP). Collection of extra aqueous volume, Nitrite+Nitrate, and Phosphorous was not performed at all locations to conserve sample containers per Field Modification No. 1: Contingency Plan.

3.3.2. Sediment Sampling

Planned sediment sampling was curtailed due to a shortage of sample containers and also time constraints. Collection of contingency aliquots for volatile organic compounds (VOCs) was reduced to conserve vials per Field Modification No. 1: Contingency Plan.

Sediment was obtained from the locations specified in the quantity defined in each SIP; however modifications to the sampling approach were required due to delays in the release of sample containers from Customs. This delay also caused scheduling constraints. To address these scheduling constraints, transect locations were pre-screened via examination of points along the transect using a hand auger in order to identify a single location along each transect with the most obvious signs of contamination. The selected point was flagged, and samples were taken on a later date after containers were released. Sediment characteristics for all pre-screened locations were noted in the field log.

3.3.3. Soil Boring and Soil Sample Collection

The number of soil borings advanced and soil samples taken are identified in the field logbook.

3.3.4. Groundwater Sampling

Limitations to the sampling program were driven by availability of sample containers and the resulting effect on the schedule. Collection of extra aqueous volume, Nitrite+Nitrate, and

Phosphorous was not performed at all locations to conserve sample containers per Field Modification No. 1: Contingency Plan.

3.4. Summary of Field Activities

Round I field activities were conducted from July 20 to August 31, 2013, and included:

- Installation of monitoring wells and piezometers
- Logging and sampling of soil borings
- Sediment sampling
- Surface water sampling
- Measurement of groundwater levels
- Groundwater sampling

Round II field activities were conducted from September 28 to October 17, 2013, and included supplemental sampling activities and re-sampling at locations where Round I samples did not meet laboratory temperature requirements. A summary of the number of locations sampled during the field program is presented in Table 3.4-1, below. Site-specific summaries of field activities are provided in the following sections. Lithographic logs for each soil boring are presented in Appendix A, and site photographs are included in Appendix B.

Table 3.4-1: Overall Summary of Field Activities

Sample or Instrumentation Type	Sampled or Installed
Soil Round I	*44*
Soil Round II	*18*
Total Soil	**62**
Groundwater Round I	*6*
Groundwater Round II	*15*
Total Groundwater	**21**
Piezometers Round I	*26*
Piezometers Round II	*0*
Total Piezometers	**26**
Sediment Round I	*16*
Sediment Round II	*15*
Total Sediment	**31**
Surface Water Round I	*7*
Surface Water Round II	*10*
Surface Water	**17**

3.5. Lago Agrio-02 (LA-02)

Observations of contamination were noted during field investigations in all matrices analyzed, including groundwater, soils around and downgradient of the Pit 3 area, and surface water and sediments near the Pit 3. Figures 3.5-1A and 3.5-1B show the sample locations and field observations from sampling activities. Table 3.5-1, below, provides a summary of the field activities conducted at LA-02.

Table 3.5-1 – LA-02 Sampling Summary

Sample or Instrumentation Type	Sampled or Installed
Soil Round I	*15*
Soil Round II	*6*
Total Soil	**21**
Groundwater Round I	*2*
Groundwater Round II	*3*
Total Groundwater	**5**
Piezometers Round I	*4*
Piezometers Round II	*0*
Total Piezometers	**4**
Sediment Round I	*3*
Sediment Round II	*2*
Total Sediment	**6**
Surface Water Round I	*2*
Surface Water Round II	*2*
Surface Water	**4**

3.5.1. Soil Sampling

Soil borings were advanced at a total of 21 locations at LA-02 during Rounds I and II of the filed investigation. One boring location, N06, was re-located from a pile of rubble north of the platform to a nearby location on the property of the adjacent residence and renamed as N06A. Another boring location, N28, was added in the field based on property owner observations of oil in the soils while digging a post hole for his home.

Samples were collected from 15 borings during Round I from August 19 through 21, 2013. During Round II, samples were collected from six borings on October 4 and 5, 2013. The locations sampled during Round II included three locations previously sampled during Round I, and two new sample locations: N06A, at the adjacent residence, and N15, adjacent to MW-04.

The following signs of soil contamination were noted: Visible oil (N01, N04, N06A, N11, N15A, N16, and N17), oil sheen (N01, N03, N10, N13, N16, N17, N21, N22, and N28), and petroleum odor (N01, N03, N04, N05, N06A, N08, N10, N11, N15A, N16, N17, N21, and N28). Further, 13 locations had comparatively elevated PID readings.

Soil borings were advanced using direct push (manual slide hammer with tripod or Geoprobe) or rotary drilling methodology at the locations specified in the SIP. Borings were drilled in accordance with the procedures detailed in modified SOP No. 07 – Procedure for the Collection and Processing of Direct Push Soil Borings, or modified SOP No. 08 – Procedures for Hollow Stem Auger Soil Borings. The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Soil samples were collected from each boring at the interval specified in the SIP. PID screening was used to aid in the selection of samples for laboratory analysis; however, PID readings were not taken when humidity or other field conditions prevented the equipment from calibrating. Once collected, soils were classified in accordance with SOP No. 06 – Procedure for the Classification of Soil and Sediment. A subset of the soil samples collected was analyzed for the parameters specified in Table 1.5-1, and a small subset of these samples was also analyzed for steranes and hopanes per Field Modification No. 02.

Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling Equipment. Where feasible, cuttings and excess sample material not sent for analysis were returned to the same boring. Cuttings from borings intended for monitoring well installation were spread on the soil unless grossly contaminated. Grossly contaminated cuttings were contained and managed by PetroAmazonas.

3.5.2. Monitoring Well Installation and Development

Monitoring wells were installed from July 29 through July 31, 2013 at four planned locations and at one additional location (N20A-MW-05), situated topographically downgradient from the western side of Pit 3 (Figure 3.5-1).

Signs of petroleum contamination were noted during construction at all wells in the pit area with the exception of MW-05, and included: Visible oil (MW-01), oil sheen and petroleum odor (MW-02), petroleum odor (MW-03), and flecks of hardened asphalt (MW-04). Comparatively elevated PID readings were also detected in the soils.

Borings to be completed as monitoring wells were advanced using the same techniques as those utilized to drill the soil borings (see Section 3.5.1, above). The soil column was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Following construction, each monitoring well was developed in accordance with modified SOP No. 09 – Procedure for Groundwater Well Installation and Development. Non-dedicated equipment was decontaminated prior to initial use and between well locations using the procedures outlined in modified SOP No. 10 – Procedure for the Decontamination of Groundwater Sampling Equipment. If petroleum product later was found to be present in the groundwater, development water was contained and managed by PetroAmazonas.

3.5.3. Groundwater Sampling

Following the installation and development of the monitoring wells, the wells were allowed to equilibrate for at least three weeks. Once equilibrated, the field team collected groundwater samples from a subset the newly-installed monitoring wells. Groundwater samples were collected during Round I on August 26, 2013 at MW-01 (one sample) and MW-02 (one sample), and during Round II on October 4 through 6, 2013 at MW-02, MW-03, and MW-05 (one sample at each well). No samples were collected from MW-01 and MW-04 during Round II due to the presence of petroleum product (MW-01) and slow recovery during the purging process (MW-04). Petroleum product was detected during the October gauging event in all wells, with a thickness ranging from a sheen in four wells to approximately 3 mm (0.01 ft) in MW-01. Comparatively elevated PID readings were observed at all monitoring wells with the exception of MW-05 during August and October gauging events. Samples were obtained in accordance with modified SOP No. 08 – Procedure for Groundwater Well Installation, Well Development, and Groundwater Sampling, with guidance from modified SOP No. 11 – Guidance for Low Flow/Minimal Drawdown Groundwater Sample Collection.

Non-dedicated equipment was decontaminated prior to initial use and between well locations using the procedures outlined in modified SOP No. 09 – Procedure for the Decontamination of Groundwater Sampling Equipment. During Round I, all purge water was contained and managed by PetroAmazonas. During Round II, purge water was contained for PetroAmazonas disposal if there were visible signs of product, such as sheen or oil droplets. Where there were no signs of petroleum product, purge water was discharged on the ground surface in the vicinity of the well. Groundwater samples were analyzed for the parameters specified in Table 1.5-1.

3.5.4. Piezometer Installation

Four piezometers were installed at LA-02 on July 27, 2013. Groundwater was observed at all piezometer locations. Oil sheen and odor were noted at location N07A, downgradient, of Pit 3 and the adjacent residence. No other obvious signs of contamination were reported at the other piezometer locations. Piezometers were installed in hand auger borings.

3.5.5. Sediment Sampling

Sediment samples were taken at three locations during Round I on July 20 and 21, 2013. During Round II, on October 4, 2013, sediment samples were collected at two locations, one new location and one that was sampled during Round I. Signs of contamination include: visible oil at T05A, and odor and sheen at T04A. Sediment samples were retrieved in accordance with SOP No. 05 – Procedure for the Collection and Processing of Surface Sediment Samples (Push Cores).

Upon collection, sediment samples were classified in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment and logged in the field logbook. Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling Equipment. Sediment samples were analyzed for the parameters specified in Table 1.5-1. Any excess sediment captured but not utilized to fill sample containers was contained with grossly contaminated cuttings from soil samples and managed by PetroAmazonas.

3.5.6. Surface Water Sampling

Four of six planned surface water samples were collected at LA-02: T02A and T03A on August 26, 2013 during Round I, and T04 and T05 on October 8, 2013 during Round II. Samples were retrieved in accordance with the procedures detailed in field- modified SOP No. 03 – Procedure for the Collection of Surface Water. Non-dedicated equipment was rinsed in the stream between measurements. Excess water not placed in sample jars was returned to the source water body where the sample was collected.

3.6. Aguarico-02

Signs of petroleum contamination were noted during field investigations in soils downgradient of the pit area and in sediment (Round I, only) south and west of the pit area. Figure 3.6-1 shows the sample locations and field observations from the field. Table 3.6-1, below, provides a summary of the field activities conducted at AG-02.

Table 3.6-1: AG-02 Sampling Summary

Sample or Instrumentation Type	Sampled or Installed
Soil Round I	*0*
Soil Round II	*2*
Total Soil	**2**
Groundwater Round I	*0*
Groundwater Round II	*0*
Total Groundwater	**0**
Piezometers Round I	*3*
Piezometers Round II	*0*
Total Piezometers	**3**
Sediment Round I	*0*
Sediment Round II	*2*
Total Sediment	**2**
Surface Water Round I	*0*
Surface Water Round II	*0*
Surface Water	**0**

3.6.1. Soil Sampling

Soil characteristics, as observed during the failed monitoring well installations (see Section 3.6.2), consisted primarily of very dense clay or silt materials. Because of the difficult terrain and the adverse drilling conditions, Round I soil borings were advanced using a hand auger at only four of the 17 planned locations on August 29, 2013. Soils were analyzed using in-situ TPH testing at the following three locations: in the Pit area (N11), downgradient of Pit 2 at an apparent seep (N9B), and on the path leading from the pit to the stream near N07. During Round II, one soil sample was taken at N11 on October 4, 2013.

In-situ TPH readings in the range of 1,300-46,000 ppm were detected for all samples collected during Round I, with signs of contamination at all sites that included petroleum odors (N07 – strong; N11- slight), visible black spots in the soil (N09A and N07), and specs of gray with a clump of black oil in the soil (N11). Soils at N17, near the stream northwest of the pit area, had no visible signs of contamination.

Soil borings were advanced hand augers at the locations specified in the SIP. The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Soil samples were continuously collected from each boring. PID screening was used to aid in the selection of samples for laboratory analysis; however, PID readings were not taken when humidity or other field conditions prevented the equipment from calibrating. Once collected, soils were classified in accordance with SOP No. 06 – Procedure for the Classification of Soil and Sediment. A subset of the soil samples collected was analyzed for the parameters specified in Table 1.5-1.

Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling Equipment. Where feasible, cuttings and excess sample material not sent for analysis were returned to the same boring.

3.6.2. Monitoring Well Installation and Development

Two monitoring well locations were planned at AG-02; however, repeated attempts using the Ecodrill and hand augers at these and several other locations from August 7 through 9, 2013 were not successful in reaching groundwater. Soil characteristics and observations were logged in the field logbook. The Ecodrill was used at three locations to depths of up to 6 m, with shallower attempts using a hand auger conducted at three additional locations. Signs of contamination at N07 included comparatively elevated PID readings and a 5 cm interval at 1.8 m containing black asphalt with a strong odor. This point is located near the path leading from the platform west to the stream area downgradient from Pit 2. The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

3.6.3. Groundwater Sampling

No groundwater sampling was conducted at Aguarico-02.

3.6.4. Piezometer Installation

Piezometers were installed at three of the four planned locations at AG-02 on August 11, 2013. The fourth piezometer, N08, was abandoned due to site conditions. One of the three completed locations, N16 was relocated downslope to approximately 2.5 m (eight feet) uphill of the stream. No groundwater was observed at any of these locations, and no visible signs of contaminations were noted. Piezometers were installed in hand auger borings.

3.6.5. Sediment Sampling

No sediment samples were taken at AG-02 during Round I.

During Round II, two sediment samples were collected from AG-02 on October 4, 2013. One sediment sample was obtained from a small stream. No visible signs of oil contamination were observed. The second sample was taken from N9B, located at a seep. Free phase oil was observed in the water and the sediment. Sediment samples were retrieved in accordance with SOP No. 05 – Procedure for the Collection and Processing of Surface Sediment Samples (Push Cores).

Upon collection, sediment samples were classified in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment and logged in the field logbook. Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling Equipment. Sediment samples were analyzed for the parameters specified in Table 1.5-1. Any excess sediment captured but not utilized to fill sample containers was contained with grossly contaminated cuttings from soil samples and managed by PetroAmazonas.

3.6.6. Surface Water Sampling

No surface water samples were collected at AG-02 during Round I or Round II.

3.7. Guanta-06 (GU-06)

Signs of contamination were noted during field investigations in all matrices analyzed: groundwater, soils around and downgradient of the Pit A area, and surface water and sediments near the pit and up to 400 m downstream of the site and adjacent to local residences. Figures 3.7-1A and 3.7-1B show the sample locations and field observations from field activities. Table 3.7-1, below, provides a summary of activities conducted at GU-06.

Table 3.7-1: GU-06 Sampling Summary

Sample or Instrumentation Type	Sampled or Installed
Soil Round I	*9*
Soil Round II	*1*
Total Soil	**10**
Groundwater Round I	*2*
Groundwater Round II	*3*
Total Groundwater	**5**
Piezometers Round I	*6*
Piezometers Round II	*0*
Total Piezometers	**6**
Sediment Round I	*7*

Sample or Instrumentation Type	Sampled or Installed
Sediment Round II	*4*
Total Sediment	**11**
Surface Water Round I	*2*
Surface Water Round II	*1*
Surface Water	**3**

3.7.1. Soil Sampling

Round 1 soil samples were taken at GU-06 on August 23 and August 24, 2013 at 9 soil boring locations. Originally planned low-priority locations (N01, N02, N03, N14, and N22) were abandoned to conserve sample containers, and N09 was abandoned due to time constraints. The following signs of soil contamination were noted at GU-06: Visible oil (N04 and N16), oil sheen (N18, and N19), petroleum odor (N04, N13, N17, N18, N19, and N21), and comparatively elevated PID readings (N06, N10, N13, N17, N18, and N28). On October 6, 2013 during Round II, one additional soil sample was collected at a new soil boring location, N29, near the abandoned flare.

Soil borings were advanced using direct push (manual slide hammer with tripod or Geoprobe) or rotary drilling methodology at the locations specified in the SIP. Borings were drilled in accordance with the procedures detailed in modified SOP No. 07 – Procedure for the Collection and Processing of Direct Push Soil Borings, or modified SOP No. 08 – Procedures for Hollow Stem Auger Soil Borings. The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Soil samples were continuously collected from each boring. PID screening was used to aid in the selection of samples for laboratory analysis; however, PID readings were not taken when humidity or other field conditions prevented the equipment from calibrating. Once collected, soils were classified in accordance with SOP No. 06 – Procedure for the Classification of Soil and Sediment. A subset of the soil samples collected was analyzed for the parameters specified in Table 1.5-1, and a small subset of these samples was also analyzed for steranes and hopanes per Field Modification No. 02.

Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling

Equipment. Where feasible, cuttings and excess sample material not sent for analysis were returned to the same boring. Cuttings from borings intended for monitoring well installation were spread on the soil unless grossly contaminated. Grossly contaminated cuttings were contained and managed by PetroAmazonas.

3.7.2. Monitoring Well Installation and Development

Monitoring wells were installed at three of the four planned locations (MW-01, MW-03, and MW-04) at GU-06 from August 1 through August 3, 2013. The fourth planned well location (MW2) was installed as a temporary well (without grouting and a permanent steel casing) due to high groundwater elevation (groundwater at or near the ground surface) at the well location. Ultimately, this location was completed as a piezometer (N10).

Signs of petroleum contamination were noted at each well during construction, including strong petroleum odor noted at each well, visible black specks in soil and brown/black floating specks with sheen (MW-01), visible crude and oil sheen with a comparatively elevated high PID reading (MW-03), and black specks and gray banding in strata at the 3.0-3.6 m interval indicating possible petroleum oxidation (MW-04).

Borings to be completed as monitoring wells were advanced using the same techniques as those utilized to drill the soil borings (see Section 3.7.1, above). The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Following construction, each monitoring well was developed in accordance with modified SOP No. 09 – Procedure for Groundwater Well Installation and Development. Non-dedicated equipment was decontaminated prior to initial use and between well locations using the procedures outlined in modified SOP No. 10 – Procedure for the Decontamination of Groundwater Sampling Equipment. If petroleum product later was found to be present in the groundwater, development water was contained and managed by PetroAmazonas.

3.7.3. Groundwater Sampling

Following the installation and development of the monitoring wells, the field team collected groundwater samples from the newly-installed monitoring wells. Groundwater samples were collected on August 27, 2013 at MW-01 and MW-03 during Round I and on October 7, 2013 during Round II at MW-01, MW-03, and MW-04. No petroleum product was detected with an oil-water interface probe during an October gauging event. However, a comparatively elevated

PID reading was observed at MW-01 during an August gauging event. Samples were obtained in accordance with modified SOP No. 08 – Procedure for Groundwater Well Installation, Well Development, and Groundwater Sampling, with guidance from modified SOP No. 11 – Guidance for Low Flow/Minimal Drawdown Groundwater Sample Collection.

Non-dedicated equipment was decontaminated prior to initial use and between well locations using the procedures outlined in modified SOP No. 09 – Procedure for the Decontamination of Groundwater Sampling Equipment. During Round I, all purge water was contained and managed by PetroAmazonas. During Round II, purge water was contained for PetroAmazonas disposal if there were visible signs of product, such as sheen or oil droplets. Where there were no signs of product, purge water was discharged on the ground surface in the vicinity of the well. Groundwater samples were analyzed for the parameters specified in Table 1.5-1.

3.7.4. Piezometer Installation

Six piezometers were installed at GU-06 on July 28, 2013; one of the seven planned locations (N24) was abandoned due to site topography; N23 was relocated due to site conditions and N26A was added. Groundwater was observed at all locations except for N26. Signs of contamination, including oil sheen and odor, were noted at N19, which is located northwest of the Pit area, and location N10 (odor), immediately west of the Pit area. No signs of contamination were reported at the other piezometers. Piezometers were installed in hand auger borings.

3.7.5. Sediment Sampling

Sediment samples were taken from August 23 to August 25, 2013 during Round I at seven of eight planned locations. The Round I location planned for T03 was relocated to T09 based on observations of contamination at the new location shared with the team by a nearby property owner. Four additional samples were taken on October 8, 2013 during Round II re-sampling at three locations (T01, T07, and T08) and a new location at N29 in the Pit area. Signs of contamination observed include: petroleum bubbling up after the core was removed (T01), visible oil (T07 and T09), sheen (T04 and T09), and petroleum odor (T04, T06, T07, T08, and T09). Sediment samples were retrieved in accordance with SOP No. 05 – Procedure for the Collection and Processing of Surface Sediment Samples (Push Cores).

Upon collection, sediment samples were classified in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment and logged in the field logbook. Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling

Equipment. Sediment samples were analyzed for the parameters specified in Table 1.5-1. Any excess sediment captured but not utilized to fill sample containers was contained with grossly contaminated cuttings from soil samples and managed by PetroAmazonas in accordance with applicable procedures.

3.7.6. Surface Water Sampling

Three of nine planned surface water samples were collected on August 24, 2013 during Round I at T02, T08, and T10. No surface water samples were collected during Round II. Samples were retrieved in accordance with the procedures detailed in field- modified SOP No. 03 – Procedure for the Collection of Surface Water. Non-dedicated equipment was rinsed in the stream between measurements. Excess water not placed in sample jars was returned to the source water body where the sample was collected.

3.8. Shushufindi-25

Signs of contamination were noted during Round I investigations in soils around the Pit 1 area and in surface water and sediments downstream of Pit 1 and adjacent to a residence. Figure 3.8-1 shows the sample locations and field observations from field activities. Table 3.8-1 provides a summary of the activities conducted at SSF-25.

Table 3-8-1 – SSF-25 Sampling Summary

Sample or Instrumentation Type	Sampled or Installed
Soil Round I	*15*
Soil Round II	*9*
Total Soil	**24**
Groundwater Round I	*0*
Groundwater Round II	*5*
Total Groundwater	**5**
Piezometers Round I	*6*
Piezometers Round II	*0*
Total Piezometers	**6**
Sediment Round I	*3*
Sediment Round II	*3*
Total Sediment	**6**
Surface Water Round I	*0*
Surface Water Round II	*5*
Surface Water	**5**

3.8.1. Soil Sampling

Soil borings were advanced on August 26 through 29, 2013 at 17 of 30 planned locations, with samples collected at 15 of these locations. Sampling was reduced due to time constraints and limits in the number of sample containers, and was therefore focused on the Pit 1 area southwest of the platform. A limited number of samples were taken in the vicinity of the pit north of the platform and between the northwest quadrant of the platform and stream.

Signs of soil contamination at SSF-25 were noted during Round I at the following locations, primarily in the vicinity of Pit 1: Visible oil (N06), oil sheen (N10 and N12), and petroleum odor (N07, N10, and N12). PID readings were taken on August 28 and 29, 2013, with a comparatively elevated reading registered at boring location N05 and non-elevated readings observed at other locations (N01, N09, N14, N18, N24, N25, N28, and N34). Nine Round I soil samples were delayed in shipping, and arrived at the laboratories with temperature exceeding quality assurance requirements. Five of these locations were resampled and samples were collected at two additional locations during Round II on October 2 through 3, 2013.

Signs of soil contamination at SSF-25 were noted during Round II at the following locations; visible oil (N06A and N07A), oil sheen (N06A, N07A, N12, and N13A), and petroleum odor (N06A, N07A, N11A, N12, and N13A).

Soil borings were advanced using direct push (manual slide hammer with tripod or Geoprobe) or rotary drilling methodology at the locations specified in the SIP. Borings were drilled in accordance with the procedures detailed in modified SOP No. 07 – Procedure for the Collection and Processing of Direct Push Soil Borings, or modified SOP No. 08 – Procedures for Hollow Stem Auger Soil Borings. The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Soil samples were continuously collected from each boring. PID screening was used to aid in the selection of samples for laboratory analysis; however, PID readings were not taken when humidity or other field conditions prevented the equipment from calibrating. Once collected, soils were classified in accordance with SOP No. 06 – Procedure for the Classification of Soil and Sediment. A subset of the soil samples collected was analyzed for the parameters specified in Table 1.5-1, and a small subset of these samples was also analyzed for Steranes and Hopanes per Field Modification No. 02.

Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling

Equipment. Where feasible, cuttings and excess sample material not sent for analysis were returned to the same boring. Cuttings from borings intended for monitoring well installation were spread on the soil unless grossly contaminated. Grossly contaminated cuttings were contained and managed by PetroAmazonas.

3.8.2. Monitoring Well Installation and Development

Monitoring wells were installed from July 24 through July 27, 2013 at all six planned locations. Signs of petroleum contamination were noted during construction at the three wells in the Pit 1 area, and included: petroleum odor (MW-02, MW-03, and MW-04), and comparatively elevated PID readings in soils at (MW-02 and MW-03).

Borings to be completed as monitoring wells were advanced using the same techniques as those utilized to drill the soil borings (see Section 3.8.1, above). The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Following construction, each monitoring well was developed in accordance with modified SOP No. 09 – Procedure for Groundwater Well Installation and Development. Non-dedicated equipment was decontaminated prior to initial use and between well locations using the procedures outlined in modified SOP No. 10 – Procedure for the Decontamination of Groundwater Sampling Equipment. If a product later was found to be present in the groundwater, development water was contained and managed by PetroAmazonas.

3.8.3. Groundwater Sampling

Following the installation and development of the monitoring wells, the field team collected groundwater samples from the newly-installed monitoring wells. A sheen of petroleum product was detected at MW-03 using an oil-water interface probe during a September gauging event. Comparatively elevated PID readings were also observed at MW-02 and MW-03. Groundwater samples were collected during Round II at MW-02, MW-03, MW-04, and MW-05 on September 30 and October 1, 2013. Groundwater samples were not obtained at MW-06 because the outer protective casing and inner PVC pipe were damaged. This damage prevented sampling equipment from being lowered down the well. At MW-01 the recharge rate after purging was very slow. Due to this low recovery rate, only VOCs and GRO samples were obtained. Samples were obtained in accordance with modified SOP No. 08 – Procedure for Groundwater Well Installation, Well Development, and Groundwater Sampling, with guidance from modified SOP No. 11 – Guidance for Low Flow/Minimal Drawdown Groundwater Sample Collection.

Non-dedicated equipment was decontaminated prior to initial use and between well locations using the procedures outlined in modified SOP No. 09 – Procedure for the Decontamination of Groundwater Sampling Equipment. During Round I, all purge water was contained and managed by PetroAmazonas. During Round II, purge water was contained for Petro Amazonas disposal if there were visible signs of product, such as sheen or oil droplets. Where there were no signs of product, purge water was discharged on the ground surface in the vicinity of the well. Groundwater samples were analyzed for the parameters specified in Table 1.5-1.

3.8.4. Piezometer Installation

Six piezometers were installed at SSF-25 on July 24 and 25, 2013. Groundwater was not observed at the time of installation at any of the installed locations, but water levels were subsequently recorded for all piezometer locations except N08 and N17 (dry); no obvious signs of contamination were reported at the piezometers. Piezometers were installed in hand auger borings.

3.8.5. Sediment Sampling

Sediment samples were taken on August 29, 2013 during Round I at three of six planned locations: T01, T02, and T03. Of the three unsampled locations, two sites, T05 and T06, were located north of the well site. The third location, T04, was investigated; however, there was no defined stream bank in this area and no signs of contamination in the stream. Signs of contamination were noted at points approximately 4.5 m (15 ft) and 6.1 m (20 ft) west of the stream. Signs of contamination noted during Round I included: visible oil (T03) and strong petroleum odor (T02).

Two of the locations sampled during Round I, T02 and T03, were resampled on October 2, 2013 during Round II. In addition, one new sediment sample (SSF-25-SP) was collected on October 5, 2013 near a spring at the Perez residence. Based on field team conversations with Mr. Perez, this spring was used in the past as a water source until notification was provided by an Ecuadorian agency that it should no longer be used due to contamination. Further, PetroAmazonas installed a potable water line and meter for Perez usage within the last two years. Signs of contamination noted during Round I included: visible oil (T03) and strong petroleum odor (T02). Signs of contamination were noted during Round II at location T02A (petroleum odor, oil sheen and free-phase oil). Sediment samples were retrieved in accordance with SOP No. 05 – Procedure for the Collection and Processing of Surface Sediment Samples (Push Cores).

Upon collection, sediment samples were classified in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment and logged in the field logbook. Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling Equipment. Sediment samples were analyzed for the parameters specified in Table 1.5-1. Any excess sediment captured but not utilized to fill sample containers was contained with grossly contaminated cuttings from soil samples and managed by PetroAmazonas.

3.8.6. Surface Water Sampling

No surface water samples were collected during Round I. During Round II, a total of four surface water samples were obtained: one from the spring at the Perez residence, and three others from sediment sampling locations, including T04A, T03A, and T02A.

Samples were retrieved in accordance with the procedures detailed in field- modified SOP No. 03 – Procedure for the Collection of Surface Water. Non-dedicated equipment was rinsed in the stream between measurements. Excess water not placed in sample jars was returned to the source water body where the sample was collected.

3.9. Yuca-02

Signs of contamination were noted during Round I investigations in sediment north of the platform in the area of the circa 1980’s oil spill reported in Chevron’s PI and JI documents and east of the platform in the stream flowing north from the Pit A area. Contamination was noted in soils south and east of the platform in the vicinity of Pit 1 and Pit A. A resident adjacent to Pit A noted visible oil bubbling up whenever sediment was disturbed in the wetlands on his property between his residence and Pit A. Figure 3.9-1 shows sample locations and field observations from field activities. Table 3.9-1, below, provides a summary of the activities conducted at YU-02.

Table 3.9-1: YU-02 Sampling Summary

Sample or Instrumentation Type	Sampled or Installed
Soil Round I	*5*
Soil Round II	*1*
Total Soil	**6**
Groundwater Round I	*2*
Groundwater Round II	*4*
Total Groundwater	**6**
Piezometers Round I	*7*
Piezometers Round II	*0*
Total Piezometers	**7**
Sediment Round I	*2*
Sediment Round II	*4*
Total Sediment	**6**
Surface Water Round I	*3*
Surface Water Round II	*2*
Surface Water	**5**

3.9.1. Soil Sampling

Twenty-one soil borings were logged at YU-02 from August 15 through 28, 2013. There were several deviations from the planned seven locations, including:

- Due to the incohesive nature of the material (*i.e.*, the soils were highly liquid and would compress or fall out of the sampling tube), multiple attempts were necessary adjacent to locations N02, N13, and N14;
- Relocation of N06 from an area adjacent to soil borings with no signs of contamination to a location in line with MW-02 and MW-04, both of which had signs of contamination but were not sampled during well installation;
- Relocation of N09 to a point also in line with MW-02 and MW-04; and
- Addition of N12A and N18A east of the platform near piezometer locations N12 and N18, both of which exhibited signs of oxidized petroleum (gray and blue clay).

Five soil samples were collected from the 21 soil borings advanced during Round I. No additional soil borings were advanced during Round II.

Signs of soil contamination noted at YU-02 during Round I included: Visible oil at N09A; petroleum odor at N02A, N06A, N16, N17, and N18A; gray or bluish soils (indicating potential for oxidized petroleum) at N02/N02A, N05, N06A, and N07; and comparatively elevated PID readings at N02, N02A, N06A, N09A, and N18A.Soil borings were advanced using direct push (manual slide hammer with tripod or Geoprobe) or rotary drilling methodology at the locations specified in the SIP. Borings were drilled in accordance with the procedures detailed in modified SOP No. 07 – Procedure for the Collection and Processing of Direct Push Soil Borings, or modified SOP No. 08 – Procedures for Hollow Stem Auger Soil Borings. The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Soil samples were continuously collected from each boring. PID screening was used to aid in the selection of samples for laboratory analysis; however, PID readings were not taken when humidity or other field conditions prevented the equipment from calibrating. Once collected, soils were classified in accordance with SOP No. 06 – Procedure for the Classification of Soil and Sediment. A subset of the soil samples collected was analyzed for the parameters specified in Table 1.5-1, and a small subset of these samples was also analyzed for Steranes and Hopanes per Field Modification No. 02.

Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling Equipment. Where feasible, cuttings and excess sample material not sent for analysis were returned to the same boring. Cuttings from borings intended for monitoring well installation were spread on the soil unless grossly contaminated. Grossly contaminated cuttings were contained and managed by PetroAmazonas.

3.9.2. Monitoring Well Installation and Development

Monitoring wells were installed on August 5 and 6, 2013 at all four planned locations. Signs of petroleum contamination noted during well construction include: visible oil (MW-01), strong petroleum odor (MW-01, MW-02, and MW-04), blackened sand (MW-02), and signs of oxidation (MW-01 and MW-02).

Borings to be completed as monitoring wells were advanced using the same techniques as those utilized to drill the soil borings (see Section 3.9.1, above). The soil stratigraphy was continuously logged in the field logbook in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Soil samples were continuously collected from each well boring. Once collected, soils were classified in accordance with SOP No. 06 – Procedure for the Classification of Soil and Sediment.

Following construction, each monitoring well was developed in accordance with modified SOP No. 09 – Procedure for Groundwater Well Installation and Development. Non-dedicated equipment was decontaminated prior to initial use and between well locations using the procedures outlined in modified SOP No. 10 – Procedure for the Decontamination of Groundwater Sampling Equipment. If a petroleum product later was found to be present in the groundwater, development water was contained and managed by PetroAmazonas.

3.9.3. Groundwater Sampling

Following the installation and development of the monitoring wells, the field team collected groundwater samples from a subset of the newly-installed monitoring wells. Groundwater samples were collected during Round I on August 28, 2013 at MW-01 and MW-04, and at all wells during Round II on October 13, 2013. A comparatively elevated PID reading was observed at MW-01 during the August gauging event. Samples were obtained in accordance with modified SOP No. 08 – Procedure for Groundwater Well Installation, Well Development, and Groundwater Sampling, with guidance from modified SOP No. 11 – Guidance for Low Flow/Minimal Drawdown Groundwater Sample Collection.

Non-dedicated equipment was decontaminated prior to initial use and between well locations using the procedures outlined in modified SOP No. 09 – Procedure for the Decontamination of Groundwater Sampling Equipment. During Round I, all purge water was contained and managed by PetroAmazonas. During Round II, purge water was contained for PetroAmazonas disposal if there were visible signs of petroleum product, such as sheen or oil droplets. Where there were no signs of product, purge water was discharged on the ground surface in the vicinity of the well. Groundwater samples were analyzed for the parameters specified in Table 1.5-1.

3.9.4. Piezometer Installation

Seven piezometers were installed at YU-02 on August 2, 2013; Groundwater was observed at the time of installation at all locations with slight petroleum odor noted at N16 and N17. Blue and gray clays, indicating possible petroleum oxidation were noted at N02, N04, and N18. Piezometer N17 was inadvertently removed by PetroAmazonas during a routine site cleaning/grading activity. Piezometers were installed in hand auger borings.

3.9.5. Sediment Sampling

Sediment samples were collected at T04 and T06A during Round I on August 17, 2013. Four additional sediment samples were collected during Round II on October 12, 2013 at T03, T05, and T06B, and at the irrigation ditch west of Pit 1 (T08). Sediment samples were retrieved in accordance with SOP No. 05 – Procedure for the Collection and Processing of Surface Sediment Samples (Push Cores).

Upon collection, sediment samples were classified in accordance with modified SOP No. 06 – Procedure for the Classification of Soil and Sediment and logged in the field logbook. Non-dedicated equipment was decontaminated between locations using the procedures outlined in modified SOP No. 04 – Procedure for the Decontamination of Sediment and Soil Sampling Equipment. Sediment samples were analyzed for the parameters specified in Table 1.5-1. Any excess sediment captured but not utilized to fill sample containers was contained with grossly contaminated cuttings from soil samples and managed by PetroAmazonas.

3.9.6. Surface Water Sampling

Surface water samples were collected on during Round I August 3, 16, and 17, 2013 at T03 and the two locations where sediment samples were collected (T04 and T06A). No additional surface water samples were collected at YU-02 during Round II. Visible oil and strong petroleum odors were noted at the three locations sampled during Round I.

Samples were retrieved in accordance with the procedures detailed in field- modified SOP No. 03 – Procedure for the Collection of Surface Water. Non-dedicated equipment was rinsed in the stream between measurements. Excess water not placed in sample jars was returned to the source water body where the sample was collected.

3.10. Groundwater Elevation and Product Monitoring

As with groundwater quality, the monitoring of groundwater elevations and the interaction with proximal surface water features is a critical component in determining how potential contaminants migrate; therefore, the newly-installed monitoring wells and piezometers were checked for groundwater elevations and potential free-phase oil (*e.g.*, LNAPL) layer elevations and thickness. The top of groundwater was determined to the nearest hundredth of a foot (0.01 ft) (3mm) using an electronic water level indicator measured from a specific permanent mark placed at the top of the well casing at the time of surveying. Product evaluation and sampling was conducted in accordance with SOP No. 12 – Procedure for the Collection of Non-Aqueous Phase Liquids. If LNAPL was detected, one or more samples were collected for characterization ("fingerprint analysis") at the discretion of the Technical Field Team Leader in consultation with the Project Manager. Product was observed at LA-02-MW-01 and LA-02-MW-04 during Round II elevation and LNAPL monitoring. Numerical groundwater elevations for each well site are presented in Table 3.10-1. Groundwater elevations are discussed in Sections 4.1 through 4.5, below, and shown in Figures 4.1-1, 4.3-1, 4.4-1, and 4.5-1.

3.11. Slug Test

Hydraulic conductivity (slug) tests were conducted at a total of four locations: SSF-25, GU-06, LA-02, and YU-02. Multiple monitoring wells were tested at each location. Slug tests were carried out in accordance with SOP No. 18 – Procedure for Conducting Slug Testing and Mini-Pumping Tests. All testing was conducted after groundwater sampling had been completed. At monitoring wells with a known, fast recharge rate based on prior groundwater sampling data, multiple slug tests were conducted. Where slower recharge rates had been previously identified, only one test was carried out. Wells with extremely slow recharge rates were not tested due to logistical constraints.

The slug tests were conducted by using a bailer to withdraw water from the monitoring well, creating a rising head in the monitoring well. Water level data were collected using a Solinst Diver® transducer placed near the bottom of the well in order to minimize disturbances during bailer removal. The transducer was programmed to collect data at one second intervals for the first five minutes, then at five second intervals for the next 20 minutes. Manual measurements were also collected during the slug test as a backup in case of equipment failure. In instances where there was insufficient water in the well to install a transducer, manual measurements were collected as the primary data source. Data were subsequently transcribed/downloaded and analyzed using the Bouwer-Rice method (Bouwer & Rice, 1976). Individual slug test results are presented in Appendix C, and the results of the hydraulic conductivity testing are summarized in Table 3.11-1.

Table 3.11-1: Hydraulic Conductivity

Site	Well ID	Estimated Hydraulic Conductivity (ft/day)	Estimated Hydraulic Conductivity (cm/sec)
GU-06	GU-06-MW-01-Test 1	31	1.09E-02
GU-06	GU-06-MW-01-Test 2	39	1.38E-02
GU-06	GU-06-MW-03	4.1	1.45E-03
LA-02	LA-02-MW-02	0.7	2.47E-04
LA-02	LA-02-MW-03	2.9	1.02E-03
LA-02	LA-02-MW-05-Test1	0.21	7.41E-05
LA-02	LA-02-MW-05-Test2	0.23	8.12E-05
SSF-25	SSF-25-MW-02	0.069	2.44E-05

Site	Well ID	Estimated Hydraulic Conductivity (ft/day)	Estimated Hydraulic Conductivity (cm/sec)
SSF-25	SSF-25-MW-03-Test1	3.6	1.27E-03
SSF-25	SSF-25-MW-03-Test2	3.9	1.38E-03
SSF-25	SSF-25-MW-04-Test1	3	1.06E-03
SSF-25	SSF-25-MW-04-Test2	2.4	8.47E-04
SSF-25	SSF-25-MW-05-Test1	1.6	5.65E-04
SSF-25	SSF-25-MW-05-Test2	1.5	5.30E-04
YU-02	YU-02-MW-01-Test1	2.4	8.47E-04
YU-02	YU-02-MW-01-Test2	2.4	8.47E-04
YU-02	YU-02-MW-02	3.7	1.31E-03
YU-02	YU-02-MW-03-Test1	0.4	1.41E-04
YU-02	YU-02-MW-03-Test2	0.25	8.83E-05

Additionally, drawdown and recovery were monitored during low-flow groundwater sampling at well LA-02-MW-03. The Cooper-Jacob method of analysis of both drawdown and recovery data shows hydraulic conductivities ranging from 4.2 x 10^{-5} cm/sec (0.12 ft/day) (drawdown) to 9.5 x 10^{-5} cm/sec (0.27 ft/day) (recovery). These data demonstrate good agreement, within one order of magnitude, with hydraulic conductivity testing conducted using rising head tests. The discharge rate used in the drawdown analysis was the time-weighted average over the sampling period. Plots of these analyses are presented in Appendix D.

3.12. Crude Oil Samples

During Round I, crude oil samples were collected to support the analysis of steranes and hopanes, oil weathering, and other analyses, as documented in Field Modification No. 02. Samples were collected from pump stations at LA-30, SSF-65, and YU-01B with the support of PetroAmazonas staff, who operated the wellhead so that samples could be obtained. Crude oil was initially collected in 1-liter wide mouth jars and was then transferred into two smaller jars by field staff. Excess oil was returned to PetroAmazonas for disposal. Crude oil sample results are presented in Table 3.12-1 – Summary of Crude Oil Sample Results.

3.13. Sample Management and Preservation

Samples were containerized in jars or bottles clearly labeled with, at a minimum, the following information:

- Unique Sample ID
- Analytical Parameter Requested

- Sample Date
- Sample Type
- Preservative(s) Used

Sample information was captured in chain of custody forms as well as in the field logbook. Preservation of the samples was performed in accordance with laboratory instruction provided in the QA/QC Requirements, included as Attachment 4.

Additional details associated with sample management and sample preservation can be found in SOP No. 13 – Procedure to Conduct Sample Management and SOP No. 14 – Procedure for Sample Preservation. Samples were stored in coolers on ice during collection activities, with coolers re-packed with fresh ice for storage and again prior to shipping. Due to delays with shipments, some samples reached the laboratories outside of temperature ranges defined for sample preservation in the SOPs. The expected impact of higher than required sample preservation temperatures would be a potential low bias in the reported data, or lower reported contaminant concentrations than are actually present in the media sampled, particularly for VOCs, Diesel Range Organics (DROs), and Gasoline Range Organics (GROs). Re-sampling at the affected locations was performed during Round II.

3.14. Quality Control Samples

Quality control procedures were implemented to ensure that sampling, transportation, and laboratory activities did not compromise sample quality. Trip blanks, equipment blanks, field duplicate samples, matrix spike (MS) samples, matrix spike duplicate (MSD) samples, and laboratory replicate samples provide a quantitative basis for validating the analytical data. Collection of quality control samples is achieved through providing additional sample material to the laboratory. Quality control samples were collected at a frequency of 20 percent, *e.g.,* one field duplicate sample per 20 environmental samples. Equipment blanks were collected at a frequency of one equipment blank per 20 environmental samples and represent all non-dedicated equipment used in sample collection and processing. SOP No. 15 – Procedure to Conduct Collection of Field Blanks and Equipment Blanks provides details on how equipment blank samples were obtained.

3.15. Surveying

Location data was collected during Round I stakeout and sampling activities using hand-held GPS instrumentation; however, in certain situations, a hand-held GPS system was either not available or did not receive sufficient GPS satellite coverage to provide adequate spatial resolution. As a result, node locations were located using distances measured from known fixed points, primarily monitoring wells.

During the Round II investigation, a survey was conducted using Leica high-precision GPS control and Total Station Equipment. Each of the groundwater monitoring wells and piezometers was surveyed to determine the elevation of the top of each well casing and protective casing relative to a common datum. At each piezometer that was immediately adjacent to a stream or water body, the water surface elevation was measured. The locations of soil borings, in addition to wells and piezometers, were also surveyed and tied to the UTM datum during the Round II field work.

3.16. Subcontracted Services

Subcontracted services were required to complete components of the investigation, including drilling, surveying, chemical analysis, data validation, and security. Table 3.16-1lists the subcontractors and services used to support investigation activities. In addition to the subcontractors listed, PetroAmazonas removed and managed the investigation-derived wastes.

Table 3.16-1: Subcontractors

Contractor	Service
Hidrogeocol Ecuador, CIA, LTDA Calle La Niña E8-52 y Diego de Almagro Edificio Royal Business Of. 507 Quito, Ecuador	Rotary and direct push soil borings, and Drilling and installation of monitoring wells
A.S. Constructores Cia. Ltda. Toledo N23-126 y Madrid Edificio Munich Of 02 Quito, Ecuador	Survey sample locations and site features
ALS Life Sciences Division | Corplab Environmental Services Rigoberto Heredia Oe 6 -157 y Huachi Quito-Ecuador	Direct push soil borings with Geoprobe
Axys Analytical Services, Ltd. 2045 Mills Road West Sidney BC V8L5X2	Chemical Analytical Services
Battelle 397 Washington St. Duxbury. MA 02332	
Katahdin Analytical Services, Inc. 600 Technology Way Scarborough ME 04074	
New Environmental Horizon, Inc. 34 Pheasant Run Dr. Skillman, NJ 08550	Data Validation Services

Contractor	Service
WSO Worldwide Security Options Quito, Ecuador	Security

4. GEOLOGY AND HYDROGEOLOGY

4.1. Lago Agrio 02 (LA-02)

The site-specific geology of LA-02 is derived from 30 borings, including five monitoring well completions, that are focused primarily in the area of former Pit 3, a non-RAP remediated pit, and areas downgradient of the former pit such as at a nearby residence (coincident with approximate location of a suspected non-RAP remediated pit). During the subsurface investigation, 30 borings at LA-02 were drilled to terminal depths of between approximately 4 and 6 meters below ground surface (bgs), with an average depth of 4.2 meters bgs. Subsurface conditions, while heterogeneous throughout the extent of the site, generally consisted of a mixture of well-sorted sand, silt, and clay. Sand was generally found at shallower depths with silt/clay found generally at depth. Soils at LA-02 can be generally divided into two major strata; a shallow, well-sorted sand stratum and a deep silt/clay soil stratum.

The first stratum, generally encountered at or near grade, consisted of a grayish-brown, olive-black, or dark yellowish brown well-sorted sand with a variable silt fraction with a total depth of 1.5-4 meters bgs. This stratum was occasionally inter-fingered with lenses of less permeable materials (silt to clay) with thicknesses most frequently less than 50 cm. Stratum one is occasionally overlain by variably-colored silt or clay, usually of less than one meter thick. This silt to clay surficial stratum is observed in borings N04, N05, N07B, N10, N16, N21, N22, N23, N25, and N26.

The second major stratum consisted of yellow-brown, light olive gray or dark gray silt to clay layer underlying the sand strata. This stratum was observed in borings N03, N04, N05, N06A, N08, N10, N12, N14, N15, N20, N21, N23, N24, N25, N26, and N28. Stratum two is occasionally interbedded with lenses of sand, most frequently less than 50 cm thick and consisting of yellowish-brown to dark yellowish-brown, well-sorted silty sand. The second stratum was at some locations underlain by well-sorted to silty sand (observed in LA02-N05, LA02-N12, LA02-N14, and LA02-N24).

A review of the subsurface material encountered during the drilling of these borings indicates that a number of the borings and monitoring wells are located in Pit 3. Of the 30 borings drilled (see Appendix A), 11 borings are interpreted to be located in Former Pit 3 based on a review of geologic logs, visual and olfactory observations, PID measurements, and analytical data derived from soil and groundwater samples. Observable impact due to petroleum product (petroleum odor, petroleum sheen on water table, or free-phase oil) was found in 18 of the 30 borings. Of the 18 borings with visible impacts, nine are located in Pit 3. Petroleum sheen was observed in 11 of the 30 borings drilled, while free-phase oil was visible in five borings: LA02-MW-01, LA02-N11, LA02-N15, LA02-N16 and LA02-N17. Four borings outside of Pit 3 were also observed to be impacted by petroleum odor or petroleum sheen in the field.

Groundwater was encountered in 25 of the 30 borings advanced (83%). Depths to saturation ranged from 0.35 to 5.03 m bgs, with the average depth to saturation being approximately 2.5 m bgs. A map of synoptic groundwater elevation data (Figure 4.1-1) collected from a network of five monitoring wells, four piezometers, and two spot elevations in the stream shows that groundwater flow is from east to southwest toward the unnamed stream to the west of the former pits. The groundwater gradient across the site is approximately 0.15 to 0.25 to the west and southwest. One monitoring well, MW-04 is located in the pit. The screened interval of MW-04 is entirely below the bottom of the pit. The static water level in MW-04 is below the bottom of the pit.

Hydraulic conductivity testing of select monitoring wells at LA-02 was conducted using slug testing (rising head) and small scale drawdown/recovery testing. Slug tests were carried out following SOP No. 18 – Procedure for Conducting Slug Testing and Mini-Pumping Tests. All testing was conducted after all groundwater sampling had been conducted. At monitoring wells with a known fast recharge rate based on prior groundwater sampling data, multiple slug tests were conducted. Where slower recharge rates had been previously identified, only one test was carried out. Wells with extremely slow recharge rates were not tested due to logistical constraints. Monitoring well MW-01 was not tested due to the presence of free product in the well while MW-04 was not tested due to very slow recharge rate. Three monitoring wells (MW-02, MW-03, and MW-05) were tested using rising head slug tests. Plots of these analyses are presented in Appendix C. The three monitoring wells tested are not located in pits; therefore the results will be reflective of hydraulic conductivities of native formation material. Hydraulic conductivities from monitoring wells MW-02, MW-03 and MW-05 ranged from 7.4×10^{-5} to 1×10^{-3} cm/sec (0.21 ft/day to 2.9 ft/day).

Additionally, drawdown and recovery were monitored during low-flow groundwater sampling at well MW-03. Analysis (Cooper-Jacob method) of both drawdown and recovery data show hydraulic conductivities ranging from 4.2×10^{-5} cm/sec (0.12 ft/day) (drawdown) to 9.5×10^{-5}

cm/sec (0.27 ft/day) (recovery). These data show good agreement (within one order of magnitude) with hydraulic conductivity testing conducted using rising head tests. The discharge rate for the drawdown analysis was the time-weighted average over the sampling period. Plots of these analyses are presented in Appendix D.

A comparison of the calculated hydraulic conductivity testing results indicates that range of 4.2 x 10^{-5} cm/sec (0.12 ft day) to 1 x 10^{-3} cm/sec (2.9 ft/day) are consistent with the range of hydraulic conductivities (10^{-5} to 10^{-3} cm/sec) estimated for silty sand and fine sand (Fetter, 1998; Freeze and Cherry, 1979) that were observed at LA-02.

4.2. Aguarico 02 (AG-02)

The site-specific geology of AG-02 is derived from nine borings that are focused primarily in the area of Pit 2 as well as areas downgradient of Pit 2 and a large area identified as having asphalt at surface. During the subsurface investigation nine borings at AG-02 were drilled to terminal depths of between approximately 0.15 and 6 meters below bgs, with an average depth of 1.7 meters bgs. Subsurface conditions, while heterogeneous throughout the extent of the site, generally consisted of a mixture of well sorted sand, silt, and clay. Silt and clay were generally found at near/at surface with sand and silty soils found generally at greater depths. Soils at AU-02 can be generally divided two major strata; a shallow silt and clay stratum and a deeper sandy/silty soil stratum.

The first stratum, generally encountered at or near grade, consisted of a light to moderate reddish brown clayey silt/silty clay to a total depth of up to 1 meter bgs. Clay was noted at seven boring locations extending from surface to a maximum borehole terminal depth of 0.75 m.

The second major stratum consisted of a light brown to reddish brown to medium gray coarse to fine sand. This second stratum transitions into a dry medium gray to light brown silt below 4 m depth. The aerial extent of this lower silt unit is uncertain due to a lack of deep boreholes at the location.

A review of the subsurface material encountered during drilling indicates that three of the nine borings drilled (see Appendix A), (AG02-N09A, AG02-N09B, and AG02-N11) are impacted by petroleum based on a review of geologic logs, visual and olfactory observations, PID measurements and analytical data derived from soil samples. Observable/measureable impacts due to petroleum (petroleum odor, petroleum sheen on water table, free-phase oil and tar) were found in three of the nine borings. Free-phase oil was visible in borings AG02- N09A and AG02-

N11, while tar was observed in boring AG02-N09B. Petroleum odors were noted in borings AG02-N09A, AG02-N09B, and AG02-N11.

Groundwater was encountered in two of the nine borings (22%). Depths to saturation ranged from approximately 0.03 to 0.1 m bgs

4.3. Guanta 06 (GU-06)

The site-specific geology of GU-06 is derived from 22 borings, including four monitoring well completions, that are focused primarily in the area of Pit 1A as well as areas downgradient of Pit 1A. During the subsurface investigation 22 borings at GU-06 were drilled to terminal depths of between approximately 0.75 and five meters bgs, with an average depth of 2.8 meters bgs. Subsurface conditions, while heterogeneous throughout the extent of the site, generally consisted of a mixture of well sorted sand, silt, and clay. Silt and clay were generally found at a shallower depths with sandy/silty soils found generally at depth with some clay/silt underlying the sand. Soils at GU-06 can be generally divided into two major strata; a shallow silt and clay stratum and a deeper sandy/silty soil stratum.

The first stratum, generally encountered at or near grade, consisted of a light to moderate brown to a moderate to dark yellowish brown (sometimes reddish brown) clayey silt/silty clay to a total depth of up to five meters bgs. This stratum was occasionally inter-fingered with lenses of dark yellowish brown coarse to fine sand usually less than 50 cm in thickness. This silt to clay surficial stratum is observed in borings N05, N06, N07, N08, N11, N12, N15, N18, N19, N20, N21, N23, N25, N26, N27, and N28.

The second major stratum consisted of a moderate to dark yellowish brown or light olive gray coarse to fine sand. This stratum, observed in most borings is frequently underlain by silt, clayey silt or clay. Occasional lenses of silt/clay are mixed into the sand stratum. These lenses are generally less than 50 cm in thickness. Some coarse to fine gravel is also intermixed with the sand stratum.

A review of the subsurface material encountered during drilling indicates that a number of the borings and monitoring wells are located in Pit 1A. Of the 22 borings drilled (see Appendix A), five of the locations (GU06-N11, GU06-MW-03, GU06-MW-04, GU06-N17 and GU06-N21) are interpreted to be located in Pit 1A based on a review of geologic logs, visual and olfactory observations, photoionization detector (PID) measurements and analytical data derived from soil and groundwater samples. Observable/measureable impacts due to petroleum (petroleum odor, petroleum sheen on water table or free-phase oil) were found in nine of the 22 borings. Petroleum sheen was observed in three of the 22 borings (GU06-MW-01, GU06- MW-03 and GU06-18), while free-phase oil was visible in boring GU06- MW-03. Free-phase oil was also encountered in MW-04 during groundwater sampling activities. Other locations where petroleum impacts were observed in the Pit 1A were GU06-N11, GU06-MW-04 and GU06-N21. Borings outside of the pit (GU06-MW-01, GU06-N06, GU06- MW-02, GU06-N13, GU06-N18 and GU06-N19) were also impacted by petroleum odor or petroleum sheen.

Groundwater was encountered in 18 of the 22 borings (82%). Depths to saturation ranged from approximately 0.2 to three m bgs with the average depth to saturation being approximately 1.6 m bgs. A map of synoptic groundwater elevation data (Figure 4.3-1) collected from a network of four monitoring wells, six piezometers and three spot elevations in the stream shows that groundwater flow in the shallow saturated deposits is from east to west toward the unnamed stream. The groundwater gradient across the site is approximately 0.16 to 0.22 to the west/northwest. Two monitoring wells (MW-03 and MW-04) were interpreted to be located in Pit 1A. The screened intervals of MW-03 and -04 extend into the native material below the estimated bottom of the pit. Static water levels in these monitoring wells are above the estimated pit bottom.

Hydraulic conductivity testing of select monitoring wells at GU-06 was conducted using slug testing (rising head) tests. Slug tests were carried out following SOP No. 18 – Procedure for Conducting Slug Testing and Mini-Pumping Tests. All testing was conducted after all groundwater sampling had been conducted. At monitoring wells with a known fast recharge rate (based on prior groundwater sampling data), multiple slug tests were conducted. Where slower recharge rates had been previously identified, only one test was carried out. Wells with extremely slow recharge rates were not tested due to logistical constraints. Monitoring well MW-04 was not tested due to very slow recharge rate. MW-02 was not completed as a monitoring well (completed as a piezometer) due to high water table conditions. Results of hydraulic conductivity tests in the two remaining wells ranged from 1.4 x 10^{-3} cm/sec to 1.4 x 10^{-2} cm/sec (4.1 ft/day to 39 ft/day). Plots of these analyses are presented in Appendix D. The two monitoring wells (MW-01and MW-03) were tested using rising head slug tests. Hydraulic conductivity test results from MW-01 and MW-03 represent a hybrid conductivity of both formation and pit material conductivities.

Hydraulic conductivities from monitoring well MW-03 are an order of magnitude different from hydraulic conductivities for MW-01, which ranged from 1.1 x 10^{-2} to 1.4 x 10^{-2} cm/sec (31 to 39 ft/day) while the hydraulic conductivity for MW-03 is 1.4 x 10^{-3} cm/sec (4.1 ft/day). A comparison of the calculated hydraulic conductivity testing results indicates that a range of 1.4 x

10^{-3} cm/sec (4.1 ft day) to1.4 x 10^{-2} cm/sec (39 ft/day) is consistent with the hydraulic conductivities (10^{-3} to 10^{-2} cm/sec) estimated for silty sand/fine sand (MW-03) and medium to fine sand/well sorted clean sand (MW-01) (Fetter, 1998; Freeze and Cherry, 1979) that were observed at GU-06 at these locations.

4.4. Shushufindi 25 (SSF-25)

The site-specific geology of SSF-25 is derived from 30 borings, including six monitoring well completions, that are focused primarily in the area of former Pit 1 and areas downgradient of the former Pit and oil production/pumping equipment. During the subsurface investigation 30 borings at SSF-25 were drilled to terminal depths of between approximately 0.2 and 5.2 meters bgs, with an average depth of 3.2 meters bgs. Subsurface conditions, while heterogeneous throughout the extent of the site, generally consisted of a mixture of silt, clay, silty sand, and sand. Sandy material was generally found at intermediate depths and silts/clays were found generally near/at surface.

The first stratum, generally encountered at or near grade, consisted of a dusky yellow, brown, or reddish brown, clayey silt/clay with a thickness between 0.5 – 3.0 m. This stratum was observed in many boreholes at SSF-25. In some cases the silt/clay stratum was overlain by a layer of sand up to 30 cm in thickness and in other cases the stratum contains a lens of sandy material, up to 60 cm in thickness

Beneath the upper silt/clay stratum was a dark gray to brown medium to fine sand with a thickness in excess of 2.4 m. At many locations the transition between Stratum 1 and Stratum 2 is gradual and silty sand is present at the bottom of Stratum 1. At two locations a single stratum of grayish to dark yellowish brown silty sand is present from the surface to depths in excess of 4.8m.

A review of the subsurface material encountered during the drilling of these borings indicates that a number of the borings and a monitoring well are located in Pit 1. Of the 30 borings drilled (see Appendix A), six of the borings (SSF25-N05, SSF25-N06, SSF25-N06A, SSF25-N10, SSF25-MW-03 and SSF25-N12) are interpreted to be located in Pit 1 based on a review of geologic logs, visual and olfactory observations, photoionization detector (PID) measurements and analytical data derived from soil and groundwater samples. Observable/measureable impacts due to petroleum product (petroleum odor, petroleum sheen on water table or free-phase oil) were observed in seven of the 30 borings. Petroleum sheen was observed in two of the 30 borings (SSF25-N10 and SSF25-N12) while free-phase oil was visible in boring SSF25-N06. The other location where petroleum impacts were observed in the Pit was SSF25-MW-03. Borings outside of Pit 1 (SSF25-N07, SSF25-MW-02 and SSF25-MW-04) were also observed to be impacted by petroleum odor or petroleum sheen.

Groundwater was encountered in 20 of the 30 borings (67%). Depths to saturation ranged from approximately 1 to 3.5 m bgs with the average depth to saturation being approximately 2.2 m bgs. A map of synoptic groundwater elevation data (Figure 4.4-1) collected from a network of monitoring wells, piezometers, and two spot elevations in the stream shows that groundwater flow in the shallow saturated deposits is from east to west toward the unnamed stream. The groundwater gradient across the site is approximately 0.054 to 0.074 to the west. One monitoring well (MW-03) is interpreted to be located in the pit. The screened interval of MW-03 penetrates the estimated bottom of the pit. The static water level in MW-03 is above the estimated pit bottom.

Hydraulic conductivity testing of select monitoring wells at SSF-25 was conducted using slug testing (rising head) tests. Slug tests were carried out following SOP No. 18 – Procedure for Conducting Slug Testing and Mini-Pumping Tests. All testing was conducted after all groundwater sampling had been conducted. At monitoring wells with a known fast recharge rate (based on prior groundwater sampling data), multiple slug tests were conducted. Where slower recharge rates had been previously identified, only one test was carried out. Wells with extremely slow recharge rates were not tested due to logistical constraints. Monitoring well MW-01 was not tested due to very slow recharge rate. Four monitoring wells (MW-02, MW-03, MW-04 and MW-05) were tested using rising head slug tests. MW-06 was damaged after installation and could not be sampled or tested because equipment could not be placed in the well. Plots of these analyses are presented in Appendix C. One of the monitoring wells (MW-03) is located in the pit and the screened interval intersects the estimated pit bottom/native material interface. Hydraulic conductivity test results from MW-03 represent a hybrid conductivity of both formation and pit material conductivities while hydraulic conductivity test results for MW-02, MW-04 and MW-05 are representative of native formation material.

Hydraulic conductivities from monitoring wells MW-03, MW-04 and MW-05 are similar with values of 5.3 x 10^{-4} to 1.3 x 10^{-3} cm/sec (1.5 ft/day to 3.9 ft/day). Monitoring well MW-02 has a hydraulic conductivity of 2.4 x 10^{-5} cm/sec (0.069 ft/day). A comparison of the calculated hydraulic conductivity testing results indicates that range of 2.4 x 10^{-5} cm/sec (0.069 ft/day) to 1.3 x 10^{-3} cm/sec (3.9 ft/day) are consistent with the range of hydraulic conductivities (10^{-5} to 10^{-3}

cm/sec) estimated for silty sand and fine sand (Fetter, 1998; Freeze and Cherry, 1979) that were observed at SSF-25.

4.5. Yuca 02 (YU-02)

The site-specific geology of YU-02 is derived from 21 borings, including three monitoring well completions, which are focused primarily in the area of former Pit 1 and areas in close proximity to the other smaller former pits and oil production/pumping equipment. During the subsurface investigation 21 borings at YU-02 were drilled to terminal depths of between approximately 0.6 and 6.5 meters bgs, with an average depth of 2.6 meters bgs. Subsurface conditions, while heterogeneous throughout the extent of the site, generally consisted of a mixture of well sorted sand, silt and clay. Sand was generally found at intermediate depths with silts/clays found generally at near/at surface and at depth.

The first stratum, generally encountered at or near grade, consisted of a greenish grey to moderate brown/grayish brown clayey silt/clay of variable thickness. This stratum was observed in many boreholes at YU-02. In some cases the silt/clay stratum was overlain by a layer of sand up to 50 cm in thickness.

Beneath the upper silt/clay stratum was a medium bluish grey to dark grey/dark yellowish brown coarse to fine sand. This stratum ranged in thickness up to 50 cm. One borehole, YU-02-N0-11, was comprised almost entirely of (approximately 4 m thickness) medium grey, dusky yellowish brown and olive black sand (in descending order).

A third stratum, a bluish grey to dark grey silt/clay, was encountered underlying the coarse to fine sand stratum at most boring locations. The thickness of this layer ranged up to approximately 1.5 m where present.

A review of the subsurface material encountered during drilling indicates that five of the 21 borings and monitoring wells are located in Pit 1(see Appendix A). The five locations (monitoring wells MW-01, MW-02 and MW-03 as well as borings N06A and N09A) are interpreted to be located in Pit 1 based on a review of geologic logs, visual and olfactory observations, PID measurements and analytical data derived from soil and groundwater samples. Observable/measureable impacts due to petroleum product (petroleum odor, petroleum sheen on water table or free-phase oil) were found in eight of the 21 borings. Petroleum sheen was observed in two of the 21 borings (YU02-MW-04 and YU02-N09A) while free-phase oil was visible in boring YU02-N09A. Both samples where oil was observed were taken from borings interpreted to be located in former Pit 1. The other locations were petroleum impacts (staining, odors, comparatively elevated PID readings, and elevated analytical results) were observed in Pit 1 were YU02-MW-01, YU02-MW-02 and YU02-N06A. Borings outside of Pit 1 (YU02-N16, YU02-N17 and YU02-N18A) were also impacted by petroleum odor or petroleum sheen.

Groundwater was encountered in 17 of the 21 of the borings (81%). Depths to saturation ranged from approximately 0.2 to 2.75 m bgs with the average depth to saturation being approximately 1.4 m bgs. A map of synoptic groundwater elevation data (Figure 4.5-1) collected from a network of monitoring wells, piezometers, and two spot elevations in the stream shows that groundwater flow in the shallow saturated deposits is complex with a groundwater ridge running approximately east-west along the length of the platform. Groundwater moves from the ridge to the north toward a wetland complex and to the southeast toward a groundwater depression running southwest-northeast. The groundwater gradient across the site is approximately 0.04 to 0.14 dependent on location. The lower gradient is from MW-04 to MW-02, while the highest gradient is measured from piezometer N04 to MW-02. Three monitoring wells (MW-01, MW-02 and MW-04) were interpreted to be located in Pit 1. The screened intervals of MW-01 and MW-02 are entirely below the estimated bottom of the pit while the screened interval for MW-04 extends into the estimated bottom of the pit. Static water levels in the monitoring wells are all above the estimated pit bottom.

Hydraulic conductivity testing of select monitoring wells at YU-02 was conducted using slug testing (rising head) tests. Slug tests were carried out following SOP No. 18 – Procedure for Conducting Slug Testing and Mini-Pumping Tests. All testing was conducted after all groundwater sampling had been conducted. At monitoring wells with a known fast recharge rate (based on prior groundwater sampling data), multiple slug tests were conducted. Where slower recharge rates had been previously identified, only one test was carried out. Wells with extremely slow recharge rates were not tested due to logistical constraints. Monitoring well MW-04 was not tested due to very slow recharge rate. Three monitoring wells (MW-01 to MW-03) were tested using rising head slug tests. Plots of these analyses are presented in Appendix C. Two of the monitoring well screens (MW-01 and MW-02) are located below estimated pit bottoms and results from testing of these monitoring wells represents hydraulic conductivities of native formation material. Hydraulic conductivity test results from MW-03 represent a hybrid conductivity of both formation and pit material conductivities.

Hydraulic conductivities from monitoring wells MW-01 and MW-02 are similar with values of 8.4×10^{-3} to 1.3×10^{-3} cm/sec (2.4 ft/day to 3.7 ft/day). Hydraulic conductivity values for MW-03 are an order of magnitude lower, ranging from 8.8 x 10^{-5} to 1.4 x 10^{-4} cm/sec (0.25 ft/day to 0.4 ft/day). A comparison of the calculated hydraulic conductivity testing results indicates that the range of 8.8 x 10^{-5} cm/sec (0.25 ft day) to 1.3 x 10^{-3} cm/sec (3.7 ft/day) are consistent with the range of hydraulic conductivities (10^{-5} to 10^{-3} cm/sec) estimated for silty sand/fine sand to clean sand (Fetter, 1998; Freeze and Cherry, 1979) that were observed at YU-02.

4.6. Summary of Soil Characteristics Across all Five Well Areas

Five well sites (LA-02, SSF-25, GU-06, YU-02 and AG-02) were investigated independently by LBG as part of the effort to prepare this report. In total, 112 borings were advanced across all five locations. Table 4.6-1, below provides a summary of the proportions of borings at each site which encountered sand and groundwater.

Sand (as a primary stratigraphic unit) was encountered at 84 of the 112 borings (75 percent). By location sand was encountered most frequently in LA-02 (90 percent of borings) and least frequently at AG-02 (11 percent of borings). Observations at the AG-02 suggest that clay is the predominant soil and sand was only encountered near the terminal depths of the deepest borings. At the other sites sand is frequently encountered both near the surface and at depth. Where sand was encountered at depth it was generally saturated with groundwater.

Groundwater was encountered at 82 of the 112 borings (73 percent). Depths at which groundwater was first encountered, as well as the average depth of first encounter across the sites, are provided in Table 1. At AG-02, groundwater was only encountered at two borings at very shallow depths; thus no average is listed. In addition, a groundwater seep/spring was encountered at AG-02 at boring location N9B.

Given that sand was found as a common deposit at four of the five sites investigated, and groundwater was found at all five sites spread out across an area of about 2000 square kilometers, it can be concluded that sand is a common subsurface material type in the former Concession Area and that shallow groundwater occurs throughout the region.

Table 4.6-1: Summary of Boring Results for Occurrence of Sand and Groundwater

Site Name	Number of Borings	Proportion of Borings – Sand Encountered	Proportion of Borings – GW Encountered d	Depth GW First Encountered – Range / Average (m)
LA-02	30	90%	83%	0.35 – 5.03 / 2.5
SSF-25	30	80%	67%	0.20-05.25 / 3.2
GU-06	22	70%	81%	0.6 – 5.2 / 2.75
YU-02	21	76%	81%	0.6 – 6 / 2.6

Site Name	Number of Borings	Proportion of Borings – Sand Encountered	Proportion of Borings – GW Encountered d	Depth GW First Encountered – Range / Average (m)
AG-02	9	11%	22%	0.03 – 0.1 / *
All Sites	**112**	**73%**	**75%**	

*Note: Groundwater was encountered in only 2 borings at AG-02

4.7. Evaluation of Contamination Outside of Pits

The estimation of which soil borings (including monitoring wells and well points) were located inside or outside of a pit was made taking into account a number of factors. These factors include:

- Geographic location of boring in relation to mapped extent of pits,
- Geological descriptions of subsurface material encountered in borings (color, soil type, changes in color and/or soil type, presence of roots/leaves at depth suggesting soil mixing)
- Observations regarding petroleum impact (in conjunction with other indications such as location and geologic material) – type of impact (odor, sheen or free-phase oil)and depth of impact observed,
- Groundwater flow direction with respect to boring position and pit location (i.e., up-gradient or down-gradient of a known pit)
- Location of boring with respect to other borings interpreted in/out of pit (e.g., if boring under examination is surrounded by other borings deemed “in”, it is highly likely the boring is in the pit if no other evidence is available to support that conclusion.

By examining and integrating all these factors and using professional judgment, an estimation was made as to whether individual borings were located inside or outside of a former pit (either remediated or simply closed by burial). The results of these analyses are shown in Table 4.7-1, below.

Table 4.7-1: Summary of Borings Inside and Outside Pits

Location	Total number of borings at location	Number of borings “in pit”	Number of borings “out of pit”
LA02	30	11	19
SSF25	30	6	24
GU06	22	5	17
YU02	21	5	16
AU02	9	0	9

Observations of contaminations including presence of oil as sheens or free product, strong petroleum odors, and analytical results of soil and groundwater samples were used to assess if there was evidence of contaminant migration beyond the pit boundary. Note that not all locations where there were observable impacts were sampled for laboratory analyses. The number of borings where the presence of contamination was identified outside of pit boundaries is presented in Table 4.7-2, below.

Table 4.7-2: Summary of Contamination Presence Outside Pits

Location	Visual Observation Only, No Sample Collected	Visual Observation and Laboratory Sample Analyses	No Visible Observation, Laboratory Sample Analyses Only	Total number of borings outside of pits where contamination was observed
LA02	4	6	1	11
SSF25	2	1	9	12
GU06	4	1	2	7
YU02	2	1	2	5
AU02	4	-	-	4

The observation and confirmation of contamination beyond pit boundaries shows, that to some extent, petroleum hydrocarbon contamination does not stay in the pits and is immobile as asserted by Chevron's experts. However, due to the limited nature of our investigation and the locations where samples were collected, the extent of soil contamination beyond the pits has not been fully delineated. At some locations, such as LA-02, there is evidence of oil contamination migrating between the pit and an adjacent stream. At SSF-25, there are several metals, vanadium and barium in particular, that can be found exceeding the applicable standards (and Chevron's average background) in several borings. At YU-02, there is dissolved TPH and PAH's found in a monitoring well (MW-03) that is 30 m downgradient of a RAP remediated pit, showing migration in the groundwater.

5. DATA SUMMARY

The environmental data collected by the LBG from July through October 2013 are summarized and compared to relevant Ecuadorian standards by the environmental media sampled at each well site. There may be differences between the sample totals included in this section and those detailed in Sections 3.5 through 3.9 due to the sample volume available in the field. Not enough volume may have been available to analyze for all parameters, in which case aliquots for a reduced list were sent to the analytical laboratory. Further, there is the possibility that the aliquots provided to the laboratory may not have been large enough to perform the actual analysis, in which case no data were produced for the analyte in question.

It should be noted that some of the samples required dilution by the analytical laboratories for successful PAH analysis due to the detection of very high contaminant concentrations which were off the laboratories' calibration curves, and that two methods were utilized in the detection of PAHs. These items are discussed in detail in Attachment 5.

5.1. Comparison Criteria

The Reglamento Sustitutivo del Reglamento Ambiental para las Operaciones Hidrocarburiferas en el Ecuador (RAOHE) Decreto 1215 and Texto Unificado de la Legislacion Ambiental Secundaria del Ministerio del Ambiente (TULSMA) Decreto 3516 were previously discussed in Sections 2.2.5 and 2.2.6 of the *LBG February 2013 Expert Report*.[77] RAOHE was published in Official Register No. 265 of February 13, 2001 and TULSMA was published in Official Register Supplement No. 2 of March 31, 2003.

The analytical data obtained during the site investigation was compared to the RAOHE and TULSMA numerical criteria to determine exceedances of permissible limits for soil, sediment, surface water and groundwater.

For RAOHE, these numerical criteria are listed in the regulations as follows:

8. Table 1 in Annex 1 of RAOHE provides maximum allowable limits for noise.
9. Table 3 in Annex 2 of RAOHE provides permissible limits for air emissions.
10. Table 4a provides effluent limits for liquid discharges.

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[77] The LBG Expert Report, February 2013 discussed TULAS criteria. The TULSMA criteria specified here are an update of those TULAS criteria.

11. Table 4b provides permissible limits for the receiving stream at the point of compliance.
12. Table 5 provides effluent limits for discharges to sewers.
13. Table 6 provides permissible limits for restoration of contaminated soils for various land uses including agricultural, industrial, and sensitive ecosystems.
14. Table 7 provides the permissible limits in leachate for final disposal of sludges and drill cuttings with and without a “waterproofed” (*i.e.*, an impermeable) base.

For TULSMA, these numerical criteria are listed in the regulations as follows:

Book VI, Appendix 1 includes the following:

- Table 1 provides the permissible limits for water for human consumption and domestic use requiring conventional water treatment.
- Table 2 provides the permissible limits for water for human consumption and domestic use requiring disinfection only.
- Table 3 provides water quality criteria for the preservation of flora and fauna in cold or warm fresh waters, marine waters, and estuaries.
- Table 4 provides additional permissible limits for evaluating water quality.
- Table 5 provides the permissible limits for groundwater.
- Table 6 provides allowable water quality criteria for agricultural use.
- Table 7 provides guidelines for water used for irrigation purposes.
- Table 8 provides water quality criteria for use by livestock.
- Table 9 provides water quality criteria for recreational uses and Table 10 provides water quality criteria for recreational uses with secondary contact.

Book VI, Appendix 2 includes the following:

- Table 1 describes factors that indicate the severity of contamination as compared to background values.
- Table 2 provides quality criteria (background concentrations) for soils.
- Table 3 provides soil remediation criteria for various land uses including agricultural, residential, commercial, and industrial.

Specific criteria for the soil comparison include:

- RAOHE Sensitive Ecosystem Criteria (Table 6)
- RAOHE Agricultural Criteria (Table 6)
- TULSMA Residential Criteria (Book VI, Appendix 2, Table 3)
- TULSMA Agricultural Criteria (Book VI, Appendix 2, Table 3)

It should be noted that the RAOHE Table 6 standards for PAHs in soils do not specify which PAHs are to be summed to assess compliance. LBG used the sum of 16 USEPA carcinogenic PAHs (cPAH) for comparison to the RAOHE standards. This approach is conservative, considering that RAOHE Annex 5, Analytical Methods, recommends that USEPA Methods 8100 or 8310 be used to determine PAH concentrations in soils, and these methods quantitate the 16 USEPA cPAH plus additional PAH target compounds.

Specific criteria for the sediment comparison include:

- RAOHE Sensitive Ecosystem Criteria (Table 6)

Additional criteria for the soil and sediment include:

- Lago Agrio Judgment

Specific criteria for groundwater and surface water comparison include:

- TULSMA Groundwater (Book VI, Appendix 1, Table 5)
- TULSMA Surface Water (Book VI, Appendix 1, Tables 3 and 4)

Actual criteria values are presented in the data summary tables associated with each of the following study area discussions.

Note that for metals in soil or sediment, background concentrations need to be considered. Section 4.1.3.3 of the TULSMA Residential and Agricultural Criteria states:

> *"The more reliable background values are those derived from the samples taken in those areas outside the area under study which are considered unaffected by local contamination. In the total absence of background values of the immediate area outside the study area these values may be obtained from applicable regional or national areas. To determine the background or reference value, at least 5 samples should be collected, if taken from 5 to 20 samples, the averaged value must be selected as the background value."* [78]

Chevron collected 88 background samples from around the concession and analyzed them for 9 metals, shown in Table 5-2, below. In each case the Ecuadorian standard is greater than the background concentration. For this reason it is more correct to compare metals concentrations in soil to the Ecuadorian standards rather than background.

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[78] Presidency of the Republic, Environmental Quality Standard for Soil and Remediation Criteria for Contaminated Soils, Book VI, Appendix 2, Section 4.1.3.3, p. 11.

Table 5-1: Comparison of Ecuadorian Standards to Chevron Background Sample Results

Metal	Chevron Average Concentration[79]	RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Soil Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516
Barium	231	NA	NA	500	750
Cadmium	0.16	1	2.00	5.00	2.00
Chromium	22	NA	NA	65	65
Copper	28	NA	NA	63	63
Lead	7.05	80	100	100	100
Mercury	0.11	NA	NA	2.00	0.80
Nickel	14	40	50	100	50
Vanadium	93	NA	NA	130	130
Zinc	49	NA	NA	200	200

5.2. Lago Agrio-02 (LA-02)

5.2.1. Summary of Results

The analytical results obtained from the soil, sediment, groundwater, and surface water samples are shown on Figures 5.2-1 through Figure 5.2-4. Figures 5.2-1 and 5.2-2 present the TPH concentrations for the solid and aqueous phases, respectively, while Figures 5.2-3 and 5.3-4 show the Total PAH (sum of 16) and Alkylated PAH concentrations for those phases. The data for soil, sediment, and groundwater/surface water are included in Table 5.2-1, Table 5.2-2, and Table 5.2-3, respectively. A summary of the concentration ranges in exceedence of one or more of the Ecuadorian standards for crude oil contaminants is presented in Table 5.2-4, below.

Table 5.2-4: Summary of Concentration Ranges for Crude Oil Components at LA-02

Crude Oil Components	Lago Agrio 02			
	Soil (mg/kg)	Groundwater (mg/L)	Sediment (mg/kg)	Surface Water (mg/L)
TPH	313 - 31,960	0.48 - 0.65	1,110 - 6,775	0.69 - 1.09
Total PAHs	2.06 - 46	NE	1.45	0.000353
Total Phenols	NE	NE	ND	2.10E-3 - 2.70E-3
Barium	608	NE	418 - 5,460	NE

Range of values reflect exceedences, only.

NA = Not available
ND = Non detect
NE = No exceedences
NC = Sample not collected
🟨 = No criteria – range of values above background (231 mg/kg)

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[79] Chevron's Ecuador Oriente Region Analytical Database (Access® Database). May 2007

Soil

Twenty-one soil samples were collected from 17 locations, at depths from 0.1 m to 4.26 m bgs. Because three Round I samples exceeded the holding temperature due to transit delays and were replaced with Round II samples, data for 18 samples were evaluated. TPH was detected in all 18 samples. One or more individual PAHs and alkylated PAHs were detected in 17 samples. The total alkylated PAH concentrations range from two to 109 times higher than the total parent PAH concentrations (as sum of 16 USEPA high-priority PAH compounds). One or more VOCs associated with crude oil (benzene, toluene, ethylbenzene, xylenes, cyclohexane, isopropylbenzene and methylcyclohexane) were detected in 12 samples. Barium, cadmium, chromium, copper, lead, nickel, vanadium, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples, while cobalt was detected at concentrations greater than the TULSMA soil quality criterion in one or more samples.

Evaluation of these data indicates that:

- In ten samples, TPH concentrations are greater than each of the RAOHE and TULSMA standards. The highest elevated TPH concentration (31,960 mg/kg in sample LA02-N09 from Pit 3) is about 32 times greater than the RAOHE standard for sensitive ecosystems (1,000 mg/kg) and about 13 times greater than the RAOHE standard for agricultural soil and the TULMA standard for residential soil (2,500 mg/kg). The TPH concentration in sample LA02-N28 in proximity to the residence (2,400 mg/kg) is marginally less than the TULSMA standard for residential soil.
- In 16 samples, TPH concentrations are greater than the threshold concentration criteria (100 mg/kg) cited in the Lago Agrio Judgment.
- In 11 samples, the Total PAH concentrations (sum of 16 USEPA high priority PAH compounds) are greater than the RAOHE standard for sensitive ecosystems and the RAOHE and TULSMA standards for agricultural soil. The highest elevated Total PAH concentration (46 mg/kg in sample LA02-N09 from Pit 3) is 46 times greater than the RAOHE standard for sensitive ecosystems (1 mg/kg) and about 23 times greater than the TULMA standard for agricultural soil (2 mg/kg).
- In ten samples, naphthalene concentrations are greater than the TULSMA standards for both residential soil and agricultural soil, in eight samples, benzo[a]anthracene concentrations are greater than the TULSMA standard for agricultural soil, and in nine samples pyrene concentrations are greater than the TULSMA standard for agricultural soil.

- In one sample, the barium concentration (608 mg/kg in sample LA02-N08 in Pit 3) is greater than the TULSMA standard for residential soil (500 mg/kg). The elevated barium concentration is about three times greater than the average background soil concentration (231 mg/kg).
- Cobalt concentrations in one sample, copper concentrations in two samples, and lead concentrations in one sample are greater than the TULSMA standards for residential soil and/or the RAOHE and TULSMA standards for agricultural soil, where available.

Groundwater

Groundwater samples were collected from three monitoring wells (LA02-MW-02, LA02-MW-03, and LA02-MW-05) during Round II in October 2013. LA-02-MW-01 and LA-02-MW-04 were not sampled during Round II (LA-02-MW-01 had a measureable free-phase oil layer and LA-02-MW-04 did not have sufficient recovery). Therefore, data for LA-02-MW-01 from sampling conducted during Round I in August 2013 are included in this evaluation (note, free-phase oil was observed during purging and sampling of LA-02-MW-01 during Round 1. TPH and one or more individual PAHs were detected in all four samples. Alkylated PAHs and naphthenic acids were detected in the three Round II samples. The total alkylated PAH concentrations range from three to 22 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). Phenols and one or more metals were detected in all four samples.

Chemical concentrations that exceed the TULSMA standards for groundwater include:

- TPH and chrysene in LA02-MW-02 and LA02-MW-01. The highest elevated TPH concentration (0.65 mg/L in LA02-MW-02 downgradient of Pit 3) is about two times greater than the standard (0.325 mg/L).

Sediment

Sediment samples were collected from five locations. TPH, one or more individual PAHs and alkylated PAHs were detected in all five samples. The total alkylated PAH concentrations range from 20 to 74 times higher than the total parent PAH concentrations (sum 16 USEPA high priority PAH compounds). VOCs associated with crude oil (isopropylbenzene and methylcyclohexane) were detected in two samples. Barium, cadmium, chromium, lead, nickel, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples.

Chemical concentrations that exceed the RAOHE standards for sensitive ecosystems include:

- TPH in four samples. The highest elevated TPH concentration (6,775 mg/kg in sample LA02-T05A located west of Pit 3) is about seven times greater than the standard (1,000 mg/kg).
- Total PAHs in one sample (LA02-T05A). This concentration (1.45 mg/kg is marginally greater than the standard (1 mg/kg).

Surface Water

Surface water samples were collected from four locations. TPH, one or more individual PAHs, alkylated PAHs, and naphthenic acids were detected in all four samples. The total alkylated PAH concentrations range from marginally to 25 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). One VOC associated with crude oil (toluene) was detected in two samples, and total phenols and one or more metals were detected in all four samples.

Chemical concentrations that exceed the TULSMA standards for surface water include:

- TPH in two samples. The highest elevated TPH concentration (1.09 mg/L in sample LA02-T04A located west of the well platform and downstream of the residence and Pit 3) is about two times greater than the standard (0.5 mg/kg).
- Total PAHs in one sample (LA02-T05A). This concentration (0.000353 mg/L) is marginally greater than the standard (0.0003 mg/L).
- Total phenols in four samples. The highest elevated Total phenols concentration (0.0027 mg/L in sample LA02-T02 located downstream of the well platform and west of Pit 4) is about three times greater than the standard (0.001 mg/L).
- Aluminum and iron in all four samples and manganese concentrations in two samples.

5.3. Aguarico-02 (AG-02)

5.3.1. Summary of Results

The analytical results obtained from the soil and sediment samples are shown on Figures 5.3-1 and 5.3-2. Figure 5.3-1 present the TPH concentration for the soil and sediment, and Figure 5.3-2 show the Total PAH (sum of 16) and Alkylated PAH concentrations for soil and sediment. In addition, the data for soil is included in Table 5.3-1, and the data for sediment is presented in Table 5.3-2. No groundwater or surface water samples were collected at AG-02. A summary of the concentration ranges for crude oil contaminants in exceedence of one or more of the Ecuadorian standards is presented in Table 5.3-3, below.

Table 5.3-3: Summary of Concentration Ranges for Crude Oil Components at AG-02

Crude Oil Components	Aguarico 02			
	Soil (mg/kg)	Groundwater (mg/L)	Sediment (mg/kg)	Surface Water (mg/L)
TPH	NE	NC	31,310	NC
Total PAHs	NE	NC	19	NC
Total Phenols	NA	NC	NA	NC
Barium	NE	NC	🟨 269 - 580	NC

Range of values reflect exceedences, only.

NA = Not available
ND = Non detect
NE = No exceedences
NC = Sample not collected
🟨 = No criteria – range of values above background (231 mg/kg)

Soil

A soil sample was collected from one location to a depth of 1.11 m bgs. TPH, one or more individual PAHs, and alkylated PAHs were detected in the sample. The total alkylated PAH concentration is nine times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). Cadmium, chromium, lead, nickel, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples. Evaluation of these data indicates that the cadmium concentration is greater than the RAOHE standard for sensitive ecosystems.

Sediment

Sediment samples were collected from two locations. TPH, one or more individual PAHs, and alkylated PAHs were detected in both samples. The total alkylated PAH concentrations are 10 and 24 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). Six VOCs associated with crude oil (ethylbenzene, toluene, xylenes, isopropylbenzene, cyclohexane, and methylcyclohexane) were detected in one sample. Barium, cadmium, chromium, lead, nickel, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples.

Chemical concentrations that exceed the RAOHE standards for sensitive ecosystems include:

- TPH in one sample. The elevated TPH concentration (31,310 mg/kg in sample AG02-N09), located in a wetland (and unconfirmed pit) area west of Pit 2, is about 31 times greater than the standard (1,000 mg/kg).
- Total PAH (sum of 16 high priority PAH compounds) in one sample. This concentration (19 mg/kg) is 19 times greater than the standard (1 mg/kg).
- Cadmium in one sample.

5.4. Guanta 06 (GU-02)

5.4.1. Summary of Results

The analytical results obtained from the soil, sediment, groundwater, and surface water samples are shown on Figures 5.4-1 through Figure 5.4-4. Figures 5.4-1 and 5.4-2 present the TPH concentrations for the solid and aqueous phases, respectively, while Figures 5.4-3 and 5.4-4 show the Total PAH (sum of 16) and Alkylated PAH concentrations for those phases. The data for soil, sediment, and ground/water surface water are included in Table 5.4-1, Table 5.4-2, and Table 5.4-3, respectively. A summary of the concentration ranges for crude oil contaminants in exceedence of one or more of the Ecuadorian standards is presented in Table 5.4-4, below.

Table 5.4-4: Summary of Concentration Ranges for Crude Oil Components at GU-06

Crude Oil Components	Guanta 06			
	Soil (mg/kg)	Groundwater (mg/L)	Sediment (mg/kg)	Surface Water (mg/L)
TPH	466 - 1,075	1.74	3,180 - 13,000	NE
Total PAHs	1.02	NE	2.24 - 3.14	NE
Total Phenols	ND	NE	ND	3.5E-3 - 0.01
Barium	4,550 - 5,080	NE	232 - 5,270	NE

Range of values reflect exceedences, only.

NA = Not available
ND = Non detect
NE = No exceedences
NC = Sample not collected
🟨 = No criteria – range of values above background (231 mg/kg)

Soil

Soil samples were collected from ten locations, at depths from 0.04 m to 3.25 m bgs. TPH was detected in nine samples. One or more individual PAHs and alkylated PAHs were detected in all ten samples. The total alkylated PAH concentrations range from three to 49 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). One or more VOCs associated with crude oil (benzene, ethylbenzene, toluene, cyclohexane, isopropylbenzene, and methylcyclohexane) were detected in five samples. Of the chlorinated VOCs, chloroform was detected in one sample and trichloroethene was detected in another sample. Barium, cadmium, chromium, copper, lead, mercury, nickel, vanadium, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples.

Evaluation of these data indicates that:

- TPH in one sample (1,075 mg/kg in sample GU06-N18 located west of Pit A) is marginally greater than the RAOHE standard for sensitive ecosystems (1,000 mg/kg) and greater than the TULSMA standard for agricultural soil (500 mg/kg) in two samples (1,075 mg/kg in sample GU06-N18 and 787 mg/kg in sample GU06-N17 located in Pit A).

- In three samples, TPH is greater than the threshold concentration criteria (100 mg/kg) cited in the Lago Agrio Judgment.
- Total PAH (sum of 16 USEPA high priority PAH compounds) in one sample (1.02 mg/kg in sample GU06-18) is marginally greater than the RAOHE standard for sensitive ecosystems (1 mg/kg).
- In two samples, barium is greater than the TULSMA standards for both residential soil (500 mg/kg) and agricultural soil (750 mg/kg). The highest elevated barium concentration (5,080 mg/kg in sample GU06-N17) is about 20 times greater than the average concentration in background soil (231 mg/kg).
- Copper is greater than the TULSMA standard for residential soil in one sample and vanadium is greater than the TULSMA standards for residential soil and agricultural soil in three samples.

Groundwater

Groundwater samples were collected from three monitoring wells (GU06-MW-01, GU06-MW-03, and GU06-MW-04) during Round II in October 2013. TPH, one or more individual PAHs , alkylated PAHs, and naphthenic acids were detected in all three samples. The total alkylated PAH concentrations range from 12 to 24 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). Five VOCs associated with crude oil (benzene, ethylbenzene, cyclohexane, isopropylbenzene, and methylcyclohexane) were detected in one sample, total phenols were detected in two samples, and one or more metals were detected in all three samples.

Chemical concentrations that exceed the TULSMA standards for groundwater include:

- TPH, benzo[ghi]perylene, and chrysene in GU06-MW-04. The elevated TPH concentration (1.74 mg/L in GU06-MW-04) is about five times greater than the standard (0.325 mg/L).

Sediment

Sediment samples were collected from nine locations. Although 11 samples were collected, because two Round I samples exceeded the holding temperature due to transit delays, nine samples were evaluated. TPH was detected in eight samples. One or more individual PAHs and alkylated PAHs were detected in all nine samples. The total alkylated PAH concentrations range from four to 47 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). One or more VOCs associated with crude oil (benzene, ethylbenzene, toluene, xylenes, isopropylbenzene, and methylcyclohexane) were detected in three samples. Barium, cadmium, chromium, copper, lead, nickel, vanadium, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples.

Chemical concentrations that exceed the RAOHE standards for sensitive ecosystems include:

- TPH in five samples. The highest TPH concentration (13,000 mg/kg in sample GU06-T06 located downstream of Pit A) is 13 times greater than the standard (1,000 mg/kg).
- Total PAH (sum of 16 USEPA high priority PAH compounds) in three samples. The highest Total PAH concentration (3.14 mg/kg in sample GU06-T09) is about three times greater than the standard (1 mg/kg).
- Cadmium in three samples.

Surface Water

Surface water samples were collected from three locations. TPH, one or more individual PAHs, alkylated PAHs, and naphthenic acids were detected in all three samples. The total alkylated PAH concentrations range from about equal to seven times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). A VOC associated with crude oil (toluene) was detected in one sample, total phenols were detected in two samples, and one or more metals tested for were detected in all three samples.

Chemical concentrations that exceed the TULSMA standards for surface water include:

- Total phenols in two samples. The highest elevated total phenols concentration (0.01 mg/L in sample GU06-T08) is ten times greater than the standard (0.001 mg/L).
- Iron in three samples, aluminum in two samples, and manganese in one sample.

5.5. Shushufindi 25 (SSF-25)

5.5.1. Summary of Results

The analytical results obtained from the soil, sediment, groundwater, and surface water samples are shown on Figures 5.5-1 through Figure 5.5-4. Figures 5.5-1 and 5.5-2 present the TPH concentrations for the solid and aqueous phases, respectively, while Figures 5.5-3 and 5.5-4 show the Total PAH (sum of 16) and Alkylated PAH concentrations for those phases. The data for soil, sediment, and ground water/surface water are included in Table 5.5-1, Table 5.5-2, and Table 5.5-3, respectively. A summary of the concentration ranges for crude oil contaminants in exceedence of one or more of the Ecuadorian standards is presented in Table 5.5-4, below.

Table 5.5-4: Summary of Concentration Ranges for Crude Oil Components at SSF-25

Crude Oil Components	Shushufindi 25			
	Soil (mg/kg)	Groundwater (mg/L)	Sediment (mg/kg)	Surface Water (mg/L)
TPH	120 - 12,350	0.88 - 1.43	3,140 -11,900	0.92
Total PAHs	2.35 - 12	NE	2.97	NE
Total Phenols	NE	NE	ND	1.90E-3 - 4.40E-3
Barium	522 - 786	NE	332 - 579	NE

Range of values reflect exceedences, only.

NA = Not available
ND = Non detect
NE = No exceedences
NC = Sample not collected
🟨 = No criteria – range of values above background (231 mg/kg)

Soil

Twenty-four soil samples were collected from 17 locations, at depths from 0.75m to 3.32 m bgs; samples were collected from three depths at SSF25-N06A and at two depths from SSF25-N10R and SSF25-12. Because four Round I samples exceeded the holding temperature due to transit delays, data for 20 samples were evaluated. TPH was detected in 15 samples. One or more individual PAHs and alkylated PAHs were detected in all 20 samples. The total alkylated PAH concentrations range from about equal to 41 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). One or more VOCs associated with crude oil (ethylbenzene, toluene, xylenes, cyclohexane, isopropylbenzene, and methylcyclohexane) were detected in nine samples. Barium, chromium, copper, lead, nickel, vanadium, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples, while cobalt was detected at concentrations greater than the TULSMA soil quality criterion in one or more samples.

Evaluation of these data indicates that:

- TPH is greater than each of the RAOHE and TULSMA standards in five samples and greater than the TULSMA standard for agricultural soil in seven samples. The highest elevated TPH concentration (12,350 mg/kg in sample SSF25-N05 located in the remediated area in Pit 1) is about 12 times greater the RAOHE standard for sensitive ecosystems (1,000 mg/kg) and about five times greater than the RAOHE standard for agricultural soil and TULSMA standard for residential soil (2,500 mg/kg).
- In nine samples, TPH concentrations are greater than the threshold concentration criteria (100 mg/kg) cited in the Lago Agrio Judgment.

- In five samples, Total PAHs (sum of 16 USEPA high priority PAH compounds) is greater than the RAOHE standard for sensitive ecosystems and the RAOHE and TULSMA standards for agricultural soil. The highest elevated Total PAH concentrations (12 mg/kg in samples SSF25-N05 and SSF25-N06 in the remediated area in Pit 1) are 12 times greater than the RAOHE standard for sensitive ecosystems (1 mg/kg) and six times greater than the RAOHE and TULSMA standards for agricultural soil (2 mg/kg).
- Ethylbenzene in two samples and xylenes in one sample are greater than the TULSMA standards for agricultural soil.
- Barium is greater than the TULSMA standard for residential soil (500 mg/kg) in seven samples and the TULSMA standard for agricultural soil (750 mg/kg) in three samples. The highest elevated barium concentration (786 mg/kg in sample SSF25-N10 located just west of Pit 1) is about three times greater than the average background soil concentration (231 mg/kg).
- Lead and nickel are greater than the RAOHE standards for sensitive ecosystems in one and 11 samples, respectively. Vanadium in 14 samples, copper in ten samples, and chromium in three samples are greater than the TULSMA standards for residential soil. Nickel is greater than the TULSMA standard for agricultural soil in three samples.

Groundwater

Groundwater samples were collected from four monitoring wells (SSF25-MW-02, SSF25-MW-03, SSF25-MW-04, and SSF25-MW-05) during Round II in October 2013. TPH, one or more PAHs, alkylated PAHs, naphthenic acids, total phenols, and one or more of the metals were detected in all four samples. The highest total alkylated PAH concentrations is 31 times greater than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). A VOC associated with crude oil (isopropylbenzene) was detected in one sample.

Chemical concentrations that exceed the TULSMA standards for groundwater include:

- TPH in SSF25-MW-02 and SSF25-MW-03. The highest elevated TPH concentration (1.43 mg/L in SSF25-MW-03 located in the remediated area in Pit 1) is about four times greater than the standard (0.325 mg/L).
- Chrysene in SSF25-MW-02.

Sediment

Sediment samples were collected from six locations, including from the Perez spring. Because one sediment sample exceeded the holding time for temperature due to transit delays, data for five samples were evaluated. TPH, one or more PAHs , and alkylated PAHs were detected in all five samples. The total alkylated PAH concentrations range from six to 102 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). Two VOCs associated with crude oil (toluene and isopropylbenzene) were each detected in one sample. Barium, cadmium, chromium, lead, nickel, vanadium, and zinc were detected at concentrations are greater than the available average concentrations in background soil in one or more samples.

Chemical concentrations that exceed the RAOHE standards for sensitive ecosystems include:

- TPH in two samples is greater than the RAOHE standard for sensitive ecosystems. The highest elevated TPH concentration (11,900 mg/kg in sample SSF25-T02 located northwest and downstream of Pit 1) is about 12 times greater than the standard (1,000 mg/kg).
- Total PAHs (sum of 16 USEPA high priority PAH compounds) in one sample is greater than the RAOHE standard for sensitive ecosystems. This concentration (2.97 mg/kg in sample SSF25-T02) is about three times greater than the standard (1 mg/kg).

Surface Water

Surface water samples were collected from five locations, including one from the Perez spring. TPH, one or more PAHs, alkylated PAHs, and naphthenic acids were detected in all five samples. The total alkylated PAH concentrations range from three to 51 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). A VOC associated with crude oil (toluene) was detected in one sample, total phenols were detected in three samples, and one or more metals were detected in all five samples.

Chemical concentrations that exceed the TULSMA standards for surface water include:

- TPH in one sample. The highest elevated TPH concentration (0.92 mg/L in sample SSF25-T03A located north of SS25-T02A and northwest of a residence) is about two times greater than the standard (0.5 mg/L).
- Total phenols in three samples. The highest elevated total phenols concentration (0.0044 mg/L in sample SSF25-T03A) is about four times greater than the standard (0.001 mg/L).
- Aluminum, iron, manganese concentrations in all five samples and thallium in one sample.

5.6. Yuca 02 (YU-02)

5.6.1. Summary of Results

The analytical results obtained from the soil, sediment, groundwater, and surface water samples are shown on Figures 5.6-1 through Figure 5.6-4. Figures 5.6-1 and 5.6-2 present the TPH concentrations for the solid and aqueous phases, respectively, while Figures 5.6-3 and 5.6-4 show the Total PAH (sum of 16) and Alkylated PAH concentrations for those phases. The data for soil, sediment, and groundwater/surface water are included in Table 5.6-1, Table 5.6-2, and Table 5.6-3, respectively. A summary of the concentration ranges for crude oil contaminants in exceedence of one or more of the Ecuadorian standards is presented in Table 5.6-4, below.

Table 5.6-4: Summary of Concentration Ranges for Crude Oil Components at YU-02

Crude Oil Components	Yuca 02			
	Soil (mg/kg)	Groundwater (mg/L)	Sediment (mg/kg)	Surface Water (mg/L)
TPH	183 - 7,540	0.58 - 0.68	5,230 - 51,100	1.03-2.20
Total PAHs	1.27 - 1.62	NA	1.51 - 11	NE
Total Phenols	NE	NE	ND	4.50E-3 - 0.02
Barium	516 - 2,800	0.54 - 1.46	241 - 694	4.03-18

Range of values reflect exceedences, only.

NA = Not available
ND = Non detect
NE = No exceedences
NC = Sample not collected
🟨 = No criteria – range of values above background (231 mg/kg)

Soil

Soil samples were collected from five locations, at depths ranging from 0.2m to 2 m bgs. TPH, one or more individual PAHs, and alkylated PAHs were detected in all five samples. The total alkylated PAH concentrations range from about equal to 64 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). One VOC associated with crude oil (cyclohexane) was detected in one sample. Barium, cadmium, chromium, copper, lead, nickel, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples, while cobalt was detected at concentrations greater than the TULSMA soil quality criterion in one or more samples.

Evaluation of these data indicates that:

- TPH is greater than each of the RAOHE and TULSMA standards for soil in two samples. The highest elevated TPH concentration (7,540 mg/kg in sample YU02-N18A located just east of the stream, downstream of Pit A) is about eight times greater the RAOHE standard for sensitive ecosystems (1,000 mg/kg) and about three times greater than the RAOHE standard for agricultural soil and TULSMA standard for residential soil (2,500 mg/kg).
- In three samples, TPH was detected at concentrations greater than the threshold concentration criteria (100 mg/kg) cited in the Lago Agrio Judgment .

- In two samples, Total PAHs (sum of 16 USEPA high priority PAH compounds) is greater than the RAOHE standard for sensitive ecosystems. The highest elevated Total PAHs concentration 1.62 mg/kg in sample YU02-N18A) is about two times greater than the standard (1 mg/kg).
- In one sample, benzo[a]anthracene and pyrene are greater than the TULSMA standard for agricultural soil.
- Barium is greater than the TULSMA standard for residential soil (500 mg/kg) in two samples and the TULSMA standard for agricultural soil (750 mg/kg) in one sample. The highest elevated barium concentration (2,800 mg/kg in sample YU02-N18A) is about 12 times greater than the average background soil concentration (231 mg/kg).
- Nickel in one sample is greater than the RAOHE standard for sensitive ecosystems and copper in one sample is greater than the TULSMA standards for residential soil and agricultural soil.

Groundwater

Groundwater samples were collected from four monitoring wells (YU02-MW-01, YU02-MW-02, YU02-MW-03, and YU02-MW-04) during Round II in October 2013. TPH, one or more individual PAHs, alkylated PAHs, naphthenic acids, total phenols, and one or more metals were detected in all four samples. The total alkylated PAH concentrations range from about equal to 20 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds).

Chemical concentrations that exceed the TULSMA standards for groundwater include:

- TPH in YU02-MW-03 and YU02-MW-04. The elevated TPH concentrations (0.68 mg/L and 0.58 mg/L, respectively) are about two times greater than the standard (0.325 mg/L).
- Barium in YU02-MW-01, YU02-MW-03, and YU02-MW-04. The highest elevated barium concentration (1.46 mg/L in YU02-MW-04) is about four times greater than the standard (0.34 mg/L).

Sediment

Sediment samples were collected from six locations, including from a drainage ditch. TPH, one or more of the PAHs, and alkylated PAHs were detected in all six samples. The total alkylated PAH concentrations range from three to 49 times higher than the total parent PAH concentrations (sum of 16 USEPA high priority PAH compounds). One or more VOCs associated with crude oil (toluene, cyclohexane, isopropylbenzene, and methylcyclohexane) were detected in three samples. Barium, cadmium, copper, lead, mercury, nickel, vanadium, and zinc were detected at concentrations greater than the available average concentrations in background soil in one or more samples.

Chemical concentrations that exceed the RAOHE standards for sensitive ecosystems include:

- TPH in three samples. The highest elevated TPH concentrations (51,100 mg/kg in sample YU02-T05 located in the wetland area just north of the well platform) is 51 times greater the standard (1,000 mg/kg).
- Total PAH concentrations (sum 16 USEPA high priority PAH compounds) in three samples. The highest elevated Total PAH concentrations (11 mg/kg in samples YU02-T06A and YU02-T05) are 11 times greater than the standard (1 mg/kg).
- Lead in one sample and nickel in one sample.

Surface Water

Surface water samples were collected from five locations. TPH, one or more PAHs, alkylated PAHs, and naphthenic acids were detected in all five samples. The total alkylated PAH concentrations range from equal to 17 times higher than the total parent PAH concentrations (sum 16 USEPA high priority PAH compounds). A VOC associated with crude oil (toluene) was detected in three samples, total phenols were detected in four samples, and one or more metals were detected in all five samples.

Chemical concentrations that exceed the TULSMA standards for surface water include:

- TPH in two samples. The highest elevated TPH concentration (2.20 mg/L in sample YU02-T06B located in the wetland area just north of the well platform) is about four times greater than the standard (0.5 mg/L).
- Total phenols in four samples. The highest elevated total phenols concentrations (0.02 mg/L in samples YU02-T05 and YU02-T06B located in the wetland area just north of the well platform) are about 20 times greater than the standard (0.001 mg/L).
- Barium in two samples and one or more of aluminum, cadmium, copper, iron, manganese, nickel, thallium, vanadium, and zinc in all five samples. The highest elevated barium concentration (18 mg/L in sample YU02-T06B) is 18 times greater than the standard (1 mg/L).

6. REFERENCES

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7. GLOSSARY OF ABBREVIATIONS

AG	Aguarico
cm/sec	Centimeters per Second
cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbons
DRO	Diesel Range Organics
E&P	Exploration and Production
ft/day	Feet per Day
FSP	Field Sampling Plan
GPS	Global Positioning System
GRO	Gasoline Range Organics
GU	Guanta
HASP	Health and Safety Plan
IDW	Investigation-Derived Waste
JI	Judicial Inspection
LA	Lago Agrio
LBG	The Louis Berger Group, Inc.
LNAPL	Light Non-Aqueous Phase Liquid
mg/kg	Milligram per Kilogram
mg/L	Milligram per Liter
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MW	Monitoring Well
NAD	North American Datum
NGVD	National Geodetic Vertical Datum
PAH	Polycyclic Aromatic Hydrocarbon
PI	Pre-Inspection
PID	Photoionization Detector
ppm	Parts Per Million
QA/QC	Quality Assurance / Quality Control
QC	Quality Control

RAOHE	Reglamento Ambiental para las Operaciones Hidrocarburiferas en el Ecuador
SI	Site Investigation
SIP	Site Investigation Plan
SOP	Standard Operating Procedures
SSF	Shushufindi
TULSMA	Texto Unificado de la Legislacion Ambiental Secundaria del Ministerio del Ambiente
USEPA	United States Environmental Protection Agency
UTM	Universal Transverse Mercator
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compounds
YU	Yuca

TABLES

SITE INVESTIGATION AND DATA SUMMARY REPORT

Napo Concession Area
ORIENTE Region
Ecuador
In the Matter of BIT Arbitration
Chevron v. Government of Ecuador
Prepared by
The Louis Berger Group, Inc.
Prepared for
Winston & Strawn, LLP
December, 2013

Table 3.12-1 Summary of Crude Oil Sample Results

Lab Analytical Method	Chemical	Unit	Sample ID					
			LA030-A		SSF065-A		YU01B-A	
			Concentrations	RL	Concentrations	RL	Concentrations	RL
MADEPEPH	C19-C36 ALIPHATICS	MG/KG	120,000	2,000	130,000	2,000		
	C9-C18 EXTRACTABLE PETROLEUM HYDROCARBONS	MG/KG	130,000	2,000	170,000	2,000		
	UNADJUSTED C11-C22 AROMATICS	MG/KG	100,000	2,000	110,000	2,000		
MADEPVPH	C9-C10 PETROLEUM HYDROCARBONS	MG/KG	29,000	380	38,000	380		
	UNADJUSTED C5-C8 ALIPHATICS	MG/KG	50,000	380	100,000	380		
	UNADJUSTED C9-C12 ALIPHATICS	MG/KG	64,000	380	87,000	380		
SW8015B	DIESEL RANGE ORGANICS	MG/KG	410,000	38,000	420,000	38,000		
	Extended Diesel Range Organics	MG/KG	47,000	19,000	42,000	19,000		
	GASOLINE RANGE ORGANICS	MG/KG	64,000	770	94,000	1,900		
	Heavy Diesel Range Organics	MG/KG	26,000	19,000	22,000	19,000		
SW8260B	1,1,1-TRICHLOROETHANE	MG/KG	U	39	U	40		
	1,1,2,2-TETRACHLOROETHANE	MG/KG	U	39	U	40		
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	MG/KG	U	39	U	40		
	1,1,2-TRICHLOROETHANE	MG/KG	U	39	U	40		
	1,1-DICHLOROETHANE	MG/KG	U	39	U	40		
	1,1-DICHLOROETHENE	MG/KG	U	39	U	40		
	1,2,3-TRICHLOROBENZENE	MG/KG	U	39	U	40		
	1,2,4-TRICHLOROBENZENE	MG/KG	U	39	U	40		
	1,2-DIBROMO-3-CHLOROPROPANE	MG/KG	U	39	U	40		
	1,2-DIBROMOETHANE	MG/KG	U	39	U	40		
	1,2-DICHLOROBENZENE	MG/KG	U	39	U	40		
	1,2-DICHLOROETHANE	MG/KG	U	39	U	40		
	1,2-DICHLOROPROPANE	MG/KG	U	39	U	40		
	1,3-DICHLOROBENZENE	MG/KG	U	39	U	40		
	1,4-DICHLOROBENZENE	MG/KG	U	39	U	40		
	1,4-DIOXANE (P-DIOXANE)	MG/KG	U	3,900	U	4,000		
	2-BUTANONE	MG/KG	U	200	U	200		
	2-HEXANONE	MG/KG	U	200	U	200		
	4-METHYL-2-PENTANONE	MG/KG	U	200	U	200		
	ACETONE	MG/KG	U	200	U	200		
	BENZENE	MG/KG	440	39	380	40		
	Benzene, 1,2,4,5-tetramethyl-	UG/L	569 J					
	Benzene, 1-ethyl-2-methyl-	UG/L	529 J					
	Benzene, 1-ethyl-3-methyl-	UG/L	982 J					
	BROMOCHLOROMETHANE	MG/KG	U	39	U	40		
	BROMODICHLOROMETHANE	MG/KG	U	39	U	40		
	BROMOFORM	MG/KG	U	39	U	40		
	BROMOMETHANE	MG/KG	U	78	U	79		
	Butane, 2-methyl-	UG/L			3,460 J			
	C4H10 isomer-2.375	UG/L			2,710 J			
	C6H14 isomer-4.383	UG/L	1,030 J					
	C8H16 Isomer-10.211	UG/L			151 J			
	C9H20 Isomer-12.163	UG/L	478 J					
	CARBON DISULFIDE	MG/KG	U	39	U	40		
	CARBON TETRACHLORIDE	MG/KG	U	39	U	40		
	CHLOROBENZENE	MG/KG	U	39	U	40		
	CHLOROETHANE	MG/KG	U	78	U	79		
	CHLOROFORM	MG/KG	U	39	U	40		
	CHLOROMETHANE	MG/KG	U	78	U	79		
	CIS-1,2-DICHLOROETHENE	MG/KG	U	39	U	40		
	CIS-1,3-DICHLOROPROPENE	MG/KG	U	39	U	40		
	CYCLOHEXANE	MG/KG	770	39	1,600	200		
	Cyclohexane, 1,1,3-trimethyl-	UG/L	430 J		776 J			
	Cyclohexane, 1,3-dimethyl-,	UG/L			115 J			
	Cyclohexane, 1,3-dimethyl-, cis-	UG/L	130 J					
	Cyclopentane, 1,2,3-trimeth	UG/L			121 J			
	Cyclopentane, 1,2-dimethyl-	UG/L			4,140 J			
	Cyclopentane, methyl-	UG/L	1,380 J		5,560 J			
	DIBROMOCHLOROMETHANE	MG/KG	U	39	U	40		
	DICHLORODIFLUOROMETHANE	MG/KG	U	78	U	79		
	ETHYLBENZENE	MG/KG	600	39	580	40		
	Heptane, 2-methyl-	UG/L	134 J		135 J			
	Hexane	UG/L	968 J		4,840 J			
	ISOPROPYLBENZENE	MG/KG	180	39	130	40		
	Isopropylcyclobutane	UG/L	904 J					
	M, P XYLENES	MG/KG	1,300	78	1,400	79		
	METHYL ACETATE	MG/KG	U	39	U	40		
	METHYL TERT-BUTYL ETHER	MG/KG	U	39	U	40		
	METHYLCYCLOHEXANE	MG/KG	2,800	95	3,400	200		
	METHYLENE CHLORIDE	MG/KG	U	200	U	200		
	Naphthalene	MG/KG	480	39	460	40		
	Octane, 2,6-dimethyl-	UG/L	371 J					
	O-XYLENE	MG/KG	780	39	830	40		
	Pentane	UG/L	814 J		4,380 J			
	Pentane, 2-methyl-	UG/L			5,660 J			
	Pentane, 3-methyl-	UG/L			2,840 J			
	STYRENE	MG/KG	U	39	U	40		
	TETRACHLOROETHENE	MG/KG	U	39	U	40		
	TOLUENE	MG/KG	2,000	95	2,000	200		
	TRANS-1,2-DICHLOROETHENE	MG/KG	U	39	U	40		
	TRANS-1,3-DICHLOROPROPENE	MG/KG	U	39	U	40		
	TRICHLOROETHENE	MG/KG	U	39	U	40		
	TRICHLOROFLUOROMETHANE	MG/KG	U	78	U	79		
	Undecane	UG/L	627 J					
	Unknown Cycloalkane-7.645 (1,3-dimethyl-Cyclopentane)	UG/L			2,480 J			
	Unknown Cycloalkane-7.73 (1,3-dimethyl-Cyclopentane)	UG/L			1,840 J			
	Unknown-10.211	UG/L	204 J					
	VINYL CHLORIDE	MG/KG	U	78	U	79		

Table 3.12-1 Summary of Crude Oil Sample Results

Lab Analytical Method	Chemical	Unit	Sample ID					
			LA030-A		SSF065-A		YU01B-A	
			Concentrations	RL	Concentrations	RL	Concentrations	RL
SW8270	1,1'-BIPHENYL	MG/KG	U	100	U	100		
	1,2,4,5-TETRACHLOROBENZENE	MG/KG	U	100	U	100		
	2,2'-OXYBIS(1-CHLOROPROPANE)	MG/KG	U	100	U	100		
	2,3,4,6-TETRACHLOROPHENOL	MG/KG	U	100	U	100		
	2,4,5-TRICHLOROPHENOL	MG/KG	U	250	U	250		
	2,4,6-TRICHLOROPHENOL	MG/KG	U	100	U	100		
	2,4-DICHLOROPHENOL	MG/KG	U	100	U	100		
	2,4-DIMETHYLPHENOL	MG/KG	U	100	U	100		
	2,4-DINITROPHENOL	MG/KG	U	250	U	250		
	2,4-DINITROTOLUENE	MG/KG	U	100	U	100		
	2,6-DINITROTOLUENE	MG/KG	U	100	U	100		
	2-CHLORONAPHTHALENE	MG/KG	U	100	U	100		
	2-CHLOROPHENOL	MG/KG	U	100	U	100		
	2-Methylnaphthalene	MG/KG	1,000	100	1,100	100		
	2-METHYLPHENOL	MG/KG	U	100	U	100		
	2-NITROANILINE	MG/KG	U	250	U	250		
	2-NITROPHENOL	MG/KG	U	100	U	100		
	3,3'-DICHLOROBENZIDINE	MG/KG	U	100	U	100		
	3-NITROANILINE	MG/KG	U	250	U	250		
	4,6-DINITRO-2-METHYLPHENOL	MG/KG	U	250	U	250		
	4-BROMOPHENYL PHENYL ETHER	MG/KG	U	100	U	100		
	4-CHLORO-3-METHYLPHENOL	MG/KG	U	100	U	100		
	4-CHLOROANILINE	MG/KG	U	100	U	100		
	4-CHLOROPHENYL PHENYL ETHER	MG/KG	U	100	U	100		
	4-NITROANILINE	MG/KG	U	250	U	250		
	4-NITROPHENOL	MG/KG	U	250	U	250		
	Acenaphthene	MG/KG	U	100	U	100		
	Acenaphthylene	MG/KG	U	100	U	100		
	ACETOPHENONE	MG/KG	U	100	U	100		
	Anthracene	MG/KG	U	100	U	100		
	ATRAZINE	MG/KG	U	100	U	100		
	BENZALDEHYDE	MG/KG	U	100	U	100		
	BENZO(A)ANTHRACENE	MG/KG	U	100	U	100		
	BENZO(A)PYRENE	MG/KG	U	100	U	100		
	BENZO(B)FLUORANTHENE	MG/KG	U	100	U	100		
	BENZO(K)FLUORANTHENE	MG/KG	U	100	U	100		
	BENZO[G,H,I]PERYLENE	MG/KG	U	100	U	100		
	BIS(2-CHLOROETHOXY) METHANE	MG/KG	U	100	U	100		
	BIS(2-CHLOROETHYL) ETHER	MG/KG	U	100	U	100		
	BIS(2-ETHYLHEXYL) PHTHALATE	MG/KG	U	100	U	100		
	BUTYL BENZYL PHTHALATE	MG/KG	U	100	U	100		
	C10H14 Isomer-9.421	MG/KG			955 J			
	C12H12 Isomer-14.382	MG/KG	939 J					
	C9H12 Isomer-7.879	MG/KG			921 J			
	C9H12 Isomer-8.337	MG/KG	941 J					
	CAPROLACTAM	MG/KG	U	100	U	100		
	CARBAZOLE	MG/KG	U	100	U	100		
	Chrysene	MG/KG	U	100	U	100		
	CRESOLS, M & P	MG/KG	U	100	U	100		
	DIBENZO(A,H)ANTHRACENE	MG/KG	U	100	U	100		
	DIBENZOFURAN	MG/KG	U	100	U	100		
	DIETHYL PHTHALATE	MG/KG	U	100	U	100		
	DIMETHYL PHTHALATE	MG/KG	U	100	U	100		
	DI-N-BUTYL PHTHALATE	MG/KG	U	100	U	100		
	DI-N-OCTYLPHTHALATE	MG/KG	U	100	U	100		
	Fluoranthene	MG/KG	U	100	U	100		
	Fluorene	MG/KG	U	100	U	100		
	HEXACHLOROBENZENE	MG/KG	U	100	U	100		
	HEXACHLOROBUTADIENE	MG/KG	U	100	U	100		
	HEXACHLOROCYCLOPENTADIENE	MG/KG	U	100	U	100		
	HEXACHLOROETHANE	MG/KG	U	100	U	100		
	INDENO(1,2,3-CD)PYRENE	MG/KG	U	100	U	100		
	ISOPHORONE	MG/KG	U	100	U	100		
	Naphthalene	MG/KG	580	100	640	100		
	NITROBENZENE	MG/KG	U	100	U	100		
	N-NITROSO-DI-N-PROPYLAMINE	MG/KG	U	100	U	100		
	N-NITROSODIPHENYLAMINE	MG/KG	U	100	U	100		
	PENTACHLOROPHENOL	MG/KG	U	250	U	250		
	Phenanthrene	MG/KG	190	100	180	100		
	PHENOL	MG/KG	U	100	U	100		
	Pyrene	MG/KG	U	100	U	100		

Table 3.12-1 Summary of Crude Oil Sample Results

Lab Analytical Method	Chemical	Unit	Sample ID					
			LA030-A		SSF065-A		YU01B-A	
			Concentrations	RL	Concentrations	RL	Concentrations	RL
SW8270	Unknown Alkane-11.315	MG/KG			377 J			
	Unknown Alkane-11.501	MG/KG			290 J			
	Unknown Alkane-14.102	MG/KG	1,350 J					
	Unknown Alkane-14.827	MG/KG	1,700 J					
	Unknown Alkane-15.354	MG/KG	2,100 J					
	Unknown Alkane-16.069	MG/KG	1,160 J					
	Unknown Alkane-16.534	MG/KG	2,380 J					
	Unknown Alkane-17.052	MG/KG	1,440 J					
	Unknown Alkane-17.704	MG/KG	3,680 J					
	Unknown Alkane-17.722	MG/KG			1,210 J			
	Unknown Alkane-18.718	MG/KG	1,490 J					
	Unknown Alkane-18.801	MG/KG	1,940 J					
	Unknown Alkane-18.808	MG/KG			548 J			
	Unknown Alkane-19.74	MG/KG			627 J			
	Unknown Alkane-22.493	MG/KG			2,150 J			
	Unknown Alkane-6.795	MG/KG	1,260 J					
	Unknown Alkane-6.802	MG/KG			1,430 J			
	Unknown Alkane-8.058	MG/KG	1,470 J					
	Unknown Alkane-8.065	MG/KG			1,320 J			
	Unknown Alkane-8.43	MG/KG	987 J					
	Unknown Alkane-8.438	MG/KG			1,010 J			
	Unknown Alkane-9.773	MG/KG			465 J			
	Unknown Cycloalkane-13.312	MG/KG			1,920 J			
	Unknown Cycloalkane-7.206	MG/KG			1,310 J			
	Unknown Cycloalkane-7.706	MG/KG	1,030 J					
	Unknown Cycloalkane-7.713	MG/KG			1,090 J			
AXYS SOP MLA-021 (8270) - Alkanes	2,6,10-Trimethyl Tridecane	ng/mg	1,980	16	2,420	30	1,060	13
	2,6-Dimethyl Undecane	ng/mg	2,580	17	3,590	32	974	14
	Docosane (nC22)	ng/mg	2,500	38	3,050	21	159	25
	Dodecane (nC12)	ng/mg	3,910	17	3,890	32	475	14
	Dotriacontane (nC32)	ng/mg	896	21	929	18	77 J	20
	Eicosane (nC20)	ng/mg	2,720	37	3,260	21	173	25
	Farnesane	ng/mg	1,900	16	2,380	30	965	13
	Heneicosane (nC21)	ng/mg	2,550	37	3,020	20	227	24
	Heptacosane (nC27)	ng/mg	1,410 B	40	1,640 B	22	99 BJ	27
	Heptadecane (nC17)	ng/mg	3,960	17	4,640	42	321	38
	Hexacosane (nC26)	ng/mg	1,720 B	39	2,010 B	21	175 B	25
	Hexadecane (nC16)	ng/mg	4,150	17	4,710	42	434	39
	Hexatriacontane (nC36)	ng/mg	408	30	340	25	31 J	29
	Nonacosane (nC29)	ng/mg	1,320 B	42	1,500 B	23	88 BJ	28
	Nonadecane (nC19)	ng/mg	3,020	17	3,610	43	218	39
	Norfarnesane	ng/mg	1,950	17	2,330	32	854	14
	Norpristane	ng/mg	2,590	17	3,370	42	1,390	38
	Octacosane (nC28)	ng/mg	1,250 B	41	1,440 B	23	107 BJ	27
	Octadecane (nC18)	ng/mg	3,350	16	3,980	41	288	38
	Pentacosane (nC25)	ng/mg	2,070 B	39	2,340 B	21	229 B	25
	Pentadecane (nC15)	ng/mg	4,290	15	4,880	29	531	13
	Pentatriacontane (nC35)	ng/mg	759	27	665	23	197 K	27
	Phytane	ng/mg	3,310	16	4,430	40	1,830	36
	Pristane	ng/mg	2,930	14	4,120	37	1,470	33
	Tetracosane (nC24)	ng/mg	2,090 B	38	2,540 B	21	144 BJ	25
	Tetradecane (nC14)	ng/mg	4,130	16	4,420	30	618	13
	Tetratriacontane (nC34)	ng/mg	619	24	561	20	136 KJ	23
	Triacontane (nC30)	ng/mg	1,290 B	19	1,530 B	16	89 BJ	18
	Tricosane (nC23)	ng/mg	2,170 B	37	2,600 B	21	125 BJ	25
	Tridecane (nC13)	ng/mg	4,080	16	4,240	31	626	14
	Tritriacontane (nC33)	ng/mg	831	22	909	19	48 KJ	22
	Untriacontane (nC31)	ng/mg	1,150	19	1,310	16	88 J	19

Table 3.12-1 Summary of Crude Oil Sample Results

Lab Analytical Method	Chemical	Unit	Sample ID					
			LA030-A		SSF065-A		YU01B-A	
			Concentrations	RL	Concentrations	RL	Concentrations	RL
AXYS SOP MLA-021 (8270) - PAH	1,2,6-Trimethylphenanthrene	ng/mg	28 D	2.220	25 D	2.300	22 D	1.300
	1,2-Dimethylnaphthalene	ng/mg	236 D	1.090	253 D	1.490	96 D	1.190
	1,4,6,7-Tetramethylnaphthalene	ng/mg	169 D	7.860	184 KD	6.220	114 KD	3.460
	1,7-Dimethylfluorene	ng/mg	17 KD	1.250	28 D	1.470	22 D	0.330
	1,7-Dimethylphenanthrene	ng/mg	108 D	1.100	99 D	1.400	92 D	0.891
	1,8-Dimethylphenanthrene	ng/mg	24 D	1.110	22 D	1.420	14 D	0.899
	1-Methylchrysene	ng/mg	12 D	1.460	9.050 D	1.080	6.090 D	0.745
	1-Methylnaphthalene	ng/mg	870 D	1.300	912 D	2.350	233 D	0.702
	1-Methylphenanthrene	ng/mg	114 D	1.230	96 D	1.850	60 D	0.823
	2,3,5-Trimethylnaphthalene	ng/mg	521 D	2.170	558 D	2.260	287 D	0.846
	2,3,6-Trimethylnaphthalene	ng/mg	612 D	2.190	652 D	2.280	415 D	0.855
	2,4-Dimethyldibenzothiophene	ng/mg	40 KD	0.885	46 KD	1.280	52 KD	0.675
	2,6-Dimethylnaphthalene	ng/mg	496 D	0.885	526 D	1.210	231 D	0.968
	2,6-Dimethylphenanthrene	ng/mg	32 D	1.110	27 D	1.420	26 D	0.899
	2/3-Methyldibenzothiophenes	ng/mg	96 D	1.290	96 D	1.750	106 D	0.653
	2-Methylanthracene	ng/mg	3.690 D	1.280	5.420 D	1.930	2.100 KD	0.860
	2-Methylfluorene	ng/mg	48 D	1.270	34 D	5.180	19 D	1.450
	2-Methylnaphthalene	ng/mg	976 D	1.230	1,180 D	2.240	340 D	0.668
	2-Methylphenanthrene	ng/mg	97 D	1.250	99 D	1.870	66 D	0.835
	3,6-Dimethylphenanthrene	ng/mg	41 KD	1.120	37 KD	1.430	22 KD	0.908
	3-Methylfluoranthene/Benzo[a]fluorene	ng/mg	60 D	1.760	78 D	3.140	26 D	2.070
	3-Methylphenanthrene	ng/mg	102 D	1.250	90 D	1.880	57 D	0.839
	5,9-Dimethylchrysene	ng/mg	17 D	1.430	14 D	2.150	11 D	0.494
	5/6-Methylchrysene	ng/mg	9.110 D	1.570	7.280 D	1.170	4.610 D	0.804
	7-Methylbenzo[a]pyrene	ng/mg	4.330 D	1.640	2.400 D	1.240	2.180 D	1.070
	9/4-Methylphenanthrene	ng/mg	174 D	1.250	157 D	1.880	97 D	0.839
	Acenaphthene	ng/mg	15 D	0.681	21 D	1.060	7.790 D	0.366
	Acenaphthylene	ng/mg	1.110 D	0.228	0.539 KDJ	0.271	0.672 DJ	0.218
	Anthracene	ng/mg	UD	2.180	UD	2.910	0.898 KDJ	0.896
	Benz[a]anthracene	ng/mg	5.090 KBD	1.740	4.790 KBD	0.764	2.260 KBD	0.475
	Benzo[a]pyrene	ng/mg	2.040 KD	0.876	1.450 KD	0.937	0.801 KDJ	0.371
	Benzo[b]fluoranthene	ng/mg	3.110 KD	0.590	1.300 KD	0.655	1.470 KD	0.248
	Benzo[e]pyrene	ng/mg	13 D	0.814	3.650 KD	0.871	4.410 D	0.345
	Benzo[ghi]perylene	ng/mg	4.900 D	0.805	UD	0.790	2.200 D	0.304
	Benzo[j,k]fluoranthenes	ng/mg	UD	0.670	UD	0.757	UD	0.285
	Biphenyl	ng/mg	27 BD	0.585	28 BD	0.341	27 BD	0.185
	C1 Phenanthrenes/Anthracenes	ng/mg	491 D	1.230	447 D	1.850	279 D	0.823
	C1-Acenaphthenes	ng/mg	6.570 D	0.296	9.970 D	0.180	4.290 D	0.251
	C1-Benzo[a]anthracenes/Chrysenes	ng/mg	60 D	1.510	50 D	1.120	37 D	0.773
	C1-Benzofluoranthenes/Benzopyrenes	ng/mg	38 D	1.640	18 D	1.240	15 D	1.070
	C1-Biphenyls	ng/mg	41 BD	0.264	53 BD	0.176	47 BD	0.185
	C1-Dibenzothiophenes	ng/mg	326 D	1.290	346 D	1.750	360 D	0.653
	C1-Fluoranthenes/Pyrenes	ng/mg	150 D	1.760	137 D	3.140	57 D	2.070
	C1-Fluorenes	ng/mg	302 D	1.270	35 D	5.180	149 D	1.450
	C1-Naphthalenes	ng/mg	1,850 D	1.230	2,090 D	2.240	572 D	0.668
	C2 Phenanthrenes/Anthracenes	ng/mg	565 D	1.110	518 D	1.420	366 D	0.899
	C2-Benzo[a]anthracenes/Chrysenes	ng/mg	92 D	1.430	76 D	2.150	58 D	0.494
	C2-Benzofluoranthenes/Benzopyrenes	ng/mg	19 D	1.660	15 D	1.220	11 D	0.811
	C2-Biphenyls	ng/mg	37 BD	0.257	53 BD	0.301	59 BD	0.238
	C2-Dibenzothiophenes	ng/mg	503 D	0.885	540 D	1.280	625 D	0.675
	C2-Fluoranthenes/Pyrenes	ng/mg	271 D	1.480	242 D	2.250	126 D	1.060
	C2-Fluorenes	ng/mg	315 D	1.250	299 D	1.470	205 D	0.330
	C2-Naphthalenes	ng/mg	2,910 D	1.090	3,120 D	1.490	1,310 D	1.190
	C3-Benzo[a]anthracenes/Chrysenes	ng/mg	24 BD	1.020	22 BD	0.870	16 BD	0.625
	C3-Dibenzothiophenes	ng/mg	380 BD	1.830	433 BD	2.540	536 BD	1.080
	C3-Fluoranthenes/Pyrenes	ng/mg	252 D	2.160	190 D	2.850	125 D	1.760
	C3-Fluorenes	ng/mg	322 D	3.230	321 D	2.150	257 D	1.100
	C3-Naphthalenes	ng/mg	2,450 D	2.180	2,620 D	2.270	1,570 D	0.851
	C3-Phenanthrenes/Anthracenes	ng/mg	516 D	2.220	434 D	2.300	320 D	1.300
	C4-Benzo[a]anthracenes/Chrysenes	ng/mg	12 D	0.686	15 D	0.827	9.460 D	0.418
	C4-Dibenzothiophenes	ng/mg	168 BD	1.820	207 BD	1.420	263 BD	0.784
	C4-Fluoranthenes/Pyrenes	ng/mg	93 D	2.540	83 D	3.020	53 D	1.810
	C4-Naphthalenes	ng/mg	1,120 D	7.860	1,220 D	6.220	769 D	3.460
	C4-Phenanthrenes/Anthracenes	ng/mg	731 D	5.950	720 D	3.070	502 D	2.560
	Chrysene	ng/mg	25 BD	2.090	18 BD	0.997	14 BD	0.595
	Dibenz[a,h]anthracene	ng/mg	0.930 D	0.470	UD	0.686	0.436 KDJ	0.412
	Dibenzothiophene	ng/mg	73 KBD	1.490	77 KBD	2.290	73 BD	1.160
	Fluoranthene	ng/mg	2.420 BD	0.909	UD	2.750	0.583 BDJ	0.573
	Fluorene	ng/mg	71 D	0.212	58 D	0.503	19 D	0.541
	Indeno[1,2,3-cd]pyrene	ng/mg	UD	0.838	UD	0.841	UD	0.318
	Naphthalene	ng/mg	513 BD	0.672	648 BD	0.419	180 BD	0.303
	Perylene	ng/mg	UD	0.859	UD	0.941	UD	0.349
	Phenanthrene	ng/mg	156 BD	2.000	160 BD	2.680	78 BD	0.824
	Pyrene	ng/mg	8.700 BD	0.895	4.960 KBD	2.710	2.280 BD	0.564
	Retene	ng/mg	30 KD	5.950	63 D	3.070	39 D	2.560

Table 3.12-1 Summary of Crude Oil Sample Results

Lab Analytical Method	Chemical	Unit	Sample ID					
			LA030-A		SSF065-A		YU01B-A	
			Concentrations	RL	Concentrations	RL	Concentrations	RL
AXYS SOP MLA-091	$C_{12}H_{18}O_2$	ng/mg	U	0.100	U	0.100	U	0.098
	$C_{12}H_{20}O_2$	ng/mg	U	0.100	0.394	0.100	0.984	0.098
	$C_{12}H_{22}O_2$	ng/mg	0.214	0.100	1.100	0.100	2.210	0.098
	$C_{12}H_{24}O_2$	ng/mg	0.194	0.100	1.300	0.100	2.500	0.098
	$C_{13}H_{20}O_2$	ng/mg	U	0.100	0.119	0.100	0.329	0.098
	$C_{13}H_{22}O_2$	ng/mg	0.156	0.100	0.652	0.100	2.030	0.098
	$C_{13}H_{24}O_2$	ng/mg	0.281	0.100	1.320	0.100	3.560	0.098
	$C_{13}H_{26}O_2$	ng/mg	0.387	0.100	1.960	0.100	3.370	0.098
	$C_{14}H_{20}O_2$	ng/mg	U	0.100	0.208	0.100	0.357	0.098
	$C_{14}H_{22}O_2$	ng/mg	U	0.100	0.263	0.100	0.859	0.098
	$C_{14}H_{24}O_2$	ng/mg	0.201	0.100	1.040	0.100	3.510	0.098
	$C_{14}H_{26}O_2$	ng/mg	0.434	0.100	2.930	0.100	6.000	0.098
	$C_{14}H_{28}O_2$	ng/mg	0.511	0.100	2.550	0.100	4.450	0.098
	$C_{15}H_{18}O_2$	ng/mg	U	0.100	0.125 B	0.100	0.112 B	0.098
	$C_{15}H_{20}O_2$	ng/mg	U	0.100	U	0.100	0.149	0.098
	$C_{15}H_{22}O_2$	ng/mg	U	0.100	0.209	0.100	0.454	0.098
	$C_{15}H_{24}O_2$	ng/mg	U	0.100	0.473	0.100	1.590	0.098
	$C_{15}H_{26}O_2$	ng/mg	0.303	0.100	1.470	0.100	5.180	0.098
	$C_{15}H_{28}O_2$	ng/mg	0.420	0.100	2.700	0.100	6.120	0.098
	$C_{15}H_{30}O_2$	ng/mg	0.617	0.100	3.180	0.110	5.440	0.098
	$C_{16}H_{20}O_2$	ng/mg	0.239 B	0.100	0.329 B	0.100	0.297 B	0.098
	$C_{16}H_{22}O_2$	ng/mg	U	0.100	0.121	0.100	0.244	0.098
	$C_{16}H_{24}O_2$	ng/mg	U	0.100	0.288	0.100	0.765	0.098
	$C_{16}H_{26}O_2$	ng/mg	0.161	0.100	0.694	0.100	2.260	0.098
	$C_{16}H_{28}O_2$	ng/mg	0.271	0.100	1.350	0.100	4.720	0.098
	$C_{16}H_{30}O_2$	ng/mg	0.422	0.100	2.820	0.100	6.220	0.098
	$C_{16}H_{32}O_2$	ng/mg	U	0.100	4.090	0.100	6.430	0.098
	$C_{17}H_{22}O_2$	ng/mg	U	0.100	0.134	0.100	0.222	0.098
	$C_{17}H_{24}O_2$	ng/mg	U	0.100	0.159	0.100	0.406	0.098
	$C_{17}H_{26}O_2$	ng/mg	U	0.100	0.381	0.100	1.000	0.098
	$C_{17}H_{28}O_2$	ng/mg	U	0.100	0.534	0.100	1.810	0.098
	$C_{17}H_{30}O_2$	ng/mg	0.341	0.100	1.500	0.100	4.510	0.098
	$C_{17}H_{32}O_2$	ng/mg	0.407	0.100	2.350	0.100	5.450	0.098
	$C_{17}H_{34}O_2$	ng/mg	U	0.141	1.600	0.203	2.490	0.333
	$C_{18}H_{24}O_2$	ng/mg	2.260 B	0.100	3.020 B	0.100	2.960 B	0.098
	$C_{18}H_{26}O_2$	ng/mg	0.122	0.100	0.302	0.100	0.670	0.098
	$C_{18}H_{28}O_2$	ng/mg	0.257 B	0.100	0.587 B	0.100	1.430 B	0.098
	$C_{18}H_{30}O_2$	ng/mg	0.114	0.100	0.552	0.100	1.730	0.098
	$C_{18}H_{32}O_2$	ng/mg	0.266	0.100	1.300	0.100	3.760	0.098
	$C_{18}H_{34}O_2$	ng/mg	U	1.270	2.290	0.100	5.050	0.098
	$C_{18}H_{36}O_2$	ng/mg	U	0.100	U	0.100	U	0.098
	$C_{19}H_{26}O_2$	ng/mg	0.213	0.100	0.472	0.100	0.921	0.098
	$C_{19}H_{28}O_2$	ng/mg	U	0.100	0.296	0.100	0.788	0.098
	$C_{19}H_{30}O_2$	ng/mg	0.123	0.100	0.486	0.100	2.140	0.098
	$C_{19}H_{32}O_2$	ng/mg	0.275	0.100	0.931	0.100	11	0.098
	$C_{19}H_{34}O_2$	ng/mg	0.331 B	0.100	1.520 B	0.100	4.560 B	0.098
	$C_{19}H_{36}O_2$	ng/mg	0.367	0.100	2.410	0.100	5.340	0.098
	$C_{19}H_{38}O_2$	ng/mg	1.520 B	0.100	4.650 B	0.100	6.460 B	0.098
	$C_{20}H_{28}O_2$	ng/mg	4.740 B	0.477	5.030 B	0.254	4.790 B	0.531
	$C_{20}H_{30}O_2$	ng/mg	0.331 B	0.100	0.693 B	0.100	U	2.010
	$C_{20}H_{32}O_2$	ng/mg	0.252 B	0.100	0.665 B	0.100	2.060 B	0.098
	$C_{20}H_{34}O_2$	ng/mg	0.160	0.100	0.711	0.100	3.960	0.098
	$C_{20}H_{36}O_2$	ng/mg	0.212	0.100	1.140	0.100	3.340	0.098
	$C_{20}H_{38}O_2$	ng/mg	0.393	0.100	2.050	0.100	4.720	0.098
	$C_{21}H_{30}O_2$	ng/mg	0.222 B	0.100	0.456 B	0.100	0.803 B	0.098
	$C_{21}H_{32}O_2$	ng/mg	U	0.100	0.331	0.100	0.826	0.098
	$C_{21}H_{34}O_2$	ng/mg	U	0.100	0.453	0.100	1.380	0.098
	$C_{21}H_{36}O_2$	ng/mg	0.183	0.100	0.784	0.100	5.800	0.098
	$C_{21}H_{38}O_2$	ng/mg	0.275	0.100	1.340	0.100	3.510	0.098
	$C_{21}H_{40}O_2$	ng/mg	0.454 B	0.100	2.210 B	0.100	4.570 B	0.098

Table 5.2-1 Summary of Soil Results for LA-02

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	LA02-N17		LA02-N03		LA02-N08	
Sample Name									LA02-SL001		LA02-SL003		LA02-SL004	
Depth (m bgs^1)									0.98 - 1.13		0.66 - 0.81		2.75 - 2.9	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	2,500	2,500	500	100	758		13,428		796	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	UD	0.04	0.03 J	6.71E-3
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	3.41E-3	UD	0.02	U	6.27E-3
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	UD	0.36	U	0.02
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	0.01 KBJ	5.30E-3	0.29 KBD	0.09	0.03 KBJ	4.15E-3
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	0.02	UD	0.14	U	0.01
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	8.68E-3	0.17 BDJ	0.09	U	7.62E-3
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	UD	0.10	U	8.46E-3
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	UD	0.11	U	9.71E-3
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.09 BJ	5.37E-3	2.19 BD	0.11	0.21 BJ	5.40E-3
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	UD	0.11	U	0.01
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	8.05E-3	UD	0.13	U	0.02
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 J	8.85E-3	1.13 KD	0.04	0.11 J	3.45E-3
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	UD	0.10	U	8.64E-3
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	0.03 KBJ	0.02	1.09 BD	0.01	0.01 KBJ	6.31E-3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.02 J	0.01	5.16 BD	0.34	0.08 J	0.02
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.02 BJ	7.91E-3	0.38 BD	0.12	0.04 BJ	0.02
Sum of 6 PAHs^3	NA	NA	NA	1	2	NA	2	NA	U	0.03	0.17		U	0.03
LMW PAHs^4	NA	NA	NA	1	2	NA	2	NA	0.08		7.38		0.22	
HMW PAHs^5	NA	NA	NA	1	2	NA	2	NA	0.12		3.04		0.28	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	0.20		10		0.50	
Sum PAHs^7	NA	NA	NA	1	2	NA	2	NA	2.11		62		4.98	
Sum Alkylated PAHs + Biphenyl^{17}	NA	NA	NA	NA	NA	NA	NA	NA	22		474		55	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.46	U	0.45	U	0.50
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03	U	0.04	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.2	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.65	U	0.75	U	0.70
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	0.05	0.03	U	0.04	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.34	0.03	0.20	0.04	0.02 J	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.02	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	0.03	6.50E-3	U	7.50E-3	U	7.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	5.40E-3 J	7.50E-3	U	7.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	0.02	7.50E-3	U	7.00E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.23 J	0.46	0.02	7.50E-3	U	7.00E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	18,700	23	18,900	30	93,000	40
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.04 J	0.08	0.04 J	0.10	0.08 J	0.13
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	0.93	0.38	0.63	0.50	1.60	0.66
BARIUM	17	910	231	NA	NA	500	750	NA	139	0.15	298	0.20	608	0.26
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.28	0.08	0.31	0.10	1.30	0.13
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.06 J	0.08	0.12	0.10	0.10 J	0.13
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	5,820	7.60	6,540	10	2,000	13
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	11	0.38	13	0.50	37	0.66
COBALT	NA	NA	NA	NA	NA	50	40	NA	10	0.08	9.10	0.10	22	0.13
COPPER	4.30	69	28	NA	NA	63	63	NA	36	0.23	34	0.30	81	0.40
IRON	NA	NA	NA	NA	NA	NA	NA	NA	17,600	7.60	20,300	10	49,900	26
LEAD	2.10	15	7.05	80	100	100	100	NA	3.50	0.08	8.10	0.10	14	0.13
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	3,150	7.60	3,500	10	3,820	26
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	146	0.15	187	0.20	445	0.26
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.01 J	0.03	0.02 J	0.04	0.05 J	0.05
NICKEL	4.00	43	14	40	50	100	50	NA	12	0.15	14	0.20	27	0.26
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	442	76	547	100	1,190	130
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	0.17 J	0.38	U	0.50	U	0.66
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.04 J	0.08	0.05 J	0.10	0.08 J	0.13
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,270	76	1,510	100	205	130
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.04 J	0.08	0.08 J	0.10	0.19	0.13
VANADIUM	40	171	93	NA	NA	130	130	NA	70	0.38	78	0.50	114	0.66
ZINC	16	134	49	NA	NA	200	200	NA	39	0.76	44	1.00	82	1.30
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	9,100	560	50,000	560	7,200	610

Table 5.2-1 Summary of Soil Results for LA-02

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	**RAOHE Agricultural Criteria Decreto 1215**	**TULSMA Residential Criteria Decreto 3516**	**TULSMA Agricultural Criteria Decreto 3516**	**Lago Agrio Judgment**	LA02-N13		LA02-N05		LA02-N04	
Sample Name									LA02-SL005		LA02-SL008 [13]		LA02-SL009 [13]	
Depth (m bgs[1])									2.9 - 3.05		4.1 - 4.26		1.42 - 1.57	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	10,609		3,238		5,931	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	0.23 KJ	0.01	0.09 KJ	9.58E-3	0.16	0.01
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	6.07E-3	U	3.33E-3
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.11	U	0.04	U	0.06
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	0.29 KBJ	0.07	0.05 BJ	0.01	0.14 KB	0.03
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	0.06	0.03 KJ	0.01	0.04 KJ	0.03
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.13 J	0.03	0.03 J	7.04E-3	0.07 J	0.02
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.08 BJ	0.04	0.02 KBJ	0.01	0.03 KBJ	0.01
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	8.95E-3	U	0.02
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	1.89 B	0.09	0.45 B	0.02	1.05 B	0.03
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.06	U	5.47E-3	0.01 BJ	0.01
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.22	0.03 BJ	0.02	0.06 BJ	0.04
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	1.01	0.03	0.40	0.02	0.70	2.47E-3
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.01	U	0.01
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	0.23 BJ	0.01	0.14 BJ	3.96E-3	1.91 B	2.08E-3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	5.39	0.10	2.11	0.04	3.45	0.06
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.32 BJ	0.22	0.08 BJ	0.02	0.22 B	0.04
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	0.21		0.09		0.21	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	6.86		2.74		6.21	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	2.70		0.67		1.64	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	9.56		3.41		7.85	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	58		23		45	
Sum Alkylated PAHs + Biphenyl[17]	NA	NA	NA	NA	NA	NA	NA	NA	486		168		332	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.81	U	0.50	U	0.43
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	2.40E-3 J	6.00E-3	U	6.50E-3	U	6.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03	U	0.03	U	0.03
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.2	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.60	U	0.65	U	0.65
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03	U	0.03
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03	U	0.03
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03	U	0.03
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.16	0.03	0.03	0.03	0.09	0.03
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.01	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	1.80E-3 J	6.00E-3	2.90E-3 J	6.50E-3	3.10E-3 J	6.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	0.21	6.00E-3	0.05	6.50E-3	2.60	0.42
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.02	6.00E-3	0.14	6.50E-3	0.75	0.42
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	6.50E-3	U	6.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	17,300	25	29,900	35	19,200	35
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.03 J	0.09	0.04 J	0.12	0.04 J	0.12
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	0.55	0.42	0.93	0.59	0.66	0.58
BARIUM	17	910	231	NA	NA	500	750	NA	132	0.17	249	0.23	162	0.23
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.27	0.09	0.56	0.12	0.32	0.12
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.05 J	0.09	0.12	0.12	0.10 J	0.12
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	5,630	8.50	5,340	12	6,270	12
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	11	0.42	17	0.59	12	0.58
COBALT	NA	NA	NA	NA	NA	50	40	NA	8.40	0.09	12	0.12	9.40	0.12
COPPER	4.30	69	28	NA	NA	63	63	NA	32	0.25	39	0.35	33	0.35
IRON	NA	NA	NA	NA	NA	NA	NA	NA	17,200	8.50	21,400	12	19,200	12
LEAD	2.10	15	7.05	80	100	100	100	NA	6.30	0.09	8.30	0.12	6.50	0.12
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	2,950	8.50	2,690	12	3,550	12
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	139	0.17	221	0.23	174	0.23
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.02 J	0.03	0.02 J	0.04	0.02 J	0.03
NICKEL	4.00	43	14	40	50	100	50	NA	14	0.17	21	0.23	13	0.23
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	423	85	602	120	553	120
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.42	U	0.59	U	0.58
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.04 J	0.09	0.07 J	0.12	0.05 J	0.12
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,330	85	1,240	120	1,440	120
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.08 J	0.09	0.11 J	0.12	0.09 J	0.12
VANADIUM	40	171	93	NA	NA	130	130	NA	72	0.42	83	0.59	73	0.58
ZINC	16	134	49	NA	NA	200	200	NA	62	0.85	98	1.20	46	1.20
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	43,000	490	15,000	610	23,000	540

Table 5.2-1 Summary of Soil Results for LA-02

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	LA02-N16		LA02-N26		LA02-N09	
Sample Name									LA02-SL011		LA02-SL012		LA02-SL013	
Depth (m bgs^1)									2.89 - 3.04		0.1 - 0.25		1.27 - 1.42	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	2,500	2,500	500	100	11,150		16		31,960	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	0.52	0.03	U	7.23E-3	1.12 D	0.08
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	1.08 K	8.98E-3	U	4.73E-3	UD	0.09
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.13 KJ	0.07	U	3.02E-3	UD	0.57
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	0.19 KBJ	0.08	U	3.18E-3	0.96 KBD	0.47
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	0.05	U	5.78E-3	UD	0.34
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.08 J	0.03	U	3.74E-3	0.49 KBD	0.21
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.05 KJ	0.04	U	8.90E-3	0.16 KBDJ	0.08
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	4.73E-3	UD	0.26
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	1.70	0.10	5.26E-3 BJ	3.46E-3	4.90 BD	0.49
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	6.63E-3	0.07 KDJ	0.06
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.09 BJ	0.09	3.46E-3 BJ	2.42E-3	UD	0.29
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	1.85	0.06	U	3.56E-3	5.05 D	0.20
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	9.47E-3 KBJ	8.35E-3	UD	0.08
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	2.86 B	0.02	0.02 KBJ	9.39E-3	10 BD	0.03
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	8.70 B	0.07	9.78E-3 J	2.83E-3	22 BD	0.40
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.32 B	0.12	6.35E-3 BJ	2.38E-3	0.91 BD	0.28
Sum of 6 PAHs^3	NA	NA	NA	1	2	NA	2	NA	0.23		0.01		0.65	
LMW PAHs^4	NA	NA	NA	1	2	NA	2	NA	15		0.03		38	
HMW PAHs^5	NA	NA	NA	1	2	NA	2	NA	2.43		0.02		7.48	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	18		0.05		46	
Sum PAHs^7	NA	NA	NA	1	2	NA	2	NA	117		0.07		247	
Sum Alkylated PAHs + Biphenyl^{17}	NA	NA	NA	NA	NA	NA	NA	NA	703		0.11		1,443	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.37	U	0.43	U	1.10
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	0.0056	5.50E-3	U	9.50E-3	0.0045 J	8.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	2.50E-3 J	5.50E-3	U	9.50E-3	4.30E-3 J	8.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.03	8.90E-3	
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03	U	0.05	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.2	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.55	U	0.95	U	0.80
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	0.03 J	0.05	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.05	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.05	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.22	0.03	0.38	0.05	U	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.02	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	3.90E-3 J	5.50E-3	U	9.50E-3	8.00E-3	8.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.01	5.50E-3	U	9.50E-3	0.04	8.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	3.40	0.34	U	9.50E-3	5.50	0.60
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.79	0.34	U	9.50E-3	2.80	0.60
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	5.50E-3	U	9.50E-3	U	8.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	18,400	25	19,100	32	22,700	34
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.04 J	0.08	0.04 J	0.10	0.10 J	0.11
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	0.47	0.42	0.60	0.52	1.30	0.56
BARIUM	17	910	231	NA	NA	500	750	NA	193	0.17	114	0.21	410	0.22
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.31	0.08	0.27	0.10	0.53	0.11
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.07 J	0.08	0.11	0.10	0.20	0.11
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	6,680	8.40	5,510	10	4,900	11
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	12	0.42	12	0.52	15	0.56
COBALT	NA	NA	NA	NA	NA	50	40	NA	8.40	0.08	9.20	0.10	8.70	0.11
COPPER	4.30	69	28	NA	NA	63	63	NA	31	0.25	30	0.32	66	0.34
IRON	NA	NA	NA	NA	NA	NA	NA	NA	19,800	8.40	21,800	10	17,000	11
LEAD	2.10	15	7.05	80	100	100	100	NA	3.50	0.08	3.60	0.10	34	0.11
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	3,400	8.40	3,380	10	2,570	11
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	172	0.17	289	0.21	181	0.22
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	4.00E-3 J	0.03	0.02 J	0.04	0.07	0.05
NICKEL	4.00	43	14	40	50	100	50	NA	13	0.17	13	0.21	19	0.22
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	561	84	404	100	632	110
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.42	U	0.52	U	0.56
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.05 J	0.08	0.04 J	0.10	0.09 J	0.11
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,530	84	1,210	100	1,080	110
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.08	0.08	0.07 J	0.10	0.18	0.11
VANADIUM	40	171	93	NA	NA	130	130	NA	72	0.42	73	0.52	65	0.56
ZINC	16	134	49	NA	NA	200	200	NA	41	0.84	39	1.00	91	1.10
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	29,000	470	21,000	540	52,000	670

Table 5.2-1 Summary of Soil Results for LA-02

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	LA02-N10		LA02-N11		LA02-N21	
Sample Name									LA02-SL014		LA02-SL015		LA02-SL016	
Depth (m bgs^1)									3.1 - 3.25		1.74 - 1.89		3.5 - 3.65	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	2,500	2,500	500	100	4,511		24,790		313	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	0.10 KJ	5.56E-3	0.62	0.04	U	8.48E-3
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	5.99E-3	U	0.04	U	0.03
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.06	U	0.49	U	4.07E-3
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	0.09 KBJ	0.02	0.51 KB	0.46	U	7.60E-3
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	0.03 KJ	0.02	U	0.16	U	0.01
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.05 J	0.02	0.27 KJ	0.10	0.01 KJ	6.75E-3
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.02 KBJ	9.25E-3	0.13 KJ	0.03	U	0.02
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	0.11	8.21E-3 KBJ	7.81E-3
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.80 B	0.02	3.98 B	0.54	0.05 KBJ	9.13E-3
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.01 KBJ	9.28E-3	U	0.13	U	0.01
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.04 KBJ	0.03	U	0.27	0.01 KBJ	4.36E-3
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.64	0.02	2.79	0.09	U	0.01
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	9.15E-3	U	0.04	U	0.02
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	1.23 B	8.10E-3	3.78 B	0.13	9.11E-3 KBJ	5.38E-3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	3.25	0.06	13 B	0.51	0.01 KBJ	4.24E-3
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.17 BJ	0.03	0.64 B	0.27	0.02 BJ	4.28E-3
Sum of 6 PAHs^3	NA	NA	NA	1	2	NA	2	NA	0.14		0.40		0.03	
LMW PAHs^4	NA	NA	NA	1	2	NA	2	NA	5.22		20		0.02	
HMW PAHs^5	NA	NA	NA	1	2	NA	2	NA	1.21		5.53		0.09	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	6.43		26		0.12	
Sum PAHs^7	NA	NA	NA	1	2	NA	2	NA	35		153		0.44	
Sum Alkylated PAHs + Biphenyl^{17}	NA	NA	NA	NA	NA	NA	NA	NA	248		1,135		6.83	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.58	U	0.77	U	0.41
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	0.0021 J	0.01	U	6.00E-3	U	5.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	0.17	0.01	0.0056 J	6.00E-3	U	5.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	0.02		3.80E-3		U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.05	U	0.03	U	0.03
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.2	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.01	U	6.00E-3	U	5.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	1.00	U	0.60	U	0.55
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.05	U	0.03	U	0.03
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.05	U	0.03	U	0.03
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.05	U	0.03	U	0.03
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.05	U	0.03	0.01 J	0.03
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	6.00E-3	U	5.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	0.01	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	4.90E-3 J	0.01	2.60E-3 J	6.00E-3	U	5.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.01	U	6.00E-3	U	5.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.25	0.01	0.06	6.00E-3	U	5.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	1.90	0.85	1.80	0.38	U	5.50E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	6.00E-3	U	5.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	6.00E-3	U	5.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	1.70	0.85	0.81	0.38	U	5.50E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	6.00E-3	U	5.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	45,200	46	16,800	26	17,600	30
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.14 J	0.15	0.04 J	0.09	0.04 J	0.10
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	1.40	0.77	0.43 J	0.44	0.32 J	0.50
BARIUM	17	910	231	NA	NA	500	750	NA	209	0.31	153	0.18	125	0.20
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.53	0.15	0.27	0.09	0.27	0.10
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.12 J	0.15	0.10	0.09	0.04 J	0.10
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,880	15	5,980	8.80	6,390	10
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	25	0.77	7.80	0.44	14	0.50
COBALT	NA	NA	NA	NA	NA	50	40	NA	43	0.15	6.60	0.09	7.40	0.10
COPPER	4.30	69	28	NA	NA	63	63	NA	41	0.46	27	0.26	29	0.30
IRON	NA	NA	NA	NA	NA	NA	NA	NA	33,700	15	14,800	8.80	19,900	10
LEAD	2.10	15	7.05	80	100	100	100	NA	141	0.15	3.80	0.09	3.60	0.10
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,080	15	2,690	8.80	2,200	10
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	548	0.31	140	0.18	153	0.20
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.05 J	0.05	6.00E-3 J	0.03	7.00E-3 J	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	18	0.31	11	0.18	11	0.20
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	582	150	555	88	537	100
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	0.06 J	0.77	U	0.44	U	0.50
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.32	0.15	0.04 J	0.09	0.05 J	0.10
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	245	150	1,400	88	1,530	100
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.11 J	0.15	0.06 J	0.09	0.04 J	0.10
VANADIUM	40	171	93	NA	NA	130	130	NA	80	0.77	53	0.44	76	0.50
ZINC	16	134	49	NA	NA	200	200	NA	66	1.50	33	0.88	38	1.00
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	26,000	710	59,000	500	19,000	510

Table 5.2-1 Summary of Soil Results for LA-02

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	LA02-N01		LA02-N01		LA02-N22	
Sample Name									LA02-SL017A[18]		LA02-SL017B[18]		LA02-SL018	
Depth (m bgs[1])									2.06 - 2.21		1.96 - 2.06		1.16 - 1.31	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	8,450[15]		280[16]		38	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	0.12	3.66E-3			U	6.66E-4
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	7.43E-3 J	1.38E-3			2.68E-4 J	2.29E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.06 KB	4.61E-3			2.32E-4 KBJ	2.09E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	0.14 KB	2.75E-3			U	1.98E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	0.08 K	0.01			U	5.82E-4
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.08 K	9.37E-3			U	3.87E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.05 KB	8.76E-3			1.32E-3 BJ	3.95E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	0.02 KBJ	1.00E-2			U	4.12E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	1.08 B	3.02E-3			1.09E-3 BJ	1.91E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.02 KBJ	7.85E-3			U	3.70E-4
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.05 KBJ	7.35E-3			5.31E-4 BJ	2.12E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.62	2.82E-3			U	3.17E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	9.29E-3			U	4.25E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	0.76 B	1.70E-3			1.70E-3 BJ	3.99E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	2.50 B	4.24E-3			3.61E-3 BJ	1.92E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.18 B	7.24E-3			5.51E-4 BJ	2.09E-4
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	0.28				1.85E-3	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	4.05				5.81E-3	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	1.70				3.49E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	5.75				9.30E-3	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	29				0.02	
Sum Alkylated PAHs + Biphenyl[17]	NA	NA	NA	NA	NA	NA	NA	NA	225				0.09	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.45			U	0.40
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA			U	0.60	U	5.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA			U	0.60	U	5.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA			U	0.60	U	5.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA			U	1.80	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA			U	3.00	U	0.03
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.2	0.1	NA			U	0.60	U	5.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA			U	0.60	U	5.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA			U	1.20	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA			U	0.60	U	5.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA			U	0.60	U	5.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA			U	0.60	U	5.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA			U	0.60	U	5.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA			U	0.60	U	5.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA			U	0.60	U	5.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA			U	0.60	U	5.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA			U	60	U	0.55
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA			U	3.00	U	0.03
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA			U	3.00	U	0.03
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA			U	3.00	U	0.03
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA			U	3.00	U	0.03
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA			U	0.60	U	5.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA			U	1.20	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA			U	0.60	U	5.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA			U	0.60	U	5.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	1.20	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	1.20	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA			U	0.60	U	5.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	1.20	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA			3.60	0.60	U	5.50E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA			U	0.60	U	5.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA			U	0.60	U	5.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA			U	0.60	U	5.50E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA			U	0.60	U	5.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA			U	1.20	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	52,700	140			13,500	26
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.10	0.09			0.07 J	0.09
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	1.50	0.46			0.56	0.42
BARIUM	17	910	231	NA	NA	500	750	NA	401	0.18			75	0.17
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.86	0.09			0.28	0.09
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.11	0.09			0.12	0.09
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	2,860	46			4,820	8.50
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	23	0.46			12	0.42
COBALT	NA	NA	NA	NA	NA	50	40	NA	14	0.09			8.40	0.09
COPPER	4.30	69	28	NA	NA	63	63	NA	51	0.28			30	0.26
IRON	NA	NA	NA	NA	NA	NA	NA	NA	38,200	46			20,100	8.50
LEAD	2.10	15	7.05	80	100	100	100	NA	9.80	0.09			3.50	0.09
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	2,620	46			2,560	8.50
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	237	0.18			157	0.17
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.02 J	0.04			U	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	21	0.18			13	0.17
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	809	460			399	85
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.46			0.05 J	0.42
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.06 J	0.09			0.04 J	0.09
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	588	460			963	85
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.13	0.09			0.06 J	0.09
VANADIUM	40	171	93	NA	NA	130	130	NA	95	0.46			74	0.42
ZINC	16	134	49	NA	NA	200	200	NA	89	0.92			76	0.85
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	27,000	600			2,400	530

Table 5.2-1 Summary of Soil Results for LA-02

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	**RAOHE Agricultural Criteria Decreto 1215**	**TULSMA Residential Criteria Decreto 3516**	**TULSMA Agricultural Criteria Decreto 3516**	**Lago Agrio Judgment**	LA02-N28		LA02-N06A		LA02-N15A	
Sample Name									LA02-SL019		LA02-SL020		LA02-SL021	
Depth (m bgs^1)									0.40 - 0.55		3.55 - 3.70		2.05 - 2.20	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	2,500	2,500	500	100	2,400		1,768		6,440	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 J	9.03E-3	0.06 K	9.00E-4	0.17	4.71E-3
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	8.20E-3 KJ	2.63E-3	0.13 K	2.12E-3	U	2.92E-3
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 KBJ	0.01	0.01 KBJ	2.30E-3	0.05 KB	0.01
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	0.03 KBJ	0.02	0.04 KBJ	2.07E-3	0.21 B	3.51E-3
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	0.04	0.02 KJ	4.34E-3	0.08 K	0.01
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	0.02 J	2.97E-3	0.07	8.50E-3
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 BJ	0.03	9.43E-3 BJ	2.94E-3	0.04 BJ	8.59E-3
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	5.00E-3 KBJ	3.30E-3	0.01 BJ	9.09E-3
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.24 BJ	0.02	0.24 B	2.07E-3	0.97 B	3.63E-3
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	4.71E-3 BJ	3.84E-3	0.02 KBJ	0.01
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.02 BJ	0.01	0.02 BJ	1.12E-3	0.05 KB	5.44E-3
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.10 J	6.97E-3	0.25	2.56E-3	0.90	2.11E-3
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	3.10E-3	U	9.28E-3
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	0.02 BJ	9.90E-3	6.97E-3 BJ	1.41E-3	2.98 B	1.53E-3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.25 BJ	0.01	1.19 B	2.12E-3	3.90 B	0.01
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.04 BJ	0.01	0.05 B	1.11E-3	0.21 B	5.35E-3
Sum of 6 PAHs^3	NA	NA	NA	1	2	NA	2	NA	0.05		0.07		0.25	
LMW PAHs^4	NA	NA	NA	1	2	NA	2	NA	0.44		1.65		8.00	
HMW PAHs^5	NA	NA	NA	1	2	NA	2	NA	0.36		0.40		1.65	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	0.80		2.06		9.65	
Sum PAHs^7	NA	NA	NA	1	2	NA	2	NA	3.76		11		52	
Sum Alkylated PAHs + Biphenyl^{17}	NA	NA	NA	NA	NA	NA	NA	NA	37		82		310	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.41	U	0.44	U	0.49
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	7.00E-3	U	7.00E-3	U	0.50
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	7.00E-3	U	7.00E-3	2.80	0.50
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.02	17	
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.04	U	0.04	U	2.50
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.2	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	1.00
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	0.50
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.70	U	0.70	U	50
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	2.50
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	2.50
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	2.50
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.09	0.04	U	0.04	U	2.50
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	0.50
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.01	U	1.00
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	0.50
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	0.50
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	1.00
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	1.00
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	0.32 J	0.50
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	1.00
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	0.15	7.00E-3	0.20 J	0.50
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	0.50
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	0.50
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	1.50	0.50
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	0.50
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	1.00
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	25,700	140	40,200	170	45,200	39
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.07 J	0.09	0.08 J	0.11	0.18	0.13
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	1.00	0.47	1.00	0.56	1.30	0.64
BARIUM	17	910	231	NA	NA	500	750	NA	208	0.19	266	0.22	148	0.26
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.46	0.09	0.81	0.11	0.37	0.13
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.15	0.09	0.09 J	0.11	0.08 J	0.13
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,300	47	2,720	56	1,390	13
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	13	0.47	30	0.56	25	0.64
COBALT	NA	NA	NA	NA	NA	50	40	NA	12	0.09	19	0.11	15	0.13
COPPER	4.30	69	28	NA	NA	63	63	NA	35	0.28	56	0.33	30	0.39
IRON	NA	NA	NA	NA	NA	NA	NA	NA	29,800	47	39,400	56	32,000	13
LEAD	2.10	15	7.05	80	100	100	100	NA	6.90	0.09	8.20	0.11	13	0.13
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	3,160	47	3,280	56	3,120	13
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	227	0.19	451	0.22	534	0.26
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.09	0.04	9.00E-3 J	0.04	0.07	0.05
NICKEL	4.00	43	14	40	50	100	50	NA	14	0.19	25	0.22	15	0.26
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	480	470	838	560	731	130
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.47	0.07 J	0.56	0.18 J	0.64
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.06 J	0.09	0.08 J	0.11	0.03 J	0.13
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	916	470	344 J	560	127 J	130
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.10	0.09	0.15	0.11	0.14	0.13
VANADIUM	40	171	93	NA	NA	130	130	NA	85	0.47	101	0.56	84	0.64
ZINC	16	134	49	NA	NA	200	200	NA	48	0.94	72	1.10	55	1.30
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	14,000	500	5,900	580	18,000	620

Table 5.2-1 Summary of Soil Results for LA-02

NOTES

1. bgs = Below Ground Surface
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAH represents the sum of the detected concentrations of 6 PAH compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).
5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).
6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.
7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   B = analyte found in sample and the associated blank.
   K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   D = dilution data
10. NA - Not available
11. RL = Reporting Limit
12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
13. Sample arrived at laboratory outside of holding temperature due to transit delays.
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
15. Value represents sum of the detected concentrations of DRO, Heavy DRO, and Extended Range DRO.
16. Value represents TPH GRO only.
17. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.
18. LA02-SL017A and LA02-SL017B are co-located samples. Field crew collected VOC and TPH-GRO for LA02-SL017B and then remaining sample fell from sleeve; second boring was collected (co-located) for the remaining parameters in LA02-SL017A.

Table 5.2-2 Summary of Groundwater and Surface Water Results for LA-02

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Groundwater**							
Sample Location			LA02-N02 (MW01)		LA02-N12 (MW02)		LA02-N24 (MW03)		LA02-N20A (MW05)	
Sample Name			LA02-GW001 [15]		LA02-GW004		LA02-GW005		LA02-GW006	
Depth (ft / meter below TOC[1])			14.13 ft (4.31 m)		14.13 ft (4.31 m)		12.85 ft (3.92 m)		12.3 ft (3.75 m)	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.48		0.65		0.05		0.03	
Acenaphthene	NA	NA	2.45E-4 B	4.66E-7	7.27E-5 B	1.43E-6	2.14E-5 B	2.96E-7	3.38E-7 BJ	2.65E-7
Acenaphthylene	NA	2E-3	9.80E-7 KJ	3.38E-7	1.11E-4 KB	6.61E-7	2.15E-6 KBJ	2.23E-7	4.36E-7 BJ	1.69E-7
Anthracene	2.5E-3	NA	U	1.50E-5	U	6.51E-6	1.88E-6 KBJ	9.52E-7	1.74E-7 KBJ	1.28E-7
Benz[a]anthracene	2.5E-4	NA	U	2.00E-6	3.73E-6 KBJ	4.80E-7	6.22E-7 BJ	1.74E-7	1.12E-7 BJ	3.72E-8
Benzo[a]pyrene	2.6E-5	NA	U	5.52E-7	1.37E-6 KJ	7.60E-7	U	3.33E-7	U	1.02E-7
Benzo[b]fluoranthene	NA	NA	2.23E-6 J	3.64E-7	1.56E-6 KJ	5.38E-7	U	2.33E-7	U	7.23E-8
Benzo[ghi]perylene	2.5E-5	NA	9.69E-7 J	3.62E-7	9.02E-7 KBJ	8.89E-7	U	1.83E-7	U	1.30E-7
Benzo[j,k]fluoranthenes	2.6E-5	NA	U	4.36E-7	U	5.93E-7	U	2.57E-7	U	7.89E-8
Chrysene	2.6E-5	NA	4.08E-5 B	2.00E-6	3.17E-5 B	5.29E-7	3.35E-6 BJ	1.81E-7	3.82E-7 BJ	4.13E-8
Dibenz[a,h]anthracene	NA	NA	U	5.66E-7	4.32E-7 KBJ	4.02E-7	U	1.75E-7	U	1.43E-7
Fluoranthene	5E-4	NA	7.33E-6 B	2.45E-7	3.56E-6 BJ	2.15E-6	2.24E-6 BJ	2.98E-7	7.52E-7 BJ	8.17E-8
Fluorene	NA	NA	6.64E-4 BD	9.62E-7	1.84E-4 B	4.10E-6	1.04E-5 B	3.05E-7	5.14E-7 BJ	9.71E-8
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	U	3.78E-7	U	9.55E-7	U	1.89E-7	U	1.41E-7
Naphthalene	0.04	6E-3	3.65E-3 BD	5.23E-7	6.86E-4 B	1.46E-6	1.24E-5 B	3.81E-7	7.62E-6 B	2.00E-7
Phenanthrene	2.5E-3	NA	9.50E-4 BD	2.24E-6	4.80E-4 B	5.99E-6	4.43E-5 B	8.75E-7	2.25E-6 BJ	1.17E-7
Pyrene	NA	NA	2.59E-5 B	2.41E-7	1.44E-5 B	2.12E-6	4.28E-6 BJ	2.94E-7	9.23E-7 BJ	8.05E-8
Sum of 6 PAHs[3]	NA	3E-4	1.05E-5		7.39E-6		2.24E-6		7.52E-7	
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	5.59E-3		1.59E-3		1.03E-4		1.35E-5	
Sum PAHs[5]	NA	3E-4	0.02		8.02E-3		1.90E-4		2.08E-5	
Sum Alkylated PAHs + Biphenyl[14]	NA	NA	0.07		0.03		8.01E-4		4.54E-5	
Total Phenols by Method E420.1	1	0.001	5.60E-3	5.00E-3	1.90E-3 J	5.00E-3	2.20E-3 J	5.00E-3	U	5.00E-3
Total Phenols by Method SW8270	1	0.001	U	0.01	U	0.01	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOTAL XYLENES	0.035	NA	U	1.50E-3	U	1.50E-3	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	4.30E-4 J	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	2.10E-3	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	4.40E-4 J	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	0.12 J	0.30	1.04	0.30	0.95	0.30	0.56	0.30
ANTIMONY	NA	0.02	6.00E-5 J	1.00E-3	2.10E-4 J	1.00E-3	1.60E-4 J	1.00E-3	1.90E-4 J	1.00E-3
ARSENIC	0.04	0.05	U	5.00E-3	2.40E-3 J	5.00E-3	U	5.00E-3	U	5.00E-3
BARIUM	0.34	1	0.31	2.00E-3	0.10	2.00E-3	0.17	2.00E-3	0.06	2.00E-3
BERYLLIUM	NA	0.1	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CADMIUM	0.0032	0.001	8.00E-5 J	1.00E-3	1.10E-4 J	1.00E-3	9.00E-5 J	1.00E-3	7.00E-5 J	1.00E-3
CALCIUM	NA	NA	13	0.10	14	0.10	19	0.10	8.28	0.10
CHROMIUM	0.02	0.05	1.30E-3 J	5.00E-3	1.30E-3 J	5.00E-3	1.30E-3 J	5.00E-3	1.10E-3 J	5.00E-3
COBALT	0.06	0.20	2.10E-3	1.00E-3	2.30E-3	1.00E-3	1.70E-3	1.00E-3	1.60E-3	1.00E-3
COPPER	0.05	0.02	1.00E-3 J	3.00E-3	1.90E-3 J	3.00E-3	2.20E-3 J	3.00E-3	1.80E-3 J	3.00E-3
IRON	NA	0.30	27	0.10	11	0.10	19	0.10	0.51	0.10
LEAD	0.05	NA	1.70E-4 J	1.00E-3	3.80E-4 J	1.00E-3	4.80E-4 J	1.00E-3	5.40E-4 J	1.00E-3
MAGNESIUM	NA	NA	9.19	0.10	11	0.10	9.75	0.10	3.64	0.10
MANGANESE	NA	0.10	1.39	2.00E-3	1.36	2.00E-3	1.21	2.00E-3	0.18	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4
NICKEL	0.05	0.03	2.50E-4 J	2.00E-3	6.70E-4 J	2.00E-3	8.00E-4 J	2.00E-3	1.40E-3 J	2.00E-3
POTASSIUM	NA	NA	3.63	1.00	3.61	1.00	4.09	1.00	1.28	1.00
SELENIUM	NA	0.01	1.30E-3 J	5.00E-3	5.50E-4 J	5.00E-3	U	5.00E-3	U	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	7.68	1.00	6.32	1.00	5.83	1.00	7.47	1.00
THALLIUM	NA	4E-4	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
VANADIUM	NA	0.10	1.00E-3 J	5.00E-3	2.90E-3 J	5.00E-3	2.40E-3 J	5.00E-3	2.40E-3 J	5.00E-3
ZINC	0.43	0.18	U	0.01	7.40E-3 J	0.01	6.50E-3 J	0.01	6.00E-3 J	0.01
Naphthenic Acid[6]	NA	NA	2.45		0.30		4E-3		3E-3	

Table 5.2-2 Summary of Groundwater and Surface Water Results for LA-02

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Surface Water**							
Sample Location			LA02-T03A		LA02-T02		LA02-T05A		LA02-T04A	
Sample Name			LA02-SW001		LA02-SW002		LA02-SW003		LA02-SW005	
Depth (ft / meter below TOC[1])			0.49 ft (0.15 m)		0.49 ft (0.15 m)		NA		NA	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.05		0.02		1.09		0.69	
Acenaphthene	NA	NA	1.46E-6 BJ	1.41E-7	1.55E-6 BJ	3.43E-7	6.91E-6 J	1.22E-6	2.85E-6 J	1.19E-6
Acenaphthylene	NA	2E-3	5.61E-7 J	1.64E-7	6.41E-7 J	2.19E-7	1.11E-5 J	6.16E-7	1.29E-5 J	6.43E-7
Anthracene	2.5E-3	NA	U	1.38E-7	U	1.24E-7	3.95E-6 KBJ	4.15E-7	2.80E-6 KBJ	1.28E-6
Benz[a]anthracene	2.5E-4	NA	U	1.80E-7	5.80E-8 KBJ	3.97E-8	2.26E-5 KBJ	6.05E-7	1.27E-5 KBJ	7.69E-7
Benzo[a]pyrene	2.6E-5	NA	U	2.75E-7	U	1.98E-7	2.23E-5 KJ	2.80E-6	7.29E-6 KJ	2.62E-6
Benzo[b]fluoranthene	NA	NA	2.83E-7 J	1.70E-7	U	1.27E-7	1.66E-5 KJ	1.85E-6	1.16E-5 KJ	1.72E-6
Benzo[ghi]perylene	2.5E-5	NA	3.90E-7 KJ	1.69E-7	U	2.03E-7	1.67E-5 BJ	2.74E-6	1.17E-5 KBJ	1.43E-6
Benzo[j,k]fluoranthenes	2.6E-5	NA	U	2.07E-7	U	1.50E-7	3.97E-6 J	2.12E-6	4.32E-6 J	2.01E-6
Chrysene	2.6E-5	NA	1.43E-6 BJ	1.54E-7	1.10E-7 BJ	4.07E-8	1.39E-4 B	7.91E-7	8.23E-5 B	7.72E-7
Dibenz[a,h]anthracene	NA	NA	U	1.71E-7	U	1.28E-7	5.66E-6 KJ	3.88E-6	4.76E-6 J	1.54E-6
Fluoranthene	5E-4	NA	6.93E-7 BJ	6.92E-8	3.48E-7 BJ	5.40E-8	7.54E-6 BJ	7.95E-7	8.11E-6 BJ	4.92E-7
Fluorene	NA	NA	1.43E-6 BJ	8.22E-8	9.95E-7 BJ	1.25E-7	5.14E-6 BJ	3.42E-7	2.59E-6 BJ	7.62E-7
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	4.09E-7 KJ	1.61E-7	2.58E-7 J	1.89E-7	U	2.98E-6	2.48E-6 KBJ	1.59E-6
Naphthalene	0.04	6E-3	3.07E-5 B	2.36E-7	2.86E-5 B	3.27E-7	5.31E-5 B	4.18E-6	3.47E-6 BJ	1.44E-6
Phenanthrene	2.5E-3	NA	1.91E-6 KBJ	1.30E-7	2.02E-6 BJ	1.16E-7	1.56E-5 BJ	3.82E-7	1.27E-5 BJ	1.18E-6
Pyrene	NA	NA	8.51E-7 BJ	6.80E-8	3.91E-7 BJ	5.31E-8	2.30E-5 BJ	7.83E-7	1.55E-5 BJ	4.84E-7
Sum of 6 PAHs[3]	NA	3E-4	1.78E-6		6.06E-7		6.71E-5	1.33E-5	4.55E-5	9.86E-6
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	4.01E-5		3.50E-5		3.53E-4	2.65E-5	1.98E-4	1.99E-5
Sum PAHs[5]	NA	3E-4	5.37E-5		4.90E-5		5.38E-4	3.82E-5	3.32E-4	3.03E-5
Sum Alkylated PAHs + Biphenyl[14]	NA	NA	1.15E-4		4.28E-5		8.70E-3	1.66E-5	3.64E-3	1.71E-5
Total Phenols by Method E420.1	1	0.001	2.10E-3 J	5.00E-3	2.70E-3 J	5.10E-3	2.50E-3 J	5.00E-3	2.50E-3 J	5.00E-3
Total Phenols by Method SW8270	1	0.001	U	0.01	U	0.01	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	U	5.00E-4	6.00E-4	5.00E-4	2.40E-3	5.00E-4
TOTAL XYLENES	0.035	NA	U	1.50E-3	U	1.50E-3	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	2.20E-3 J	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	0.01	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	0.70	0.30	0.15 J	0.30	0.54	0.30	1.64	0.30
ANTIMONY	NA	0.02	1.10E-4 J	1.00E-3	U	1.00E-3	1.40E-4 J	1.00E-3	4.40E-4 J	1.00E-3
ARSENIC	0.04	0.05	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
BARIUM	0.34	1	0.07	2.00E-3	0.02	2.00E-3	0.09	2.00E-3	0.26	2.00E-3
BERYLLIUM	NA	0.1	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CADMIUM	0.0032	0.001	9.00E-5 J	1.00E-3	8.00E-5 J	1.00E-3	5.00E-5 J	1.00E-3	6.00E-5 J	1.00E-3
CALCIUM	NA	NA	4.97	0.10	5.26	0.10	12	0.10	8.94	0.10
CHROMIUM	0.02	0.05	1.80E-3 J	5.00E-3	1.40E-3 J	5.00E-3	1.00E-3 J	5.00E-3	1.40E-3 J	5.00E-3
COBALT	0.06	0.20	7.00E-4 J	1.00E-3	3.80E-4 J	1.00E-3	3.40E-3	1.00E-3	2.00E-3	1.00E-3
COPPER	0.05	0.02	2.40E-3 J	3.00E-3	2.30E-3 J	3.00E-3	1.70E-3 J	3.00E-3	6.20E-3	3.00E-3
IRON	NA	0.30	2.12	0.10	1.30	0.10	10	0.10	7.25	0.10
LEAD	0.05	NA	4.50E-4 J	1.00E-3	1.00E-4 J	1.00E-3	6.00E-4 J	1.00E-3	2.30E-3	1.00E-3
MAGNESIUM	NA	NA	1.50	0.10	1.29	0.10	4.59	0.10	3.45	0.10
MANGANESE	NA	0.10	0.05	2.00E-3	0.03	2.00E-3	0.43	2.00E-3	0.31	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4
NICKEL	0.05	0.03	3.10E-4 J	2.00E-3	U	2.00E-3	7.90E-4 J	2.00E-3	1.10E-3 J	2.00E-3
POTASSIUM	NA	NA	3.60	1.00	2.75	1.00	4.74	1.00	4.61	1.00
SELENIUM	NA	0.01	U	5.00E-3	U	5.00E-3	3.60E-4 J	5.00E-3	U	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	1.84	1.00	1.96	1.00	4.81	1.00	4.60	1.00
THALLIUM	NA	4E-4	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
VANADIUM	NA	0.10	2.10E-3 J	5.00E-3	1.00E-3 J	5.00E-3	2.20E-3 J	5.00E-3	4.70E-3 J	5.00E-3
ZINC	0.43	0.18	5.20E-3 J	0.01	U	0.01	5.10E-3 J	0.01	0.01	0.01
Naphthenic Acid[6]	NA	NA	9E-3		2E-3		0.20		0.10	

Table 5.2-2 Summary of Groundwater and Surface Water Results for LA-02

NOTES

1. TOC = Top of the Casing
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D;however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.
5. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 4 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
6. Naphthenic acid represents the sum of 60 compounds as done by AXYS SOP MLA-077
7. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
8. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   B = analyte found in sample and the associated blank.
   K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   D = dilution data
9. NA - Not available
10. RL = Reporting Limit
11. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
12. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
13. GW and SW standard in bold represent sum of isomers
14. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.
15. Well has purging contraint and was not sampled using low flow sampling procedures.

Table 5.2-3 Summary of Sediment Results for LA-02

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	LA02-T05A		LA02-T04A		LA02-T02A		LA02-T03A		LA02-T05A	
Sample Name					LA02-SD001		LA02-SD002		LA02-SD004		LA02-SD006		LA02-SD007	
Depth (m bgs^1)					0.2 - 0.35		0.2 - 0.35		0.3 - 0.45		0.15 - 0.30		0.00 - 0.16	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	2,690		1,210		1,110		128		6,775	
Acenaphthene	NA	NA	NA	NA	0.02 J	8.58E-3	5.03E-3 J	4.41E-3	U	2.30E-3	U	6.15E-4	0.05 J	6.08E-3
Acenaphthylene	NA	NA	NA	NA	5.32E-3 KJ	4.94E-3	U	2.41E-3	U	1.65E-3	U	2.34E-4	6.58E-3 KJ	3.31E-3
Anthracene	NA	NA	NA	NA	U	0.08	U	0.02	U	9.84E-3	U	9.25E-4	U	0.09
Benz[a]anthracene	NA	NA	NA	NA	0.03 KBJ	0.03	U	7.76E-3	U	0.01	U	1.63E-3	0.10 KB	0.03
Benzo[a]pyrene	NA	NA	NA	NA	U	0.02	U	4.23E-3	U	0.01	U	3.03E-3	U	0.04
Benzo[b]fluoranthene	NA	NA	NA	NA	0.02 BJ	0.01	3.30E-3 BJ	2.22E-3	U	7.01E-3	U	2.15E-3	0.06 K	0.03
Benzo[ghi]perylene	NA	NA	NA	NA	U	0.01	3.46E-3 KBJ	3.36E-3	8.82E-3 J	4.39E-3	3.64E-3 KJ	1.63E-3	0.03 J	9.42E-3
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	U	0.02	U	2.66E-3	U	8.64E-3	U	2.28E-3	U	0.03
Chrysene	NA	NA	NA	NA	0.18 KB	0.04	0.04 B	0.01	0.06	0.01	0.02 B	1.56E-3	0.60 B	0.03
Dibenz[a,h]anthracene	NA	NA	NA	NA	U	8.15E-3	U	3.22E-3	U	4.80E-3	U	1.84E-3	U	0.02
Fluoranthene	NA	NA	NA	NA	U	0.06	9.56E-3 BJ	8.69E-3	U	6.33E-3	1.29E-3 BJ	7.55E-4	U	0.05
Fluorene	NA	NA	NA	NA	0.01 J	8.92E-3	0.01 J	5.45E-3	3.42E-3 KJ	1.48E-3	1.38E-3 KJ	3.46E-4	0.07	0.02
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	U	0.01	U	3.47E-3	U	4.27E-3	U	1.71E-3	U	0.01
Naphthalene	NA	NA	NA	NA	5.91E-3 KBJ	2.01E-3	6.71E-3 BJ	2.06E-3	8.65E-3 BJ	3.60E-3	3.22E-3 BJ	7.60E-4	6.39E-3 BJ	3.78E-3
Phenanthrene	NA	NA	NA	NA	0.08 KB	0.08	0.05 B	0.02	0.02 BJ	9.22E-3	8.21E-3 BJ	8.50E-4	0.36 B	0.08
Pyrene	NA	NA	NA	NA	0.09 B	0.06	0.04 BJ	8.55E-3	0.01 BJ	6.23E-3	3.45E-3 BJ	7.43E-4	0.18 B	0.05
Sum of 6 PAHs^3	NA	NA	NA	1.00	0.02		0.02		8.82E-3		4.93E-3		0.09	
LMW PAHs^4	NA	NA	NA	1.00	0.13		0.08		0.03		0.01		0.48	
HMW PAHs^5	NA	NA	NA	1.00	0.32		0.10		0.09		0.03		0.97	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1.00	0.45		0.18		0.12		0.04		1.45	
Sum PAHs^7	NA	NA	NA	1.00	1.43		1.74		0.82		0.72		4.68	
Sum Alkylated PAHs + Biphenyl^{15}	NA	NA	NA	NA	33		13		6.91		0.81		74	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	0.45	U	0.54	U	0.47	U	0.44	U	0.56
BENZENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
ETHYLBENZENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
TOLUENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
TOTAL XYLENES	NA	NA	NA	NA	U	0.02	U	0.02	U	1.26	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
CHLOROFORM	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	U	0.03	U	0.04	U	2.10	U	0.03	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	U	0.01	U	0.01	U	0.84	U	0.01	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	0.60	U	0.70	U	42	U	0.65	U	0.75
2-BUTANONE	NA	NA	NA	NA	0.06	0.03	0.03 J	0.04	U	2.10	U	0.03	U	0.04
2-HEXANONE	NA	NA	NA	NA	U	0.03	U	0.04	U	2.10	U	0.03	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	0.03	U	0.04	U	2.10	U	0.03	U	0.04
ACETONE	NA	NA	NA	NA	0.30	0.03	0.19	0.04	U	2.10	0.22	0.03	0.38	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
BROMOFORM	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
BROMOMETHANE	NA	NA	NA	NA	U	0.01	U	0.01	U	0.84	U	0.01	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	9.60E-3	6.00E-3	2.20E-3 J	7.00E-3	U	0.42	5.20E-3 J	6.50E-3	0.02	7.50E-3
CHLOROBENZENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
CHLOROETHANE	NA	NA	NA	NA	U	0.01	U	0.01	U	0.84	U	0.01	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.01	U	0.84	U	0.01	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
CYCLOHEXANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.01	U	0.84	U	0.01	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	2.30E-3 J	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	3.70E-3 J	7.50E-3
METHYL ACETATE	NA	NA	NA	NA	0.03	6.00E-3	U	7.00E-3	1.10	0.42	U	6.50E-3	U	7.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	0.08	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	0.11	7.50E-3
STYRENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	6.00E-3	U	7.00E-3	U	0.42	U	6.50E-3	U	7.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.01	U	0.84	U	0.01	U	0.02
ALUMINUM	NA	NA	NA	NA	14,300	38	17,500	34	16,800	28	17,800	35	13,300	42
ANTIMONY	NA	NA	NA	NA	0.05 J	0.12	0.05 J	0.11	0.09 J	0.09	0.07 J	0.12	0.04 J	0.14
ARSENIC	NA	NA	NA	NA	0.50 J	0.63	0.73	0.57	1.00	0.47	0.91	0.58	0.80	0.70
BARIUM	17	910	231	NA	418	0.25	5,460	4.60	5,120	3.70	2,200	1.20	972	0.56
BERYLLIUM	NA	NA	NA	NA	0.18	0.12	0.27	0.11	0.32	0.09	0.33	0.12	0.21	0.14
CADMIUM	0.07	0.29	0.16	1	0.11 J	0.12	0.18	0.11	0.24	0.09	0.15	0.12	0.14	0.14
CALCIUM	NA	NA	NA	NA	5,560	12	5,580	11	5,310	9.30	4,140	12	4,560	14
CHROMIUM	5.10	98	22	NA	17	0.63	23	0.57	18	0.47	13	0.58	19	0.70
COBALT	NA	NA	NA	NA	10	0.12	8.60	0.11	9.90	0.09	9.80	0.12	9.40	0.14
COPPER	4.30	69	28	NA	28	0.38	28	0.34	24	0.28	31	0.35	27	0.42
IRON	NA	NA	NA	NA	21,600	12	19,300	11	21,600	9.30	17,700	12	19,100	14
LEAD	2.10	15	7.05	80	28	0.12	19	0.11	5.90	0.09	5.30	0.12	41	0.14
MAGNESIUM	NA	NA	NA	NA	3,500	12	2,500	11	2,500	9.30	2,250	12	2,720	14
MANGANESE	NA	NA	NA	NA	191	0.25	183	0.23	170	0.19	144	0.23	175	0.28
MERCURY	7.10E-3	0.27	0.11	NA	7.00E-3 J	0.04	0.02 J	0.04	0.02 J	0.04	0.01 J	0.04	0.01 J	0.05
NICKEL	4.00	43	14	40	13	0.25	11	0.23	14	0.19	13	0.23	12	0.28
POTASSIUM	NA	NA	NA	NA	383	120	484	110	807	93	597	120	365	140
SELENIUM	NA	NA	NA	NA	U	0.63	U	0.57	U	0.47	U	0.58	U	0.70
SILVER	NA	NA	NA	NA	0.03 J	0.12	0.04 J	0.11	0.04 J	0.09	0.04 J	0.12	0.03 J	0.14
SODIUM	NA	NA	NA	NA	1,170	120	1,160	110	1,050	93	854	120	886	140
THALLIUM	NA	NA	NA	NA	0.05 J	0.12	0.08 J	0.11	0.11	0.09	0.09 J	0.12	0.06 J	0.14
VANADIUM	40	171	93	NA	84	0.63	66	0.57	81	0.47	65	0.58	69	0.70
ZINC	16	134	49	NA	50	1.20	54	1.10	55	0.93	44	1.20	51	1.40
TOTAL ORGANIC CARBON	NA	NA	NA	NA	41,000	580	6,500	660	30,000	570	22,000	580	49,000	770

Table 5.2-3 Summary of Sediment Results for LA-02

NOTES

1. bgs = Below Ground Surface
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAH compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene,
4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).
5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).
6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.
7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   B = analyte found in sample and the associated blank.
   K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   D = dilution data
10. NA - Not available
11. RL = Reporting Limit
12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: yellow - exceeds RAOHE sensitive ecosytem criteria.
13. Sample arrived at laboratory outside of holding temperature due to transit delays.
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Table 5.3-1 Summary of Soil Results for AG-02

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	AG02-N11	
Sample Name									AG02-SL001	
Depth (m bgs[1])									0.85 - 1.11	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	33	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.10E-3
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	9.44E-4 J	6.29E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	1.18E-3 KBJ	7.42E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	1.03E-3 BJ	4.34E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	1.57E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.13E-3
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	1.93E-3 KBJ	7.04E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	1.24E-3
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	2.03E-3 BJ	4.30E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	1.36E-3 KBJ	8.46E-4
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	1.35E-3 BJ	2.91E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	7.39E-4 J	4.70E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	1.65E-3 KBJ	7.36E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	3.09E-3 BJ	8.10E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	2.61E-3 BJ	6.83E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	1.65E-3 BJ	2.87E-4
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	4.93E-3	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	8.56E-3	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	0.01	
Sum of 16 PAHs[6] (EPA High Priority PAH Compo	NA	NA	NA	1	2	NA	2	NA	0.02	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	0.03	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	0.18	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.41
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	6.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	6.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	6.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.2	0.1	NA	U	6.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	6.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.60
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.04	0.03
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	17,000	34
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.91	0.11
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	4.70	0.57
BARIUM	17	910	231	NA	NA	500	750	NA	217	0.23
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.90	0.11
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	1.20	0.11
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,750	11
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	24	0.57
COBALT	NA	NA	NA	NA	NA	50	40	NA	10	0.11
COPPER	4.30	69	28	NA	NA	63	63	NA	22	0.34
IRON	NA	NA	NA	NA	NA	NA	NA	NA	24,200	11
LEAD	2.10	15	7.05	80	100	100	100	NA	19	0.11
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	2,790	11
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	393	0.23
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.03 J	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	31	0.23
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	727	110
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	0.50 J	0.57
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.03 J	0.11
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	66 J	110
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.16	0.11
VANADIUM	40	171	93	NA	NA	130	130	NA	57	0.57
ZINC	16	134	49	NA	NA	200	200	NA	140	1.10
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	4,200	520

Table 5.3-1 Summary of Soil Results for AG-02

NOTES

1. bgs = Below Ground Surface
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).
5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).
6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.
7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data
10. NA - Not available
11. RL = Reporting Limit
12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
13. Sample arrived at laboratory outside of holding temperature due to transit delays.
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Table 5.3-2 Summary of Sediment Results for AG-02

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	AG02-T04		AG02-N09	
Sample Name					AG02-SD001		AG02-SD002	
Depth (m bgs[1])					0.05 - 0.20		0.02 - 0.17	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	51		31,310	
Acenaphthene	NA	NA	NA	NA	3.56E-3 J	8.38E-4	0.36 D	5.70E-3
Acenaphthylene	NA	NA	NA	NA	8.50E-4 KJ	7.11E-4	UD	0.01
Anthracene	NA	NA	NA	NA	4.36E-3 BJ	1.16E-3	0.09 KBD	0.03
Benz[a]anthracene	NA	NA	NA	NA	4.21E-3 BJ	7.66E-4	0.56 KBD	0.04
Benzo[a]pyrene	NA	NA	NA	NA	4.62E-3 J	1.39E-3	0.39 D	0.05
Benzo[b]fluoranthene	NA	NA	NA	NA	1.38E-3 KJ	9.46E-4	0.50 D	0.03
Benzo[ghi]perylene	NA	NA	NA	NA	6.43E-3 BJ	3.90E-4	1.06 BD	0.04
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	1.27E-3 BJ	1.05E-3	0.08 KBD	0.04
Chrysene	NA	NA	NA	NA	8.15E-3 BJ	8.11E-4	4.07 BD	0.05
Dibenz[a,h]anthracene	NA	NA	NA	NA	U	1.81E-3	0.15 BD	0.04
Fluoranthene	NA	NA	NA	NA	4.10E-3 BJ	1.06E-4	0.20 BD	9.85E-3
Fluorene	NA	NA	NA	NA	0.01 J	7.40E-4	2.69 D	0.02
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	1.57E-3 KBJ	4.16E-4	0.08 BD	0.04
Naphthalene	NA	NA	NA	NA	0.02 BJ	1.42E-3	0.12 BD	0.02
Phenanthrene	NA	NA	NA	NA	0.03 BJ	1.07E-3	8.07 BD	0.03
Pyrene	NA	NA	NA	NA	9.21E-3 BJ	1.04E-4	1.07 BD	9.70E-3
Sum of 6 PAHs[3]	NA	NA	NA	1	0.02		2.31	
LMW PAHs[4]	NA	NA	NA	1	0.07		11	
HMW PAHs[5]	NA	NA	NA	1	0.04		8.15	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	0.11		19	
Sum PAHs[7]	NA	NA	NA	1	0.63		71	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	1.06		473	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	0.45	U	1.40
BENZENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
ETHYLBENZENE	NA	NA	NA	NA	U	7.00E-3	4.00E-3 J	0.01
TOLUENE	NA	NA	NA	NA	U	7.00E-3	0.05	0.01
TOTAL XYLENES	NA	NA	NA	NA	U	0.02	0.04	
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	7.00E-3	U	0.01
CHLOROFORM	NA	NA	NA	NA	U	7.00E-3	U	0.01
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
METHYLENE CHLORIDE	NA	NA	NA	NA	U	0.04	U	0.06
TETRACHLOROETHENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
TRICHLOROETHENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
VINYL CHLORIDE	NA	NA	NA	NA	U	0.01	U	0.03
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	0.70	U	1.20
2-BUTANONE	NA	NA	NA	NA	U	0.04	U	0.06
2-HEXANONE	NA	NA	NA	NA	U	0.04	U	0.06
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	0.04	U	0.06
ACETONE	NA	NA	NA	NA	0.09	0.04	0.96 B	0.06
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
BROMOFORM	NA	NA	NA	NA	U	7.00E-3	U	0.01
BROMOMETHANE	NA	NA	NA	NA	U	0.01	U	0.03
CARBON DISULFIDE	NA	NA	NA	NA	1.90E-3 J	7.00E-3	0.02	0.01
CHLOROBENZENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
CHLOROETHANE	NA	NA	NA	NA	U	0.01	U	0.03
CHLOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.03
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
CYCLOHEXANE	NA	NA	NA	NA	U	7.00E-3	0.16	0.01
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	7.00E-3	U	0.01
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.03
ISOPROPYLBENZENE	NA	NA	NA	NA	U	7.00E-3	0.46	0.01
METHYL ACETATE	NA	NA	NA	NA	U	7.00E-3	U	0.01
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	7.00E-3	U	0.01
METHYLCYCLOHEXANE	NA	NA	NA	NA	U	7.00E-3	0.69 E	0.01
STYRENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	7.00E-3	U	0.01
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.03
ALUMINUM	NA	NA	NA	NA	16,800	150	19,500	45
ANTIMONY	NA	NA	NA	NA	0.75	0.10	0.74	0.15
ARSENIC	NA	NA	NA	NA	5.20	0.51	3.70	0.76
BARIUM	17	910	231	NA	580	0.41	269	0.30
BERYLLIUM	NA	NA	NA	NA	0.74	0.10	0.83	0.15
CADMIUM	0.07	0.29	0.16	1	0.56	0.10	1.40	0.15
CALCIUM	NA	NA	NA	NA	1,900	51	1,580	15
CHROMIUM	5.10	98	22	NA	25	0.51	24	0.76
COBALT	NA	NA	NA	NA	11	0.10	10	0.15
COPPER	4.30	69	28	NA	22	0.31	25	0.45
IRON	NA	NA	NA	NA	32,800	51	23,200	15
LEAD	2.10	15	7.05	80	19	0.10	14	0.15
MAGNESIUM	NA	NA	NA	NA	3,020	51	2,480	15
MANGANESE	NA	NA	NA	NA	280	0.20	208	0.30
MERCURY	7.10E-3	0.27	0.11	NA	0.03 J	0.04	0.03 J	0.07
NICKEL	4.00	43	14	40	23	0.20	40	0.30
POTASSIUM	NA	NA	NA	NA	1,050	510	809	150
SELENIUM	NA	NA	NA	NA	0.38 J	0.51	0.62 J	0.76
SILVER	NA	NA	NA	NA	0.05 J	0.10	0.03 J	0.15
SODIUM	NA	NA	NA	NA	181 J	510	217	150
THALLIUM	NA	NA	NA	NA	0.16	0.10	0.21	0.15
VANADIUM	40	171	93	NA	67	0.51	72	0.76
ZINC	16	134	49	NA	103	1.00	140	1.50
TOTAL ORGANIC CARBON	NA	NA	NA	NA	12,000	580	150,000	910

Table 5.3-2 Summary of Sediment Results for AG-02

NOTES

1. bgs = Below Ground Surface
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and
4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).
5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes,
6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High
7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene,
8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this tabl
9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data
10. NA - Not available
11. RL = Reporting Limit
12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: yellow - exceeds RAOHE sensitive ecosytem criteria.
13. Sample arrived at laboratory outside of holding temperature due to transit delays.
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Table 5.4-1 Summary of Soil Results for GU-06

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	**RAOHE Agricultural Criteria Decreto 1215**	**TULSMA Residential Criteria Decreto 3516**	**TULSMA Agricultural Criteria Decreto 3516**	**Lago Agrio Judgment**	GU06-N13		GU06-N17		GU06-N06	
Sample Name									GU06-SL001		GU06-SL002		GU06-SL003	
Depth (m bgs^1)									1.3 - 1.45		2.11 - 2.26		0.04 - 0.19	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	2,500	2,500	500	100	71		787		17	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.66E-3	0.02 K	1.53E-3	U	1.02E-3
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.25E-3	U	1.55E-3	U	1.00E-3
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	4.98E-3	U	0.01	U	2.40E-3
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	U	8.34E-3	5.35E-3 KBJ	3.55E-3	7.21E-3 KBJ	3.98E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	1.11E-3	U	3.32E-3	U	1.37E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	9.83E-4	4.33E-3 KBJ	2.18E-3	U	6.98E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.11E-3	9.30E-3 BJ	1.52E-3	1.36E-3 KBJ	7.78E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	8.38E-4	U	2.59E-3	U	9.09E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	3.78E-3 BJ	7.30E-4	0.04 B	4.63E-3	1.18E-3 BJ	3.88E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	7.87E-4	U	1.72E-3	1.19E-3 KJ	1.04E-3
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	9.11E-4 KBJ	4.60E-4	6.91E-3 BJ	5.18E-3	1.05E-3 BJ	3.80E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	U	9.70E-4	0.08	2.57E-3	U	1.13E-3
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	1.34E-3 KBJ	7.31E-4	U	1.56E-3	3.41E-3 KBJ	7.85E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	3.48E-3 BJ	1.86E-3	0.02 B	6.26E-4	5.18E-3 BJ	1.27E-3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.01 BJ	8.15E-4	0.06 B	0.01	2.44E-3 BJ	5.34E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	U	2.04E-3	0.02 B	5.09E-3	1.35E-3 BJ	3.53E-4
Sum of 6 PAHs^3	NA	NA	NA	1.00	2	NA	2	NA	2.25E-3		0.02		5.82E-3	
LMW PAHs^4	NA	NA	NA	1.00	2	NA	2	NA	0.02		0.17		7.62E-3	
HMW PAHs^5	NA	NA	NA	1.00	2	NA	2	NA	6.03E-3		0.09		0.02	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1.00	2	NA	2	NA	0.02		0.26		0.02	
Sum PAHs^7	NA	NA	NA	1.00	2	NA	2	NA	0.08		1.72		0.03	
Sum Alkylated PAHs + Biphenyl^{15}	NA	NA	NA	NA	NA	NA	NA	NA	0.69		13		0.08	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.46	U	0.49	U	0.46
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	6.50E-3	6.90E-3 J	8.00E-3	U	8.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	1.40E-3 J	6.50E-3	U	8.00E-3	U	8.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03	U	0.04	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.20	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	6.50E-3	2.80E-3 J	8.00E-3	U	8.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.10	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.65	U	0.80	U	0.80
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	0.04 J	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.05	0.03	0.03 J	0.04	0.79	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.02	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	0.03	8.00E-3	7.30E-3 J	8.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	0.02	6.50E-3	U	8.00E-3	U	8.00E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	8.00E-3	5.50E-3 J	8.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.05	6.50E-3	0.02	8.00E-3	U	8.00E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	8.00E-3	U	8.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	32,600	32	23,500	33	37,800	33
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.68	0.11	0.58	0.11	0.18	0.11
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	3.40	0.54	3.90	0.55	2.20	0.55
BARIUM	17	910	231	NA	NA	500	750	NA	89	0.22	5,080	2.20	267	0.22
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.69	0.11	0.98	0.11	0.61	0.11
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.12	0.11	0.51	0.11	0.20	0.11
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	100	11	10,000	11	1,410	11
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	31	0.54	39	0.55	35	0.55
COBALT	NA	NA	NA	NA	NA	50	40	NA	10	0.11	16	0.11	12	0.11
COPPER	4.30	69	28	NA	NA	63	63	NA	27	0.32	24	0.33	25	0.33
IRON	NA	NA	NA	NA	NA	NA	NA	NA	42,100	22	31,800	22	41,700	22
LEAD	2.10	15	7.05	80	100	100	100	NA	16	0.11	29	0.11	9.50	0.11
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	3,870	22	5,710	22	1,640	22
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	426	0.22	467	0.22	406	0.22
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.06	0.04	0.02 J	0.05	0.09	0.05
NICKEL	4.00	43	14	40	50	100	50	NA	27	0.22	29	0.22	19	0.22
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	862	110	2,320	110	414	110
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.54	0.14 J	0.55	U	0.55
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.04 J	0.11	0.17	0.11	0.08 J	0.11
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	56 J	110	283	110	194	110
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.28	0.11	0.26	0.11	0.24	0.11
VANADIUM	40	171	93	NA	NA	130	130	NA	83	0.54	71	0.55	120	0.55
ZINC	16	134	49	NA	NA	200	200	NA	95	1.10	108	1.10	77	1.10
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	6,200	570	6,800	600	23,000	570

Table 5.4-1 Summary of Soil Results for GU-06

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	GU06-N18		GU06-N21		GU06-N04	
Sample Name									GU06-SL004		GU06-SL005 [13]		GU06-SL006 [13]	
Depth (m bgs[1])									1.21 - 1.36		1.8 - 1.95		3.1 - 3.25	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	1,075		U	28	79	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	0.05 J	0.02	6.41E-4 KJ	5.69E-4	6.51E-4 J	5.25E-4
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	6.94E-3	U	4.43E-4	6.59E-4 KJ	1.62E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	9.88E-4	U	9.08E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	2.66E-3 KBJ	1.30E-4	7.74E-4 KBJ	6.94E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	0.02	U	3.98E-4	U	8.28E-4
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	2.05E-4	7.92E-4 BJ	5.34E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.04 J	0.01	5.28E-4 KBJ	1.99E-4	1.95E-3 KBJ	7.11E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	3.18E-4	U	6.34E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.12 J	0.02	5.75E-4 BJ	1.33E-4	3.14E-3 BJ	7.18E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	3.34E-4	U	4.76E-4
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.02 BJ	0.01	3.50E-4 BJ	1.46E-4	U	7.00E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.15 J	0.01	U	3.35E-4	1.60E-3 J	4.16E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	0.01 KBJ	0.01	7.20E-4 KBJ	2.33E-4	U	6.77E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	0.03 KBJ	0.01	1.20E-3 BJ	4.75E-4	1.43E-3 BJ	4.23E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.55 B	0.02	9.80E-4 BJ	1.48E-4	0.01 B	8.51E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.04 BJ	0.01	5.02E-4 BJ	1.69E-4	1.02E-3 BJ	6.88E-4
Sum of 6 PAHs[3]	NA	NA	NA	1.00	2	NA	2	NA	0.07		1.60E-3		2.74E-3	
LMW PAHs[4]	NA	NA	NA	1.00	2	NA	2	NA	0.79		2.82E-3		0.02	
HMW PAHs[5]	NA	NA	NA	1.00	2	NA	2	NA	0.23		5.34E-3		7.68E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1.00	2	NA	2	NA	1.02		8.16E-3		0.03	
Sum PAHs[7]	NA	NA	NA	1.00	2	NA	2	NA	3.67		0.02		0.11	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	25		0.03		0.66	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.51	U	0.66	U	0.46
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	8.00E-3	U	0.01		
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	8.00E-3	U	0.01		
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	8.00E-3	U	0.01		
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.03		
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.04	U	0.06		
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.20	0.1	NA	U	8.00E-3	U	0.01		
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	8.00E-3	U	0.01		
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02		
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.00E-3	U	0.01		
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.00E-3	U	0.01		
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.00E-3	U	0.01		
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.10	NA	U	8.00E-3	U	0.01		
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.00E-3	U	0.01		
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.00E-3	U	0.01		
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.00E-3	U	0.01		
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.00E-3	U	0.01		
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.80	U	1.10		
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	0.01 J	0.06		
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.06		
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.06		
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.07	0.04	0.16	0.06		
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	8.00E-3	U	0.01		
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	0.02		
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	2.20E-3 J	8.00E-3	6.80E-3 J	0.01		
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.00E-3	U	0.01		
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02		
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02		
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.00E-3	U	0.01		
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02		
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	3.50E-3 J	8.00E-3	U	0.01		
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.00E-3	U	0.01		
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	8.00E-3	U	0.01		
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.21 J	0.50	U	0.01		
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.00E-3	U	0.01		
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02		
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	75,600	81	86,300	89	33,000	39
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.14 J	0.14	0.18	0.15	0.39	0.13
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	1.30	0.68	1.50	1.50	1.80	0.65
BARIUM	17	910	231	NA	NA	500	750	NA	328	0.27	476	0.30	133	0.26
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	1.20	0.14	0.85	0.15	0.39	0.13
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.16	0.14	0.16 J	0.74	0.21	0.13
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,960	14	4,000	15	1,850	13
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	56	0.68	54	3.70	28	0.65
COBALT	NA	NA	NA	NA	NA	50	40	NA	27	0.14	29	0.74	7.20	0.13
COPPER	4.30	69	28	NA	NA	63	63	NA	46	0.40	51	0.89	16	0.39
IRON	NA	NA	NA	NA	NA	NA	NA	NA	47,800	27	53,200	30	23,300	13
LEAD	2.10	15	7.05	80	100	100	100	NA	12	0.14	15	0.15	11	0.13
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	2,170	27	3,220	30	3,760	13
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	1,200	0.54	864	1.50	212	0.26
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.04 J	0.05	0.13	0.07	0.08	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	40	0.27	40	1.50	20	0.26
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	462	140	953	150	1,060	130
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	1.40	U	3.70	U	0.65
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.06 J	0.14	0.09 J	0.74	0.04 J	0.13
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	184	140	1,500	150	83 J	130
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.13 J	0.14	0.31	0.15	0.20	0.13
VANADIUM	40	171	93	NA	NA	130	130	NA	189	0.68	182	3.70	68	0.65
ZINC	16	134	49	NA	NA	200	200	NA	93	1.40	138	7.40	156	1.30
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	7,400	630	14,000	870	11,000	600

Table 5.4-1 Summary of Soil Results for GU-06

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	GU06-N07		GU06-N15	
Sample Name									GU06-SL007 [13]		GU06-SL009 [13]	
Depth (m bgs[1])									1.65 - 1.8		1.55 - 1.7	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	15		17	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	U	8.66E-4	U	1.14E-3
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	6.96E-4	U	5.32E-3
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.14E-3	U	7.76E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	1.96E-3 KBJ	5.58E-4	7.01E-4 KBJ	3.56E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	4.70E-3 BJ	1.70E-3	U	7.87E-4
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	2.15E-3 KJ	1.14E-3	U	5.19E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	7.46E-3 KJ	1.56E-3	1.20E-3 KJ	9.73E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	2.83E-3 KBJ	1.27E-3	U	5.68E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	4.03E-3 BJ	6.86E-4	1.79E-3 KBJ	4.25E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.66E-3	U	1.03E-3
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	2.95E-3 KBJ	2.74E-4	1.79E-3 BJ	4.08E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	U	7.83E-4	U	1.15E-3
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	3.47E-3 KBJ	1.77E-3	1.78E-3 KBJ	1.06E-3
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	2.41E-3 BJ	1.12E-3	2.11E-3 BJ	9.64E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	4.11E-3 BJ	1.19E-3	4.77E-3 BJ	8.09E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	3.84E-3 BJ	2.69E-4	1.25E-3 BJ	4.00E-4
Sum of 6 PAHs[3]	NA	NA	NA	1.00	2	NA	2	NA	0.02		4.77E-3	
LMW PAHs[4]	NA	NA	NA	1.00	2	NA	2	NA	6.52E-3		6.88E-3	
HMW PAHs[5]	NA	NA	NA	1.00	2	NA	2	NA	0.03		8.51E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1.00	2	NA	2	NA	0.04		0.02	
Sum PAHs[7]	NA	NA	NA	1.00	2	NA	2	NA	0.39		0.03	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	0.43		0.18	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.54	U	0.45
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	8.50E-3	U	6.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	8.50E-3	U	6.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	8.50E-3	U	6.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.03	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.04	U	0.03
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.20	0.1	NA	U	8.50E-3	U	6.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	8.50E-3	U	6.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	6.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	6.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	6.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.10	NA	U	8.50E-3	U	6.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	6.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	6.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	6.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	6.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.85	U	0.65
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	0.01 J	0.04	U	0.03
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.03
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.03
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.08	0.04	0.01 J	0.03
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	6.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	3.00E-3 J	8.50E-3	U	6.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	6.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	6.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	4.30E-3 J	6.50E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	6.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	6.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	6.50E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	6.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	52,500	47	45,700	35
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.06 J	0.16	0.34	0.12
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	1.20	0.78	1.30	0.58
BARIUM	17	910	231	NA	NA	500	750	NA	243	0.31	110	0.23
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.84	0.16	0.48	0.12
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.19	0.16	0.08 J	0.12
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	19,600	16	627	12
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	20	0.78	31	0.58
COBALT	NA	NA	NA	NA	NA	50	40	NA	24	0.16	7.00	0.12
COPPER	4.30	69	28	NA	NA	63	63	NA	128	0.47	19	0.35
IRON	NA	NA	NA	NA	NA	NA	NA	NA	37,600	16	28,500	12
LEAD	2.10	15	7.05	80	100	100	100	NA	8.40	0.16	11	0.12
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	5,930	16	4,930	12
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	621	0.31	142	0.23
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.02 J	0.05	0.06	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	25	0.31	26	0.23
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,220	160	1,060	120
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.78	U	0.58
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.14 J	0.16	0.04 J	0.12
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,710	160	55 J	120
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.17	0.16	0.21	0.12
VANADIUM	40	171	93	NA	NA	130	130	NA	140	0.78	72	0.58
ZINC	16	134	49	NA	NA	200	200	NA	78	1.60	77	1.20
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	7,700	660	3,200	550

Table 5.4-1 Summary of Soil Results for GU-06

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	GU06-N28		GU06-N29	
Sample Name									GU06-SL010 [13]		GU06-SL015	
Depth (m bgs[1])									0.28 - 0.43		0.85 - 1.00	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	466		7.40	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	0.01 KJ	1.10E-3	U	9.17E-4
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	0.01 K	5.54E-4	8.62E-4 J	7.19E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	7.46E-3 KJ	6.74E-3	8.34E-4 KBJ	3.92E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	4.35E-3 KBJ	2.73E-3	4.11E-4 BJ	2.33E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	3.15E-3	U	1.09E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	4.68E-3 BJ	2.06E-3	U	7.94E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	8.35E-3 BJ	1.28E-3	1.21E-3 KBJ	7.91E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	2.47E-3	U	8.46E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 B	2.77E-3	1.52E-3 BJ	2.45E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	9.88E-4 J	8.83E-4	U	1.05E-3
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	3.76E-3 KBJ	1.62E-3	7.85E-4 BJ	5.19E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.05	9.38E-4	U	7.10E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.33E-3	2.26E-3 KBJ	8.57E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	0.02 B	5.95E-4	3.10E-3 BJ	8.29E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.20 B	6.32E-3	2.62E-3 BJ	3.61E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.02 B	1.60E-3	5.82E-4 KBJ	5.11E-4
Sum of 6 PAHs[3]	NA	NA	NA	1.00	2	NA	2	NA	0.02		4.26E-3	
LMW PAHs[4]	NA	NA	NA	1.00	2	NA	2	NA	0.31		7.42E-3	
HMW PAHs[5]	NA	NA	NA	1.00	2	NA	2	NA	0.07		6.77E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1.00	2	NA	2	NA	0.38		0.01	
Sum PAHs[7]	NA	NA	NA	1.00	2	NA	2	NA	1.85		0.02	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	12		0.12	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.42	U	0.44
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	1.80E-3 J	6.50E-3	U	6.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	6.50E-3	U	6.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	6.50E-3	U	6.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03	U	0.03
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.20	0.1	NA	U	6.50E-3	U	6.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	6.50E-3	U	6.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.10	NA	U	6.50E-3	U	6.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.65	U	0.60
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	0.04	0.03
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	6.90E-3	6.50E-3	1.60E-3 J	6.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.03	6.50E-3	U	6.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	0.04	6.50E-3	U	6.00E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.38	U	6.00E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	34,400	25	22,200	130
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.67	0.08	0.63	0.09
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	2.80	0.84	2.50	0.44
BARIUM	17	910	231	NA	NA	500	750	NA	4,550	3.40	90	0.18
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.64	0.08	0.48	0.09
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.43	0.42	0.40	0.09
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,030	8.40	843	44
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	30	0.84	26	0.44
COBALT	NA	NA	NA	NA	NA	50	40	NA	12	0.42	8.50	0.09
COPPER	4.30	69	28	NA	NA	63	63	NA	26	0.50	22	0.26
IRON	NA	NA	NA	NA	NA	NA	NA	NA	31,400	17	27,000	44
LEAD	2.10	15	7.05	80	100	100	100	NA	25	0.08	11	0.09
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	5,080	17	2,760	44
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	391	3.40	305	0.18
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.07	0.03	0.06	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	26	0.34	21	0.18
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,980	84	785	440
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	2.10	0.34 J	0.44
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.08 J	0.42	0.03 J	0.09
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	198	84	50 J	440
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.21	0.08	0.16	0.09
VANADIUM	40	171	93	NA	NA	130	130	NA	63	0.84	62	0.44
ZINC	16	134	49	NA	NA	200	200	NA	106	1.70	87	0.88
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	9,000	520	3,200	570

Table 5.4-1 Summary of Soil Results for GU-06

NOTES

1. bgs = Below Ground Surface
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).
5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).
6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.
7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data
10. NA - Not available
11. RL = Reporting Limit
12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
13. Sample arrived at laboratory outside of holding temperature due to transit delays.
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.
16. Grey colored cell indicates analytes were not analyzed for the sample(s)

Table 5.4-2 Summary of Groundwater and Surface Water Results for GU-06

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Groundwater**					
Sample Location			GU06-N05 (MW01)		GU06-N16 (MW03)		GU06-N12 (MW04)	
Sample Name			GU06-GW003		GU06-GW004		GU06-GW005	
Depth (ft / meter below TOC[1])			12.3 ft (3.75 m)		9.58 ft (2.92 m)		11.32 ft (3.45 m)	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.09		0.03		1.74	
Acenaphthene	NA	NA	5.39E-5 B	9.37E-7	2.80E-6 BJ	2.35E-7	8.07E-5 B	3.75E-6
Acenaphthylene	NA	2E-3	2.28E-6 BJ	4.65E-7	3.78E-7 BJ	3.02E-7	2.60E-6 KBJ	2.06E-6
Anthracene	2.5E-3	NA	U	4.67E-6	U	9.01E-7	U	2.40E-5
Benz[a]anthracene	2.5E-4	NA	1.59E-6 KBJ	2.00E-7	U	2.65E-7	2.13E-5 KB	5.26E-6
Benzo[a]pyrene	2.6E-5	NA	7.93E-7 KJ	3.64E-7	U	3.60E-7	U	1.20E-5
Benzo[b]fluoranthene	NA	NA	1.32E-6 KJ	2.53E-7	2.76E-7 KJ	2.60E-7	2.13E-5 K	8.64E-6
Benzo[ghi]perylene	2.5E-5	NA	1.43E-6 BJ	2.29E-7	5.17E-7 BJ	3.46E-7	3.83E-5 B	4.32E-6
Benzo[j,k]fluoranthenes	2.6E-5	NA	3.38E-7 KJ	2.76E-7	U	2.77E-7	U	9.63E-6
Chrysene	2.6E-5	NA	1.18E-5 B	2.29E-7	4.96E-6 BJ	2.92E-7	1.45E-4 B	5.87E-6
Dibenz[a,h]anthracene	NA	NA	U	1.99E-7	U	2.60E-7	3.33E-6 BJ	3.15E-6
Fluoranthene	5E-4	NA	4.21E-6 BJ	2.09E-6	7.21E-7 BJ	1.96E-7	1.46E-5 B	1.05E-5
Fluorene	NA	NA	7.60E-5 B	4.35E-7	6.68E-6 B	3.06E-7	2.49E-4 B	5.97E-6
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	U	2.44E-7	U	3.51E-7	U	4.72E-6
Naphthalene	0.04	6E-3	9.45E-5 B	5.86E-7	2.67E-5 B	4.58E-7	4.62E-4 B	1.01E-6
Phenanthrene	2.5E-3	NA	5.32E-5 B	4.29E-6	9.36E-6 B	8.29E-7	2.28E-4 B	2.21E-5
Pyrene	NA	NA	1.17E-5 B	2.06E-6	3.54E-6 BJ	1.93E-7	4.92E-5 B	1.04E-5
Sum of 6 PAHs[3]	NA	3E-4	8.09E-6		1.51E-6		7.42E-5	
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	3.13E-4		5.59E-5		1.32E-3	
Sum PAHs[5]	NA	3E-4	1.02E-3		1.58E-4		4.82E-3	
Sum Alkylated PAHs + Biphenyl[14]	NA	NA	5.31E-3		6.95E-4		0.03	
Total Phenols by Method E420.1	1	0.001	2.00E-3 J	5.00E-3	U	5.00E-3	2.50E-3 J	5.00E-3
Total Phenols by Method SW8270	1	0.001	U	0.01	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4	7.20E-4	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4	3.50E-4 J	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOTAL XYLENES	0.035	NA	U	1.50E-3	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	5.60E-4 J	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3	3.90E-4 J	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	7.90E-4 J	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	0.23 J	0.30	0.03 J	0.30	0.51	0.30
ANTIMONY	NA	0.02	1.90E-4 J	1.00E-3	2.20E-4 J	1.00E-3	2.30E-4 J	1.00E-3
ARSENIC	0.04	0.05	U	5.00E-3	U	5.00E-3	6.10E-3	5.00E-3
BARIUM	0.34	1	0.07	2.00E-3	0.09	2.00E-3	0.23	2.00E-3
BERYLLIUM	NA	0.1	U	1.00E-3	U	1.00E-3	1.10E-4 J	1.00E-3
CADMIUM	0.0032	0.001	1.00E-4 J	1.00E-3	6.00E-5 J	1.00E-3	3.50E-4 J	1.00E-3
CALCIUM	NA	NA	9.28	0.10	0.79	0.10	5.84	0.10
CHROMIUM	0.02	0.05	8.20E-4 J	5.00E-3	6.40E-4 J	5.00E-3	1.40E-3 J	5.00E-3
COBALT	0.06	0.20	2.40E-3	1.00E-3	8.90E-4 J	1.00E-3	7.90E-3	1.00E-3
COPPER	0.05	0.02	1.60E-3 J	3.00E-3	7.40E-4 J	3.00E-3	4.30E-3	3.00E-3
IRON	NA	0.30	4.92	0.10	0.28	0.10	17	0.10
LEAD	0.05	NA	3.10E-4 J	1.00E-3	1.70E-4 J	1.00E-3	3.50E-3	1.00E-3
MAGNESIUM	NA	NA	1.67	0.10	0.18	0.10	1.32	0.10
MANGANESE	NA	0.10	0.38	2.00E-3	0.13	2.00E-3	1.51	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4	1.00E-5 J	2.00E-4
NICKEL	0.05	0.03	1.40E-3 J	2.00E-3	9.10E-4 J	2.00E-3	2.40E-3	2.00E-3
POTASSIUM	NA	NA	1.14	1.00	0.13 J	1.00	1.16	1.00
SELENIUM	NA	0.01	U	5.00E-3	U	5.00E-3	U	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	3.47	1.00	4.49	1.00	3.19	1.00
THALLIUM	NA	4E-4	U	1.00E-3	U	1.00E-3	6.00E-5 J	1.00E-3
VANADIUM	NA	0.10	2.20E-3 J	5.00E-3	7.80E-4 J	5.00E-3	4.60E-3 J	5.00E-3
ZINC	0.43	0.18	4.60E-3 J	0.01	9.60E-3 J	0.01	0.02	0.01
Naphthenic Acid[6]	NA	NA	0.02		7E-3		0.03	

Table 5.4-2 Summary of Groundwater and Surface Water Results for GU-06

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Surface Water**					
Sample Location			GU06-T02		GU06-T08		GU06-T10	
Sample Name			GU06-SW001		GU06-SW002		GU06-SW004	
Depth (ft / meter below TOC[1])			0.49 ft (0.15 m)		0.49 ft (0.15 m)		NA	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.02		0.15		0.02	
Acenaphthene	NA	NA	1.05E-6 BJ	4.62E-7	1.12E-6 BJ	2.93E-7	U	2.14E-7
Acenaphthylene	NA	2E-3	5.05E-7 J	2.33E-7	4.20E-7 KJ	2.53E-7	1.74E-7 KBJ	1.12E-7
Anthracene	2.5E-3	NA	U	1.30E-7	U	4.00E-7	5.63E-7 BJ	6.04E-8
Benz[a]anthracene	2.5E-4	NA	U	2.00E-7	5.98E-7 KBJ	1.27E-7	5.71E-7 KBJ	4.03E-8
Benzo[a]pyrene	2.6E-5	NA	U	1.83E-7	U	4.00E-7	9.83E-7 J	1.61E-7
Benzo[b]fluoranthene	NA	NA	U	1.10E-7	8.72E-7 J	4.00E-7	6.83E-7 KJ	8.70E-8
Benzo[ghi]perylene	2.5E-5	NA	1.85E-7 KJ	9.02E-8	2.01E-6 J	2.14E-7	1.17E-6 BJ	6.53E-8
Benzo[j,k]fluoranthenes	2.6E-5	NA	U	1.31E-7	U	4.00E-7	4.51E-7 J	9.15E-8
Chrysene	2.6E-5	NA	4.15E-7 BJ	1.00E-7	2.71E-6 BJ	1.36E-7	8.53E-7 BJ	4.41E-8
Dibenz[a,h]anthracene	NA	NA	U	1.62E-7	U	2.00E-7	U	9.56E-8
Fluoranthene	5E-4	NA	3.06E-7 BJ	4.59E-8	1.09E-6 BJ	1.62E-7	5.18E-6 BJ	7.89E-8
Fluorene	NA	NA	6.56E-7 BJ	9.44E-8	8.73E-7 BJ	2.24E-7	6.22E-7 BJ	1.34E-7
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	3.45E-7 KJ	8.44E-8	3.70E-7 KJ	2.12E-7	1.01E-6 KBJ	6.90E-8
Naphthalene	0.04	6E-3	2.30E-5 B	2.14E-7	3.02E-5 B	3.85E-7	3.13E-6 BJ	2.99E-7
Phenanthrene	2.5E-3	NA	2.13E-6 KBJ	1.22E-7	2.92E-6 BJ	4.00E-7	9.30E-6 B	5.56E-8
Pyrene	NA	NA	5.40E-7 BJ	4.52E-8	1.65E-6 BJ	1.60E-7	5.78E-6 B	7.77E-8
Sum of 6 PAHs[3]	NA	3E-4	8.36E-7		4.34E-6		9.48E-6	5.53E-7
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	2.91E-5		4.48E-5		3.05E-5	1.69E-6
Sum PAHs[5]	NA	3E-4	4.11E-5		7.70E-5		3.52E-5	2.50E-6
Sum Alkylated PAHs + Biphenyl[14]	NA	NA	5.01E-5		3.08E-4		2.57E-5	1.17E-6
Total Phenols by Method E420.1	1	0.001	3.50E-3 J	5.10E-3	0.01	5.00E-3	U	5.00E-3
Total Phenols by Method SW8270	1	0.001	U	0.01	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	8.10E-4	5.00E-4	U	5.00E-4
TOTAL XYLENES	0.035	NA	U	1.50E-3	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	5.20E-3	5.00E-3	U	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	0.09 J	0.30	4.33	0.30	0.84	0.30
ANTIMONY	NA	0.02	U	1.00E-3	1.70E-4 J	1.00E-3	1.90E-4 J	1.00E-3
ARSENIC	0.04	0.05	U	5.00E-3	U	5.00E-3	U	5.00E-3
BARIUM	0.34	1	0.04	2.00E-3	0.31	2.00E-3	0.03	2.00E-3
BERYLLIUM	NA	0.1	U	1.00E-3	1.30E-4 J	1.00E-3	9.00E-5 J	1.00E-3
CADMIUM	0.0032	0.001	7.00E-5 J	1.00E-3	2.20E-4 J	1.00E-3	2.30E-4 J	1.00E-3
CALCIUM	NA	NA	5.06	0.10	12	0.10	1.38	0.10
CHROMIUM	0.02	0.05	1.20E-3 J	5.00E-3	5.40E-3	5.00E-3	1.80E-3 J	5.00E-3
COBALT	0.06	0.20	4.60E-4 J	1.00E-3	3.60E-3	1.00E-3	8.20E-4 J	1.00E-3
COPPER	0.05	0.02	8.70E-4 J	3.00E-3	5.30E-3	3.00E-3	1.90E-3 J	3.00E-3
IRON	NA	0.30	1.55	0.10	9.87	0.10	0.46	0.10
LEAD	0.05	NA	2.00E-4 J	1.00E-3	2.80E-3	1.00E-3	4.00E-4 J	1.00E-3
MAGNESIUM	NA	NA	1.47	0.10	2.38	0.10	0.48	0.10
MANGANESE	NA	0.10	0.08	2.00E-3	0.81	2.00E-3	0.03	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4
NICKEL	0.05	0.03	U	2.00E-3	4.50E-3	2.00E-3	1.20E-3 J	2.00E-3
POTASSIUM	NA	NA	0.96 J	1.00	1.77	1.00	0.41 J	1.00
SELENIUM	NA	0.01	3.10E-4 J	5.00E-3	1.80E-3 J	5.00E-3	4.60E-4 J	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	2.30	1.00	1.92	1.00	1.58	1.00
THALLIUM	NA	4E-4	U	1.00E-3	U	1.00E-3	6.00E-5 J	1.00E-3
VANADIUM	NA	0.10	U	5.00E-3	9.10E-3	5.00E-3	2.20E-3 J	5.00E-3
ZINC	0.43	0.18	U	0.01	0.03	0.01	9.20E-3 J	0.01
Naphthenic Acid[6]	NA	NA	0.01		6E-3		1.0E-3	

Table 5.4-2 Summary of Groundwater and Surface Water Results for GU-06

1. TOC = Top of the Casing
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D;however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.
5. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 4 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
6. Naphthenic acid represents the sum of 60 compounds as done by AXYS SOP MLA-077
7. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
8. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   B = analyte found in sample and the associated blank.
   K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   D = dilution data
9. NA - Not available
10. RL = Reporting Limit
11. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
12. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
13. GW and SW standard in bold represent sum of isomers
14. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Table 5.4-3 Summary of Sediment Results for GU-06

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	GU06-T01		GU06-T08		GU06-T02	
Sample Name					**GU06-SD001**		**GU06-SD002**		**GU06-SD003** [13]	
Depth (m bgs[1])					0.05 - 0.2		0.02 - 0.17		0.5 - 0.65	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	151		3,180		30	
Acenaphthene	NA	NA	NA	NA	U	5.30E-4	4.80E-3 J	1.15E-3	U	7.41E-3
Acenaphthylene	NA	NA	NA	NA	U	3.66E-4	U	1.18E-3	U	4.94E-3
Anthracene	NA	NA	NA	NA	U	5.84E-4	0.01 KJ	7.07E-3	U	4.20E-3
Benz[a]anthracene	NA	NA	NA	NA	U	6.13E-4	0.04 B	0.02	U	3.80E-3
Benzo[a]pyrene	NA	NA	NA	NA	U	1.64E-3	0.02	8.56E-3	U	5.70E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	2.28E-3 J	1.03E-3	0.04	5.76E-3	U	3.65E-3
Benzo[ghi]perylene	NA	NA	NA	NA	7.31E-3 J	7.58E-4	0.11	7.66E-3	U	6.41E-3
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	U	1.21E-3	0.01 KJ	6.81E-3	U	4.37E-3
Chrysene	NA	NA	NA	NA	6.67E-3 J	8.06E-4	0.21	0.02	U	3.42E-3
Dibenz[a,h]anthracene	NA	NA	NA	NA	U	8.76E-4	9.01E-3 J	7.84E-3	U	0.01
Fluoranthene	NA	NA	NA	NA	7.32E-4 KBJ	5.06E-4	U	0.01	2.78E-3 BJ	2.53E-3
Fluorene	NA	NA	NA	NA	U	5.14E-4	9.96E-3 J	4.14E-3	U	4.00E-3
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	U	7.29E-4	U	8.10E-3	5.89E-3 KBJ	5.78E-3
Naphthalene	NA	NA	NA	NA	1.65E-3 BJ	9.26E-4	6.48E-3 BJ	1.10E-3	9.09E-3 KBJ	9.00E-3
Phenanthrene	NA	NA	NA	NA	1.63E-3 BJ	5.48E-4	0.03 KB	6.63E-3	3.27E-3 BJ	3.00E-3
Pyrene	NA	NA	NA	NA	2.38E-3 BJ	4.98E-4	0.09 B	0.01	U	2.49E-3
Sum of 6 PAHs[3]	NA	NA	NA	1.00	0.01		0.18		8.67E-3	
LMW PAHs[4]	NA	NA	NA	1.00	3.28E-3		0.06		0.01	
HMW PAHs[5]	NA	NA	NA	1.00	0.02		0.52		8.67E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1.00	0.02		0.58		0.02	
Sum PAHs[7]	NA	NA	NA	1.00	1.20		1.31		1.84	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	0.52		18		0.39	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	0.59	U	1.10	U	0.51
BENZENE	NA	NA	NA	NA	U	4.00E-3	5.50E-3 J	0.02	U	8.00E-3
ETHYLBENZENE	NA	NA	NA	NA	U	4.00E-3	2.80E-3 J	0.02	U	8.00E-3
TOLUENE	NA	NA	NA	NA	U	4.00E-3	7.40E-3 J	0.02	U	8.00E-3
TOTAL XYLENES	NA	NA	NA	NA	U	0.01	U	0.06	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
CHLOROFORM	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	U	0.02	U	0.10	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	U	7.90E-3	U	0.04	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	0.40	U	2.00	U	0.80
2-BUTANONE	NA	NA	NA	NA	8.70E-3 J	0.02	0.10	0.10	0.03 J	0.04
2-HEXANONE	NA	NA	NA	NA	U	0.02	U	0.10	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	0.02	U	0.10	U	0.04
ACETONE	NA	NA	NA	NA	0.08	0.02	0.71	0.10	0.25	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
BROMOFORM	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
BROMOMETHANE	NA	NA	NA	NA	U	7.90E-3	U	0.04	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	3.20E-3 J	4.00E-3	0.02 J	0.02	2.30E-3 J	8.00E-3
CHLOROBENZENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
CHLOROETHANE	NA	NA	NA	NA	U	7.90E-3	U	0.04	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	U	7.90E-3	U	0.04	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
CYCLOHEXANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	7.90E-3	U	0.04	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
METHYL ACETATE	NA	NA	NA	NA	0.03	4.00E-3	U	0.02	U	8.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
STYRENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	4.00E-3	U	0.02	U	8.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	7.90E-3	U	0.04	U	0.02
ALUMINUM	NA	NA	NA	NA	34,900	52	25,600	95	33,000	36
ANTIMONY	NA	NA	NA	NA	0.12 J	0.17	0.51	0.32	0.10 J	0.12
ARSENIC	NA	NA	NA	NA	1.30	0.87	4.00	1.60	0.89	0.60
BARIUM	17	910	231	NA	313	0.35	4,960	3.20	232	0.24
BERYLLIUM	NA	NA	NA	NA	0.78	0.17	0.86	0.32	0.58	0.12
CADMIUM	0.07	0.29	0.16	1	0.66	0.17	1.40	0.32	0.62	0.12
CALCIUM	NA	NA	NA	NA	2,610	17	7,690	32	2,860	12
CHROMIUM	5.10	98	22	NA	32	0.87	26	1.60	30	0.60
COBALT	NA	NA	NA	NA	12	0.17	13	0.32	9.70	0.12
COPPER	4.30	69	28	NA	26	0.52	34	0.95	25	0.36
IRON	NA	NA	NA	NA	22,700	17	28,100	32	19,800	12
LEAD	2.10	15	7.05	80	6.80	0.17	19	0.32	5.70	0.12
MAGNESIUM	NA	NA	NA	NA	1,830	17	5,220	32	1,580	12
MANGANESE	NA	NA	NA	NA	412	0.35	445	0.63	145	0.24
MERCURY	7.10E-3	0.27	0.11	NA	0.04 J	0.05	0.05 J	0.10	0.04 J	0.05
NICKEL	4.00	43	14	40	19	0.35	29	0.63	17	0.24
POTASSIUM	NA	NA	NA	NA	496	170	1,890	320	573	120
SELENIUM	NA	NA	NA	NA	U	0.87	U	1.60	U	0.60
SILVER	NA	NA	NA	NA	0.09 J	0.17	0.18 J	0.32	0.07 J	0.12
SODIUM	NA	NA	NA	NA	317	170	127 J	320	625	120
THALLIUM	NA	NA	NA	NA	0.12 J	0.17	0.24 J	0.32	0.10 J	0.12
VANADIUM	40	171	93	NA	82	0.87	59	1.60	79	0.60
ZINC	16	134	49	NA	77	1.70	134	3.20	75	1.20
TOTAL ORGANIC CARBON	NA	NA	NA	NA	46,000	740	120,000	1,400	U	630

Table 5.4-3 Summary of Sediment Results for GU-06

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	GU06-T09		GU06-T04		GU06-T01	
Sample Name					GU06-SD006 [13]		GU06-SD007 [13]		GU06-SD011 [13]	
Depth (m bgs[1])					0.3 - 0.45		0.42 - 0.57		0.00 - 0.10	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	7,140		3,880		207	
Acenaphthene	NA	NA	NA	NA	0.07	1.73E-3	0.04 D	2.75E-3	U	3.55E-4
Acenaphthylene	NA	NA	NA	NA	U	0.01	UD	4.27E-3	3.00E-3 BJ	3.34E-4
Anthracene	NA	NA	NA	NA	U	0.05	UD	0.03	U	7.80E-4
Benz[a]anthracene	NA	NA	NA	NA	0.15 KB	0.11	0.04 KBD	0.02	2.20E-3 KBJ	9.33E-4
Benzo[a]pyrene	NA	NA	NA	NA	0.08 KB	0.04	UD	0.02	3.74E-3 KJ	3.12E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	0.14	0.03	0.06 D	9.13E-3	5.53E-3 KJ	2.11E-3
Benzo[ghi]perylene	NA	NA	NA	NA	0.31	0.02	0.18 KD	0.02	0.03 B	2.55E-3
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	U	0.03	UD	0.01	3.09E-3 J	2.33E-3
Chrysene	NA	NA	NA	NA	0.88 KB	0.14	0.33 D	0.02	0.01 KBJ	1.20E-3
Dibenz[a,h]anthracene	NA	NA	NA	NA	0.03 J	0.03	9.85E-3 KDJ	7.85E-3	U	2.17E-3
Fluoranthene	NA	NA	NA	NA	U	0.13	UD	0.02	3.65E-3 BJ	6.82E-4
Fluorene	NA	NA	NA	NA	0.26	6.63E-3	0.09 D	2.71E-3	6.31E-4 J	1.90E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	U	0.03	UD	0.02	4.55E-3 BJ	2.72E-3
Naphthalene	NA	NA	NA	NA	9.00E-3 BJ	1.94E-3	7.14E-3 BDJ	4.15E-3	0.01 BJ	8.23E-4
Phenanthrene	NA	NA	NA	NA	0.94 B	0.05	0.07 BD	0.02	4.32E-3 BJ	7.17E-4
Pyrene	NA	NA	NA	NA	0.27 B	0.13	0.09 BD	0.02	6.39E-3 BJ	6.71E-4
Sum of 6 PAHs[3]	NA	NA	NA	1.00	0.54		0.24		0.05	
LMW PAHs[4]	NA	NA	NA	1.00	1.27		0.20		0.02	
HMW PAHs[5]	NA	NA	NA	1.00	1.87		0.71		0.08	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1.00	3.14		0.91		0.09	
Sum PAHs[7]	NA	NA	NA	1.00	11		5.30		0.48	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	100		43		0.34	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	0.65	U	0.90	U	0.68
BENZENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
ETHYLBENZENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
TOLUENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
TOTAL XYLENES	NA	NA	NA	NA	U	0.03	U	0.06	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
CHLOROFORM	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	U	0.05	U	0.10	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	U	0.02	U	0.04	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	1.00	U	2.00	U	0.75
2-BUTANONE	NA	NA	NA	NA	0.03 J	0.05	0.16	0.10	U	0.04
2-HEXANONE	NA	NA	NA	NA	U	0.05	U	0.10	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	0.05	U	0.10	U	0.04
ACETONE	NA	NA	NA	NA	0.24	0.05	1.00	0.10	0.22	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
BROMOFORM	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
BROMOMETHANE	NA	NA	NA	NA	U	0.02	U	0.04	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	4.00E-3 J	0.01	0.01 J	0.02	3.20E-3 J	7.50E-3
CHLOROBENZENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
CHLOROETHANE	NA	NA	NA	NA	U	0.02	U	0.04	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	U	0.02	U	0.04	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
CYCLOHEXANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	0.02	U	0.04	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	U	0.01	0.02	0.02	U	7.50E-3
METHYL ACETATE	NA	NA	NA	NA	U	0.01	0.21	0.02	U	7.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	5.60E-3 J	0.01	0.07	0.02	U	7.50E-3
STYRENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.01	U	0.02	U	7.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	0.02	U	0.04	U	0.02
ALUMINUM	NA	NA	NA	NA	48,600	59	31,200	91	23,500	94
ANTIMONY	NA	NA	NA	NA	1.00	0.20	0.24 J	0.30	0.17 J	0.31
ARSENIC	NA	NA	NA	NA	4.10	0.98	1.40 J	1.50	3.80	0.78
BARIUM	17	910	231	NA	217	0.39	969	0.61	312	0.31
BERYLLIUM	NA	NA	NA	NA	0.63	0.20	0.64	0.30	0.48	0.16
CADMIUM	0.07	0.29	0.16	1	0.36	0.20	0.78	0.30	0.34	0.16
CALCIUM	NA	NA	NA	NA	1,400	20	4,840	30	2,420	31
CHROMIUM	5.10	98	22	NA	34	0.98	30	1.50	20	0.78
COBALT	NA	NA	NA	NA	6.00	0.20	9.70	0.30	19	0.16
COPPER	4.30	69	28	NA	29	0.59	28	0.91	21	0.94
IRON	NA	NA	NA	NA	44,800	20	21,700	30	49,800	31
LEAD	2.10	15	7.05	80	22	0.20	8.70	0.30	7.30	0.31
MAGNESIUM	NA	NA	NA	NA	2,540	20	2,670	30	1,850	31
MANGANESE	NA	NA	NA	NA	237	0.39	332	0.61	823	0.62
MERCURY	7.10E-3	0.27	0.11	NA	0.10	0.06	0.07 J	0.10	0.05 J	0.06
NICKEL	4.00	43	14	40	25	0.39	20	0.61	15	0.31
POTASSIUM	NA	NA	NA	NA	1,810	200	998	300	425	310
SELENIUM	NA	NA	NA	NA	0.26 J	0.98	U	1.50	0.39 J	1.60
SILVER	NA	NA	NA	NA	0.07 J	0.20	0.07 J	0.30	0.05 J	0.31
SODIUM	NA	NA	NA	NA	128 J	200	693	300	367	310
THALLIUM	NA	NA	NA	NA	0.36	0.20	0.16 J	0.30	0.11 J	0.31
VANADIUM	40	171	93	NA	116	0.98	77	1.50	67	0.78
ZINC	16	134	49	NA	103	2.00	89	3.00	74	1.60
TOTAL ORGANIC CARBON	NA	NA	NA	NA	92,000	870	170,000	1,200	51,000	850

Table 5.4-3 Summary of Sediment Results for GU-06

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	GU06-T07A		GU06-T07		GU06-T06	
Sample Name					**GU06-SD012** [13]		**GU06-SD013** [13]		**GU06-SD014** [13]	
Depth (m bgs[1])					0.15 - 0.30		0.30 - 0.45		0.15 - 0.30	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	680		11,707		13,000	
Acenaphthene	NA	NA	NA	NA	U	1.34E-3	0.07 K	0.01	0.03 J	2.26E-3
Acenaphthylene	NA	NA	NA	NA	7.65E-3 BJ	1.24E-3	0.01 BJ	6.79E-3	0.01 BJ	1.88E-3
Anthracene	NA	NA	NA	NA	U	3.93E-3	U	0.07	U	0.08
Benz[a]anthracene	NA	NA	NA	NA	5.32E-3 KBJ	2.86E-3	0.10 KB	0.02	0.10 KB	0.07
Benzo[a]pyrene	NA	NA	NA	NA	0.01 J	8.23E-3	0.06 K	0.05	0.13	0.10
Benzo[b]fluoranthene	NA	NA	NA	NA	7.17E-3 KJ	5.57E-3	0.08 K	0.03	0.13 K	0.06
Benzo[ghi]perylene	NA	NA	NA	NA	0.09 B	7.28E-3	0.17 B	0.02	0.42 B	0.05
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	U	6.12E-3	U	0.04	U	0.07
Chrysene	NA	NA	NA	NA	0.07 B	3.36E-3	0.51 B	0.02	0.85 B	0.07
Dibenz[a,h]anthracene	NA	NA	NA	NA	7.77E-3 KJ	5.75E-3	0.02 KJ	0.02	0.06	0.03
Fluoranthene	NA	NA	NA	NA	7.19E-3 BJ	2.83E-3	U	0.05	U	0.06
Fluorene	NA	NA	NA	NA	5.81E-3 J	1.33E-3	0.36	0.02	0.07	0.02
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	0.01 KBJ	8.18E-3	U	0.02	U	0.06
Naphthalene	NA	NA	NA	NA	0.03 BJ	1.05E-3	0.06 B	2.27E-3	0.04 BJ	3.55E-3
Phenanthrene	NA	NA	NA	NA	0.03 BJ	3.62E-3	1.06 B	0.06	0.18 B	0.07
Pyrene	NA	NA	NA	NA	0.02 BJ	2.79E-3	0.21 B	0.05	0.21 B	0.06
Sum of 6 PAHs[3]	NA	NA	NA	1.00	0.13		0.31		0.69	
LMW PAHs[4]	NA	NA	NA	1.00	0.08		1.57		0.32	
HMW PAHs[5]	NA	NA	NA	1.00	0.23		1.14		1.92	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1.00	0.30		2.71		2.24	
Sum PAHs[7]	NA	NA	NA	1.00	0.86		12		4.41	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	2.73		92		38	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	0.99	U	0.56	U	0.63
BENZENE	NA	NA	NA	NA	U	0.02	8.60E-3	7.50E-3	U	0.01
ETHYLBENZENE	NA	NA	NA	NA	U	0.02	6.00E-3 J	7.50E-3	U	0.01
TOLUENE	NA	NA	NA	NA	U	0.02	8.90E-3	7.50E-3	U	0.01
TOTAL XYLENES	NA	NA	NA	NA	U	0.05	7.70E-3		U	0.04
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
CHLOROFORM	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
METHYLENE CHLORIDE	NA	NA	NA	NA	U	0.08	U	0.04	U	0.07
TETRACHLOROETHENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
TRICHLOROETHENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
VINYL CHLORIDE	NA	NA	NA	NA	U	0.03	U	0.02	U	0.03
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	1.60	U	0.75	U	1.40
2-BUTANONE	NA	NA	NA	NA	0.06 J	0.08	U	0.04	U	0.07
2-HEXANONE	NA	NA	NA	NA	U	0.08	U	0.04	U	0.07
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	0.08	U	0.04	U	0.07
ACETONE	NA	NA	NA	NA	0.48	0.08	0.10	0.04	0.32	0.07
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
BROMOFORM	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
BROMOMETHANE	NA	NA	NA	NA	U	0.03	U	0.02	U	0.03
CARBON DISULFIDE	NA	NA	NA	NA	0.01 J	0.02	7.20E-3 J	7.50E-3	3.70E-3 J	0.01
CHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
CHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.02	U	0.03
CHLOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.02	U	0.03
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
CYCLOHEXANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.02	U	0.03
ISOPROPYLBENZENE	NA	NA	NA	NA	U	0.02	0.02	7.50E-3	2.60E-3 J	0.01
METHYL ACETATE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
METHYLCYCLOHEXANE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
STYRENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.02	U	7.50E-3	U	0.01
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.02	U	0.03
ALUMINUM	NA	NA	NA	NA	28,200	69	21,400	59	25,600	47
ANTIMONY	NA	NA	NA	NA	0.56	0.23	0.73	0.10	0.60	0.16
ARSENIC	NA	NA	NA	NA	2.30	1.20	4.80	0.49	2.60	0.78
BARIUM	17	910	231	NA	1,150	0.46	5,090	3.90	5,270	3.10
BERYLLIUM	NA	NA	NA	NA	0.79	0.23	0.80	0.10	0.83	0.16
CADMIUM	0.07	0.29	0.16	1	1.20	0.23	1.20	0.10	0.98	0.16
CALCIUM	NA	NA	NA	NA	3,780	23	9,980	20	3,390	16
CHROMIUM	5.10	98	22	NA	29	1.20	25	0.49	26	0.78
COBALT	NA	NA	NA	NA	12	0.23	12	0.10	11	0.16
COPPER	4.30	69	28	NA	36	0.69	34	0.30	31	0.47
IRON	NA	NA	NA	NA	26,800	23	28,800	20	28,400	16
LEAD	2.10	15	7.05	80	18	0.23	34	0.10	21	0.16
MAGNESIUM	NA	NA	NA	NA	4,440	23	5,090	20	4,860	16
MANGANESE	NA	NA	NA	NA	250	0.46	408	0.20	301	0.31
MERCURY	7.10E-3	0.27	0.11	NA	0.08 J	0.09	0.05	0.04	0.04 J	0.06
NICKEL	4.00	43	14	40	28	0.46	28	0.20	31	0.31
POTASSIUM	NA	NA	NA	NA	1,360	230	1,780	200	1,510	160
SELENIUM	NA	NA	NA	NA	U	1.20	0.51	0.49	0.17 J	0.78
SILVER	NA	NA	NA	NA	0.10 J	0.23	0.18	0.10	0.12 J	0.16
SODIUM	NA	NA	NA	NA	120 J	230	118 J	200	105 J	160
THALLIUM	NA	NA	NA	NA	0.27	0.23	0.26	0.10	0.22	0.16
VANADIUM	40	171	93	NA	72	1.20	56	0.49	67	0.78
ZINC	16	134	49	NA	121	2.30	126	0.98	124	1.60
TOTAL ORGANIC CARBON	NA	NA	NA	NA	81,000	1,200	44,000	700	70,000	800

Table 5.4-3 Summary of Sediment Results for GU-06

NOTES

1. bgs = Below Ground Surface
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene,
4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).
5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).
6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.
7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data
10. NA - Not available
11. RL = Reporting Limit
12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: yellow - exceeds RAOHE sensitive ecosytem criteria.
13. Sample arrived at laboratory outside of holding temperature due to transit delays.
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes

Table 5.5-1 Summary of Soil Results for SSF-25

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	SSF25-N10		SSF25-N02		SSF25-N15	
Sample Name									SSF25-SL001[13]		SSF25-SL003 [13]		SSF25-SL007 [13]	
Depth (m bgs[1])									1.45 - 1.6		1.55 - 1.7		2.95 - 3.1	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	509		8		U	18
Acenaphthene	NA	NA	NA	NA		NA	NA	NA	0.02 KJ	0.01	U	1.32E-3		3.42E-4
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	3.94E-3	U	1.36E-3	U	5.77E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	5.12E-4	U	1.83E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	8.32E-3 KBJ	8.06E-3	6.90E-4 KBJ	2.25E-4	2.15E-3 KBJ	1.22E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	8.95E-3	U	1.64E-3	U	4.04E-4
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	5.87E-3	U	1.10E-3	U	2.54E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 KJ	6.88E-3	U	1.10E-3	U	4.23E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	6.51E-3	U	1.21E-3	U	3.11E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.06 BJ	0.01	1.51E-3 BJ	2.58E-4	1.69E-4 BJ	1.44E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	7.77E-3	U	6.07E-4	U	2.21E-4
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	1.71E-3 KBJ	2.29E-4	U	1.04E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 J	7.50E-3	U	7.80E-4	U	2.91E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	0.01 KBJ	8.24E-3	1.33E-3 KBJ	4.06E-4	3.99E-4 KBJ	3.86E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	8.03E-3 KBJ	6.26E-3	2.18E-3 KBJ	9.55E-4	1.36E-3 BJ	3.38E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.09 BJ	0.02	1.02E-3 BJ	5.34E-4	7.13E-4 BJ	1.72E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.03 BJ	9.88E-3	1.29E-3 KBJ	2.25E-4	4.27E-4 KBJ	1.02E-4
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	0.04		3.04E-3		3.99E-4	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	0.15		3.20E-3		2.07E-3	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	0.13		6.53E-3		3.15E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	0.28		9.73E-3		5.22E-3	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	1.90		0.01		6.85E-3	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	16		0.09		0.04	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.49	U	0.46	U	0.45
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03	U	0.03	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.65	U	0.60	U	0.70
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.03	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.07	0.03	0.02 J	0.03	0.03 J	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.01	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	1.90E-3 J	6.50E-3	U	6.00E-3	U	7.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	0.03	6.50E-3	U	6.00E-3	U	7.00E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	6.00E-3	U	7.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	105,000	190	103,000	150	53,200	34
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.04 J	0.13	0.04 J	0.10	0.02 J	0.11
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	U	1.30	U	1.00	U	1.10
BARIUM	17	910	231	NA	NA	500	750	NA	786	1.30	764	1.00	350	0.23
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	1.20	0.13	0.93	0.10	0.77	0.11
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.13 J	0.26	0.11 J	0.20	0.09 J	0.23
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,520	13	2,080	10	4,530	11
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	70	3.20	64	2.50	59	2.80
COBALT	NA	NA	NA	NA	NA	50	40	NA	39	0.64	36	0.50	33	0.57
COPPER	4.30	69	28	NA	NA	63	63	NA	80	0.76	83	0.60	64	0.68
IRON	NA	NA	NA	NA	NA	NA	NA	NA	64,400	64	63,100	50	50,200	57
LEAD	2.10	15	7.05	80	100	100	100	NA	10	0.13	8.30	0.10	5.30	0.11
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	6,290	64	6,360	50	11,200	57
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	764	1.30	995	1.00	785	1.10
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	9.00E-3 J	0.05	0.01 J	0.04	U	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	59	1.30	54	1.00	50	1.10
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	644	130	479	100	604	110
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	3.20	U	2.50	U	2.80
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.10 J	0.26	0.08 J	0.20	0.10 J	0.23
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,200	130	386	100	1,120	110
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.08 J	0.13	0.07 J	0.10	0.06 J	0.11
VANADIUM	40	171	93	NA	NA	130	130	NA	207	3.20	197	2.50	154	2.80
ZINC	16	134	49	NA	NA	200	200	NA	112	6.40	106	5.00	102	5.70
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	7,000	610	540 J	570	130 J	560

Table 5.5-1 Summary of Soil Results for SSF-25

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	**RAOHE Agricultural Criteria Decreto 1215**	**TULSMA Residential Criteria Decreto 3516**	**TULSMA Agricultural Criteria Decreto 3516**	**Lago Agrio Judgment**	SSF25-N19		SSF25-N25		SSF25-N24	
Sample Name									**SSF25-SL009** [13]		**SSF25-SL010** [13]		**SSF25-SL011** [13]	
Depth (m bgs[1])									2.85 - 3		1.77 - 1.95		0.85 - 1	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	4		U	18	4	
Acenaphthene	NA	NA	NA	NA		NA	NA	NA	U	4.66E-4	U	5.69E-4	U	4.02E-4
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	4.04E-4	U	3.65E-4	U	3.18E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	1.84E-4 KJ	1.65E-4	U	2.33E-4	U	1.47E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	2.40E-3 KBJ	8.65E-5	U	7.14E-5	2.40E-3 KBJ	7.10E-5
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	3.94E-4	U	2.49E-4	U	2.52E-4
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	2.53E-4	U	1.59E-4	U	1.59E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	3.56E-4 KBJ	1.91E-4	U	1.98E-4	2.91E-4 KBJ	2.29E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	3.01E-4	U	1.87E-4	U	1.94E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	2.64E-4 BJ	1.05E-4	1.46E-4 KBJ	8.33E-5	1.18E-4 KBJ	8.17E-5
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	1.70E-4 KJ	1.50E-4	U	1.92E-4	U	2.19E-4
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	3.03E-4 KBJ	1.53E-4	1.53E-4 BJ	1.08E-4	2.61E-4 BJ	8.92E-5
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	U	5.20E-4	U	3.03E-4	U	3.88E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	5.33E-4 KBJ	1.73E-4	3.87E-4 KBJ	1.85E-4	4.24E-4 KBJ	2.12E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	1.08E-3 BJ	4.88E-4	1.07E-3 BJ	5.88E-4	1.22E-3 BJ	4.53E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	6.75E-4 BJ	1.55E-4	5.33E-4 BJ	2.18E-4	5.25E-4 KBJ	1.37E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	2.44E-4 BJ	1.50E-4	1.67E-4 KBJ	1.06E-4	1.31E-4 BJ	8.77E-5
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	1.19E-3		5.40E-4		9.76E-4	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	1.94E-3		1.60E-3		1.75E-3	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	4.27E-3		8.53E-4		3.63E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	6.21E-3		2.46E-3		5.37E-3	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	7.37E-3		2.88E-3		7.08E-3	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	0.03		0.01		0.02	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.45	U	0.46	U	0.51
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.04	U	0.04	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.70	U	0.70	U	0.75
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	0.04	0.04	0.03 J	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.01	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.00E-3	U	7.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.01	U	0.02
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	47,100	39	93,600	69	52,800	43
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	U	0.13	0.02 J	0.11	0.04 J	0.14
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	U	1.30	U	1.10	U	0.72
BARIUM	17	910	231	NA	NA	500	750	NA	238	0.26	654	0.46	313	0.29
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.72	0.13	1.10	0.11	1.10	0.14
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.13 J	0.26	0.15 J	0.23	0.07 J	0.14
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	5,830	13	1,620	23	5,930	14
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	71	3.20	59	1.10	55	0.72
COBALT	NA	NA	NA	NA	NA	50	40	NA	35	0.64	30	0.23	21	0.14
COPPER	4.30	69	28	NA	NA	63	63	NA	65	0.77	70	0.69	58	0.43
IRON	NA	NA	NA	NA	NA	NA	NA	NA	56,400	64	61,100	57	48,900	29
LEAD	2.10	15	7.05	80	100	100	100	NA	5.00	0.13	7.70	0.11	5.70	0.14
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	12,600	64	8,810	57	3,720	29
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	898	1.30	791	0.46	215	0.29
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	U	0.05	U	0.04	U	0.05
NICKEL	4.00	43	14	40	50	100	50	NA	49	1.30	46	0.46	40	0.29
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	441	130	542	110	428	140
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	3.20	U	5.70	U	0.72
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.09 J	0.26	0.08 J	0.23	0.11 J	0.14
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,120	130	411	110	1,220	140
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.10 J	0.13	0.08 J	0.11	0.06 J	0.14
VANADIUM	40	171	93	NA	NA	130	130	NA	156	3.20	158	1.10	137	0.72
ZINC	16	134	49	NA	NA	200	200	NA	92	6.40	92	2.30	81	1.40
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	140 J	550	380 J	570	690	630

Table 5.5-1 Summary of Soil Results for SSF-25

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	**RAOHE Agricultural Criteria Decreto 1215**	**TULSMA Residential Criteria Decreto 3516**	**TULSMA Agricultural Criteria Decreto 3516**	**Lago Agrio Judgment**	SSF25-N18		SSF25-N34		SSF25-N05	
Sample Name									**SSF25-SL012** [13]		**SSF25-SL013** [13]		**SSF25-SL014**	
Depth (m bgs[1])									0.75 - 0.9		2.95 - 3.1		1.65 - 1.8	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	U	19	U	20	12,350	
Acenaphthene	NA	NA	NA	NA		NA	NA	NA	U	5.35E-4	U	6.24E-4	0.72 D	0.01
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	4.06E-4	U	3.49E-4	0.01 KDJ	6.70E-3
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.83E-4	2.41E-4 J	2.09E-4	0.06 KD	0.06
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	2.57E-3 KBJ	6.94E-5	5.57E-4 KBJ	7.64E-5	0.15 KBD	4.57E-3
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	2.79E-4	3.80E-4 J	2.36E-4	0.05 D	9.20E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.78E-4	2.98E-4 BJ	1.42E-4	0.13 D	5.56E-3
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	2.14E-4 KBJ	1.93E-4	6.13E-4 KBJ	2.43E-4	0.28 D	0.01
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	2.16E-4	6.41E-4 J	1.71E-4	0.05 KD	7.00E-3
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	3.43E-4 KBJ	8.12E-5	6.83E-4 BJ	9.19E-5	1.04 D	6.47E-3
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	2.20E-4	5.92E-4 J	1.83E-4	0.03 KD	0.01
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	3.12E-4 BJ	1.97E-4	7.72E-4 KBJ	1.14E-4	0.05 KBD	0.04
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	U	2.24E-4	U	3.71E-4	2.25 D	0.06
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	4.63E-4 KBJ	1.79E-4	1.16E-3 KBJ	2.18E-4	UD	0.01
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	1.23E-3 BJ	3.85E-4	1.07E-3 BJ	4.50E-4	0.25 BD	2.24E-3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	9.22E-4 KBJ	1.71E-4	7.35E-4 BJ	1.95E-4	6.76 BD	0.06
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	3.19E-4 BJ	1.94E-4	8.07E-4 KBJ	1.12E-4	0.24 BD	0.04
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	9.89E-4		3.86E-3		0.55	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	2.15E-3		2.05E-3		10	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	4.22E-3		6.50E-3		2.00	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	6.37E-3		8.55E-3		12	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	7.02E-3		0.01		64	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	0.03		0.02		347	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.47	U	0.48	U	0.50
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.04	U	0.04	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.70	U	0.75	U	0.80
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.03 J	0.04	0.03 J	0.04	U	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.02	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	4.10E-3 J	8.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	8.60	0.50
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	7.00E-3	U	7.50E-3	U	8.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.02
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	50,400	34	53,500	44	71,000	71
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.03 J	0.11	U	0.15	0.04 J	0.12
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	U	0.57	0.31 J	0.74	0.27 J	0.59
BARIUM	17	910	231	NA	NA	500	750	NA	292	0.23	286	0.29	145	0.24
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.83	0.11	0.84	0.15	0.88	0.12
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.06 J	0.11	0.10 J	0.15	0.09 J	0.12
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	5,370	11	5,900	15	7,970	12
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	46	0.57	49	0.74	56	0.59
COBALT	NA	NA	NA	NA	NA	50	40	NA	19	0.11	24	0.15	24	0.12
COPPER	4.30	69	28	NA	NA	63	63	NA	58	0.68	62	0.88	65	0.36
IRON	NA	NA	NA	NA	NA	NA	NA	NA	43,000	23	47,600	29	51,100	24
LEAD	2.10	15	7.05	80	100	100	100	NA	5.50	0.11	6.00	0.15	6.70	0.12
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,190	23	10,500	29	7,530	24
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	293	0.23	616	0.29	406	0.24
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	U	0.04	U	0.05	0.01 J	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	35	0.23	38	0.29	45	0.24
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	358	110	572	150	865	120
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	2.80	U	3.70	U	0.59
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.09 J	0.11	0.09 J	0.15	0.12 J	0.12
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,120	110	1,190	150	930	120
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.04 J	0.11	0.07 J	0.15	0.10 J	0.12
VANADIUM	40	171	93	NA	NA	130	130	NA	116	0.57	131	0.74	146	0.59
ZINC	16	134	49	NA	NA	200	200	NA	71	1.10	81	1.50	84	1.20
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	540 J	570	250 J	590	31,000	620

Table 5.5-1 Summary of Soil Results for SSF-25

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	SSF25-N09		SSF25-N14		SSF25-N06	
Sample Name									**SSF25-SL015**		**SSF25-SL016**		**SSF25-SL019**	
Depth (m bgs[1])									2.75 - 2.9		0.95 - 1.1		1.69 - 1.84	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	4		6		11,390	
Acenaphthene	NA	NA	NA	NA		NA	NA	NA	U	1.12E-3	U	2.03E-3	0.49	0.04
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.05E-3	U	9.96E-4	U	0.02
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.06E-3	U	4.20E-4	U	0.17
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	U	6.17E-4	3.77E-4 KBJ	3.51E-4	0.17 KB	0.05
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	1.29E-3	U	1.38E-3	U	0.10
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	8.28E-4	U	8.37E-4	0.11	0.07
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	U	2.05E-3	U	1.59E-3	0.25	0.02
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	1.02E-3	U	1.03E-3	U	0.07
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	U	7.78E-4	U	4.53E-4	0.85 B	0.06
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	2.02E-3	U	9.77E-4	U	0.04
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	6.81E-4 BJ	5.41E-4	6.23E-4 BJ	2.59E-4	U	0.08
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.47E-3	U	7.62E-4	1.38	0.06
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.95E-3	U	1.51E-3	U	0.02
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	3.11E-3 BJ	1.95E-3	5.67E-3 BJ	1.28E-3	4.37 B	0.03
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	1.22E-3 BJ	9.93E-4	1.46E-3 BJ	3.94E-4	3.90 B	0.16
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	2.15E-3 BJ	5.32E-4	3.12E-4 BJ	2.54E-4	0.27 B	0.08
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	6.81E-4		6.23E-4		0.36	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	4.33E-3		7.13E-3		10	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	2.83E-3		1.31E-3		1.64	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	7.16E-3		8.44E-3		12	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	0.02		0.03		54	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	0.14		6.76E-3		272	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.53	U	0.48	U	0.47
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	8.50E-3	U	8.00E-3	0.04	7.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.03	U	0.02	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.04	U	0.04	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.85	U	0.80	U	0.75
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	0.033 J	0.04	U	0.04	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.04	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	0.25	0.04	0.04	0.04	U	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	0.02	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	3.20E-3 J	7.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	0.29	7.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	U	0.48
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	8.50E-3	U	8.00E-3	U	0.48
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	8.50E-3	U	8.00E-3	U	7.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.02	U	0.02	U	0.02
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	101,000	93	55,300	34	80,500	220
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.05 J	0.15	0.03 J	0.11	0.72	0.14
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	0.46 J	0.77	0.33 J	0.57	1.30	0.73
BARIUM	17	910	231	NA	NA	500	750	NA	783	0.62	369	0.23	544	0.29
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	1.50	0.15	0.91	0.11	1.00	0.14
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.08 J	0.15	0.11	0.11	0.18	0.14
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	1,650	15	4,730	11	23,100	73
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	73	0.77	50	0.57	47	0.73
COBALT	NA	NA	NA	NA	NA	50	40	NA	32	0.15	24	0.11	25	0.14
COPPER	4.30	69	28	NA	NA	63	63	NA	69	0.46	64	0.34	84	0.44
IRON	NA	NA	NA	NA	NA	NA	NA	NA	68,200	31	47,300	23	50,800	73
LEAD	2.10	15	7.05	80	100	100	100	NA	9.10	0.15	5.90	0.11	98	0.14
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	3,730	31	8,050	23	9,170	73
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	763	0.31	695	0.45	667	0.29
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	U	0.05	U	0.04	0.03 J	0.05
NICKEL	4.00	43	14	40	50	100	50	NA	48	0.31	43	0.23	42	0.29
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	573	150	685	110	873	730
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.77	U	0.57	U	0.73
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.10 J	0.15	0.11 J	0.11	0.12 J	0.14
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	401	150	1,050	110	1,200	730
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.05 J	0.15	0.08 J	0.11	0.15	0.14
VANADIUM	40	171	93	NA	NA	130	130	NA	184	0.77	142	0.57	150	0.73
ZINC	16	134	49	NA	NA	200	200	NA	90	1.50	82	1.10	139	1.40
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	2,100	640	U	610	47,000	620

Table 5.5-1 Summary of Soil Results for SSF-25

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	**RAOHE Agricultural Criteria Decreto 1215**	**TULSMA Residential Criteria Decreto 3516**	**TULSMA Agricultural Criteria Decreto 3516**	**Lago Agrio Judgment**	SSF25-N06		SSF25-N11A		SSF25-N11A	
Sample Name									**SSF25-SL020**		**SSF25-SL021**		**SSF25-SL022**	
Depth (m bgs^1)									2.65 - 2.80		1.37 - 1.52		2.93 - 3.08	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	2,500	2,500	500	100	650		4,550		291	
Acenaphthene	NA	NA	NA	NA		NA	NA	NA	0.01 J	2.72E-3	0.09	8.51E-3	U	2.21E-3
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.23E-3	U	2.91E-3	U	8.78E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	7.54E-3	U	0.02	U	2.96E-3
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	9.74E-3 KBJ	3.88E-3	0.03 KBJ	0.02	1.98E-3 KBJ	1.58E-3
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	7.78E-3	U	0.02	U	2.34E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	6.31E-3 KJ	5.29E-3	0.03 KJ	0.01	U	1.72E-3
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.02 J	3.89E-3	0.06	0.01	3.77E-3 KJ	1.68E-3
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	5.75E-3	U	0.02	U	1.83E-3
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.04 BJ	4.48E-3	0.18 B	0.03	0.01 BJ	1.73E-3
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	2.69E-3	U	9.38E-3	U	1.45E-3
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	6.20E-3 BJ	4.26E-3	U	0.02	2.31E-3 BJ	1.22E-3
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.04 J	1.75E-3	0.29	0.02	8.26E-3 J	1.09E-3
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	4.21E-3	U	0.01	U	1.79E-3
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	9.75E-3 BJ	1.93E-3	0.89 B	5.74E-3	6.32E-3 BJ	2.46E-3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.18 B	6.93E-3	0.98 B	0.02	0.05 B	2.72E-3
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.02 BJ	4.19E-3	0.07 B	0.02	5.23E-3 BJ	1.20E-3
Sum of 6 PAHs^3	NA	NA	NA	1	2	NA	2	NA	0.03		0.09		6.08E-3	
LMW PAHs^4	NA	NA	NA	1	2	NA	2	NA	0.24		2.25		0.06	
HMW PAHs^5	NA	NA	NA	1	2	NA	2	NA	0.10		0.37		0.02	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	0.34		2.63		0.09	
Sum PAHs^7	NA	NA	NA	1	2	NA	2	NA	1.58		12		0.31	
Sum Alkylated PAHs + Biphenyl^{15}	NA	NA	NA	NA	NA	NA	NA	NA	12		67		2.41	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.42	U	0.50	U	0.44
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	6.50E-3	0.18	7.50E-3	0.032	7.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	6.50E-3	0.018	7.50E-3	0.0029 J	7.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	0.57		0.079	
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03	U	0.04	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.65	U	0.75	U	0.70
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.02	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	4.00E-3 J	6.50E-3	8.00E-3	7.50E-3	U	7.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	0.38 J	0.49	0.14	7.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	0.29 J	0.41	0.24	7.50E-3	0.04	7.00E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.25	6.50E-3	1.50	0.49	0.36 J	0.46
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.50E-3	U	7.50E-3	U	7.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	48,800	180	86,700	180	50,900	160
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.04 J	0.12	0.10 J	0.12	0.08 J	0.10
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	0.31 J	0.62	0.70	0.60	0.36 J	0.52
BARIUM	17	910	231	NA	NA	500	750	NA	328	0.25	330	0.24	403	0.42
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.80	0.12	1.00	0.12	0.76	0.10
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.10 J	0.12	0.10 J	0.12	0.05 J	0.10
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,820	62	9,320	60	4,950	52
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	48	0.62	46	0.60	46	0.52
COBALT	NA	NA	NA	NA	NA	50	40	NA	26	0.12	24	0.12	24	0.10
COPPER	4.30	69	28	NA	NA	63	63	NA	56	0.37	59	0.36	48	0.31
IRON	NA	NA	NA	NA	NA	NA	NA	NA	48,300	62	49,700	60	57,600	52
LEAD	2.10	15	7.05	80	100	100	100	NA	7.70	0.12	37	0.12	9.70	0.10
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	10,000	62	5,000	60	11,100	52
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	609	0.25	389	0.24	619	0.42
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	U	0.04	0.01 J	0.05	U	0.03
NICKEL	4.00	43	14	40	50	100	50	NA	39	0.25	40	0.24	41	0.21
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	560 J	620	733	600	562	520
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.62	U	1.20	U	1.00
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.08 J	0.12	0.09 J	0.12	0.07 J	0.10
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	966	620	1,060	600	837	520
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.09 J	0.12	0.09 J	0.12	0.08 J	0.10
VANADIUM	40	171	93	NA	NA	130	130	NA	129	0.62	145	0.60	123	0.52
ZINC	16	134	49	NA	NA	200	200	NA	97	1.20	86	1.20	113	1.00
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	4,800	560	24,000	620	1,200	610

Table 5.5-1 Summary of Soil Results for SSF-25

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	SSF25-N12		SSF25-N12		SSF25-N07	
Sample Name									**SSF25-SL023**		**SSF25-SL024**		**SSF25-SL026**	
Depth (m bgs^1)									1.83 - 1.98		2.63 - 2.78		3.02 - 3.17	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	2,500	2,500	500	100	4,300		8,160		120	
Acenaphthene	NA	NA	NA	NA		NA	NA	NA	0.10 J	0.01	0.49	0.04	U	2.08E-3
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.03	U	1.27E-3
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.04	U	0.21	U	2.14E-3
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	0.05 KBJ	0.02	0.13 KBJ	0.04	2.21E-3 KBJ	1.96E-3
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	0.04	U	0.07	U	2.70E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 KJ	0.03	0.12 KJ	0.05	U	1.83E-3
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.07 KJ	0.03	0.17 J	0.04	3.76E-3 KJ	2.51E-3
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.05	U	2.00E-3
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.23 BJ	0.02	0.63 B	0.04	0.01 KBJ	1.89E-3
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	0.03	U	2.10E-3
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.03 BJ	0.03	U	0.08	2.06E-3 BJ	9.87E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.30 J	0.02	0.42 J	0.09	2.42E-3 J	8.66E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04	U	2.68E-3
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	0.48 B	0.02	0.17 BJ	0.01	2.90E-3 KBJ	1.35E-3
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.96 B	0.04	4.85 B	0.19	0.03 BJ	1.97E-3
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.09 BJ	0.03	0.20 BJ	0.08	4.57E-3 BJ	9.71E-4
Sum of 6 PAHs^3	NA	NA	NA	1	2	NA	2	NA	0.14		0.29		5.82E-3	
LMW PAHs^4	NA	NA	NA	1	2	NA	2	NA	1.84		5.93		0.03	
HMW PAHs^5	NA	NA	NA	1	2	NA	2	NA	0.51		1.25		0.02	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	2.35		7.18		0.06	
Sum PAHs^7	NA	NA	NA	1	2	NA	2	NA	12		55		0.15	
Sum Alkylated PAHs + Biphenyl^{15}	NA	NA	NA	NA	NA	NA	NA	NA	72		293		1.52	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.44	U	0.46	U	0.46
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	0.50	U	0.46	U	6.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	0.44 J	0.50	U	0.46	U	6.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	0.50	U	0.46	U	6.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	1.50	U	1.39	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	2.50	U	2.30	U	0.03
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0	0.1	NA	U	0.50	U	0.46	U	6.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	0.50	U	0.46	U	6.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	1.00	U	0.93	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.50	U	0.46	U	6.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.50	U	0.46	U	6.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.50	U	0.46	U	6.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.50	U	0.46	U	6.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.50	U	0.46	U	6.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.50	U	0.46	U	6.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	0.50	U	0.46	U	6.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	50	U	46	U	0.65
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	2.50	U	2.30	U	0.03
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	2.50	U	2.30	U	0.03
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	2.50	U	2.30	U	0.03
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	U	2.50	U	2.30	U	0.03
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	0.50	U	0.46	U	6.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	1.00	U	0.93	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.50	U	0.46	U	6.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.1	NA	U	0.50	U	0.46	U	6.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	1.00	U	0.93	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	1.00	U	0.93	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	0.28 J	0.50	U	0.46	U	6.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	1.00	U	0.93	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	1.10	0.50	3.70	0.46	0.01	6.50E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.50	U	0.46	U	6.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	0.50	U	0.46	U	6.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	1.50	0.50	1.30	0.46	U	6.50E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.50	U	0.46	U	6.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	1.00	U	0.93	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	67,500	220	59,900	180	42,500	150
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.25	0.14	0.07 J	0.12	0.04 J	0.10
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	1.80	0.72	0.42 J	0.61	0.26 J	0.51
BARIUM	17	910	231	NA	NA	500	750	NA	522	0.29	458	0.24	200	0.41
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.97	0.14	1.10	0.12	0.84	0.10
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.17	0.14	0.13	0.12	0.11	0.10
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	10,200	72	4,010	61	5,540	51
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	41	0.72	44	0.61	38	0.51
COBALT	NA	NA	NA	NA	NA	50	40	NA	17	0.14	30	0.12	25	0.10
COPPER	4.30	69	28	NA	NA	63	63	NA	55	0.43	61	0.37	57	0.31
IRON	NA	NA	NA	NA	NA	NA	NA	NA	42,300	72	52,200	61	45,300	51
LEAD	2.10	15	7.05	80	100	100	100	NA	60	0.14	7.00	0.12	5.90	0.10
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	3,620	72	6,870	61	9,110	51
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	507	0.29	771	0.49	429	0.41
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.07	0.04	U	0.05	U	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	30	0.29	41	0.24	36	0.20
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	631 J	720	390 J	610	454 J	510
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.72	U	0.61	U	0.51
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.12 J	0.14	0.09 J	0.12	0.08 J	0.10
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	796	720	1,400	610	1,230	510
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.14 J	0.14	0.11 J	0.12	0.09 J	0.10
VANADIUM	40	171	93	NA	NA	130	130	NA	123	0.72	134	0.61	115	0.51
ZINC	16	134	49	NA	NA	200	200	NA	83	1.40	77	1.20	74	1.00
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	16,000	600	21,000	580	810	600

Table 5.5-1 Summary of Soil Results for SSF-25

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	**RAOHE Agricultural Criteria Decreto 1215**	**TULSMA Residential Criteria Decreto 3516**	**TULSMA Agricultural Criteria Decreto 3516**	**Lago Agrio Judgment**	SSF25-N13A		SSF25-N16	
Sample Name									**SSF25-SL027**		**SSF25-SL028**	
Depth (m bgs[1])									3.17 - 3.32		2.04 - 2.19	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	0.00E+0 U	19	3.60	
Acenaphthene	NA	NA	NA	NA		NA	NA	NA	U	1.02E-3	U	9.33E-4
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	6.19E-4	U	3.66E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	1.39E-3 BJ	6.86E-4	4.66E-4 KBJ	3.65E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	5.55E-4 BJ	5.34E-4	2.23E-4 KBJ	1.59E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	1.45E-3	U	5.98E-4
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.02E-3	U	4.01E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	1.44E-3 KBJ	1.01E-3	U	4.85E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	1.13E-3	U	4.48E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	1.35E-3 BJ	5.59E-4	2.65E-4 BJ	1.63E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.16E-3	U	4.84E-4
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	9.28E-4 BJ	4.08E-4	4.94E-4 BJ	2.00E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	U	6.22E-4	U	2.76E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	1.53E-3 KBJ	1.06E-3	U	5.25E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	3.92E-3 BJ	1.88E-3	1.77E-3 BJ	8.66E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	2.01E-3 BJ	6.31E-4	1.02E-3 KBJ	3.35E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	2.56E-3 BJ	4.01E-4	3.31E-4 KBJ	1.96E-4
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	3.90E-3		4.94E-4	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	7.32E-3		3.26E-3	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	8.36E-3		1.31E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	0.02		4.57E-3	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	0.02		8.37E-3	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	0.07		0.03	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.44	U	0.51
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	6.00E-3	U	8.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	1.2	0.1	NA	U	6.00E-3	U	8.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.8	0.1	NA	U	6.00E-3	U	8.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	0.03
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.03	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0	0.1	NA	U	6.00E-3	U	8.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	3	0.1	NA	U	6.00E-3	U	8.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	8.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	8.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	8.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	8.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	2	0.05	NA	U	6.00E-3	U	8.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	NA	NA	NA	U	0.60	U	0.85
2-BUTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	U	0.04
ACETONE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.03	0.02 J	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
BROMOFORM	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	NA	NA	NA	U	0.01	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	2	0.1	NA	U	6.00E-3	U	8.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
METHYL ACETATE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	NA	NA	NA	U	6.00E-3	U	8.50E-3
STYRENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	5	0.1	NA	U	6.00E-3	U	8.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	5	0.1	NA	U	0.01	U	0.02
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	42,100	140	91,500	160
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.03 J	0.09	0.06 J	0.11
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	0.20 J	0.46	0.66	0.54
BARIUM	17	910	231	NA	NA	500	750	NA	264	0.37	668	0.43
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.72	0.09	1.40	0.11
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.07 J	0.09	0.11 J	0.11
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,540	46	1,370	54
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	34	0.46	52	0.54
COBALT	NA	NA	NA	NA	NA	50	40	NA	21	0.09	27	0.11
COPPER	4.30	69	28	NA	NA	63	63	NA	49	0.28	65	0.32
IRON	NA	NA	NA	NA	NA	NA	NA	NA	44,000	46	62,200	54
LEAD	2.10	15	7.05	80	100	100	100	NA	5.30	0.09	9.70	0.11
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	9,800	46	5,520	54
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	484	0.37	817	0.43
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	U	0.04	U	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	34	0.18	43	0.22
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	435 J	460	536 J	540
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	U	0.46	U	1.10
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.07 J	0.09	0.08 J	0.11
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	913	460	475 J	540
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.18	0.09	0.06 J	0.11
VANADIUM	40	171	93	NA	NA	130	130	NA	107	0.46	158	0.54
ZINC	16	134	49	NA	NA	200	200	NA	70	0.92	88	1.10
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	U	560	950	620

Table 5.5-1 Summary of Soil Results for SSF-25

NOTES

1. bgs = Below Ground Surface
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).
5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).
6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.
7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data
10. NA - Not available
11. RL = Reporting Limit
12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
13. Sample arrived at laboratory outside of holding temperature due to transit delays.
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Table 5.5-2 Summary of Groundwater and Surface Water Results for SSF-25

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Groundwater**					
Sample Location			SSF25-N36 (MW04)		SSF25-N35 (MW05)		SSF25-N11 (MW03)	
Sample Name			SSF25-GW001		SSF25-GW002		SSF25-GW003	
Depth (ft / meter below TOC[1])			14.86 ft (4.53 m)		15.48 ft (4.72 m)		14.08 ft (4.29 m)	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.22		0.03		1.43	
Acenaphthene	NA	NA	U	3.04E-7	1.31E-6 BJ	2.60E-7	2.61E-4 B	7.62E-7
Acenaphthylene	NA	2E-3	8.18E-7 J	1.66E-7	9.67E-7 J	3.08E-7	7.16E-6	3.38E-7
Anthracene	2.5E-3	NA	U	3.43E-7	1.03E-6 BJ	1.35E-7	2.17E-5 B	3.23E-7
Benz[a]anthracene	2.5E-4	NA	2.14E-7 BJ	9.19E-8	6.15E-7 KBJ	7.57E-8	2.64E-6 BJ	3.37E-7
Benzo[a]pyrene	2.6E-5	NA	U	2.34E-7	3.22E-7 KJ	1.77E-7	7.59E-7 KJ	6.18E-7
Benzo[b]fluoranthene	NA	NA	U	1.39E-7	U	1.09E-7	8.21E-7 J	3.98E-7
Benzo[ghi]perylene	2.5E-5	NA	1.83E-7 KBJ	1.64E-7	2.78E-7 KBJ	7.95E-8	1.78E-6 BJ	6.46E-7
Benzo[j,k]fluoranthenes	2.6E-5	NA	1.94E-7 KBJ	1.79E-7	4.11E-7 KBJ	1.40E-7	8.49E-7 BJ	4.76E-7
Chrysene	2.6E-5	NA	2.67E-6 BJ	1.11E-7	1.19E-6 BJ	8.13E-8	1.54E-5 B	4.52E-7
Dibenz[a,h]anthracene	NA	NA	U	1.88E-7	U	1.43E-7	U	8.38E-7
Fluoranthene	5E-4	NA	7.93E-7 BJ	2.30E-7	2.76E-6 BJ	1.04E-7	1.16E-5 B	5.28E-7
Fluorene	NA	NA	2.07E-7 KBJ	1.05E-7	2.00E-7 BJ	1.44E-7	1.52E-4 B	4.62E-7
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	2.53E-7 KBJ	1.65E-7	3.05E-7 KBJ	8.30E-8	U	6.48E-7
Naphthalene	0.04	6E-3	7.10E-6 B	2.05E-7	2.11E-5 B	3.45E-7	5.19E-5 KB	7.83E-7
Phenanthrene	2.5E-3	NA	1.56E-6 BJ	3.22E-7	8.42E-6 B	1.26E-7	3.14E-4 B	3.03E-7
Pyrene	NA	NA	8.61E-5 B	2.27E-7	4.13E-6 BJ	1.02E-7	3.66E-5 B	5.19E-7
Sum of 6 PAHs[3]	NA	3E-4	1.42E-6		4.08E-6		1.58E-5	
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	1.00E-4		4.30E-5		8.78E-4	
Sum PAHs[5]	NA	3E-4	1.04E-4		6.16E-5		1.89E-3	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	7.52E-5		8.83E-5		0.01	
Total Phenols by Method E420.1	1	0.001	U	5.00E-3	U	5.00E-3	2.70E-3 J	5.00E-3
Total Phenols by Method SW8270	1	0.001					U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4
XYLENES TOTAL	0.035	NA	U	1.50E-3	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	1.85	0.30	5.45	0.30	0.09 J	0.30
ANTIMONY	NA	0.02	2.10E-4 J	1.00E-3	1.60E-4 J	1.00E-3	2.00E-4 J	1.00E-3
ARSENIC	0.04	0.05	U	5.00E-3	U	5.00E-3	U	5.00E-3
BARIUM	0.34	1	0.04	2.00E-3	0.05	2.00E-3	0.11	2.00E-3
BERYLLIUM	NA	0.1	5.00E-5 J	1.00E-3	9.00E-5 J	1.00E-3	U	1.00E-3
CADMIUM	0.0032	0.001	1.20E-4 J	1.00E-3	7.00E-5 J	1.00E-3	6.00E-5 J	1.00E-3
CALCIUM	NA	NA	18	0.10	10	0.10	25	0.10
CHROMIUM	0.02	0.05	1.40E-3 J	5.00E-3	4.30E-3 J	5.00E-3	9.20E-4 J	5.00E-3
COBALT	0.06	0.20	1.30E-3	1.00E-3	1.10E-3	1.00E-3	3.60E-3	1.00E-3
COPPER	0.05	0.02	3.30E-3	3.00E-3	6.70E-3	3.00E-3	9.10E-4 J	3.00E-3
IRON	NA	0.30	0.99	0.10	2.84	0.10	6.98	0.10
LEAD	0.05	NA	6.20E-4 J	1.00E-3	9.60E-4 J	1.00E-3	1.30E-4 J	1.00E-3
MAGNESIUM	NA	NA	16	0.10	3.66	0.10	24	0.10
MANGANESE	NA	0.10	2.78	2.00E-3	0.04	2.00E-3	1.22	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4
NICKEL	0.05	0.03	1.90E-3 J	2.00E-3	3.00E-3	2.00E-3	1.60E-3 J	2.00E-3
POTASSIUM	NA	NA	1.68	1.00	0.55 J	1.00	2.98	1.00
SELENIUM	NA	0.01	U	5.00E-3	U	5.00E-3	2.00E-4 J	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	6.96	1.00	6.02	1.00	43	1.00
THALLIUM	NA	4E-4	6.00E-5 J	1.00E-3	U	1.00E-3	U	1.00E-3
VANADIUM	NA	0.10	2.50E-3 J	5.00E-3	7.20E-3	5.00E-3	U	5.00E-3
ZINC	0.43	0.18	7.00E-3 J	0.01	0.01	0.01	4.30E-3 J	0.01
Naphthenic Acid[6]	NA	NA	0.03		3E-3		3	

Table 5.5-2 Summary of Groundwater and Surface Water Results for SSF-25

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Groundwater**			
Sample Location			SSF25-N13 (MW02)		SSF25-N26	
Sample Name			SSF25-GW005		SSF25-GW006	
Depth (ft / meter below TOC[1])			14.17 ft (4.32 m)		14.17 ft (4.32 m)	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)		
TPH[2]	0.325	0.5	0.88		[14]U	10
Acenaphthene	NA	NA	4.79E-4 B	1.28E-6		
Acenaphthylene	NA	2E-3	7.35E-6	4.09E-6		
Anthracene	2.5E-3	NA	2.64E-5 KB	5.16E-6		
Benz[a]anthracene	2.5E-4	NA	1.73E-5 KB	1.31E-6		
Benzo[a]pyrene	2.6E-5	NA	5.67E-6 J	8.18E-7		
Benzo[b]fluoranthene	NA	NA	1.11E-5	5.25E-7		
Benzo[ghi]perylene	2.5E-5	NA	2.11E-5 B	1.93E-6		
Benzo[j,k]fluoranthenes	2.6E-5	NA	2.50E-6 KBJ	6.33E-7		
Chrysene	2.6E-5	NA	8.11E-5 B	1.42E-6		
Dibenz[a,h]anthracene	NA	NA	2.26E-6 J	1.11E-6		
Fluoranthene	5E-4	NA	1.27E-5 B	9.60E-7		
Fluorene	NA	NA	9.21E-4 BD	1.25E-6		
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	U	1.95E-6		
Naphthalene	0.04	6E-3	3.04E-4 KB	1.47E-6		
Phenanthrene	2.5E-3	NA	1.51E-3 BD	3.33E-6		
Pyrene	NA	NA	5.18E-5 B	9.44E-7		
Sum of 6 PAHs[3]	NA	3E-4	5.31E-5			
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	3.45E-3			
Sum PAHs[5]	NA	3E-4	0.02			
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	0.11			
Total Phenols by Method E420.1	1	0.001				
Total Phenols by Method SW8270	1	0.001	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	U	5.00E-4
XYLENES TOTAL	0.035	NA	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	0.0033 J	5.00E-3	U	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	0.0049	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1				
ANTIMONY	NA	0.02				
ARSENIC	0.04	0.05				
BARIUM	0.34	1				
BERYLLIUM	NA	0.1				
CADMIUM	0.0032	0.001				
CALCIUM	NA	NA				
CHROMIUM	0.02	0.05				
COBALT	0.06	0.20				
COPPER	0.05	0.02				
IRON	NA	0.30				
LEAD	0.05	NA				
MAGNESIUM	NA	NA				
MANGANESE	NA	0.10				
MERCURY	1.8E-4	2E-4				
NICKEL	0.05	0.03				
POTASSIUM	NA	NA				
SELENIUM	NA	0.01				
SILVER	NA	0.01				
SODIUM	NA	NA				
THALLIUM	NA	4E-4				
VANADIUM	NA	0.10				
ZINC	0.43	0.18				
Naphthenic Acid[6]	NA	NA	0.8			

Table 5.5-2 Summary of Groundwater and Surface Water Results for SSF-25

Matrix	TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516	TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516	Surface Water					
Sample Location			SSF25-SP		SSF25-T04A		SSF25-T03A	
Sample Name			SSF25-SW001		SSF25-SW002		SSF25-SW003	
Depth (ft / meter below TOC[1])			NA		NA		NA	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.18		0.01		0.92	
Acenaphthene	NA	NA	2.87E-7 KBJ	2.58E-7	8.16E-7 BJ	2.34E-7	5.46E-6 B	4.98E-7
Acenaphthylene	NA	2E-3	4.74E-7 KBJ	1.15E-7	4.13E-7 BJ	2.42E-7	7.73E-7 KBJ	3.37E-7
Anthracene	2.5E-3	NA	1.63E-7 BJ	6.94E-8	U	1.70E-7	U	1.89E-6
Benz[a]anthracene	2.5E-4	NA	1.39E-7 BJ	3.57E-8	U	1.55E-7	4.00E-6 KBJ	3.63E-6
Benzo[a]pyrene	2.6E-5	NA	U	1.85E-7	2.14E-7 KJ	1.97E-7	U	5.63E-6
Benzo[b]fluoranthene	NA	NA	U	1.29E-7	1.83E-7 KJ	1.40E-7	5.21E-6 KJ	4.09E-6
Benzo[ghi]perylene	2.5E-5	NA	2.15E-7 KBJ	1.43E-7	5.52E-7 KBJ	1.37E-7	1.51E-5 B	2.63E-6
Benzo[j,k]fluoranthenes	2.6E-5	NA	U	1.42E-7	U	1.52E-7	U	4.45E-6
Chrysene	2.6E-5	NA	2.62E-7 BJ	3.47E-8	2.56E-6 KBJ	1.69E-7	3.11E-5 KB	4.11E-6
Dibenz[a,h]anthracene	NA	NA	U	9.27E-8	U	1.77E-7	U	2.66E-6
Fluoranthene	5E-4	NA	7.71E-7 BJ	7.82E-8	6.38E-7 BJ	1.58E-7	U	3.60E-6
Fluorene	NA	NA	5.24E-7 BJ	1.50E-7	6.26E-7 BJ	1.58E-7	5.69E-6 B	4.04E-7
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	1.77E-7 KBJ	1.57E-7	2.02E-7 KBJ	1.41E-7	U	2.89E-6
Naphthalene	0.04	6E-3	3.49E-6 BJ	3.17E-7	2.90E-6 BJ	2.92E-7	4.51E-6 BJ	5.18E-7
Phenanthrene	2.5E-3	NA	2.61E-6 BJ	6.38E-8	1.76E-6 BJ	1.57E-7	6.83E-6 B	1.74E-6
Pyrene	NA	NA	6.70E-7 BJ	7.70E-8	9.08E-7 BJ	1.56E-7	8.25E-6 B	3.54E-6
Sum of 6 PAHs[3]	NA	3E-4	1.16E-6		1.79E-6		2.03E-5	
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	9.78E-6		1.18E-5		8.69E-5	
Sum PAHs[5]	NA	3E-4	4.00E-5		3.32E-5		5.10E-4	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	3.03E-5		1.63E-4		3.82E-3	
Total Phenols by Method E420.1	1	0.001	U	5.00E-3	U	5.00E-3	4.40E-3 J	5.00E-3
Total Phenols by Method SW8270	1	0.001	U	0.01	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	U	5.00E-4	1.20E-3	5.00E-4
XYLENES TOTAL	0.035	NA	U	1.50E-3	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	U	5.00E-3	0.01	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	0.77	0.30	0.51	0.30	7.07	0.30
ANTIMONY	NA	0.02	2.80E-4 J	1.00E-3	2.40E-4 J	1.00E-3	2.20E-4 J	1.00E-3
ARSENIC	0.04	0.05	U	5.00E-3	U	5.00E-3	U	5.00E-3
BARIUM	0.34	1	0.07	2.00E-3	0.03	2.00E-3	0.35	2.00E-3
BERYLLIUM	NA	0.1	U	1.00E-3	U	1.00E-3	3.20E-4 J	1.00E-3
CADMIUM	0.0032	0.001	6.00E-5 J	1.00E-3	6.00E-5 J	1.00E-3	3.00E-4 J	1.00E-3
CALCIUM	NA	NA	13	0.10	12	0.10	23	0.10
CHROMIUM	0.02	0.05	1.70E-3 J	5.00E-3	1.40E-3 J	5.00E-3	9.70E-3	5.00E-3
COBALT	0.06	0.20	2.80E-3	1.00E-3	8.70E-4 J	1.00E-3	9.10E-3	1.00E-3
COPPER	0.05	0.02	2.30E-3 J	3.00E-3	1.40E-3 J	3.00E-3	0.02	3.00E-3
IRON	NA	0.30	9.06	0.10	2.50	0.10	39	0.10
LEAD	0.05	NA	2.30E-3	1.00E-3	5.40E-4 J	1.00E-3	0.01	1.00E-3
MAGNESIUM	NA	NA	4.76	0.10	4.86	0.10	9.03	0.10
MANGANESE	NA	0.10	0.37	2.00E-3	0.22	2.00E-3	0.68	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4	3.00E-5 J	2.00E-4
NICKEL	0.05	0.03	6.60E-4 J	2.00E-3	2.80E-4 J	2.00E-3	3.10E-3	2.00E-3
POTASSIUM	NA	NA	2.65	1.00	1.16	1.00	2.55	1.00
SELENIUM	NA	0.01	4.00E-4 J	5.00E-3	2.40E-4 J	5.00E-3	4.60E-4 J	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	5.07	1.00	6.38	1.00	8.04	1.00
THALLIUM	NA	4E-4	1.50E-3	1.00E-3	U	1.00E-3	6.00E-5 J	1.00E-3
VANADIUM	NA	0.10	7.10E-3	5.00E-3	3.60E-3 J	5.00E-3	0.04	5.00E-3
ZINC	0.43	0.18	6.70E-3 J	0.01	4.00E-3 J	0.01	0.08	0.01
Naphthenic Acid[6]	NA	NA	0.01		6.84E-3		0.03	

Table 5.5-2 Summary of Groundwater and Surface Water Results for SSF-25

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Surface Water**			
Sample Location			SSF25-T02A		SSF25-T04A	
Sample Name			SSF25-SW004		SSF25-SW005	
Depth (ft / meter below TOC[1])			NA		NA	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.16		0.11	
Acenaphthene	NA	NA	1.85E-6 KBJ	7.81E-7	7.56E-7 KBJ	1.65E-7
Acenaphthylene	NA	2E-3	5.36E-7 KBJ	4.10E-7	1.04E-7 KBJ	8.17E-8
Anthracene	2.5E-3	NA	U	4.84E-6	U	7.11E-8
Benz[a]anthracene	2.5E-4	NA	5.96E-6 KB	3.69E-6	1.48E-7 KBJ	9.78E-8
Benzo[a]pyrene	2.6E-5	NA	U	6.98E-6	U	2.43E-7
Benzo[b]fluoranthene	NA	NA	6.65E-6 K	4.81E-6	U	1.53E-7
Benzo[ghi]perylene	2.5E-5	NA	1.66E-5 B	2.50E-6	4.36E-7 KBJ	1.02E-7
Benzo[j,k]fluoranthenes	2.6E-5	NA	U	5.09E-6	U	1.69E-7
Chrysene	2.6E-5	NA	3.43E-5 B	4.04E-6	6.84E-7 KBJ	1.21E-7
Dibenz[a,h]anthracene	NA	NA	U	2.62E-6	9.30E-8 KJ	9.31E-8
Fluoranthene	5E-4	NA	U	2.94E-6	5.95E-7 BJ	8.02E-8
Fluorene	NA	NA	1.80E-6 BJ	6.22E-7	2.77E-7 BJ	9.46E-8
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	U	2.50E-6	2.38E-7 KBJ	1.04E-7
Naphthalene	0.04	6E-3	4.97E-6 BJ	3.18E-7	2.94E-6 BJ	7.05E-8
Phenanthrene	2.5E-3	NA	8.75E-6 B	4.45E-6	1.51E-6 BJ	6.53E-8
Pyrene	NA	NA	9.89E-6 B	2.90E-6	6.38E-7 BJ	7.90E-8
Sum of 6 PAHs[3]	NA	3E-4	2.33E-5		1.27E-6	8.51E-7
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	9.13E-5		8.42E-6	1.79E-6
Sum PAHs[5]	NA	3E-4	3.71E-4		1.95E-5	2.80E-6
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	4.63E-3		8.36E-5	1.11E-6
Total Phenols by Method E420.1	1	0.001	1.90E-3 J	5.00E-3	2.20E-3 J	5.00E-3
Total Phenols by Method SW8270	1	0.001	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	U	5.00E-4
XYLENES TOTAL	0.035	NA	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	U	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	0.57	0.30	0.82	0.30
ANTIMONY	NA	0.02	2.60E-4 J	1.00E-3	8.00E-5 J	1.00E-3
ARSENIC	0.04	0.05	U	5.00E-3	U	5.00E-3
BARIUM	0.34	1	0.03	2.00E-3	0.04	2.00E-3
BERYLLIUM	NA	0.1	U	1.00E-3	U	1.00E-3
CADMIUM	0.0032	0.001	7.00E-5 J	1.00E-3	8.00E-5 J	1.00E-3
CALCIUM	NA	NA	11	0.10	13	0.10
CHROMIUM	0.02	0.05	1.50E-3 J	5.00E-3	3.70E-3 J	5.00E-3
COBALT	0.06	0.20	6.90E-4 J	1.00E-3	1.30E-3	1.00E-3
COPPER	0.05	0.02	1.70E-3 J	3.00E-3	2.60E-3 J	3.00E-3
IRON	NA	0.30	2.08	0.10	3.83	0.10
LEAD	0.05	NA	4.00E-4 J	1.00E-3	5.10E-4 J	1.00E-3
MAGNESIUM	NA	NA	4.28	0.10	5.57	0.10
MANGANESE	NA	0.10	0.13	2.00E-3	0.26	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4
NICKEL	0.05	0.03	5.70E-4 J	2.00E-3	8.60E-4 J	2.00E-3
POTASSIUM	NA	NA	0.99 J	1.00	1.63	1.00
SELENIUM	NA	0.01	U	5.00E-3	6.80E-4 J	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	6.26	1.00	6.42	1.00
THALLIUM	NA	4E-4	U	1.00E-3	U	1.00E-3
VANADIUM	NA	0.10	5.40E-3	5.00E-3	6.60E-3	5.00E-3
ZINC	0.43	0.18	4.20E-3 J	0.01	7.90E-3 J	0.01
Naphthenic Acid[6]	NA	NA	0.02		7E-3	

Table 5.5-2 Summary of Groundwater and Surface Water Results for SSF-25

NOTES

1. TOC = Top of the Casing
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D;however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.
5. Sum PAHs is the sum of detected concentrations of the following 23 compounds : it represents the sum of 16 PAHs in note 4, plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
6. Naphthenic acid represents the sum of 60 compounds as done by AXYS SOP MLA-077
7. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
8. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data
9. NA - Not available
10. RL = Reporting Limit
11. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
12. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
13. GW and SW standard in bold represent sum of isomers
14. Sample was analyzed for TPH GRO only.
15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

16. Grey colored cell indicates analytes were not analyzed for the sample(s)

Table 5.5-3 Summary of Sediment Results for SSF-25

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	SSF25-T01		SSF25-T02		SSF25-T03A	
Sample Name					SSF25-SD001		SSF25-SD004		SSF25-SD005	
Depth (m bgs^{1})					0 - 0.15		0.1 - 0.25		0.30 - 0.45	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^{2}	0.29	451	14	1,000	604		11,900		91	
Acenaphthene	NA	NA	NA	NA	3.30E-3 KJ	1.03E-3	0.05 D	0.01	U	1.97E-3
Acenaphthylene	NA	NA	NA	NA	U	2.46E-3	UD	0.01	U	8.26E-4
Anthracene	NA	NA	NA	NA	U	7.18E-3	UD	0.06	U	1.07E-3
Benz[a]anthracene	NA	NA	NA	NA	6.72E-3 KBJ	3.11E-3	0.19 BD	0.10	9.41E-4 KBJ	5.10E-4
Benzo[a]pyrene	NA	NA	NA	NA	U	7.38E-3	UD	0.10	U	2.05E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	7.25E-3 J	4.78E-3	0.28 D	0.06	U	1.43E-3
Benzo[ghi]perylene	NA	NA	NA	NA	0.03 K	2.81E-3	0.39 D	0.06	3.10E-3 KJ	1.42E-3
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	U	6.08E-3	UD	0.07	U	1.56E-3
Chrysene	NA	NA	NA	NA	0.08	4.26E-3	1.19 D	0.13	4.27E-3 BJ	4.93E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	U	3.34E-3	0.06 D	0.05	U	1.23E-3
Fluoranthene	NA	NA	NA	NA	6.24E-3 BJ	3.70E-3	UD	0.07	2.27E-3 BJ	8.92E-4
Fluorene	NA	NA	NA	NA	0.01 J	3.31E-3	0.15 D	0.06	U	7.52E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	U	3.00E-3	UD	0.06	U	1.56E-3
Naphthalene	NA	NA	NA	NA	2.88E-3 BJ	7.06E-4	0.01 BDJ	7.26E-3	3.58E-3 KBJ	3.22E-3
Phenanthrene	NA	NA	NA	NA	0.03 B	6.73E-3	0.35 BD	0.06	2.76E-3 BJ	9.85E-4
Pyrene	NA	NA	NA	NA	0.02 B	3.64E-3	0.30 BD	0.06	4.13E-3 BJ	8.79E-4
Sum of 6 PAHs^{3}	NA	NA	NA	1	0.05		0.67		5.37E-3	
LMW PAHs^{4}	NA	NA	NA	1	0.05		0.56		6.34E-3	
HMW PAHs^{5}	NA	NA	NA	1	0.15		2.41		0.01	
Sum of 16 PAHs^{6} (EPA High Priority PAH Compounds)	NA	NA	NA	1	0.21		2.97		0.02	
Sum PAHs^{7}	NA	NA	NA	1	5.22		15		1.37	
Sum Alkylated PAHs + Biphenyl^{15}	NA	NA	NA	NA	21		169		0.89	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	1.40	U	1.70	U	0.62
BENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
ETHYLBENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
TOLUENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
TOTAL XYLENES	NA	NA	NA	NA	U	0.09	U	0.08	U	0.04
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
CHLOROFORM	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
METHYLENE CHLORIDE	NA	NA	NA	NA	U	0.15	U	0.14	U	0.06
TETRACHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
TRICHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
VINYL CHLORIDE	NA	NA	NA	NA	U	0.06	U	0.06	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	3.00	U	2.80	U	1.20
2-BUTANONE	NA	NA	NA	NA	0.13 J	0.15	0.22	0.14	U	0.06
2-HEXANONE	NA	NA	NA	NA	U	0.15	U	0.14	U	0.06
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	0.15	U	0.14	U	0.06
ACETONE	NA	NA	NA	NA	1.30	0.15	2.60	0.14	0.38	0.06
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
BROMOFORM	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
BROMOMETHANE	NA	NA	NA	NA	U	0.06	U	0.06	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	6.70E-3 J	0.03	0.03	0.03	3.80E-3 J	0.01
CHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
CHLOROETHANE	NA	NA	NA	NA	U	0.06	U	0.06	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	U	0.06	U	0.06	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
CYCLOHEXANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	0.06	U	0.06	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
METHYL ACETATE	NA	NA	NA	NA	0.12	0.03	U	0.03	U	0.01
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
METHYLCYCLOHEXANE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
STYRENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.03	U	0.03	U	0.01
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	0.06	U	0.06	U	0.02
ALUMINUM	NA	NA	NA	NA	43,200	110	47,800	110	49,400	47
ANTIMONY	NA	NA	NA	NA	U	0.36	0.15 J	0.36	0.03 J	0.16
ARSENIC	NA	NA	NA	NA	U	1.80	1.20 J	1.80	0.32 J	0.78
BARIUM	17	910	231	NA	332	0.71	333	0.72	345	0.31
BERYLLIUM	NA	NA	NA	NA	0.69	0.36	0.78	0.36	0.82	0.16
CADMIUM	0.07	0.29	0.16	1	0.43	0.36	0.46	0.36	0.34	0.16
CALCIUM	NA	NA	NA	NA	13,400	36	7,570	36	3,660	16
CHROMIUM	5.10	98	22	NA	77	1.80	53	1.80	88	0.78
COBALT	NA	NA	NA	NA	11	0.36	19	0.36	15	0.16
COPPER	4.30	69	28	NA	46	1.10	50	1.10	41	0.47
IRON	NA	NA	NA	NA	23,100	36	33,600	36	23,600	16
LEAD	2.10	15	7.05	80	15	0.36	29	0.36	5.70	0.16
MAGNESIUM	NA	NA	NA	NA	2,260	36	3,260	36	2,130	16
MANGANESE	NA	NA	NA	NA	156	0.71	794	0.72	123	0.31
MERCURY	7.10E-3	0.27	0.11	NA	0.07 J	0.11	0.05 J	0.13	0.04 J	0.05
NICKEL	4.00	43	14	40	23	0.71	27	0.72	27	0.31
POTASSIUM	NA	NA	NA	NA	570	360	700	360	540	160
SELENIUM	NA	NA	NA	NA	U	1.80	U	1.80	U	0.78
SILVER	NA	NA	NA	NA	0.14 J	0.36	0.16 J	0.36	0.12 J	0.16
SODIUM	NA	NA	NA	NA	631	360	613	360	522	160
THALLIUM	NA	NA	NA	NA	0.17 J	0.36	0.19 J	0.36	0.10 J	0.16
VANADIUM	40	171	93	NA	107	1.80	127	1.80	132	0.78
ZINC	16	134	49	NA	104	3.60	193	3.60	97	1.60
TOTAL ORGANIC CARBON	NA	NA	NA	NA	140,000	1,800	200,000	2,000	48,000	760

Table 5.5-3 Summary of Sediment Results for SSF-25

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	SSF25-T02A		SSF25-SP	
Sample Name					SSF25-SD006		SSF25-SD007	
Depth (m bgs[1])					0.00 - 0.12		0.02 - 0.17	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	3,140		48	
Acenaphthene	NA	NA	NA	NA	0.05 KJ	4.86E-3	U	1.71E-3
Acenaphthylene	NA	NA	NA	NA	U	3.64E-3	U	7.89E-4
Anthracene	NA	NA	NA	NA	U	0.06	7.79E-4 KBJ	3.66E-4
Benz[a]anthracene	NA	NA	NA	NA	0.05 KB	0.01	6.12E-4 KBJ	2.53E-4
Benzo[a]pyrene	NA	NA	NA	NA	U	0.04	U	1.40E-3
Benzo[b]fluoranthene	NA	NA	NA	NA	0.04 J	0.03	U	9.46E-4
Benzo[ghi]perylene	NA	NA	NA	NA	0.09	0.01	1.05E-3 KBJ	7.99E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	U	0.03	U	1.08E-3
Chrysene	NA	NA	NA	NA	0.27 B	0.02	9.39E-4 KBJ	2.58E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	U	0.01	U	1.91E-3
Fluoranthene	NA	NA	NA	NA	U	0.03	1.45E-3 BJ	3.32E-4
Fluorene	NA	NA	NA	NA	0.10	0.02	U	7.04E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	U	0.01	1.41E-3 KBJ	8.60E-4
Naphthalene	NA	NA	NA	NA	0.01 BJ	3.17E-3	4.30E-3 BJ	9.35E-4
Phenanthrene	NA	NA	NA	NA	0.06 KB	0.05	2.59E-3 BJ	3.37E-4
Pyrene	NA	NA	NA	NA	0.10 B	0.02	9.35E-4 BJ	3.27E-4
Sum of 6 PAHs[3]	NA	NA	NA	1	0.13		3.91E-3	
LMW PAHs[4]	NA	NA	NA	1	0.22		7.67E-3	
HMW PAHs[5]	NA	NA	NA	1	0.55		6.40E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	0.76		0.01	
Sum PAHs[7]	NA	NA	NA	1	6.96		0.52	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	56		0.09	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	1.30	U	0.65
BENZENE	NA	NA	NA	NA	U	0.03	U	0.01
ETHYLBENZENE	NA	NA	NA	NA	U	0.03	U	0.01
TOLUENE	NA	NA	NA	NA	U	0.03	0.0052 J	0.01
TOTAL XYLENES	NA	NA	NA	NA	U	0.09	U	0.03
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.01
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.01
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.01
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.01
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.01
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	0.03	U	0.01
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	0.03	U	0.01
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	0.03	U	0.01
CHLOROFORM	NA	NA	NA	NA	U	0.03	U	0.01
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.01
METHYLENE CHLORIDE	NA	NA	NA	NA	U	0.14	U	0.05
TETRACHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.01
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.01
TRICHLOROETHENE	NA	NA	NA	NA	U	0.03	U	0.01
VINYL CHLORIDE	NA	NA	NA	NA	U	0.06	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	0.03	U	0.01
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.01
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.01
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	0.03	U	0.01
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	0.03	U	0.01
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.01
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.01
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.01
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	2.90	U	1.00
2-BUTANONE	NA	NA	NA	NA	0.10 J	0.14	0.02 J	0.05
2-HEXANONE	NA	NA	NA	NA	U	0.14	U	0.05
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	0.14	U	0.05
ACETONE	NA	NA	NA	NA	1.10	0.14	0.26	0.05
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.01
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.01
BROMOFORM	NA	NA	NA	NA	U	0.03	U	0.01
BROMOMETHANE	NA	NA	NA	NA	U	0.06	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	0.01 J	0.03	2.20E-3 J	0.01
CHLOROBENZENE	NA	NA	NA	NA	U	0.03	U	0.01
CHLOROETHANE	NA	NA	NA	NA	U	0.06	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	U	0.06	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.03	U	0.01
CYCLOHEXANE	NA	NA	NA	NA	U	0.03	U	0.01
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.03	U	0.01
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	0.06	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	0.08	0.03	U	0.01
METHYL ACETATE	NA	NA	NA	NA	U	0.03	U	0.01
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	0.03	U	0.01
METHYLCYCLOHEXANE	NA	NA	NA	NA	U	0.03	U	0.01
STYRENE	NA	NA	NA	NA	U	0.03	U	0.01
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.03	U	0.01
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	0.06	U	0.02
ALUMINUM	NA	NA	NA	NA	69,600	120	84,200	230
ANTIMONY	NA	NA	NA	NA	0.10 J	0.42	0.06 J	0.16
ARSENIC	NA	NA	NA	NA	0.94 J	2.10	0.67 J	0.78
BARIUM	17	910	231	NA	579	0.84	460	0.31
BERYLLIUM	NA	NA	NA	NA	1.10	0.42	1.10	0.16
CADMIUM	0.07	0.29	0.16	1	0.35 J	0.42	0.24	0.16
CALCIUM	NA	NA	NA	NA	4,510	42	3,460	78
CHROMIUM	5.10	98	22	NA	48	2.10	77	0.78
COBALT	NA	NA	NA	NA	17	0.42	20	0.16
COPPER	4.30	69	28	NA	53	1.20	52	0.47
IRON	NA	NA	NA	NA	35,800	42	54,100	78
LEAD	2.10	15	7.05	80	17	0.42	7.50	0.16
MAGNESIUM	NA	NA	NA	NA	2,430	42	3,310	78
MANGANESE	NA	NA	NA	NA	299	0.84	248	0.31
MERCURY	7.10E-3	0.27	0.11	NA	0.09 J	0.12	0.04 J	0.07
NICKEL	4.00	43	14	40	30	0.84	38	0.31
POTASSIUM	NA	NA	NA	NA	653	420	722 J	780
SELENIUM	NA	NA	NA	NA	U	2.10	U	0.78
SILVER	NA	NA	NA	NA	0.15 J	0.42	0.11 J	0.16
SODIUM	NA	NA	NA	NA	646	420	309 J	780
THALLIUM	NA	NA	NA	NA	0.14 J	0.42	0.08 J	0.16
VANADIUM	40	171	93	NA	131	2.10	168	0.78
ZINC	16	134	49	NA	114	4.20	94	1.60
TOTAL ORGANIC CARBON	NA	NA	NA	NA	220,000	1,800	48,000	810

Table 5.5-3 Summary of Sediment Results for SSF-25

NOTES

1. bgs = Below Ground Surface

2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes,

4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).

5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).

6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high

7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.

8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.

9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
B = analyte found in sample and the associated blank.
K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
D = dilution data

10. NA - Not available

11. RL = Reporting Limit

12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: yellow - exceeds RAOHE sensitive ecosytem criteria.

13. Sample arrived at laboratory outside of holding temperature due to transit delays.

14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.

15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-

Table 5.6-1 Summary of Soil Results for YU-02

Sample Location	CVX Background Values			RAOHE Sensitive Ecosystem Criteria Decreto 1215	RAOHE Agricultural Criteria Decreto 1215	TULSMA Residential Criteria Decreto 3516	TULSMA Agricultural Criteria Decreto 3516	Lago Agrio Judgment	YU02-N14B		YU02-N06A		YU02-N09A	
Sample Name									YU02-SL002		YU02-SL003		YU02-SL004	
Depth (m bgs[1])									0.8 - 0.95		0.66 - 1.1		0.85 - 1.05	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	4.20		183		3,172	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.65E-3	U	4.84E-3	0.04 KJ	0.02
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.10E-3	U	1.65E-3	U	7.34E-3
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.19E-3	U	3.97E-3	U	0.04
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	5.65E-4 KBJ	5.63E-4	U	2.45E-3	0.03 KBJ	0.01
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	1.71E-3	U	5.65E-3	U	0.03
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.06E-3	U	3.37E-3	U	0.01
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	U	2.63E-3	5.51E-3 KBJ	4.93E-3	0.02 KBJ	0.02
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	1.38E-3	U	4.41E-3	U	0.02
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	1.08E-3 BJ	6.03E-4	0.01 KBJ	2.79E-3	0.21 BJ	0.02
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.22E-3	U	5.38E-3	U	0.01
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	1.24E-3 BJ	4.57E-4	3.43E-3 KBJ	2.86E-3	U	0.02
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.81E-3	U	1.71E-3	0.17 J	0.01
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	2.51E-3 KBJ	2.36E-3	7.90E-3 KBJ	4.68E-3	U	0.02
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	4.95E-3 KBJ	2.14E-3	0.01 KBJ	6.65E-3	0.09 BJ	0.01
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	U	1.12E-3	8.03E-3 KJ	3.72E-3	0.65	0.03
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	9.50E-4 BJ	4.50E-4	3.25E-3 BJ	2.81E-3	0.05 BJ	0.02
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	3.75E-3		0.02		0.02	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	4.95E-3		0.02		0.96	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	6.35E-3		0.03		0.31	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	0.01		0.05		1.27	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	0.05		0.13		8.56	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	0.01		0.94		81	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.47	U	0.49	U	0.44
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	0.44	U	0.01	U	7.00E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	0.5	0.1	NA	U	0.44	U	0.01	U	7.00E-3
TOLUENE	NA	NA	NA	NA	NA	0.5	0.1	NA	U	0.44	U	0.01	U	7.00E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	1.33	U	0.03	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
CHLOROFORM	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	1	0.1	NA	U	2.20	U	0.05	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.5	0.1	NA	U	0.44	U	0.01	U	7.00E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.89	U	0.02	U	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	0.50	0.05	NA	U	0.44	U	0.01	U	7.00E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	U	7.00E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	U	7.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	0.50	0.05	NA	U	0.44	U	0.01	U	7.00E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	U	7.00E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	U	7.00E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	U	7.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	1	0.05	NA	U	44	U	1.00	U	0.70
2-BUTANONE	NA	NA	NA	NA	NA	1	0.05	NA	U	2.20	U	0.05	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	1	0.05	NA	U	2.20	U	0.05	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	1	0.05	NA	U	2.20	U	0.05	U	0.04
ACETONE	NA	NA	NA	NA	NA	1	0.05	NA	U	2.20	0.03 J	0.05	0.25	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
BROMOFORM	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	U	7.00E-3
BROMOMETHANE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.89	U	0.02	U	0.01
CARBON DISULFIDE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	U	7.00E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	U	7.00E-3
CHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.89	U	0.02	U	0.01
CHLOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.89	U	0.02	U	0.01
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.44	U	0.01	9.10E-3	7.00E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.89	U	0.02	U	0.01
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01		7.00E-3
METHYL ACETATE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01		7.00E-3
STYRENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.44	U	0.01	U	7.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.89	U	0.02	U	0.01
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	33,500	27	28,700	28	43,800	32
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.13	0.09	0.08 J	0.09	0.10 J	0.11
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	1.60	0.45	2.50	0.47	1.20	0.54
BARIUM	17	910	231	NA	NA	500	750	NA	205	0.18	516	0.38	373	0.21
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.84	0.09	0.91	0.09	0.61	0.11
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.12	0.09	0.21	0.09	0.12	0.11
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	3,180	8.90	5,260	9.40	2,650	11
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	21	0.45	17	0.47	17	0.54
COBALT	NA	NA	NA	NA	NA	50	40	NA	16	0.09	13	0.09	9.20	0.11
COPPER	4.30	69	28	NA	NA	63	63	NA	50	0.27	30	0.28	37	0.32
IRON	NA	NA	NA	NA	NA	NA	NA	NA	28,000	18	23,000	9.40	22,500	11
LEAD	2.10	15	7.05	80	100	100	100	NA	10	0.09	8.70	0.09	12	0.11
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,740	18	3,150	9.40	1,880	11
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	336	0.18	273	0.19	277	0.21
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.04 J	0.04	0.03 J	0.03	0.08	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	17	0.18	17	0.19	14	0.21
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	490	89	525	94	581	110
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	0.16 J	0.45	0.26 J	0.47	0.33 J	0.54
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.05 J	0.09	0.06 J	0.09	0.08 J	0.11
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	428	89	951	94	478	110
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.13	0.09	0.10	0.09	0.18	0.11
VANADIUM	40	171	93	NA	NA	130	130	NA	77	0.45	89	0.47	88	0.54
ZINC	16	134	49	NA	NA	200	200	NA	68	0.89	80	0.94	51	1.10
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	3,500	590	5,500	600	27,000	540

Table 5.6-1 Summary of Soil Results for YU-02

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	**RAOHE Agricultural Criteria Decreto 1215**	**TULSMA Residential Criteria Decreto 3516**	**TULSMA Agricultural Criteria Decreto 3516**	**Lago Agrio Judgment**	YU02-N18A		YU02-N02A	
Sample Name									**YU02-SL005**		**YU02-SL007** [13]	
Depth (m bgs[1])									0.2 - 0.36		1.85 - 2.00	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	2,500	2,500	500	100	7,540		7.10	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	8.04E-3 KJ	3.08E-3	U	4.95E-4
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	U	2.48E-3	3.06E-3 BJ	2.48E-4
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.04 KJ	0.04	5.81E-4 BJ	1.65E-4
Benz[a]anthracene	NA	NA	NA	NA	NA	1	0.1	NA	0.18 KB	0.04	2.63E-4 BJ	1.34E-4
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.7	0.1	NA	U	0.02	4.39E-4 KJ	4.25E-4
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.08 K	0.02	U	3.10E-4
Benzo[ghi]perylene	NA	NA	NA	NA	NA	NA	NA	NA	0.11 B	0.01	6.74E-4 BJ	2.51E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	U	3.35E-4
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.96 B	0.04	4.20E-4 BJ	1.63E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	3.12E-4 KJ	2.75E-4
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	1.60E-3 BJ	1.63E-4
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	0.01 J	3.01E-3	5.12E-4 J	2.23E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	U	0.02	5.06E-4 KBJ	2.69E-4
Naphthalene	NA	NA	NA	NA	NA	0.6	0.1	NA	4.71E-3 BJ	1.59E-3	0.01 BJ	4.63E-4
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	0.13 K	0.03	2.42E-3 BJ	1.51E-4
Pyrene	NA	NA	NA	NA	NA	10	0.1	NA	0.11 B	0.02	1.73E-3 BJ	1.61E-4
Sum of 6 PAHs[3]	NA	NA	NA	1	2	NA	2	NA	0.19		3.22E-3	
LMW PAHs[4]	NA	NA	NA	1	2	NA	2	NA	0.20		0.02	
HMW PAHs[5]	NA	NA	NA	1	2	NA	2	NA	1.43		5.94E-3	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	2	NA	2	NA	1.62		0.02	
Sum PAHs[7]	NA	NA	NA	1	2	NA	2	NA	2.68		0.04	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	NA	NA	NA	NA	76		0.02	
Total Phenols by Method SW8270	NA	NA	NA	NA	NA	3.8	3.8	NA	U	0.57	U	0.46
BENZENE	NA	NA	NA	NA	NA	0.5	0.05	NA	U	0.02	U	7.50E-3
ETHYLBENZENE	NA	NA	NA	NA	NA	0.5	0.1	NA	U	0.02	U	7.50E-3
TOLUENE	NA	NA	NA	NA	NA	0.5	0.1	NA	U	0.02	U	7.50E-3
TOTAL XYLENES	NA	NA	NA	NA	NA	1	0.1	NA	U	0.06	U	0.02
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
1,1-DICHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
1,1-DICHLOROETHENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
1,2-DICHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
1,2-DICHLOROPROPANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
CARBON TETRACHLORIDE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
CHLOROFORM	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
METHYLENE CHLORIDE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.09	U	0.04
TETRACHLOROETHENE	NA	NA	NA	NA	NA	0.5	0.1	NA	U	0.02	U	7.50E-3
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
TRICHLOROETHENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
VINYL CHLORIDE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.04	U	0.02
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	NA	0.50	0.05	NA	U	0.02	U	7.50E-3
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.02	U	7.50E-3
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.02	U	7.50E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
1,2-DIBROMOETHANE	NA	NA	NA	NA	NA	0.50	0.05	NA	U	0.02	U	7.50E-3
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.02	U	7.50E-3
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.02	U	7.50E-3
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.02	U	7.50E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	NA	1	0.05	NA	U	1.80	U	0.75
2-BUTANONE	NA	NA	NA	NA	NA	1	0.05	NA	0.23	0.09	U	0.04
2-HEXANONE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.09	U	0.04
4-METHYL-2-PENTANONE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.09	U	0.04
ACETONE	NA	NA	NA	NA	NA	1	0.05	NA	1.20	0.09	0.07	0.04
BROMOCHLOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
BROMODICHLOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
BROMOFORM	NA	NA	NA	NA	NA	1	0.05	NA	U	0.02	U	7.50E-3
BROMOMETHANE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.04	U	0.02
CARBON DISULFIDE	NA	NA	NA	NA	NA	1	0.05	NA	3.20E-3 J	0.02	U	7.50E-3
CHLOROBENZENE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.02	U	7.50E-3
CHLOROETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.04	U	0.02
CHLOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.04	U	0.02
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
CYCLOHEXANE	NA	NA	NA	NA	NA	1	0.05	NA	U	0.02	U	7.50E-3
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.04	U	0.02
ISOPROPYLBENZENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
METHYL ACETATE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
METHYLCYCLOHEXANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
STYRENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.02	U	7.50E-3
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	NA	1	0.1	NA	U	0.04	U	0.02
ALUMINUM	NA	NA	NA	NA	NA	NA	NA	NA	41,600	40	39,500	37
ANTIMONY	NA	NA	NA	NA	NA	NA	NA	NA	0.16	0.13	0.10 J	0.12
ARSENIC	NA	NA	NA	NA	NA	15	12	NA	2.00	0.66	1.00	0.62
BARIUM	17	910	231	NA	NA	500	750	NA	2,800	1.30	401	0.25
BERYLLIUM	NA	NA	NA	NA	NA	NA	NA	NA	0.67	0.13	1.50	0.12
CADMIUM	0.07	0.29	0.16	1	2	5	2	NA	0.51	0.13	0.21	0.12
CALCIUM	NA	NA	NA	NA	NA	NA	NA	NA	4,120	13	4,300	12
CHROMIUM	5.10	98	22	NA	NA	65	65	NA	29	0.66	20	0.62
COBALT	NA	NA	NA	NA	NA	50	40	NA	11	0.13	15	0.12
COPPER	4.30	69	28	NA	NA	63	63	NA	48	0.40	67	0.37
IRON	NA	NA	NA	NA	NA	NA	NA	NA	24,500	13	24,300	12
LEAD	2.10	15	7.05	80	100	100	100	NA	35	0.13	7.10	0.12
MAGNESIUM	NA	NA	NA	NA	NA	NA	NA	NA	3,090	13	1,780	12
MANGANESE	NA	NA	NA	NA	NA	NA	NA	NA	274	0.26	147	0.25
MERCURY	7.10E-3	0.27	0.11	NA	NA	2	0.8	NA	0.09	0.05	0.02 J	0.04
NICKEL	4.00	43	14	40	50	100	50	NA	42	0.26	27	0.25
POTASSIUM	NA	NA	NA	NA	NA	NA	NA	NA	889	130	542	120
SELENIUM	NA	NA	NA	NA	NA	3	2	NA	0.31 J	0.66	U	0.62
SILVER	NA	NA	NA	NA	NA	20	20	NA	0.22	0.13	0.10 J	0.12
SODIUM	NA	NA	NA	NA	NA	NA	NA	NA	736	130	819	120
THALLIUM	NA	NA	NA	NA	NA	1	1	NA	0.19	0.13	0.08 J	0.12
VANADIUM	40	171	93	NA	NA	130	130	NA	83	0.66	123	0.62
ZINC	16	134	49	NA	NA	200	200	NA	124	1.30	83	1.20
TOTAL ORGANIC CARBON	NA	NA	NA	NA	NA	NA	NA	NA	88,000	690	3,900	580

Table 5.6-1 Summary of Soil Results for YU-02

NOTES

1. bgs = Below Ground Surface
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).
5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).
6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.
7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data
10. NA - Not available
11. RL = Reporting Limit
12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
13. Sample arrived at laboratory outside of holding temperature due to transit delays.
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Table 5.6-2 Summary of Groundwater and Surface Water Results for YU-02

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Groundwater**							
Sample Location			YU02-N10 (MW01)		YU02-N05 (MW02)		YU02-N11 (MW03)		YU02-N08 (MW04)	
Sample Name			YU02-GW003		YU02-GW004		YU02-GW005		YU02-GW006	
Depth (ft / meter below TOC[1])			15.75 ft (4.8 m)		17.72 ft (5.4 m)		16.73 ft (5.1 m)		11.32 ft (3.45 m)	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.24		0.17		0.68		0.58	
Acenaphthene	NA	NA	2.74E-6 J	3.98E-7	8.73E-7 BJ	3.57E-7	1.79E-5 B	4.69E-7	5.93E-5 (blank	5.27E-7
Acenaphthylene	NA	2E-3	3.36E-7 KJ	8.31E-8	U	3.19E-7	5.52E-7 BJ	1.21E-7	1.06E-6 J	3.73E-7
Anthracene	2.5E-3	NA	U	7.00E-7	5.78E-7 BJ	2.58E-7	9.13E-7 BJ	3.09E-7	3.07E-6 KBJ	3.45E-7
Benz[a]anthracene	2.5E-4	NA	1.60E-7 KBJ	6.13E-8	6.44E-7 BJ	1.30E-7	2.56E-7 KBJ	2.11E-7	1.86E-6 KBJ	2.16E-7
Benzo[a]pyrene	2.6E-5	NA	U	1.43E-7	U	1.60E-7	U	3.60E-7	1.12E-6 J	6.10E-7
Benzo[b]fluoranthene	NA	NA	U	7.63E-8	5.96E-7 J	1.18E-7	U	2.22E-7	1.20E-6 KJ	4.35E-7
Benzo[ghi]perylene	2.5E-5	NA	1.61E-7 KBJ	1.10E-7	1.12E-6 BJ	9.24E-8	6.98E-7 BJ	2.02E-7	2.08E-6 BJ	3.45E-7
Benzo[j,k]fluoranthenes	2.6E-5	NA	1.23E-7 KJ	8.63E-8	5.20E-7 J	1.28E-7	U	2.54E-7	U	4.53E-7
Chrysene	2.6E-5	NA	1.72E-6 BJ	6.85E-8	1.29E-6 BJ	1.35E-7	3.64E-6 BJ	2.67E-7	1.20E-5 B	2.73E-7
Dibenz[a,h]anthracene	NA	NA	U	1.83E-7	U	2.15E-7	U	1.28E-7	U	5.28E-7
Fluoranthene	5E-4	NA	7.77E-7 BJ	8.38E-8	5.29E-6 BJ	5.62E-8	1.72E-6 BJ	9.08E-8	6.58E-6 B	1.10E-7
Fluorene	NA	NA	6.03E-6 B	1.31E-7	9.37E-7 BJ	1.34E-7	1.43E-5 B	2.58E-7	1.01E-4 B	1.97E-7
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	1.53E-7 KBJ	1.11E-7	9.42E-7 KBJ	9.60E-8	2.65E-7 KBJ	2.19E-7	4.05E-7 KBJ	3.82E-7
Naphthalene	0.04	6E-3	1.73E-5 B	2.98E-7	8.50E-6 B	3.38E-7	2.25E-5 B	2.38E-7	5.36E-4 B	1.48E-6
Phenanthrene	2.5E-3	NA	1.47E-5 B	2.33E-7	1.25E-5 B	2.37E-7	1.81E-5 B	2.84E-7	1.91E-4 B	3.17E-7
Pyrene	NA	NA	1.76E-6 BJ	8.25E-8	5.89E-6 B	5.53E-8	6.62E-6 B	8.94E-8	8.49E-6 B	1.08E-7
Sum of 6 PAHs[3]	NA	3E-4	1.21E-6	6.10E-7	8.47E-6	6.51E-7	2.68E-6	1.35E-6	1.14E-5	2.34E-6
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	4.60E-5	2.85E-6	3.97E-5	2.83E-6	8.75E-5	3.72E-6	9.25E-4	6.70E-6
Sum PAHs[5]	NA	3E-4	1.07E-4	4.00E-6	6.23E-5	4.74E-6	2.35E-4	5.64E-6	4.00E-3	1.07E-5
Sum Alkylated PAHs + Biphenyl[14]	NA	NA	6.42E-4	2.24E-6	2.21E-4	2.91E-6	1.08E-3	2.55E-6	0.02	4.65E-6
Total Phenols by Method E420.1	1	0.001	2.00E-3 J	5.00E-3	1.40E-3 J	5.00E-3	1.40E-3 J	5.00E-3	2.40E-3 J	5.00E-3
Total Phenols by Method SW8270	1	0.001	U	0.01	U	0.01	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOTAL XYLENES	0.035	NA	U	1.50E-3	U	1.50E-3	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3	U	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	0.10 J	0.30	7.16	0.30	8.88	0.30	8.14	0.30
ANTIMONY	NA	0.02	1.30E-4 J	1.00E-3	2.00E-4 J	1.00E-3	2.80E-4 J	1.00E-3	1.80E-4 J	1.00E-3
ARSENIC	0.04	0.05	5.00E-3 J	5.00E-3	3.70E-3 J	5.00E-3	8.50E-3	5.00E-3	5.90E-3	5.00E-3
BARIUM	0.34	1	0.54	2.00E-3	0.21	2.00E-3	1.13	2.00E-3	1.46	2.00E-3
BERYLLIUM	NA	0.1	U	1.00E-3	1.80E-4 J	1.00E-3	2.50E-4 J	1.00E-3	2.00E-4 J	1.00E-3
CADMIUM	0.0032	0.001	9.00E-5 J	1.00E-3	5.40E-4 J	1.00E-3	2.30E-4 J	1.00E-3	2.90E-4 J	1.00E-3
CALCIUM	NA	NA	34	0.10	102	0.10	51	0.10	47	0.10
CHROMIUM	0.02	0.05	3.70E-3 J	5.00E-3	6.40E-3	5.00E-3	7.90E-3	5.00E-3	7.50E-3	5.00E-3
COBALT	0.06	0.20	0.01	1.00E-3	0.01	1.00E-3	7.60E-3	1.00E-3	0.03	1.00E-3
COPPER	0.05	0.02	1.80E-3 J	3.00E-3	0.01	3.00E-3	0.02	3.00E-3	0.01	3.00E-3
IRON	NA	0.30	1.67	0.10	4.78	0.10	31	0.10	67	0.10
LEAD	0.05	NA	1.70E-4 J	1.00E-3	2.50E-3	1.00E-3	9.30E-3	1.00E-3	7.00E-3	1.00E-3
MAGNESIUM	NA	NA	34	0.10	44	0.10	23	0.10	15	0.10
MANGANESE	NA	0.10	4.46	2.00E-3	2.79	2.00E-3	2.22	2.00E-3	4.64	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4
NICKEL	0.05	0.03	5.40E-3	2.00E-3	5.00E-3	2.00E-3	6.70E-3	2.00E-3	8.80E-3	2.00E-3
POTASSIUM	NA	NA	1.36	1.00	2.25	1.00	4.22	1.00	3.96	1.00
SELENIUM	NA	0.01	U	5.00E-3	5.00E-4 J	5.00E-3	U	5.00E-3	1.20E-3 J	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3	7.00E-5 J	1.00E-3	U	1.00E-3
SODIUM	NA	NA	266	5.00	97	1.00	12	1.00	25	1.00
THALLIUM	NA	4E-4	U	1.00E-3	7.00E-5 J	1.00E-3	U	1.00E-3	6.00E-5 J	1.00E-3
VANADIUM	NA	0.10	3.10E-3 J	5.00E-3	0.02	5.00E-3	0.02	5.00E-3	0.02	5.00E-3
ZINC	0.43	0.18	4.20E-3 J	0.01	0.01	0.01	0.03	0.01	0.03	0.01
Naphthenic Acid[6]	NA	NA	0.1		0.08		2		1.07	

Table 5.6-2 Summary of Groundwater and Surface Water Results for YU-02

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Surface Water**					
Sample Location			YU02-T06A		YU02-T04		YU02-T03	
Sample Name			YU02-SW001		YU02-SW002		YU02-SW003	
Depth (ft / meter below TOC[1])			0.49 ft (0.15 m)		0.49 ft (0.15 m)		0.49 ft (0.15 m)	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	0.44		0.09		0.05	
Acenaphthene	NA	NA	2.54E-6 J	1.12E-7	1.46E-6 J	2.25E-7	1.19E-6 J	4.55E-7
Acenaphthylene	NA	2E-3	9.32E-7 KBJ	1.74E-7	5.46E-7 BJ	1.35E-7	7.87E-7 BJ	1.38E-7
Anthracene	2.5E-3	NA	1.81E-6 KJ	2.32E-7	U	4.61E-7	U	1.19E-7
Benz[a]anthracene	2.5E-4	NA	2.90E-6 KBJ	3.94E-7	3.22E-7 BJ	1.66E-7	U	3.04E-8
Benzo[a]pyrene	2.6E-5	NA	U	7.29E-7	U	6.54E-7	U	2.17E-7
Benzo[b]fluoranthene	NA	NA	3.55E-6 KJ	4.21E-7	3.41E-7 J	2.93E-7	U	1.12E-7
Benzo[ghi]perylene	2.5E-5	NA	1.19E-5 B	9.57E-7	U	5.42E-7	U	1.70E-7
Benzo[j,k]fluoranthenes	2.6E-5	NA	U	5.05E-7	U	3.57E-7	U	1.35E-7
Chrysene	2.6E-5	NA	2.33E-5 B	5.19E-7	2.87E-6 BJ	1.82E-7	1.13E-7 BJ	3.91E-8
Dibenz[a,h]anthracene	NA	NA	U	6.96E-7	U	1.40E-7	U	2.07E-7
Fluoranthene	5E-4	NA	1.39E-6 BJ	1.58E-7	2.99E-7 BJ	2.70E-7	3.26E-7 BJ	6.06E-8
Fluorene	NA	NA	3.50E-6 J	2.48E-7	2.44E-6 J	1.13E-7	U	1.67E-7
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	U	1.02E-6	U	5.43E-7	5.17E-7 KBJ	1.66E-7
Naphthalene	0.04	6E-3	3.60E-5 B	3.39E-7	2.58E-5 B	3.93E-7	3.62E-5 B	3.53E-7
Phenanthrene	2.5E-3	NA	1.11E-5 B	2.17E-7	7.74E-6 B	4.32E-7	1.49E-6 BJ	1.12E-7
Pyrene	NA	NA	4.39E-6 BJ	1.55E-7	7.26E-7 BJ	2.66E-7	3.92E-7 BJ	5.96E-8
Sum of 6 PAHs[3]	NA	3E-4	1.68E-5		6.40E-7		8.43E-7	
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	1.03E-4		4.25E-5		4.10E-5	
Sum PAHs[5]	NA	3E-4	2.47E-4		1.06E-4		5.55E-5	
Sum Alkylated PAHs + Biphenyl[14]	NA	NA	1.80E-3		6.72E-4		4.24E-5	
Total Phenols by Method E420.1	1	0.001	4.50E-3 J	5.00E-3	1.40E-3 J	5.00E-3	U	5.20E-3
Total Phenols by Method SW8270	1	0.001	U	9.50E-3	U	0.01	U	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	4.00E-4 J	5.00E-4	U	5.00E-4	U	5.00E-4
TOTAL XYLENES	0.035	NA	U	1.50E-3	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10	U	0.10
2-BUTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	U	5.00E-3	U	5.00E-3	U	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	2.49	0.30	1.71	0.30	1.36	0.30
ANTIMONY	NA	0.02	5.00E-5 J	1.00E-3	U	1.00E-3	U	1.00E-3
ARSENIC	0.04	0.05	U	5.00E-3	U	5.00E-3	U	5.00E-3
BARIUM	0.34	1	0.14	2.00E-3	0.06	2.00E-3	0.04	2.00E-3
BERYLLIUM	NA	0.1	6.00E-5 J	1.00E-3	U	1.00E-3	U	1.00E-3
CADMIUM	0.0032	0.001	9.00E-5 J	1.00E-3	U	1.00E-3	4.00E-5 J	1.00E-3
CALCIUM	NA	NA	3.88	0.10	3.36	0.10	4.62	0.10
CHROMIUM	0.02	0.05	7.40E-4 J	5.00E-3	3.10E-4 J	5.00E-3	2.80E-4 J	5.00E-3
COBALT	0.06	0.20	1.10E-3	1.00E-3	6.70E-4 J	1.00E-3	2.20E-3	1.00E-3
COPPER	0.05	0.02	3.80E-3	3.00E-3	2.70E-3 J	3.00E-3	3.10E-3	3.00E-3
IRON	NA	0.30	2.16	0.10	1.78	0.10	4.00	0.10
LEAD	0.05	NA	1.30E-3	1.00E-3	4.40E-4 J	1.00E-3	7.10E-4 J	1.00E-3
MAGNESIUM	NA	NA	1.81	0.10	1.34	0.10	1.58	0.10
MANGANESE	NA	0.10	0.12	2.00E-3	0.06	2.00E-3	0.33	2.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4	U	2.00E-4
NICKEL	0.05	0.03	1.50E-3 J	2.00E-3	9.10E-4 J	2.00E-3	1.20E-3 J	2.00E-3
POTASSIUM	NA	NA	1.17	1.00	0.50 J	1.00	0.69 J	1.00
SELENIUM	NA	0.01	7.70E-4 J	5.00E-3	7.50E-4 J	5.00E-3	9.00E-4 J	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	2.19	1.00	1.89	1.00	2.05	1.00
THALLIUM	NA	4E-4	U	1.00E-3	U	1.00E-3	U	1.00E-3
VANADIUM	NA	0.10	3.50E-3 J	5.00E-3	2.50E-3 J	5.00E-3	3.00E-3 J	5.00E-3
ZINC	0.43	0.18	0.01	0.01	0.01	0.01	9.30E-3 J	0.01
Naphthenic Acid[6]	NA	NA	0.06		9E-3		0.01	

Table 5.6-2 Summary of Groundwater and Surface Water Results for YU-02

Matrix	**TULSMA Appendix 1 (Table 5) for Groundwater Decreto 3516**	**TULSMA Appendix 1 (Tables 3 and 4) for Surface Water Decreto 3516**	**Surface Water**			
Sample Location			YU02-T05		YU02-T06B	
Sample Name			YU02-SW005		YU02-SW006	
Depth (ft / meter below TOC[1])			NA		NA	
Analyte	Values (mg/L)	Values (mg/L)	Values (mg/L)	RL (mg/L)	Values (mg/L)	RL (mg/L)
TPH[2]	0.325	0.5	1.03		2.20	
Acenaphthene	NA	NA	U	2.01E-6	U	2.13E-6
Acenaphthylene	NA	2E-3	1.25E-6 BJ	7.75E-7	U	1.47E-6
Anthracene	2.5E-3	NA	8.79E-6 KBJ	1.43E-6	2.05E-6 BJ	1.54E-6
Benz[a]anthracene	2.5E-4	NA	U	4.30E-6	5.30E-6 KBJ	2.94E-6
Benzo[a]pyrene	2.6E-5	NA	U	1.29E-5	U	9.21E-6
Benzo[b]fluoranthene	NA	NA	U	9.02E-6	1.18E-5 KJ	6.00E-6
Benzo[ghi]perylene	2.5E-5	NA	1.12E-4 B	7.55E-6	9.91E-5 B	6.78E-6
Benzo[j,k]fluoranthenes	2.6E-5	NA	U	1.02E-5	U	7.35E-6
Chrysene	2.6E-5	NA	2.10E-5 KBJ	4.89E-6	3.68E-5 KB	3.27E-6
Dibenz[a,h]anthracene	NA	NA	U	1.02E-5	U	8.58E-6
Fluoranthene	5E-4	NA	9.10E-6 BJ	2.53E-6	1.06E-5 KBJ	2.75E-6
Fluorene	NA	NA	2.73E-6 BJ	1.43E-6	1.81E-6 BJ	1.31E-6
Indeno[1,2,3-cd]pyrene	2.5E-5	NA	U	7.82E-6	U	7.18E-6
Naphthalene	0.04	6E-3	7.56E-6 BJ	2.46E-6	1.90E-5 BJ	5.29E-6
Phenanthrene	2.5E-3	NA	1.43E-5 BJ	1.31E-6	1.38E-5 BJ	1.42E-6
Pyrene	NA	NA	1.14E-5 KBJ	2.49E-6	1.20E-5 BJ	2.71E-6
Sum of 6 PAHs[3]	NA	3E-4	1.21E-4		1.22E-4	
Sum of 16 PAHs[4] (EPA High Priority PAH Compounds)	NA	3E-4	1.88E-4		2.12E-4	
Sum PAHs[5]	NA	3E-4	3.02E-4		3.25E-4	
Sum Alkylated PAHs + Biphenyl[14]	NA	NA	1.19E-3		6.85E-4	
Total Phenols by Method E420.1	1	0.001	0.02	5.00E-3	0.02	5.00E-3
Total Phenols by Method SW8270	1	0.001	U	0.01	2.70E-3 J	0.01
BENZENE	0.015	0.30	U	5.00E-4	U	5.00E-4
ETHYLBENZENE	0.075	0.70	U	5.00E-4	U	5.00E-4
TOLUENE	0.50	0.30	0.01	5.00E-4	2.10E-3	5.00E-4
TOTAL XYLENES	0.035	NA	U	1.50E-3	U	1.50E-3
1,1,1-TRICHLOROETHANE	0.275	0.018	U	1.00E-3	U	1.00E-3
1,1,2,2-TETRACHLOROETHANE	NA	0.024	U	1.00E-3	U	1.00E-3
1,1,2-TRICHLOROETHANE	0.75	0.094	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHANE	1.30	NA	U	1.00E-3	U	1.00E-3
1,1-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3
1,2-DICHLOROETHANE	0.20	0.20	U	1.00E-3	U	1.00E-3
1,2-DICHLOROPROPANE	NA	0.057	U	1.00E-3	U	1.00E-3
CARBON TETRACHLORIDE	0.005	0.035	U	1.00E-3	U	1.00E-3
CHLOROFORM	0.20	NA	U	1.00E-3	U	1.00E-3
CIS-1,2-DICHLOROETHENE	0.65	**0.012**	U	1.00E-3	U	1.00E-3
METHYLENE CHLORIDE	0.50	NA	U	5.00E-3	U	5.00E-3
TETRACHLOROETHENE	0.02	0.26	U	1.00E-3	U	1.00E-3
TRANS-1,2-DICHLOROETHENE	NA	**0.012**	U	1.00E-3	U	1.00E-3
TRICHLOROETHENE	0.25	0.045	U	1.00E-3	U	1.00E-3
VINYL CHLORIDE	3.5E-4	NA	U	2.00E-3	U	2.00E-3
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2,3-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3
1,2,4-TRICHLOROBENZENE	**0.005**	NA	U	1.00E-3	U	1.00E-3
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2-DIBROMOETHANE	NA	NA	U	1.00E-3	U	1.00E-3
1,2-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3
1,3-DICHLOROBENZENE	**0.025**	2.5E-3	U	1.00E-3	U	1.00E-3
1,4-DICHLOROBENZENE	**0.025**	4.0E-3	U	1.00E-3	U	1.00E-3
1,4-DIOXANE (P-DIOXANE)	NA	NA	U	0.10	U	0.10
2-BUTANONE	NA	NA	5.30E-3	5.00E-3	2.00E-3 J	5.00E-3
2-HEXANONE	NA	NA	U	5.00E-3	U	5.00E-3
4-METHYL-2-PENTANONE	NA	NA	U	5.00E-3	U	5.00E-3
ACETONE	NA	NA	0.03	5.00E-3	0.03	5.00E-3
BROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
BROMODICHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
BROMOFORM	NA	NA	U	1.00E-3	U	1.00E-3
BROMOMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CARBON DISULFIDE	NA	NA	U	1.00E-3	U	1.00E-3
CHLOROBENZENE	0.09	0.015	U	1.00E-3	U	1.00E-3
CHLOROETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CHLOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
CIS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3
CYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3
DIBROMOCHLOROMETHANE	NA	NA	U	1.00E-3	U	1.00E-3
DICHLORODIFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
ISOPROPYLBENZENE	NA	NA	U	1.00E-3	U	1.00E-3
METHYL ACETATE	NA	NA	U	1.00E-3	U	1.00E-3
METHYL TERT-BUTYL ETHER	NA	NA	U	1.00E-3	U	1.00E-3
METHYLCYCLOHEXANE	**7.5**	NA	U	1.00E-3	U	1.00E-3
STYRENE	0.15	NA	U	1.00E-3	U	1.00E-3
TRANS-1,3-DICHLOROPROPENE	NA	**0.002**	U	1.00E-3	U	1.00E-3
TRICHLOROFLUOROMETHANE	NA	NA	U	2.00E-3	U	2.00E-3
ALUMINUM	NA	0.1	9.29	0.30	41	0.30
ANTIMONY	NA	0.02	2.20E-4 J	1.00E-3	2.30E-4 J	1.00E-3
ARSENIC	0.04	0.05	4.10E-3 J	5.00E-3	3.90E-3 J	5.00E-3
BARIUM	0.34	1	4.03	2.00E-3	18	8.00E-3
BERYLLIUM	NA	0.1	7.20E-4 J	1.00E-3	8.40E-3	1.00E-3
CADMIUM	0.0032	0.001	1.00E-3 J	1.00E-3	6.30E-3	1.00E-3
CALCIUM	NA	NA	29	0.10	102	0.10
CHROMIUM	0.02	0.05	5.00E-3	5.00E-3	8.80E-3	5.00E-3
COBALT	0.06	0.20	0.03	1.00E-3	0.13	1.00E-3
COPPER	0.05	0.02	0.08	3.00E-3	0.33	3.00E-3
IRON	NA	0.30	29	0.10	101	0.10
LEAD	0.05	NA	0.08	1.00E-3	0.15	1.00E-3
MAGNESIUM	NA	NA	16	0.10	33	0.10
MANGANESE	NA	0.10	2.52	2.00E-3	11	8.00E-3
MERCURY	1.8E-4	2E-4	U	2.00E-4	U	2.00E-4
NICKEL	0.05	0.03	0.02	2.00E-3	0.07	2.00E-3
POTASSIUM	NA	NA	8.18	1.00	28	1.00
SELENIUM	NA	0.01	3.90E-4 J	5.00E-3	2.20E-3 J	5.00E-3
SILVER	NA	0.01	U	1.00E-3	U	1.00E-3
SODIUM	NA	NA	3.81	1.00	7.98	1.00
THALLIUM	NA	4E-4	1.30E-4 J	1.00E-3	7.50E-4 J	1.00E-3
VANADIUM	NA	0.10	0.05	5.00E-3	0.57	5.00E-3
ZINC	0.43	0.18	0.19	0.01	1.00	0.01
Naphthenic Acid[6]	NA	NA	0.02		0.02	

Table 5.6-2 Summary of Groundwater and Surface Water Results for YU-02

NOTES

1. TOC = Top of the Casing
2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.
3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.
4. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D;however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.
5. Sum PAHs is the sum of detected concentrations of the following 23 compounds : it represents the sum of 16 PAHs in note 4, plus Benzo[e]pyrene, Perylene, Dibenzothiophene, 2-Methylnaphthalene, 2,6-Dimethylnaphthalene, 2,3,5-Trimethylnaphthalene and 1-Methylphenanthrene.
6. Naphthenic acid represents the sum of 60 compounds as done by AXYS SOP MLA-077
7. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.
8. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data
9. NA - Not available
10. RL = Reporting Limit
11. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows: purple - exceeds TULSMA agricultural criteria, yellow - exceeds RAOHE sensitive ecosytem criteria; and orange - exceeds TULSMA residential criteria.
12. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the level.
13. GW and SW standard in bold represent sum of isomers
14. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Table 5.6-3 Summary of Sediment Results for YU-02

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	YU02-T06A		YU02-T04		YU02-T05	
Sample Name					**YU02-SD001**		**YU02-SD002**		**YU02-SD005**	
Depth (m bgs[1])					0.07 - 0.15		0.01 - 0.16		NA	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH[2]	0.29	451	14	1,000	49,300		5,230		51,100	
Acenaphthene	NA	NA	NA	NA	0.10 J	0.03	0.06 KJ	9.14E-3	0.28 D	0.01
Acenaphthylene	NA	NA	NA	NA	U	4.65E-3	U	0.02	0.19 KBDJ	2.55E-3
Anthracene	NA	NA	NA	NA	U	0.24	U	0.09	UD	0.36
Benz[a]anthracene	NA	NA	NA	NA	1.01 KB	0.62	U	0.16	0.59 KBD	0.15
Benzo[a]pyrene	NA	NA	NA	NA	U	0.63	U	0.06	0.30 KD	0.21
Benzo[b]fluoranthene	NA	NA	NA	NA	0.79 K	0.44	0.08 KJ	0.04	0.48 D	0.15
Benzo[ghi]perylene	NA	NA	NA	NA	1.47	0.37	0.07 J	0.03	0.72 BD	0.07
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	U	0.54	U	0.05	UD	0.17
Chrysene	NA	NA	NA	NA	6.90 KB	0.83	0.61 B	0.20	4.16 BD	0.16
Dibenz[a,h]anthracene	NA	NA	NA	NA	0.36 KJ	0.19	U	0.05	0.16 KDJ	0.11
Fluoranthene	NA	NA	NA	NA	U	0.17	U	0.08	UD	0.26
Fluorene	NA	NA	NA	NA	0.06 J	0.03	0.11 J	0.04	0.70 D	0.08
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	U	0.43	U	0.04	UD	0.08
Naphthalene	NA	NA	NA	NA	0.06 BJ	9.83E-3	0.02 KBJ	0.01	0.89 BD	4.75E-3
Phenanthrene	NA	NA	NA	NA	0.27 KBJ	0.25	0.56 B	0.09	1.83 BD	0.33
Pyrene	NA	NA	NA	NA	0.34 KBJ	0.17	U	0.08	0.60 BD	0.26
Sum of 6 PAHs[3]	NA	NA	NA	1	2.26		0.15		1.50	
LMW PAHs[4]	NA	NA	NA	1	0.49		0.75		3.89	
HMW PAHs[5]	NA	NA	NA	1	11		0.76		7.01	
Sum of 16 PAHs[6] (EPA High Priority PAH Compounds)	NA	NA	NA	1	11		1.51		11	
Sum PAHs[7]	NA	NA	NA	1	17		6.95		45	
Sum Alkylated PAHs + Biphenyl[15]	NA	NA	NA	NA	332		70		539	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	1.50	U	0.64	U	9.70
BENZENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
ETHYLBENZENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
TOLUENE	NA	NA	NA	NA	U	0.22	0.067	0.01	U	0.02
TOTAL XYLENES	NA	NA	NA	NA	U	0.66	U	0.03	U	0.07
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
CHLOROFORM	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
METHYLENE CHLORIDE	NA	NA	NA	NA	U	1.10	U	0.05	U	0.11
TETRACHLOROETHENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
TRICHLOROETHENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
VINYL CHLORIDE	NA	NA	NA	NA	U	0.44	U	0.02	U	0.04
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	22	U	1.00	U	2.20
2-BUTANONE	NA	NA	NA	NA	U	1.10	U	0.05	U	0.11
2-HEXANONE	NA	NA	NA	NA	U	1.10	U	0.05	U	0.11
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	1.10	U	0.05	0.50 B	0.11
ACETONE	NA	NA	NA	NA	U	1.10	0.44	0.05	U	0.11
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
BROMOFORM	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
BROMOMETHANE	NA	NA	NA	NA	U	0.44	U	0.02	U	0.04
CARBON DISULFIDE	NA	NA	NA	NA	U	0.22	3.20E-3 J	0.01	0.01 J	0.02
CHLOROBENZENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
CHLOROETHANE	NA	NA	NA	NA	U	0.44	U	0.02	U	0.04
CHLOROMETHANE	NA	NA	NA	NA	U	0.44	U	0.02	U	0.04
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
CYCLOHEXANE	NA	NA	NA	NA	U	0.22	U	0.01	0.02 J	0.02
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	0.44	U	0.02	U	0.04
ISOPROPYLBENZENE	NA	NA	NA	NA	U	0.22	2.80E-3 J	0.01	U	0.02
METHYL ACETATE	NA	NA	NA	NA	0.30	0.22	0.03	0.01	U	0.02
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
METHYLCYCLOHEXANE	NA	NA	NA	NA	U	0.22	0.02	0.01	U	0.02
STYRENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.22	U	0.01	U	0.02
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	0.44	U	0.02	U	0.04
ALUMINUM	NA	NA	NA	NA	15,300	93	43,300	38	25,900	70
ANTIMONY	NA	NA	NA	NA	0.09 J	0.31	0.09 J	0.13	0.47	0.23
ARSENIC	NA	NA	NA	NA	0.49 J	1.60	0.90	0.64	3.70	1.20
BARIUM	17	910	231	NA	214	0.62	388	0.26	694	0.46
BERYLLIUM	NA	NA	NA	NA	0.24 J	0.31	0.63	0.13	0.53	0.23
CADMIUM	0.07	0.29	0.16	1	0.18 J	0.31	0.17	0.13	0.49	0.23
CALCIUM	NA	NA	NA	NA	1,710	31	4,150	13	3,100	23
CHROMIUM	5.10	98	22	NA	7.00	1.60	18	0.64	12	1.20
COBALT	NA	NA	NA	NA	3.30	0.31	9.50	0.13	11	0.23
COPPER	4.30	69	28	NA	22	0.93	42	0.38	50	0.70
IRON	NA	NA	NA	NA	6,200	31	18,200	13	20,100	23
LEAD	2.10	15	7.05	80	15	0.31	16	0.13	89	0.23
MAGNESIUM	NA	NA	NA	NA	914	31	2,140	13	2,530	23
MANGANESE	NA	NA	NA	NA	107	0.62	183	0.26	206	0.46
MERCURY	7.10E-3	0.27	0.11	NA	0.10 J	0.13	0.08	0.05	0.17	0.08
NICKEL	4.00	43	14	40	60	0.62	17	0.26	35	0.46
POTASSIUM	NA	NA	NA	NA	294 J	310	761	130	687	230
SELENIUM	NA	NA	NA	NA	U	1.60	0.09 J	0.64	0.55 J	1.20
SILVER	NA	NA	NA	NA	0.08 J	0.31	0.10 J	0.13	0.21 J	0.23
SODIUM	NA	NA	NA	NA	177 J	310	883	130	430	230
THALLIUM	NA	NA	NA	NA	0.08 J	0.31	0.17	0.13	0.20 J	0.23
VANADIUM	40	171	93	NA	184	1.60	79	0.64	138	1.20
ZINC	16	134	49	NA	34	3.10	65	1.30	120	2.30
TOTAL ORGANIC CARBON	NA	NA	NA	NA	300,000	1,900	50,000	790	350,000	1,200

Table 5.6-3 Summary of Sediment Results for YU-02

Sample Location	**CVX Background Values**			**RAOHE Sensitive Ecosystem Criteria Decreto 1215**	YU02-T06B		YU02-T08		YU02-T03	
Sample Name					**YU02-SD006**		**YU02-SD007**		**YU02-SD008**	
Depth (m bgs^1)					NA		NA		NA	
Analyte	Min	Max	Average	Values (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)	Values (mg/kg)	RL (mg/kg)
TPH^2	0.29	451	14	1,000	470		15		147	
Acenaphthene	NA	NA	NA	NA	U	9.87E-4	U	1.17E-3	U	1.45E-3
Acenaphthylene	NA	NA	NA	NA	U	7.82E-4	U	8.47E-4	U	5.82E-4
Anthracene	NA	NA	NA	NA	1.24E-3 KBJ	5.96E-4	5.88E-4 BJ	3.78E-4	6.05E-4 KBJ	5.79E-4
Benz[a]anthracene	NA	NA	NA	NA	4.14E-3 BJ	1.72E-3	4.20E-4 KBJ	3.10E-4	7.10E-4 KBJ	4.69E-4
Benzo[a]pyrene	NA	NA	NA	NA	U	8.71E-3	U	7.88E-4	U	9.58E-4
Benzo[b]fluoranthene	NA	NA	NA	NA	5.54E-3 KJ	5.36E-3	U	5.55E-4	U	6.84E-4
Benzo[ghi]perylene	NA	NA	NA	NA	0.03 KBJ	3.78E-3	U	5.84E-4	1.43E-3 KBJ	8.85E-4
Benzo[j,k]fluoranthenes	NA	NA	NA	NA	U	6.14E-3	U	6.18E-4	U	7.29E-4
Chrysene	NA	NA	NA	NA	0.01 BJ	2.13E-3	6.79E-4 BJ	3.87E-4	1.49E-3 BJ	5.63E-4
Dibenz[a,h]anthracene	NA	NA	NA	NA	7.69E-3 J	4.76E-3	U	6.40E-4	U	7.46E-4
Fluoranthene	NA	NA	NA	NA	4.57E-3 BJ	1.65E-3	1.13E-3 BJ	3.10E-4	1.58E-3 BJ	3.45E-4
Fluorene	NA	NA	NA	NA	1.57E-3 J	8.24E-4	U	5.56E-4	U	7.23E-4
Indeno[1,2,3-cd]pyrene	NA	NA	NA	NA	8.13E-3 BJ	4.24E-3	1.35E-3 KBJ	6.03E-4	U	9.25E-4
Naphthalene	NA	NA	NA	NA	3.70E-3 KBJ	1.92E-3	U	3.16E-3	4.86E-3 BJ	2.03E-3
Phenanthrene	NA	NA	NA	NA	6.05E-3 BJ	5.48E-4	1.71E-3 BJ	3.47E-4	3.58E-3 BJ	5.32E-4
Pyrene	NA	NA	NA	NA	4.58E-3 BJ	1.63E-3	1.23E-3 BJ	3.05E-4	2.08E-3 BJ	3.40E-4
Sum of 6 PAHs^3	NA	NA	NA	1	0.05		2.48E-3		3.01E-3	
LMW PAHs^4	NA	NA	NA	1	0.01		2.30E-3		9.05E-3	
HMW PAHs^5	NA	NA	NA	1	0.08		4.81E-3		7.29E-3	
Sum of 16 PAHs^6 (EPA High Priority PAH Compounds)	NA	NA	NA	1	0.09		7.11E-3		0.02	
Sum PAHs^7	NA	NA	NA	1	1.10		0.06		0.23	
Sum Alkylated PAHs + Biphenyl^{15}	NA	NA	NA	NA	0.31		0.04		0.14	
Total Phenols by Method SW8270	NA	NA	NA	NA	U	0.98	U	0.48	U	0.94
BENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
ETHYLBENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
TOLUENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	0.024	0.02
TOTAL XYLENES	NA	NA	NA	NA	U	0.06	U	0.03	U	0.05
1,1,1-TRICHLOROETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,1,2,2-TETRACHLOROETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,1,2-TRICHLOROETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,1-DICHLOROETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,1-DICHLOROETHENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,2-DICHLOROETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,2-DICHLOROPROPANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
CARBON TETRACHLORIDE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
CHLOROFORM	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
CIS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
METHYLENE CHLORIDE	NA	NA	NA	NA	U	0.10	U	0.05	U	0.08
TETRACHLOROETHENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
TRANS-1,2-DICHLOROETHENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
TRICHLOROETHENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
VINYL CHLORIDE	NA	NA	NA	NA	U	0.04	U	0.02	U	0.03
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,2,3-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,2,4-TRICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,2-DIBROMOETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,2-DICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,3-DICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,4-DICHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
1,4-DIOXANE (P-DIOXANE)	NA	NA	NA	NA	U	2.00	U	0.90	U	1.60
2-BUTANONE	NA	NA	NA	NA	U	0.10	U	0.05	U	0.08
2-HEXANONE	NA	NA	NA	NA	U	0.10	U	0.05	U	0.08
4-METHYL-2-PENTANONE	NA	NA	NA	NA	U	0.10	U	0.05	U	0.08
ACETONE	NA	NA	NA	NA	0.51 B	0.10	0.09	0.05	0.31 B	0.08
BROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
BROMODICHLOROMETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
BROMOFORM	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
BROMOMETHANE	NA	NA	NA	NA	U	0.04	U	0.02	U	0.03
CARBON DISULFIDE	NA	NA	NA	NA	7.20E-3 JB	0.02	U	9.00E-3	4.10E-3 J	0.02
CHLOROBENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
CHLOROETHANE	NA	NA	NA	NA	U	0.04	U	0.02	U	0.03
CHLOROMETHANE	NA	NA	NA	NA	U	0.04	U	0.02	U	0.03
CIS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
CYCLOHEXANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
DIBROMOCHLOROMETHANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
DICHLORODIFLUOROMETHANE	NA	NA	NA	NA	U	0.04	U	0.02	U	0.03
ISOPROPYLBENZENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
METHYL ACETATE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
METHYL TERT-BUTYL ETHER	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
METHYLCYCLOHEXANE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
STYRENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
TRANS-1,3-DICHLOROPROPENE	NA	NA	NA	NA	U	0.02	U	9.00E-3	U	0.02
TRICHLOROFLUOROMETHANE	NA	NA	NA	NA	U	0.04	U	0.02	U	0.03
ALUMINUM	NA	NA	NA	NA	32,000	81	47,000	38	39,700	52
ANTIMONY	NA	NA	NA	NA	0.19 J	0.27	0.20	0.13	0.09 J	0.17
ARSENIC	NA	NA	NA	NA	1.90	1.40	1.40	0.64	1.10	0.87
BARIUM	17	910	231	NA	556	0.54	162	0.26	241	0.35
BERYLLIUM	NA	NA	NA	NA	0.63	0.27	0.40	0.13	0.54	0.17
CADMIUM	0.07	0.29	0.16	1	0.40	0.27	0.06 J	0.13	0.18	0.17
CALCIUM	NA	NA	NA	NA	3,060	27	630	13	2,400	17
CHROMIUM	5.10	98	22	NA	16	1.40	20	0.64	13	0.87
COBALT	NA	NA	NA	NA	10	0.27	7.50	0.13	8.80	0.17
COPPER	4.30	69	28	NA	49	0.81	29	0.38	33	0.52
IRON	NA	NA	NA	NA	23,400	27	28,900	13	22,200	17
LEAD	2.10	15	7.05	80	27	0.27	13	0.13	12	0.17
MAGNESIUM	NA	NA	NA	NA	2,930	27	880	13	1,490	17
MANGANESE	NA	NA	NA	NA	224	0.54	77	0.26	208	0.35
MERCURY	7.10E-3	0.27	0.11	NA	0.38	0.09	0.11	0.05	0.10	0.06
NICKEL	4.00	43	14	40	19	0.54	15	0.26	12	0.35
POTASSIUM	NA	NA	NA	NA	638	270	300	130	580	170
SELENIUM	NA	NA	NA	NA	U	1.40	U	0.64	0.31 J	0.87
SILVER	NA	NA	NA	NA	0.14 J	0.27	0.05 J	0.13	0.06 J	0.17
SODIUM	NA	NA	NA	NA	458	270	59 J	130	334	170
THALLIUM	NA	NA	NA	NA	0.19 J	0.27	0.19	0.13	0.19	0.17
VANADIUM	40	171	93	NA	82	1.40	106	0.64	68	0.87
ZINC	16	134	49	NA	86	2.70	53	1.30	51	1.70
TOTAL ORGANIC CARBON	NA	NA	NA	NA	110,000	1,200	17,000	640	56,000	1,200

Table 5.6-3 Summary of Sediment Results for YU-02

NOTES

1. bgs = Below Ground Surface

2. TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

3. Sum of 6 PAHs represents the sum of the detected concentrations of 6 PAHs compounds listed in Decreto 1215 Annex 5: Fluoranthene, Benzo[b]fluoranthene, Benzo[j,k]fluoranthenes, Benzo[a]pyrene, Benzo[ghi]perylene and Indeno[1,2,3-cd]pyrene.

4. LMW PAHs represents the sum of the detected concentrations of Low Molecular Weight PAHs (Acenaphthene, Acenaphthylene, Anthracene,Fluorene, Naphthalene, and Phenanthrene).

5. HMW PAHs represents the sum of the detected concentrations of High Molecular Weight PAHs (Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene,Indeno[1,2,3-cd]pyrene,and Pyrene).

6. Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene, Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene). PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.

7. Sum PAHs represents the sum of detected concentrations of 23 compounds which comprise of the 16 PAHs listed in note 6 plus Benzo[e]pyrene, Perylene, Dibenzothiophene,

8. Data available as of Nov. 12, 2013 were used in this table and they have not been validated. Field duplicate samples are not reported in this table.

9. Laboratory qualifiers (will be replaced by the validator qualifiers once the data are validated):
   - U = The compound/analyte was analyzed for but the result was negated by validator since it was detected in a blank at a similar level.
   - J = Quantitation is approximate (estimated) due to limitations identified during the QA/QC review.
   - B = analyte found in sample and the associated blank.
   - K = peak detected but did not meet quantification criteria,result reported represents the estimated maximum possible concentration.
   - D = dilution data

10. NA - Not available

11. RL = Reporting Limit

12. Highlighted cell indicates concentration exceeds the corresponding colored cell criteria as follows:
yellow - exceeds RAOHE sensitive ecosytem criteria.

13. Sample arrived at laboratory outside of holding temperature due to transit delays.

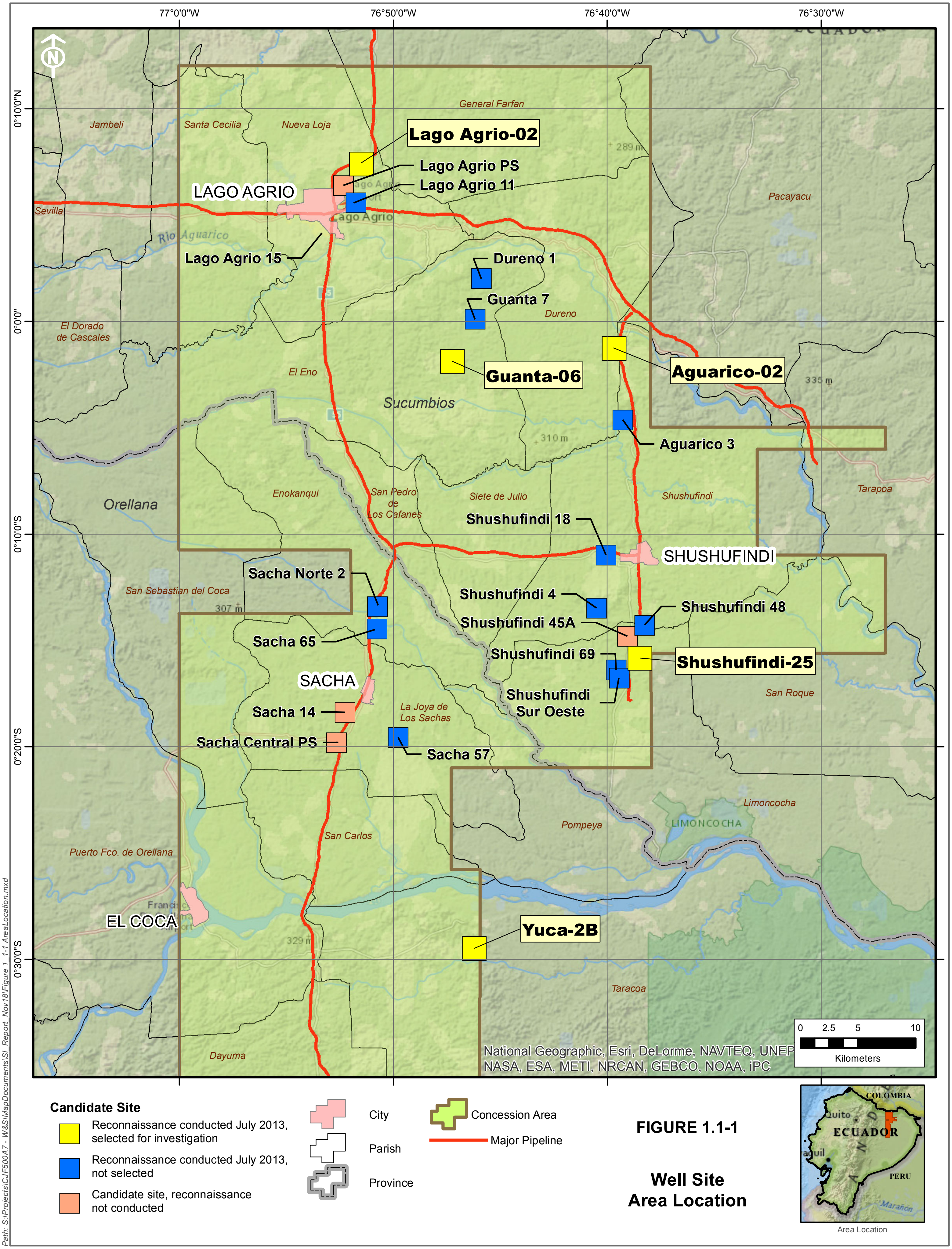
14. Analytical data for samples which required dilution/samples with higher RLs that the actual sample concentration is higher than reported and could not be quantified due to the

15. Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

FIGURES

SITE INVESTIGATION AND DATA SUMMARY REPORT

Napo Concession Area
ORIENTE Region
Ecuador
In the Matter of BIT Arbitration
Chevron v. Government of Ecuador
Prepared by
The Louis Berger Group, Inc.
Prepared for
Winston & Strawn, LLP
December, 2013



Candidate Site

- 🟨 Reconnaissance conducted July 2013, selected for investigation
- 🟦 Reconnaissance conducted July 2013, not selected
- 🟧 Candidate site, reconnaissance not conducted

City

Parish

Province

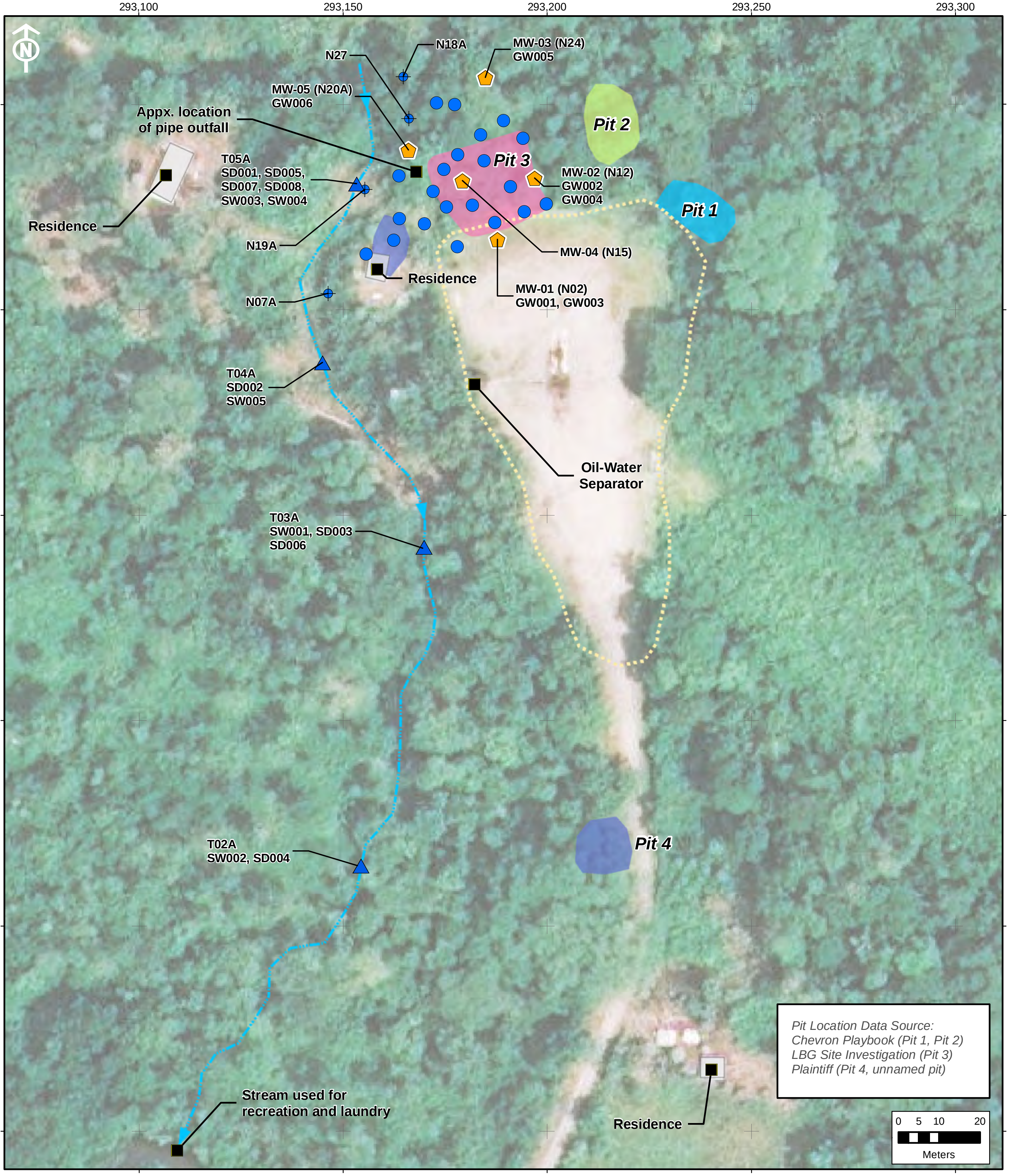
Concession Area

Major Pipeline

FIGURE 1.1-1

Well Site Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\Figure 1_1-1 AreaLocation.mxd



Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2)
LBG Site Investigation (Pit 3)
Plaintiff (Pit 4, unnamed pit)

Type
- Monitoring Well
- Soil Boring
- Sediment/Surface Water
- Piezometer

Production Area
- Platform

Pit Status
- 🟥 Closed Prior to RAP
- 🟦 RAP - Remediated
- 🟩 Non RAP - Not Remediated
- 🟪 Unconfirmed

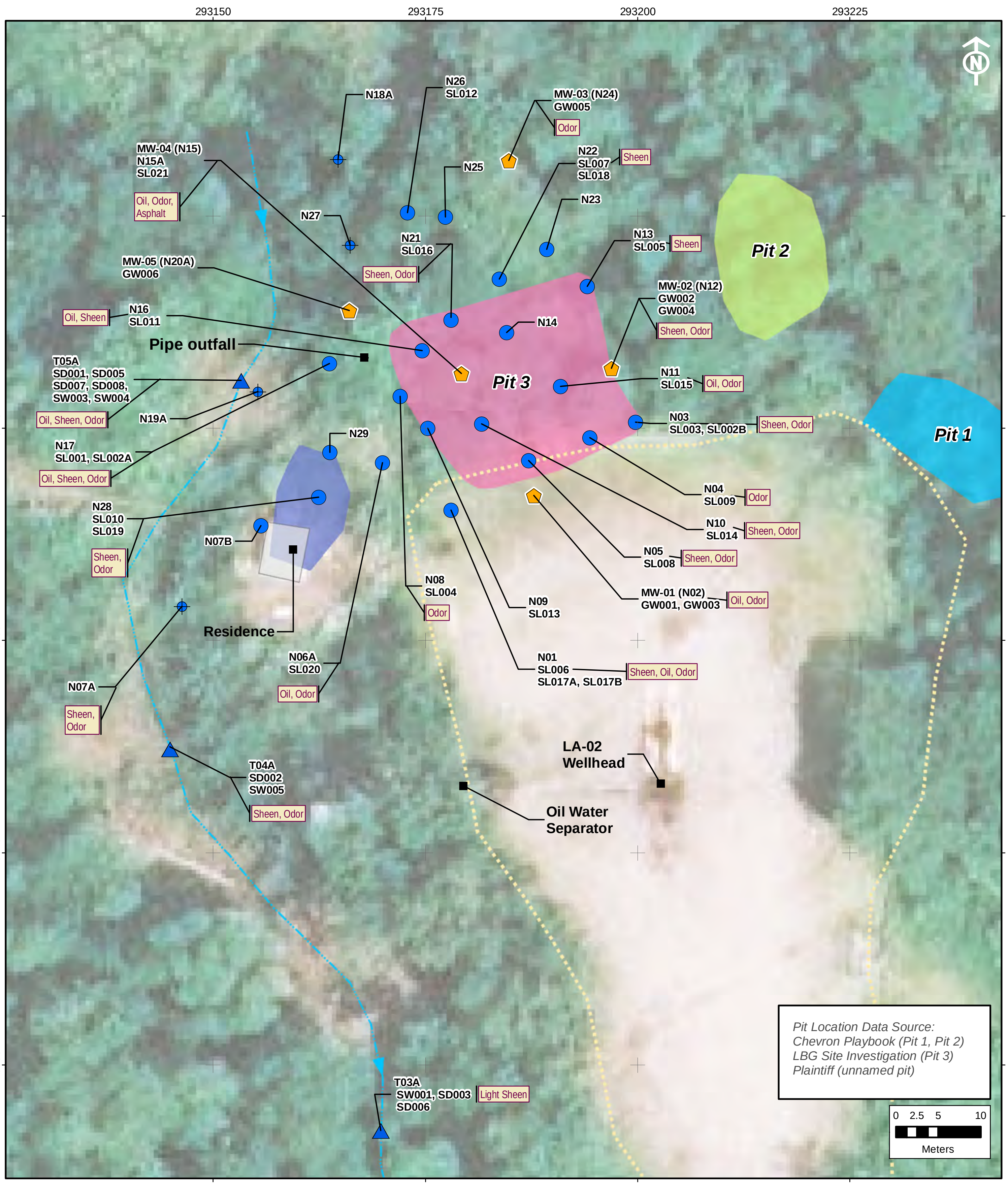
- ▭ Residence
- Stream

Figure 3.5-1A
Site Investigation

LAGO AGRIO 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\3-FieldObservations\Figure_3.5-1A_LA-02-Site_SI.mxd



Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2)
LBG Site Investigation (Pit 3)
Plaintiff (unnamed pit)

Type

- ⬟ Monitoring Well
- ● Soil Boring
- ▲ Sediment/Surface Water
- ⊕ Piezometer

Production Area

▨ Platform

Pit Status

- 🟥 Closed Prior to RAP
- 🟦 RAP - Remediated
- 🟩 Non RAP - Not Remediated
- 🟪 Unconfirmed

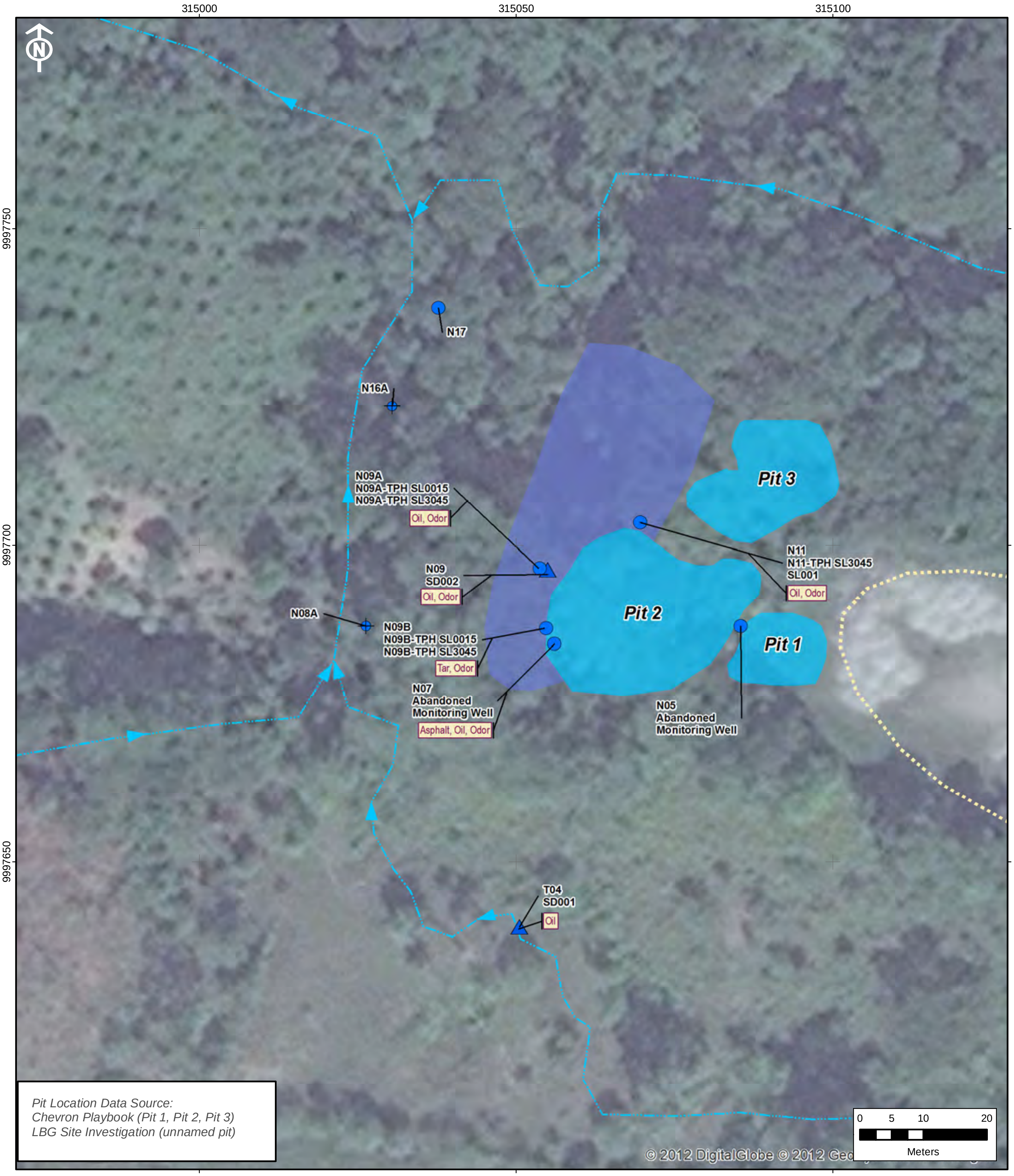
- ▭ Residence
- ➤ Stream
- Petroleum-related field observation

Area Location

Figure 3.5-1B
Site Investigation

LAGO AGRIO 02
Pit Locations

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\3-FieldObservations\Figure_3.5-1B_LA-02-Pit_SI-Revised Grid Coordinates.mxd



Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2, Pit 3)
LBG Site Investigation (unnamed pit)

Type

⬟ Monitoring Well
● Soil Boring
▲ Sediment/Surface Water
⊕ Piezometer

Production Area

▨ Platform

Pit Status

🟦 RAP - Remediated
🟪 Unconfirmed
Stream

Petroleum-related field observation.

FIGURE 3.6-1
Site Investigation

AGUARICO 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\3-FieldObservations\Figure_3.6-1 AG-02_SI.mxd

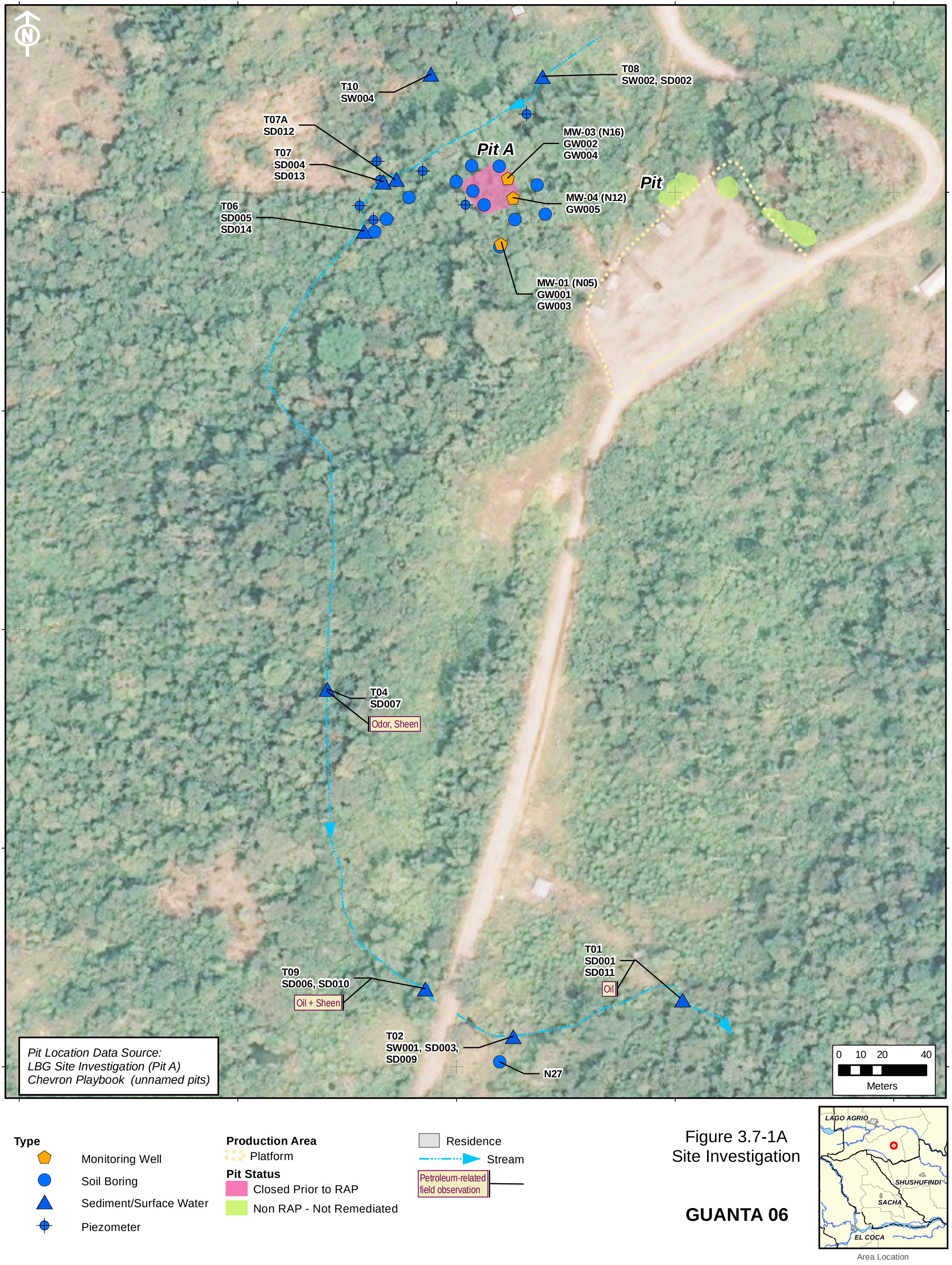
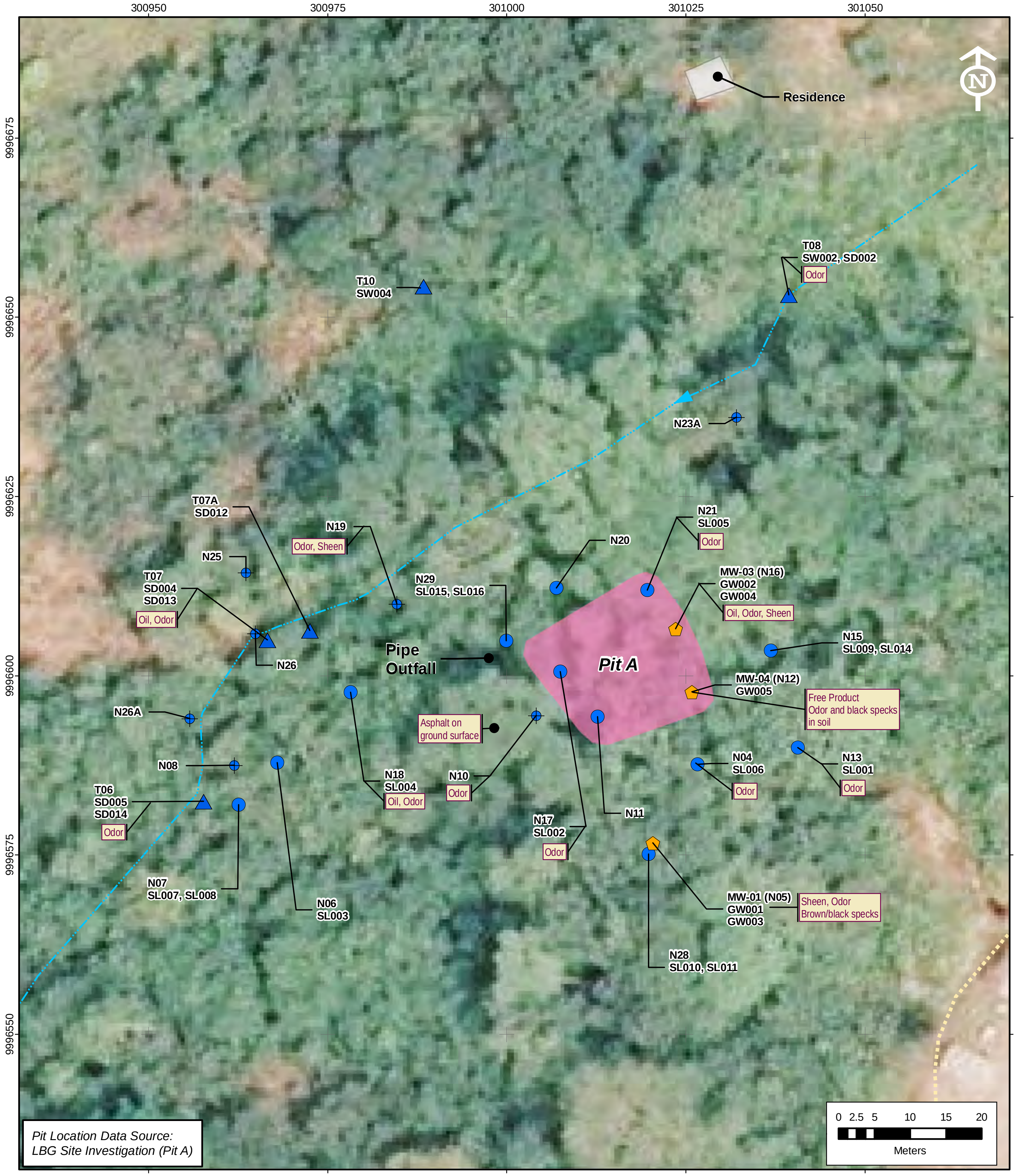


Figure 3.7-1A
Site Investigation

GUANTA 06

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\3-FieldObservations\Figure_3.7-1A GU-06_Site_SI.mxd



Pit Location Data Source:
LBG Site Investigation (Pit A)

Type

- ⬟ Monitoring Well
- ● Soil Boring
- ▲ Sediment/Surface Water
- ⊕ Piezometer

Production Area

- ▨ Platform

Pit Status

- 🟪 Closed Prior to RAP

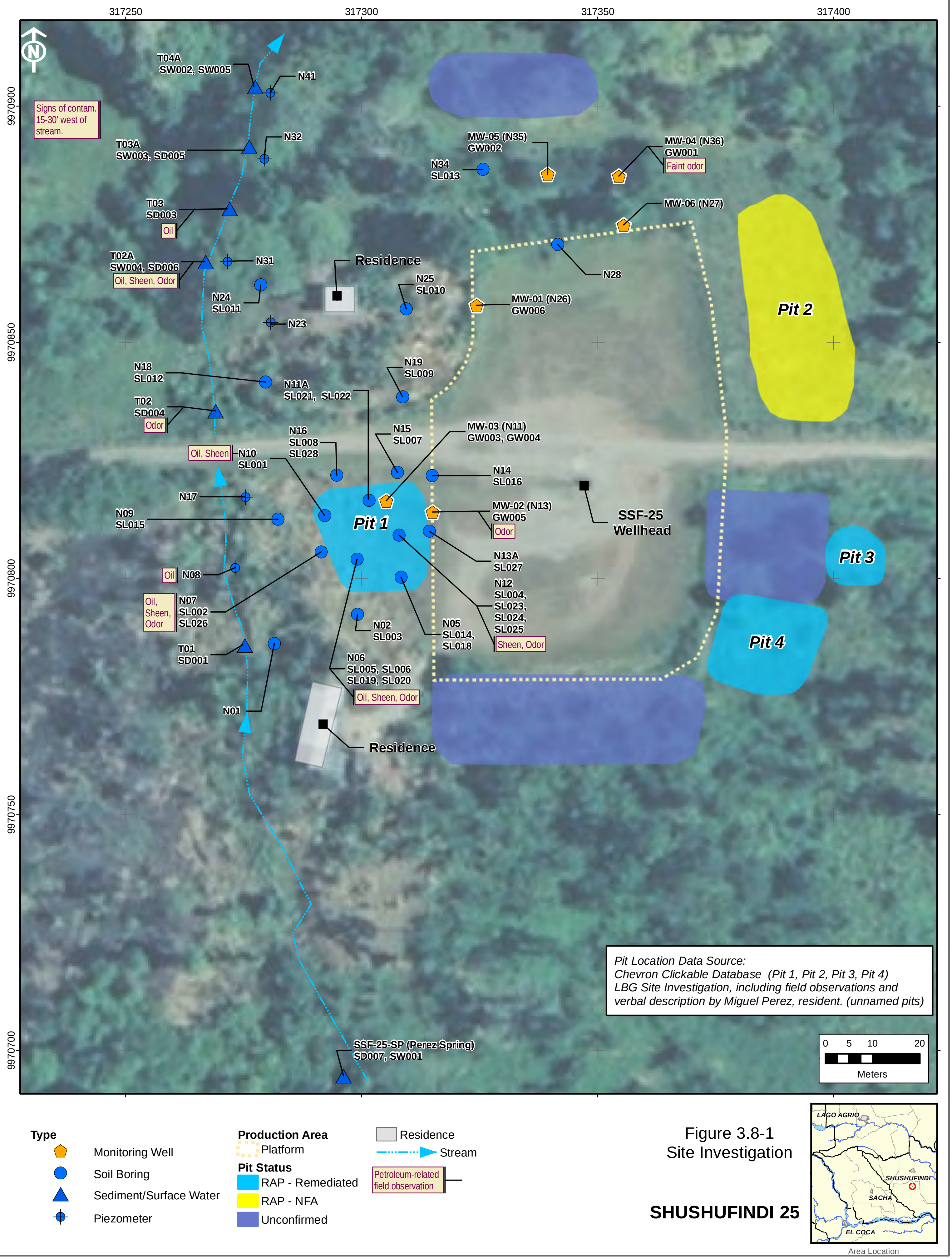
- ▭ Residence
- ➤ Stream
- Petroleum-related field observation

Figure 3.7-1B
Site Investigation

GUANTA 06
Pit Locations

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\3-FieldObservations\Figure 3.7-1B GU-06_Pit_SI.mxd

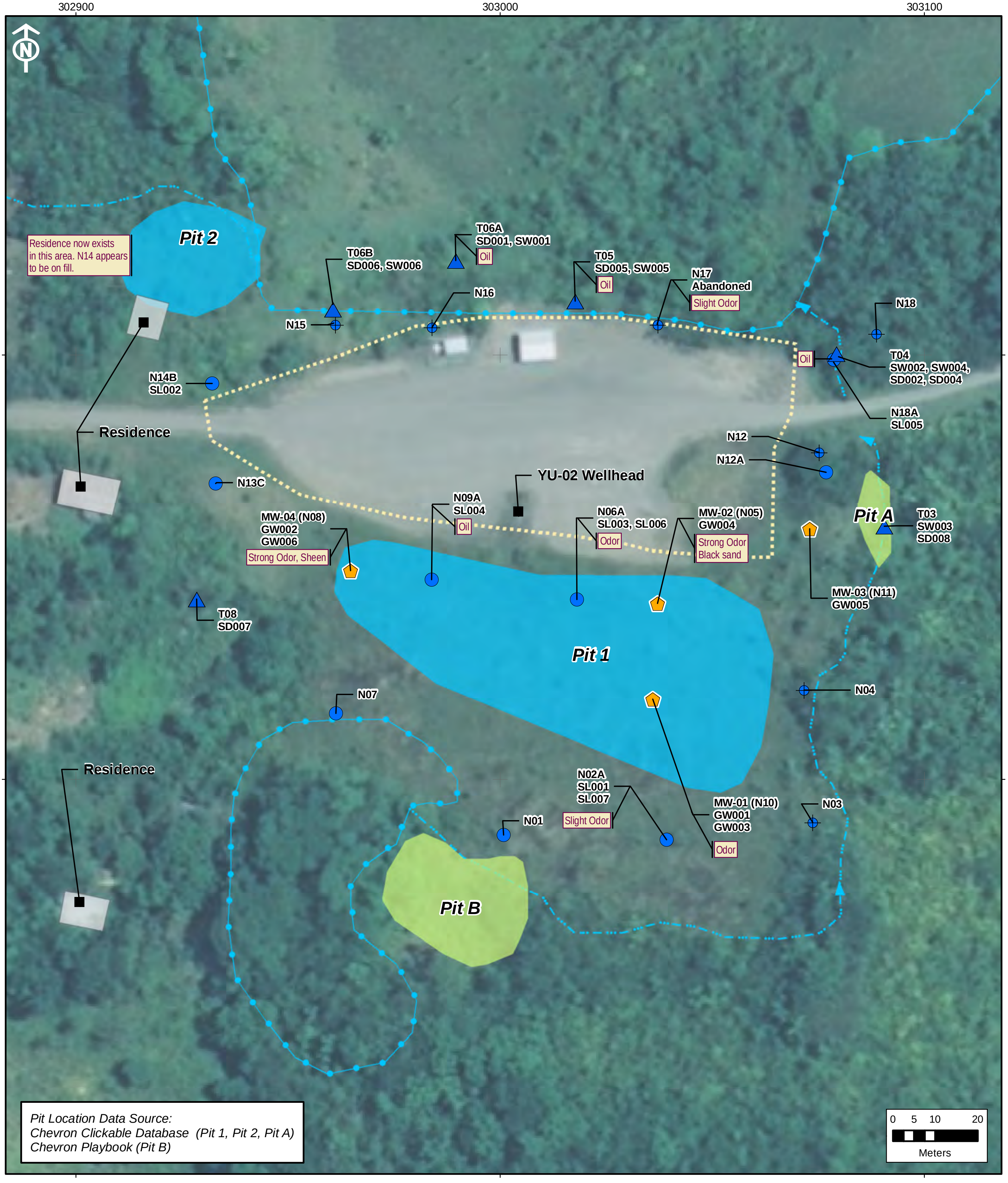


Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit 3, Pit 4)
LBG Site Investigation, including field observations and verbal description by Miguel Perez, resident. (unnamed pits)

Figure 3.8-1
Site Investigation

SHUSHUFINDI 25

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\3-FieldObservations\Figure_3.8-1_SSF-25_SI.mxd



Type
- ⬟ Monnitoring Well
- ● Soil Boring
- ▲ Sediment/Surface Water
- ⊕ Piezometer

Production Area
- ⬚ Platform

Pit Status
- 🟦 RAP - Remediated
- 🟩 Non RAP - Not Remediated

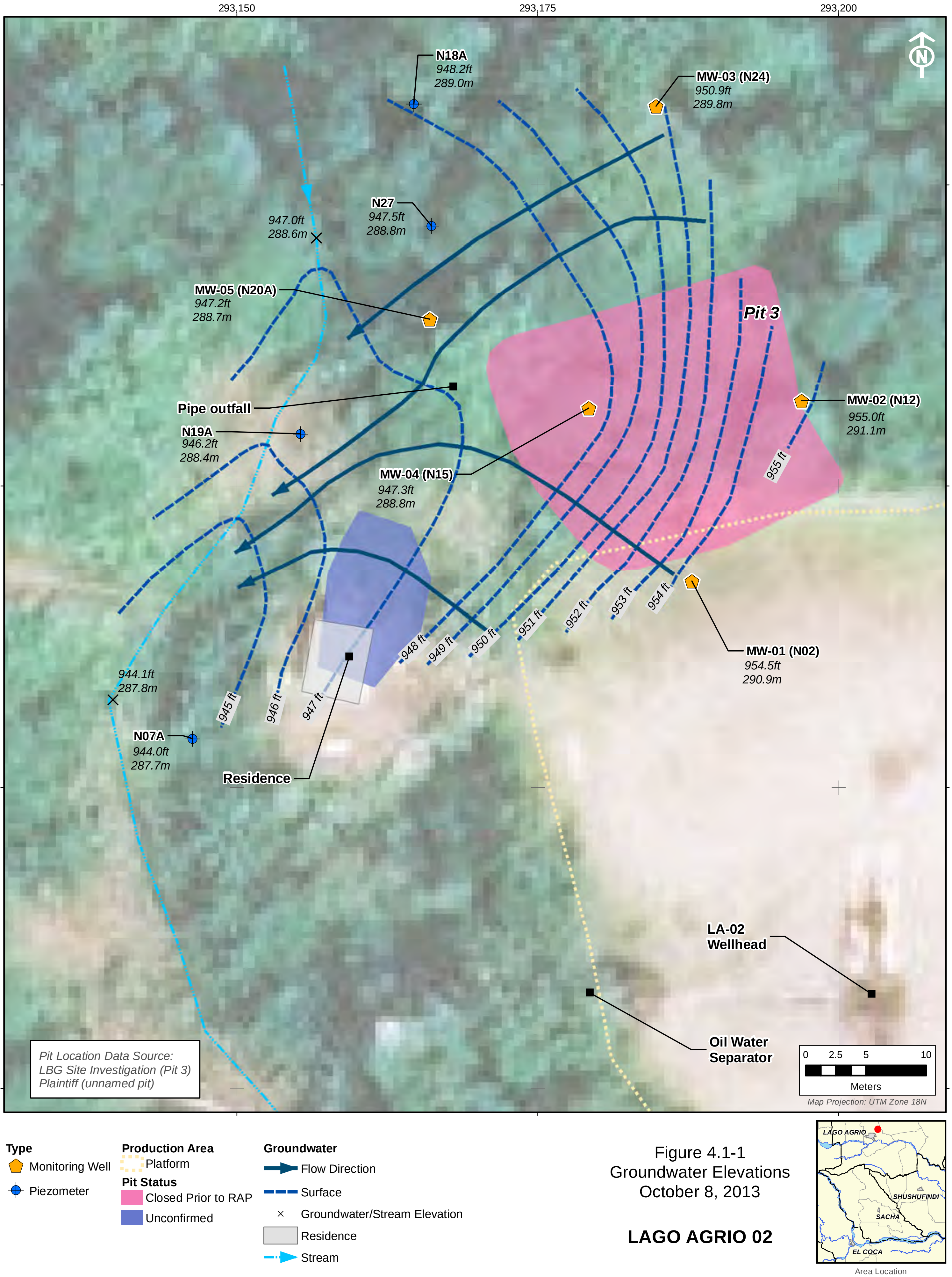
- ▭ Residence
- Stream
- Wetland
- Petroleum-related field observation

Figure 3.9-1
Site Investigation

YUCA 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\3-FieldObservations\Figure_3.9-1_YU-02_SI.mxd



Pit Location Data Source:
LBG Site Investigation (Pit 3)
Plaintiff (unnamed pit)

Figure 4.1-1
Groundwater Elevations
October 8, 2013

LAGO AGRIO 02

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\4-GW Contours\Figure 4_1-1_LA-02_GW.mxd

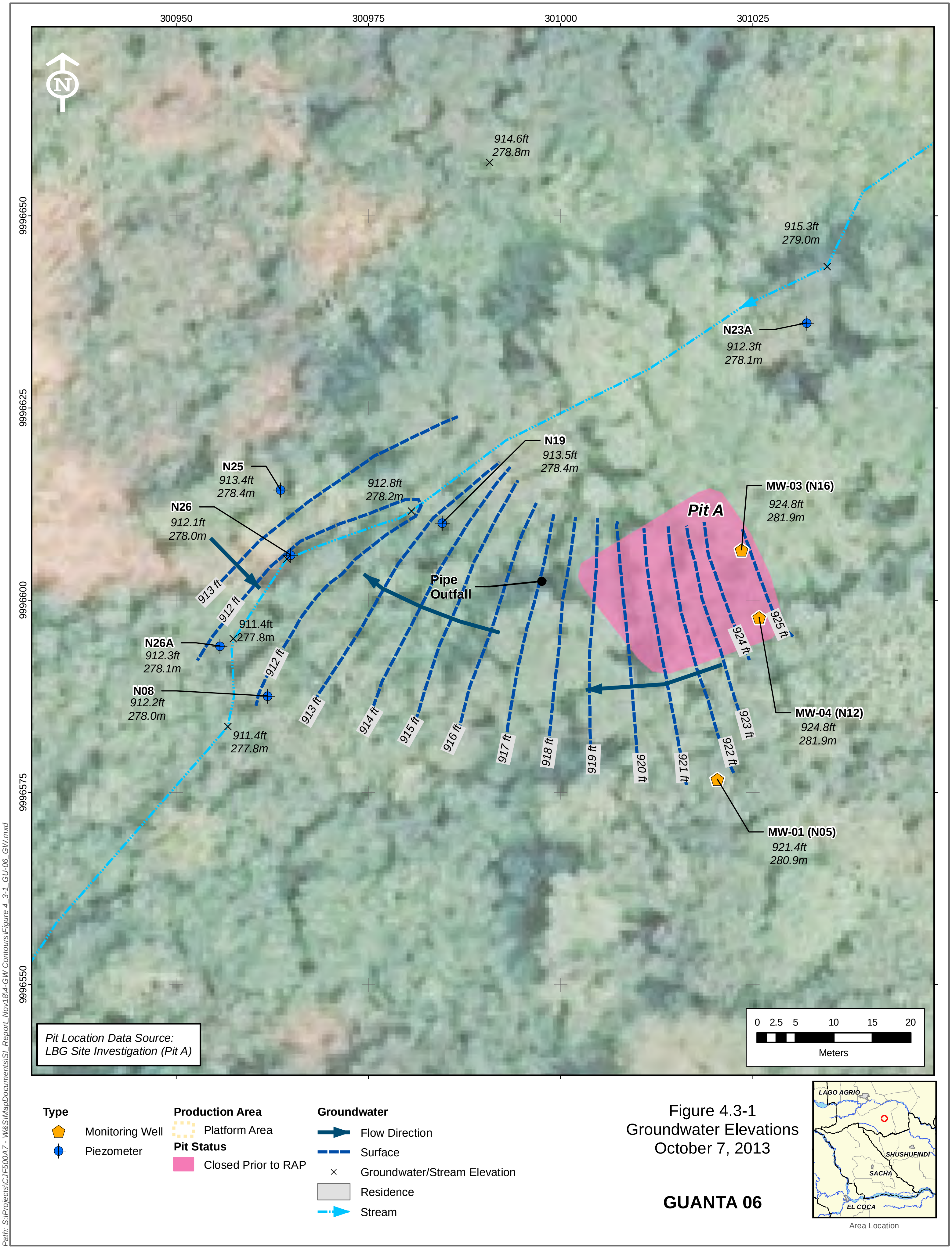
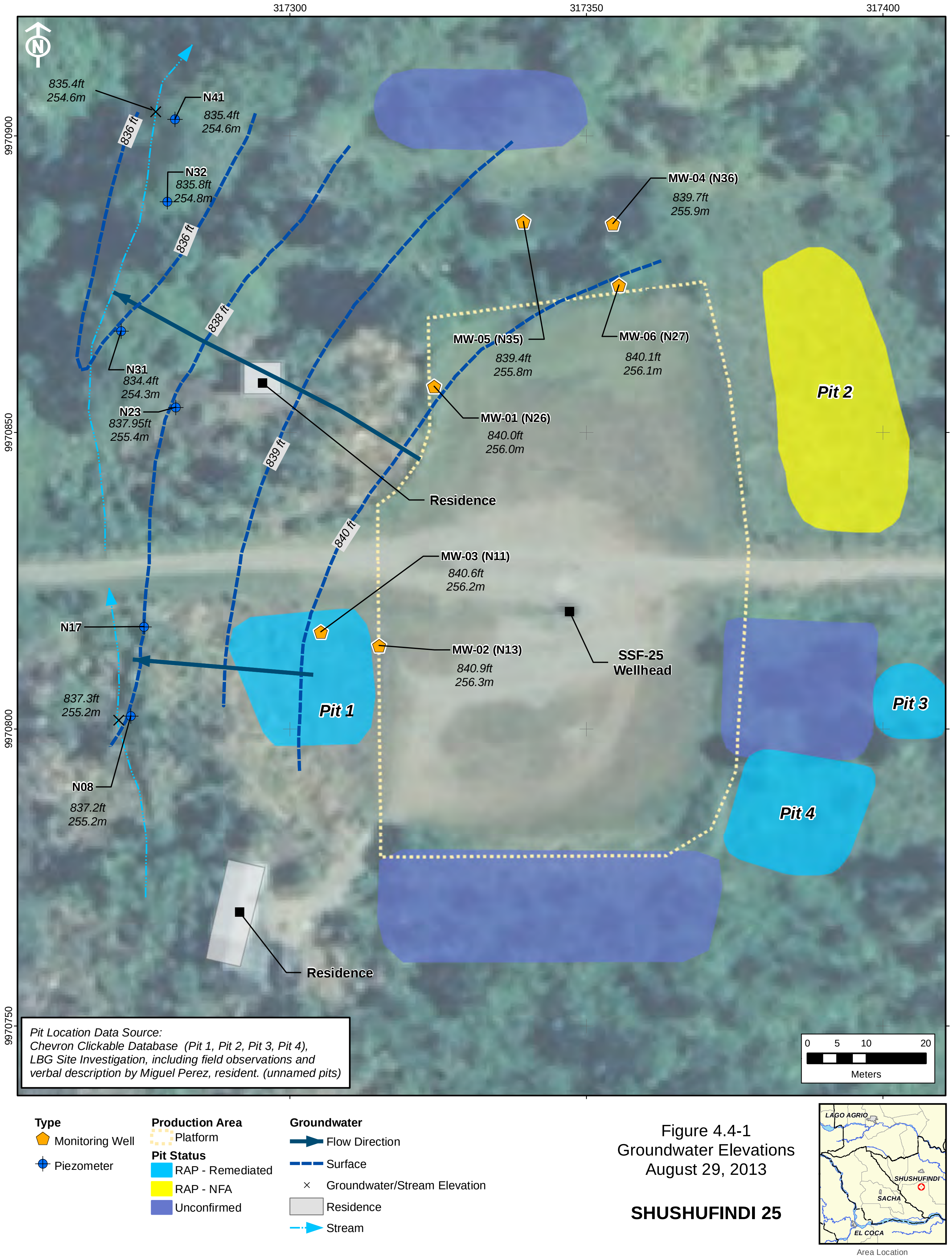


Figure 4.3-1
Groundwater Elevations
October 7, 2013

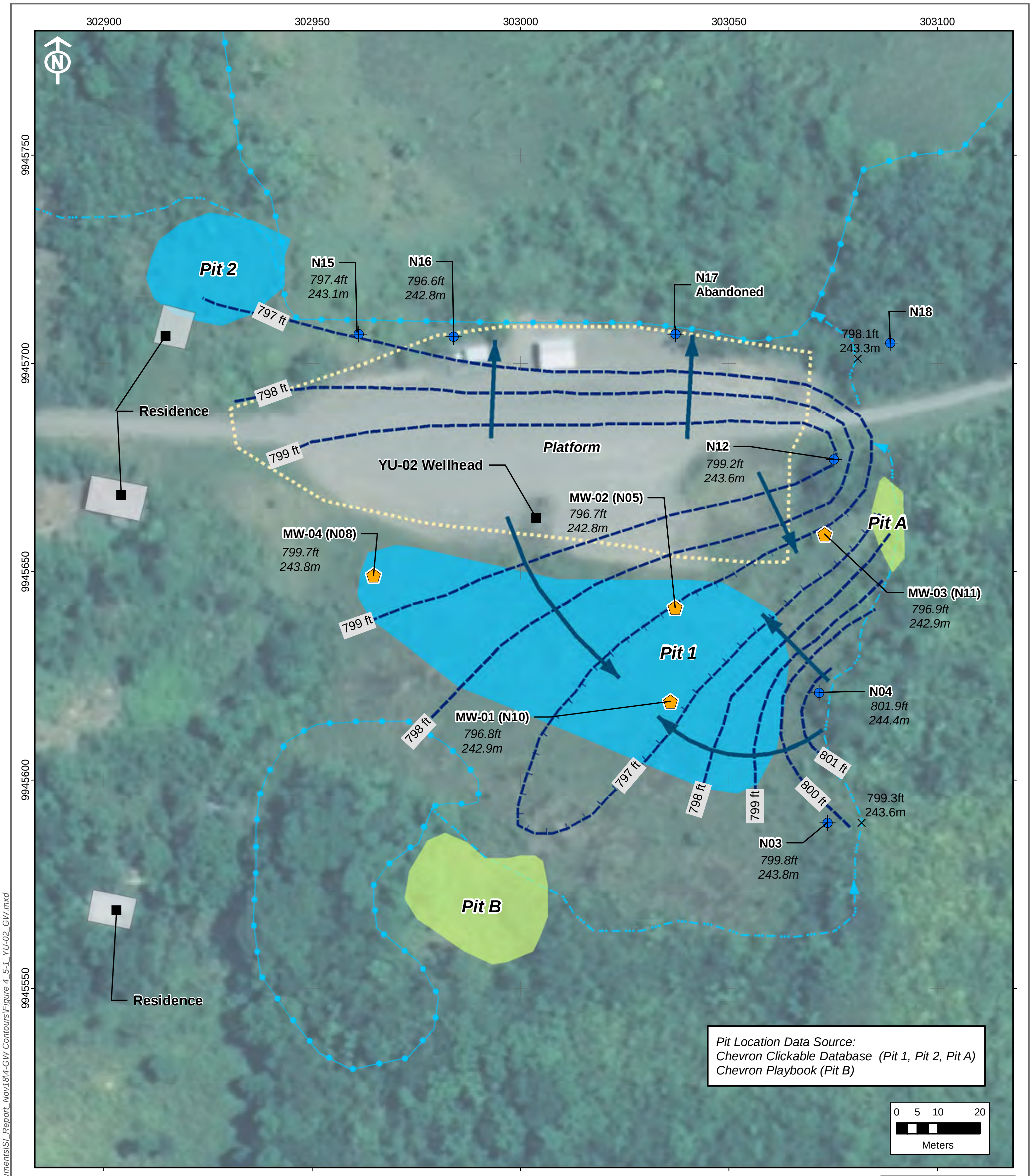
GUANTA 06



Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit 3, Pit 4),
LBG Site Investigation, including field observations and
verbal description by Miguel Perez, resident. (unnamed pits)

Figure 4.4-1
Groundwater Elevations
August 29, 2013

SHUSHUFINDI 25



Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit A)
Chevron Playbook (Pit B)

Type
⬟ Monnitoring Well
⊕ Piezometer

Production Area
▨ Platform

Pit Status
🟦 RAP - Remediated
🟩 Non RAP - Not Remediated

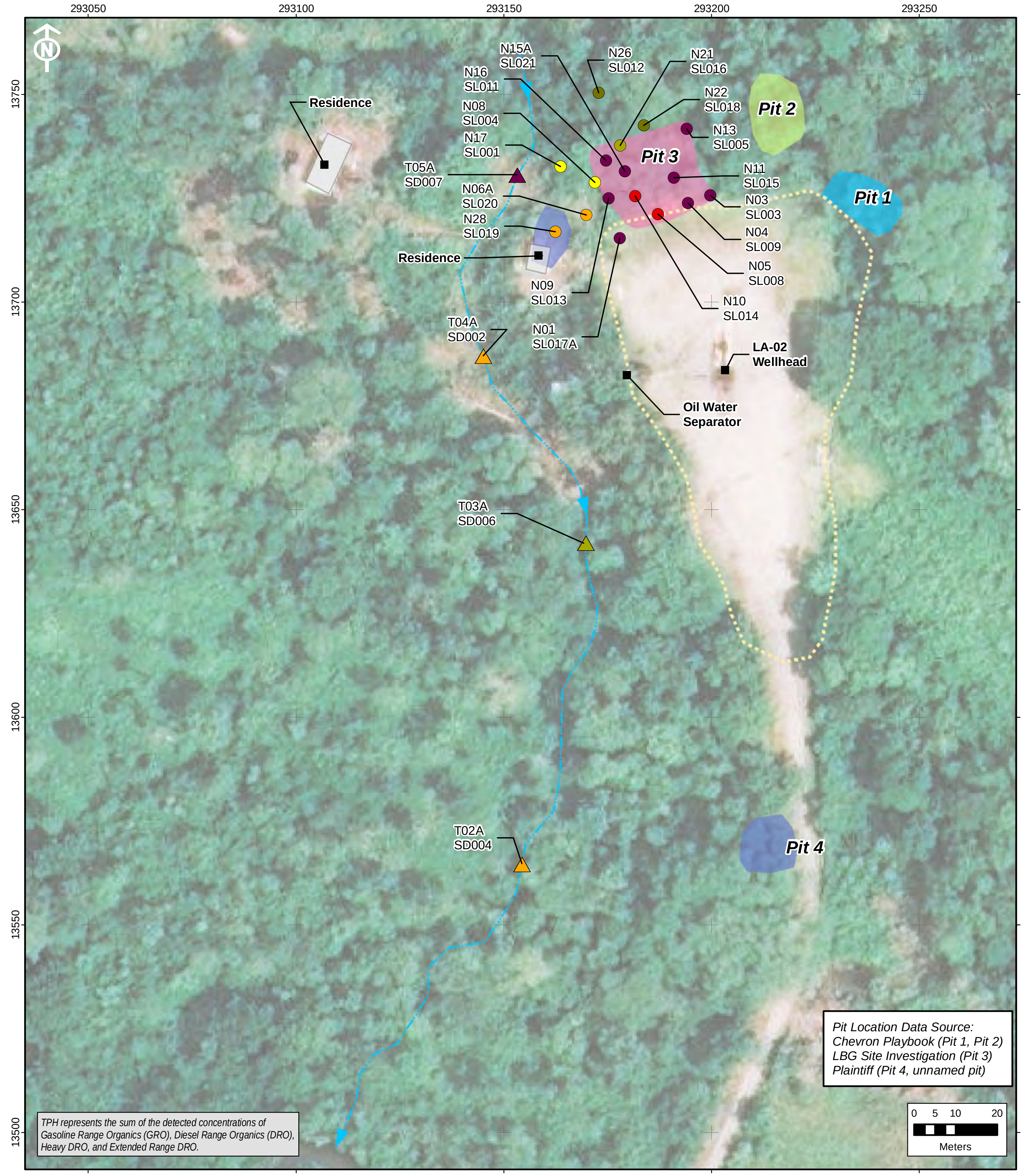
Groundwater
— — Surface
-┼- Surface Depression
➡ Flow Direction
× Groundwater/Stream Elevation
▢ Residence
··➤ Stream
●—● Wetland

Figure 4.5-1
Groundwater Elevations
October 13, 2013

YUCA 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\4-GW Contours\Figure 4_5-1_YU-02_GW.mxd



Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2)
LBG Site Investigation (Pit 3)
Plaintiff (Pit 4, unnamed pit)

TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

Sample Type
○ Soil Boring
△ Sediment
Stream
▭ Residence

TPH (ppm):
○ Non-Detect [1]
● < 100
● 101 - 500
● 501 - 1000
● 1001 - 2500
● 2501 - 5000
● > 5000

Production Area
Platform

Pit Status
🟥 Closed Prior to RAP
🟦 RAP - Remediated
🟩 Non RAP - Not Remediated
🟪 Unconfirmed

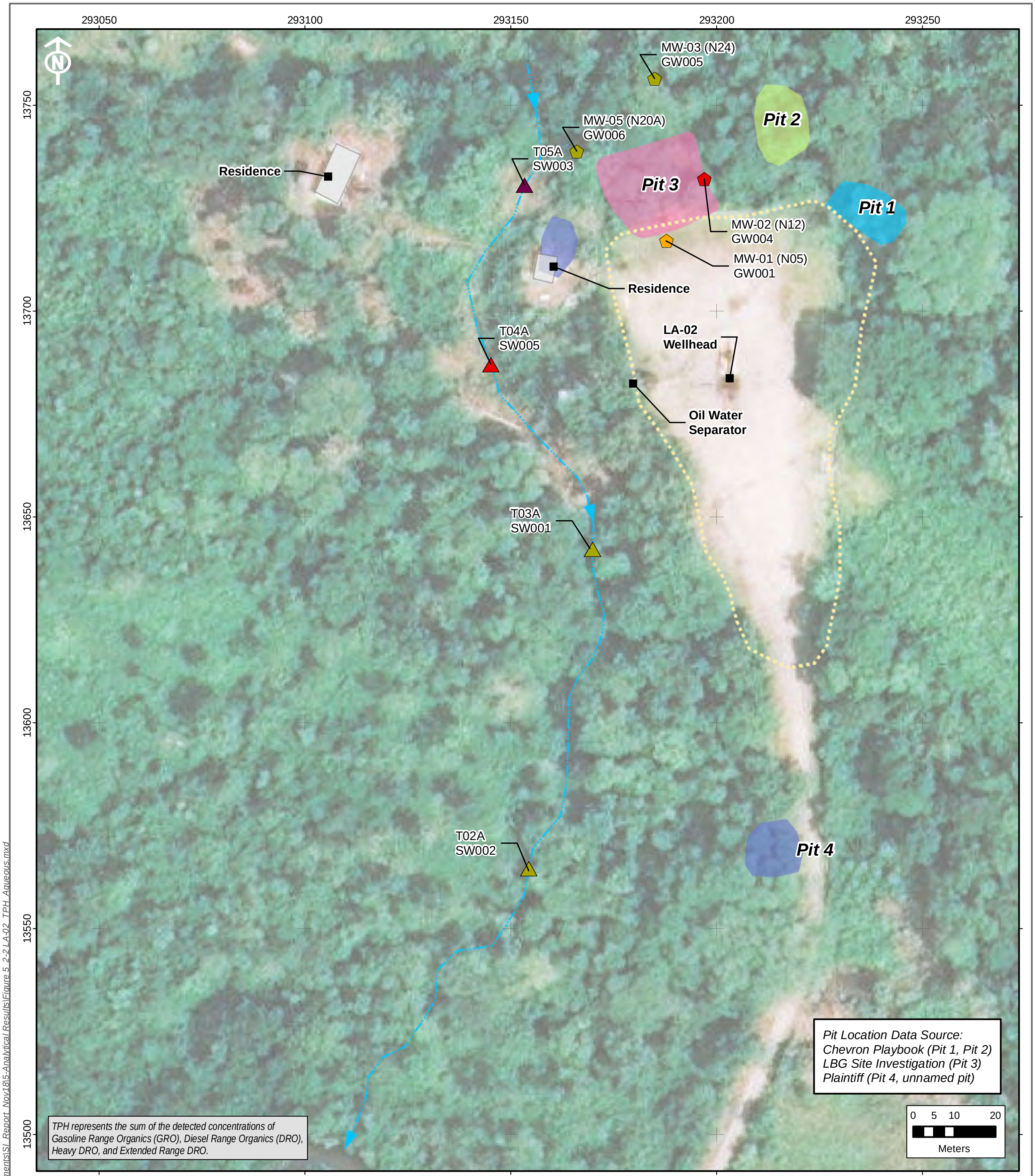
[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.2-1
TPH in Soil and Sediment Samples

LAGO AGRIO 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov185-Analytical Results\Figure 5_2-1 LA-02_TPH_Solids.mxd



Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2)
LBG Site Investigation (Pit 3)
Plaintiff (Pit 4, unnamed pit)

TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

Sample Type
⬠ Ground Water
△ Surface Water
→ Stream
▭ Residence

TPH (ppm)
● Non-Detect [1]
● < 0.100
● 0.101 - 0.325
● 0.326 - 0.500
● 0.501 - 1.000
● > 1.000

Production Area
⬚ Platform
Pit Status
🟪 Closed Prior to RAP
🟦 RAP - Remediated
🟩 Non RAP - Not Remediated
🟦 Unconfirmed

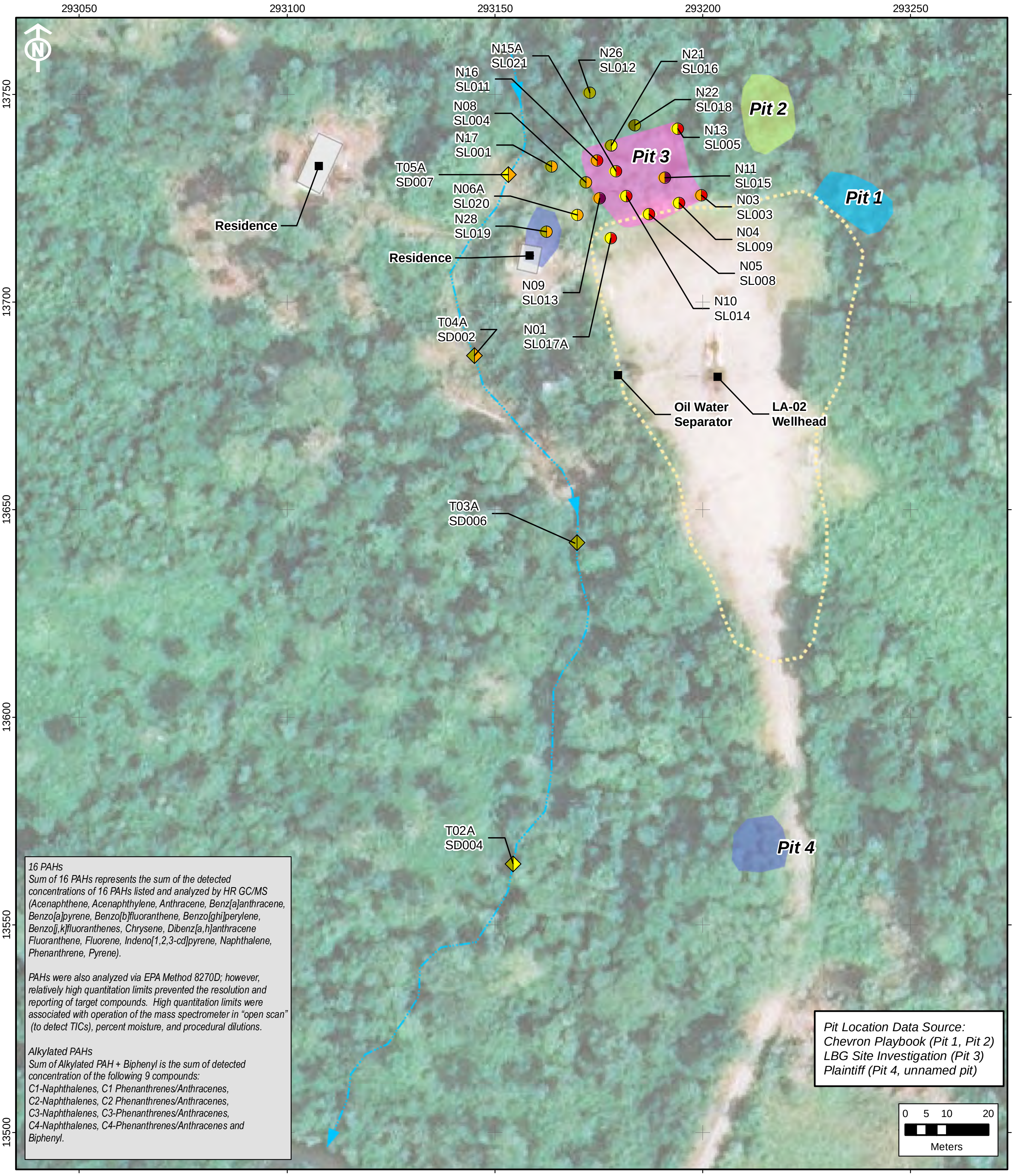
[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.2-2
TPH in Surface Water and Groundwater Samples

LAGO AGRIO 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov185-Analytical Results\Figure 5_2-2 LA-02_TPH_Aqueous.mxd



16 PAHs
Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.

Alkylated PAHs
Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds:
C1-Naphthalenes, C1 Phenanthrenes/Anthracenes,
C2-Naphthalenes, C2 Phenanthrenes/Anthracenes,
C3-Naphthalenes, C3-Phenanthrenes/Anthracenes,
C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2)
LBG Site Investigation (Pit 3)
Plaintiff (Pit 4, unnamed pit)

Sample Type
- ○ Soil Boring
- ◇ Sediment
- → Stream
- ▢ Residence

16 PAHs (ppm)
- ◐ < 0.01
- ◐ 0.02 - 1.00
- ◐ 1.01 - 10.00
- ◐ 10.01 - 100.00
- ◐ > 100.00

Alkylated PAHs (ppm)
- ◐ < 0.01
- ◐ 0.02 - 1.00
- ◐ 1.01 - 10.00
- ◐ 10.01 - 100.00
- ◐ 100.01 - 1000.00
- ◐ > 1000.00

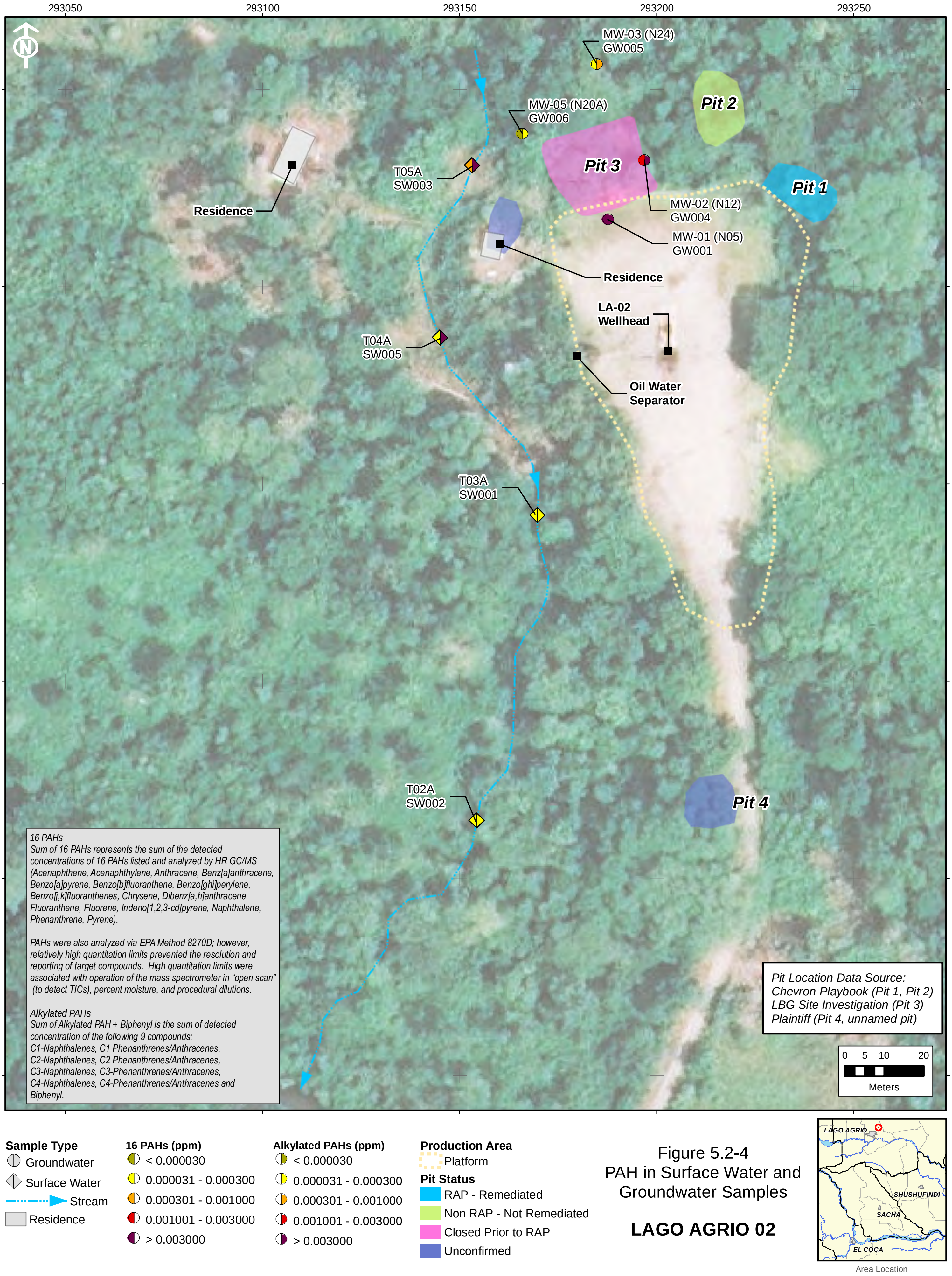
Production Area
- ▢ Platform

Pit Status
- 🟦 RAP - Remediated
- 🟩 Non RAP - Not Remediated
- 🟪 Closed Prior to RAP
- 🟦 Unconfirmed

Figure 5.2-3
PAH in Soil and Sediment Samples

LAGO AGRIO 02

Area Location



16 PAHs
Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.

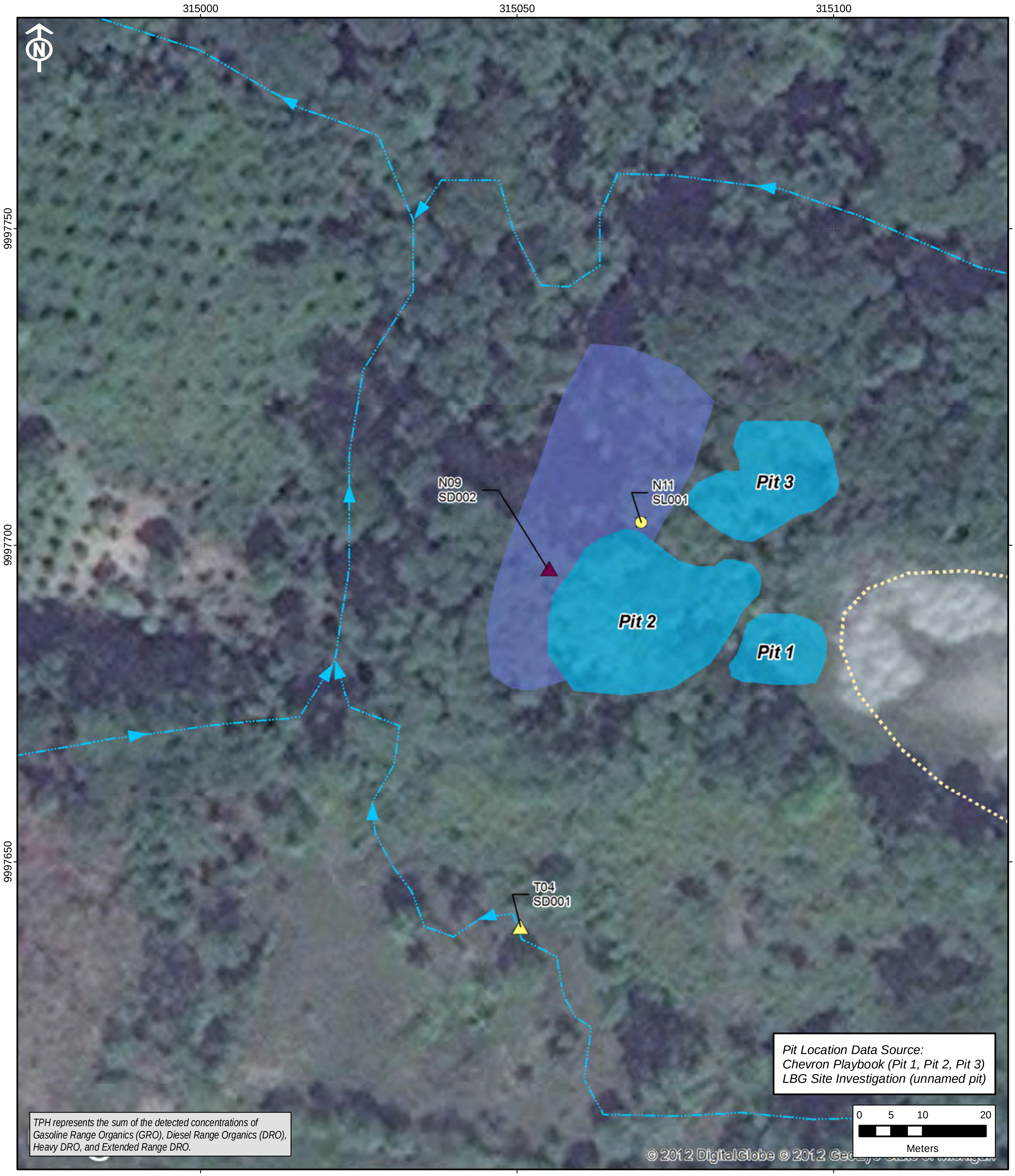
Alkylated PAHs
Sum of Alkylated PAH + Biphenyl is the sum of detected concentrations of the following 9 compounds:
C1-Naphthalenes, C1 Phenanthrenes/Anthracenes,
C2-Naphthalenes, C2 Phenanthrenes/Anthracenes,
C3-Naphthalenes, C3-Phenanthrenes/Anthracenes,
C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2)
LBG Site Investigation (Pit 3)
Plaintiff (Pit 4, unnamed pit)

Figure 5.2-4
PAH in Surface Water and
Groundwater Samples

LAGO AGRIO 02

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_2-4 LA-02_PAH_Aqueous.mxd



Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2, Pit 3)
LBG Site Investigation (unnamed pit)

TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

Sample Type

○ Soil Boring
△ Sediment
- · · ▶ Stream
▭ Residence

TPH (ppm):

● Non-Detect [1]
● < 100
● 101 - 500
● 501 - 1000
● 1001 - 2500
● 2501 - 5000
● > 5000

Production Area

▭ Platform

Pit Status

▆ RAP - Remediated
▆ Unconfirmed

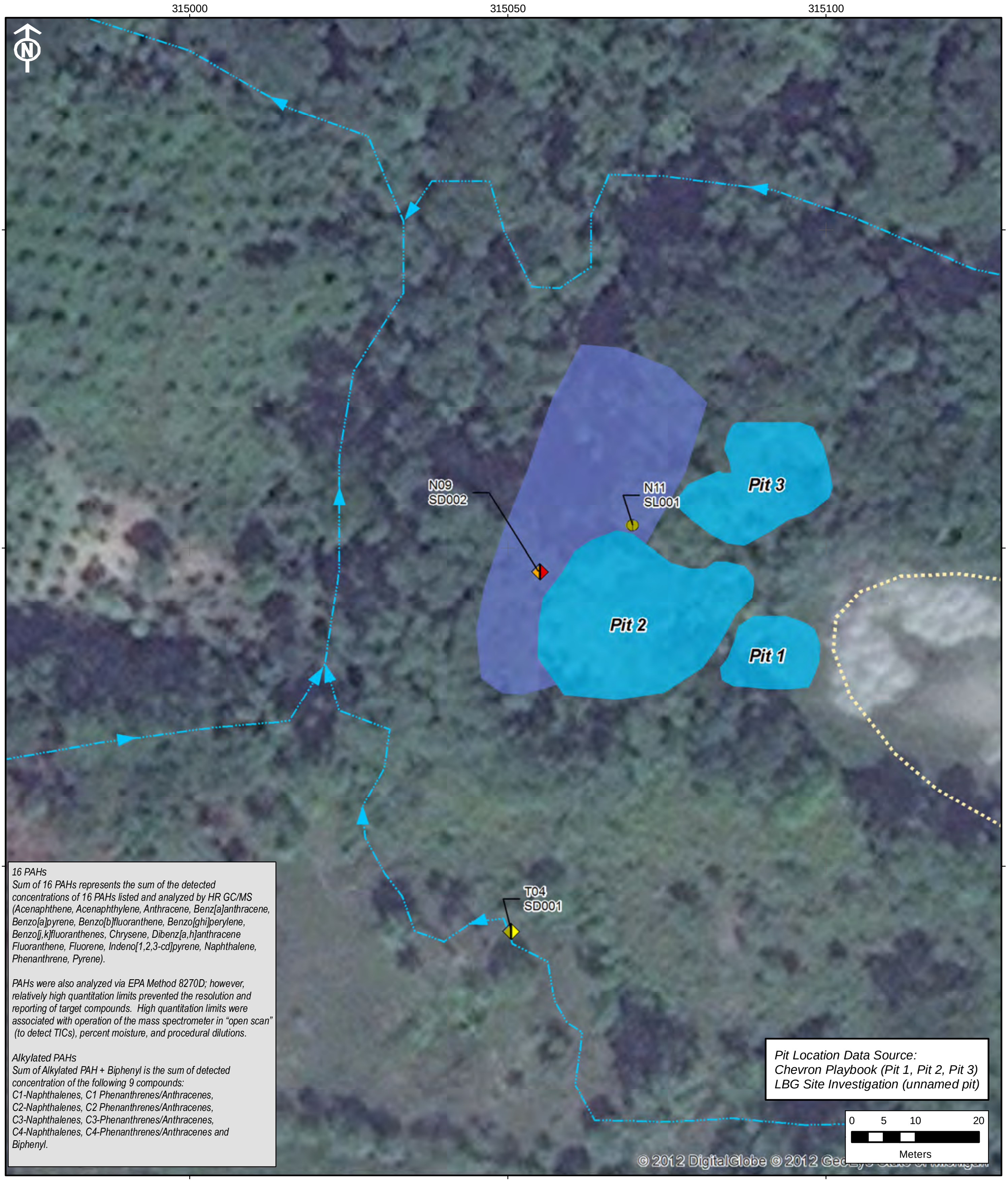
[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.3-1
TPH in Soil and
Sediment Samples

AGUARICO 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_3-1 AG-02_TPH_Solids.mxd



16 PAHs

Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.

Alkylated PAHs

Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

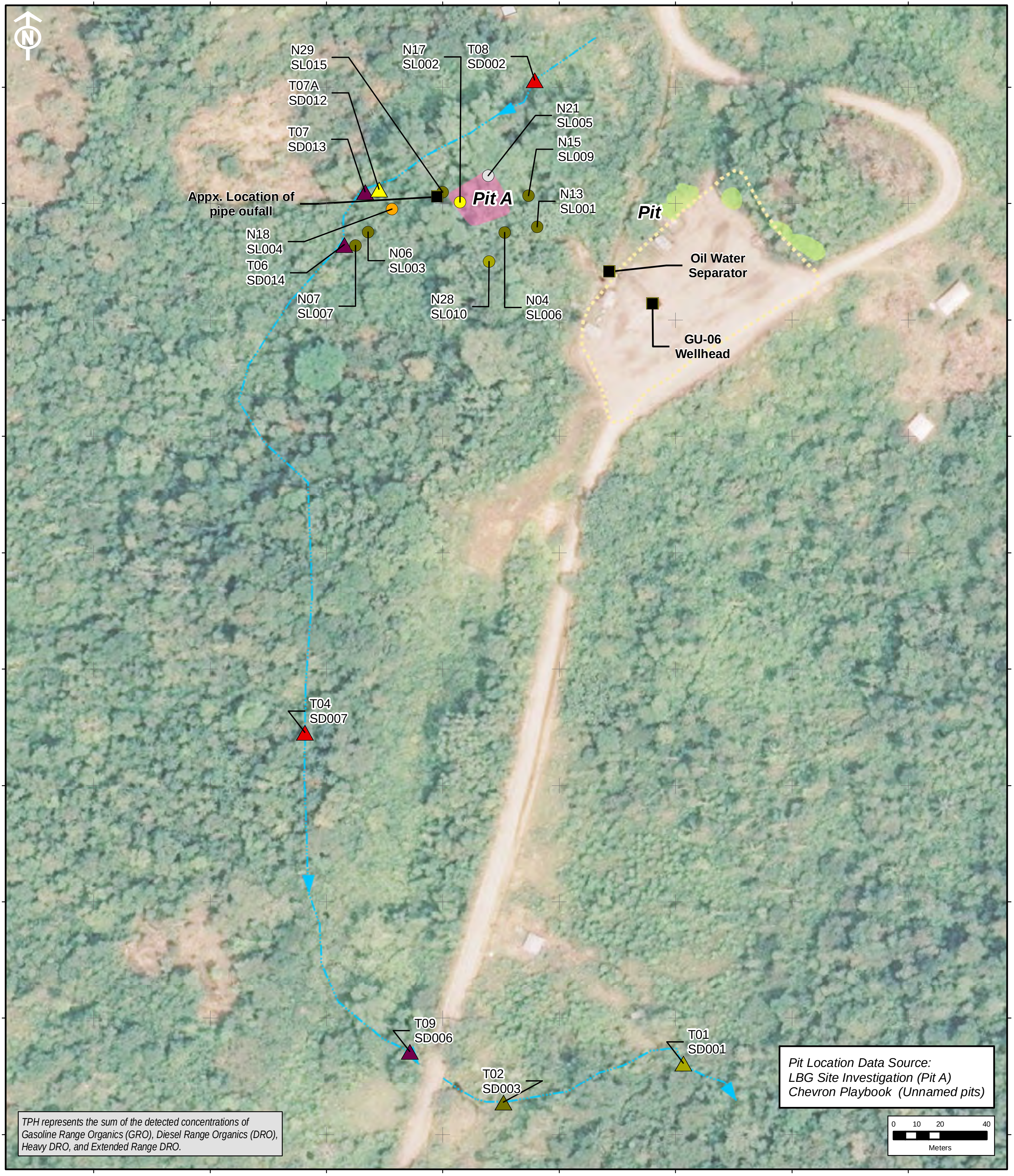
Pit Location Data Source:
Chevron Playbook (Pit 1, Pit 2, Pit 3)
LBG Site Investigation (unnamed pit)

Figure 5.3-2
PAH in Soil and
Sediment Samples

AGUARICO 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI Report Nov18\5-Analytical Results\Figure 5 3-2 AG-02 PAH Solids.mxd



Pit Location Data Source:
LBG Site Investigation (Pit A)
Chevron Playbook (Unnamed pits)

TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

Sample Type

- ○ Soil Boring
- △ Sediment
- -·-·-▶ Stream
- ▭ Residence

TPH (ppm):

- ● Non-Detect [1]
- ● < 100
- ● 101 - 500
- ● 501 - 1000
- ● 1001 - 2500
- ● 2501 - 5000
- ● > 5000

Production Area

- ⬚ Platform

Pit Status

- 🟩 Non RAP - Not Remediated
- 🟪 Closed Prior to RAP

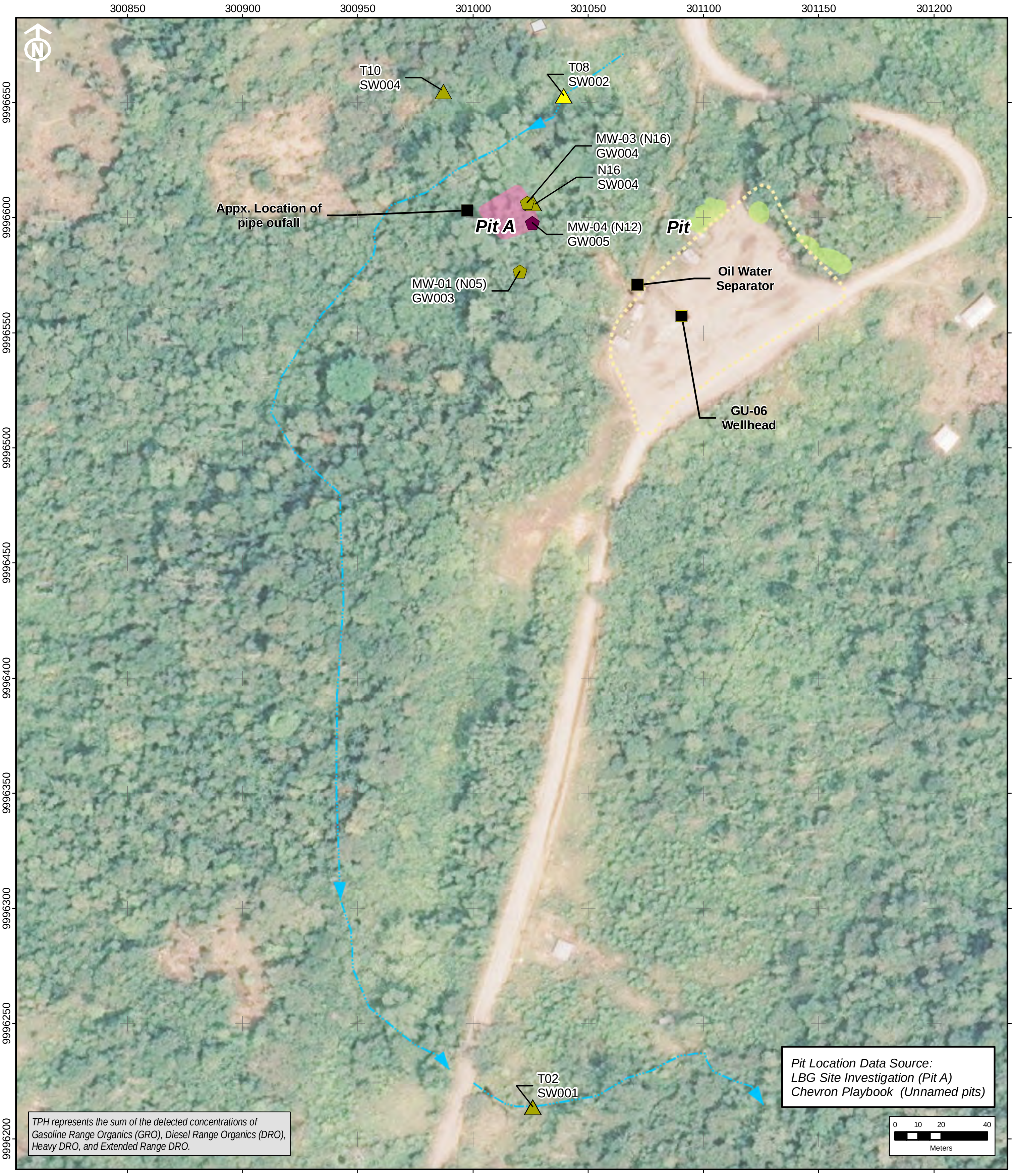
[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.4-1
TPH in Soil and Sediment Samples

GUANTA 06

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_4-1 GU-06_TPH_Solids.mxd



TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

Pit Location Data Source:
LBG Site Investigation (Pit A)
Chevron Playbook (Unnamed pits)

Sample Type
⬠ Ground Water
△ Surface Water
➤ Stream
▭ Residence

TPH (ppm)
● Non-Detect [1]
● < 0.100
● 0.101 - 0.325
● 0.326 - 0.500
● 0.501 - 1.000
● > 1.000

Production Area
▭ Platform

Pit Status
🟩 Non RAP - Not Remediated
🟥 Closed Prior to RAP

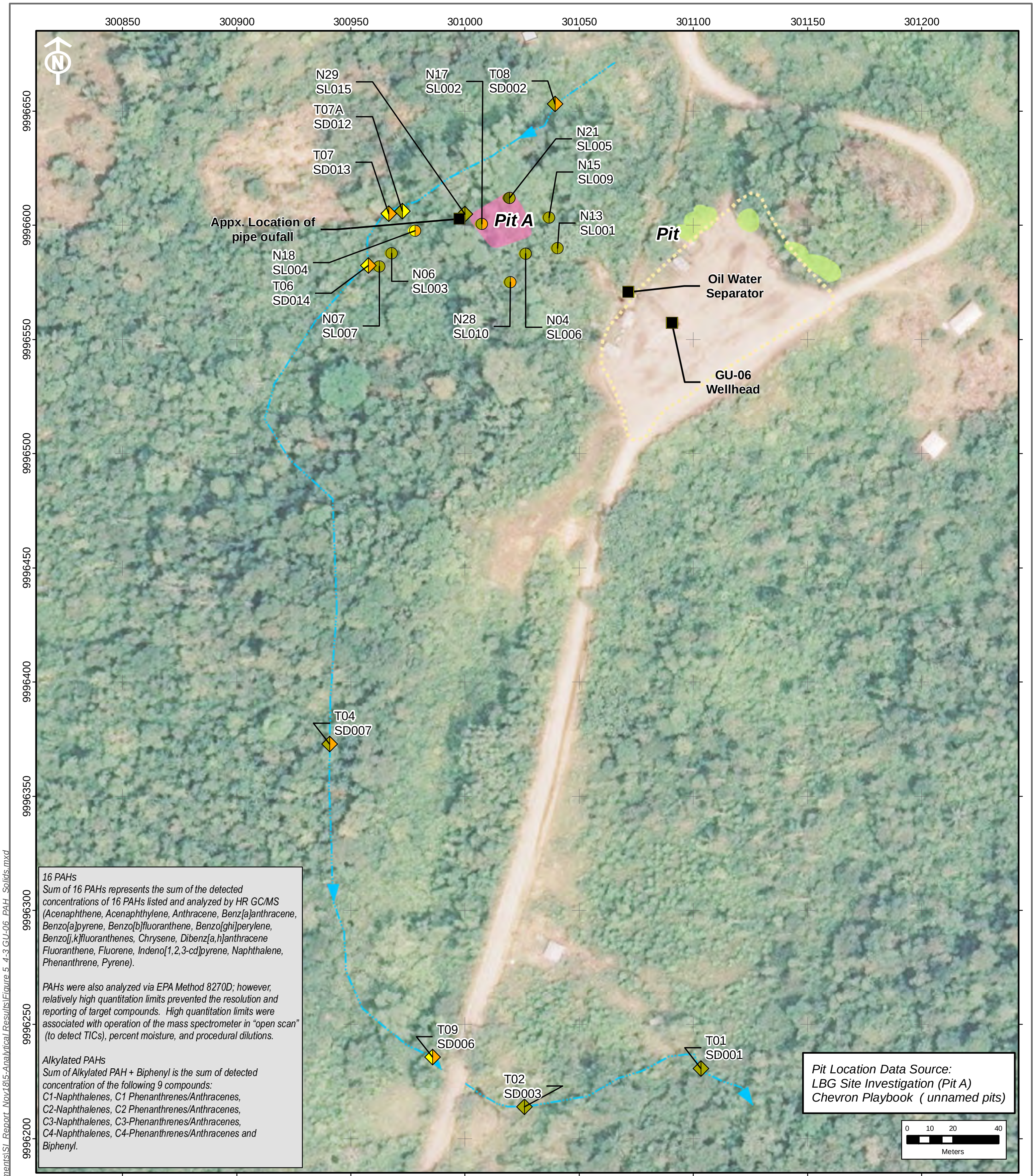
[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.4-2
TPH in Surface Water and
Groundwater Samples

GUANTA 06

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_4-2 GU-06_TPH_Aqueous.mxd



16 PAHs
Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.

Alkylated PAHs
Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds:
C1-Naphthalenes, C1 Phenanthrenes/Anthracenes,
C2-Naphthalenes, C2 Phenanthrenes/Anthracenes,
C3-Naphthalenes, C3-Phenanthrenes/Anthracenes,
C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Pit Location Data Source:
LBG Site Investigation (Pit A)
Chevron Playbook (unnamed pits)

Sample Type
◐ Soil Boring
◆ Sediment
→ Stream
▭ Residence

16 PAHs (ppm)
◐ < 0.01
◐ 0.02 - 1.00
◐ 1.01 - 10.00
◐ 10.01 - 100.00
◐ > 100.00

Alkylated PAHs (ppm)
◐ < 0.01
◐ 0.02 - 1.00
◐ 1.01 - 10.00
◐ 10.01 - 100.00
◐ 100.01 - 1000.00
◐ > 1000.00

Production Area
▭ Platform

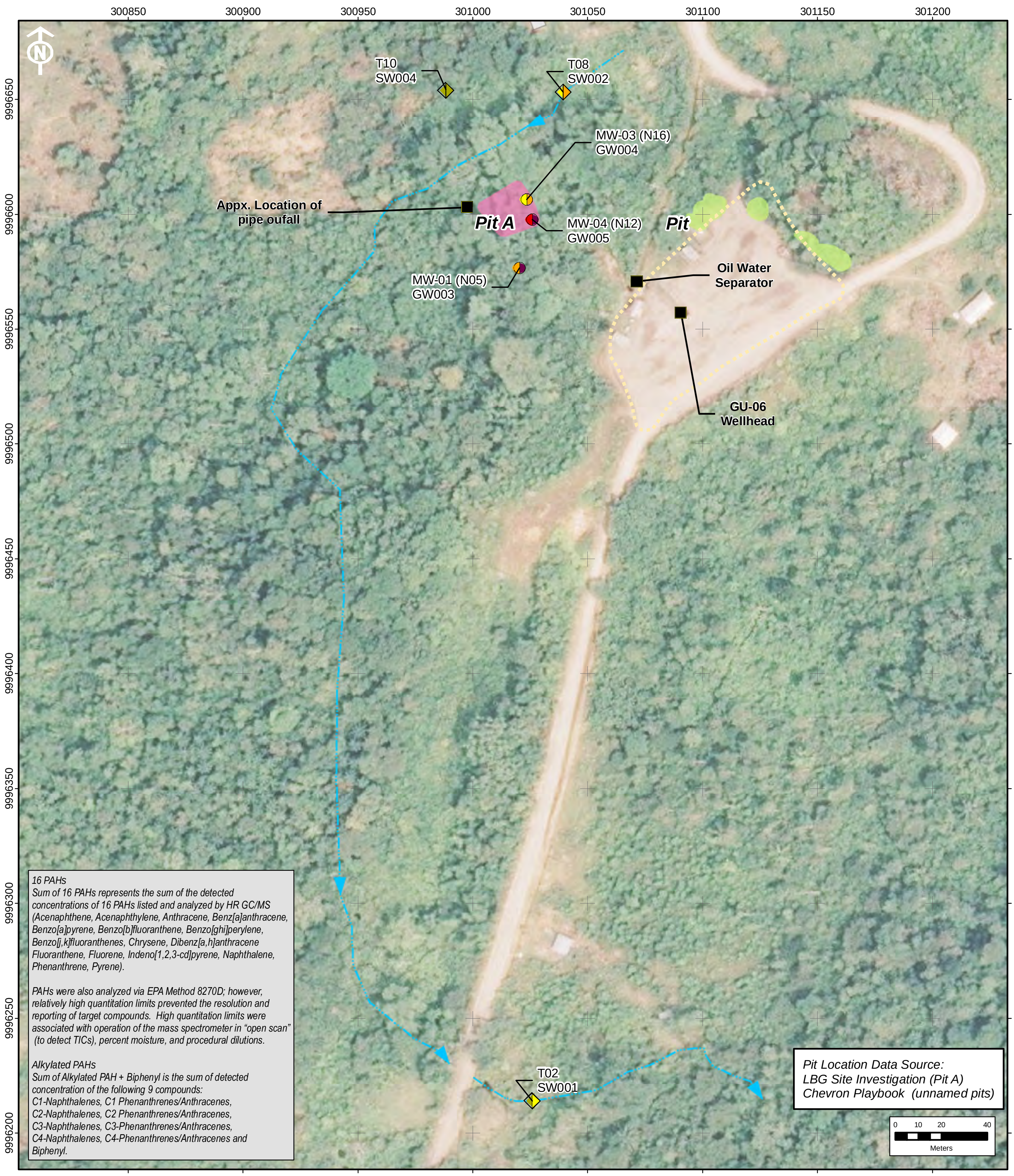
Pit Status
🟥 Closed Prior to RAP
🟩 Non RAP - Not Remediated

Figure 5.4-3
PAH in Soil and
Sediment Samples

GUANTA 06

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov185-Analytical Results\Figure 5_4-3 GU-06_PAH_Solids.mxd



16 PAHs
Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.

Alkylated PAHs
Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds:
C1-Naphthalenes, C1 Phenanthrenes/Anthracenes,
C2-Naphthalenes, C2 Phenanthrenes/Anthracenes,
C3-Naphthalenes, C3-Phenanthrenes/Anthracenes,
C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and
Biphenyl.

Pit Location Data Source:
LBG Site Investigation (Pit A)
Chevron Playbook (unnamed pits)

Sample Type
◐ Groundwater
◇ Surface Water
▭ Residence
-··-▶ Stream

16 PAHs (ppm)
◐ < 0.000030
◐ 0.000031 - 0.000300
◐ 0.000301 - 0.001000
◐ 0.001001 - 0.003000
◐ > 0.003000

Alkylated PAHs (ppm)
◐ < 0.000030
◐ 0.000031 - 0.000300
◐ 0.000301 - 0.001000
◐ 0.001001 - 0.003000
◐ > 0.003000

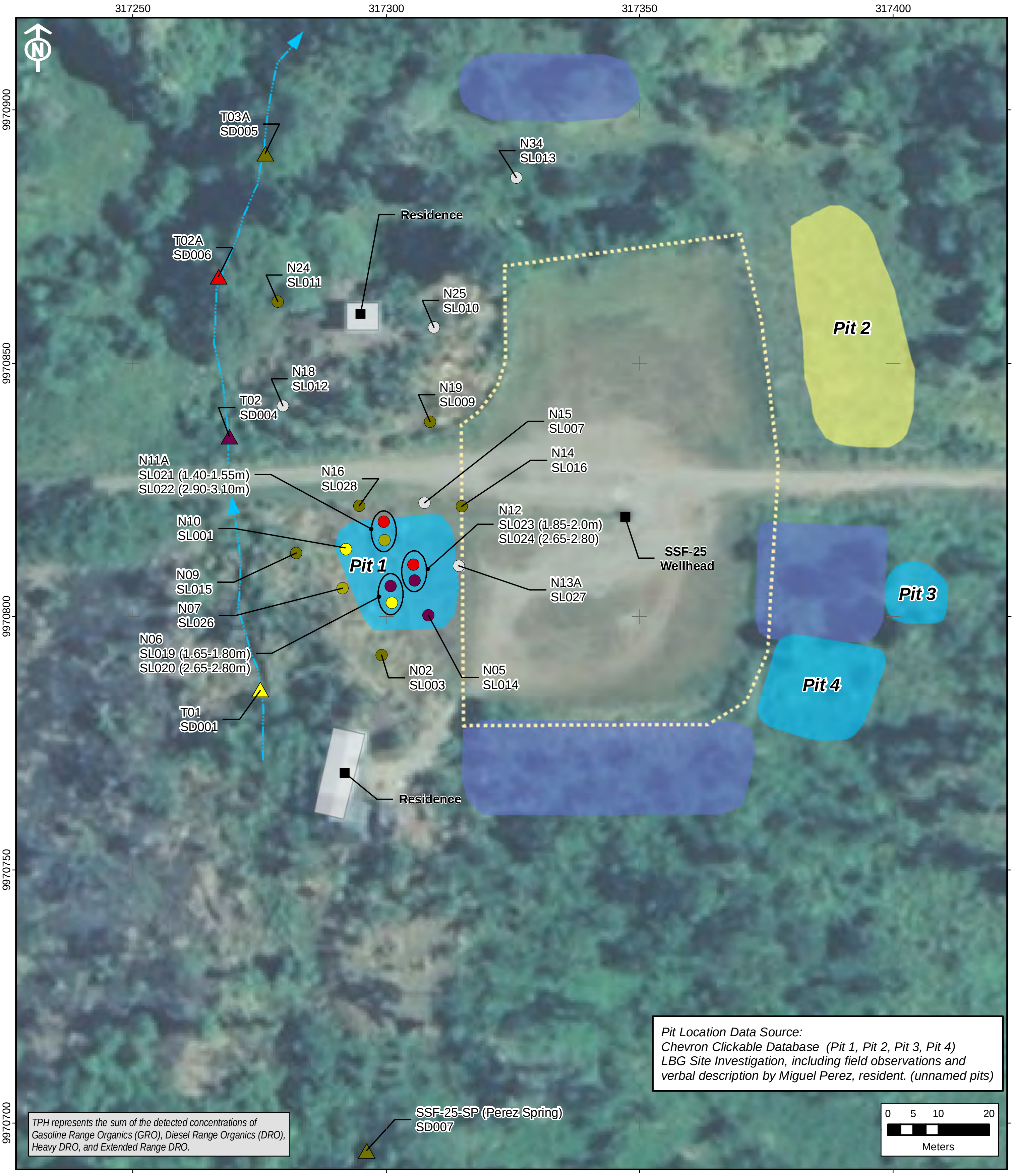
Production Area
▢ Platform

Pit Status
🟪 Closed Prior to RAP
🟩 Non RAP - Not Remediated

Figure 5.4-4
PAH in Surface Water and Groundwater Samples

GUANTA 06

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI Report Nov18\5-Analytical Results\Figure 5 4-4 GU-06 PAH Aqueous.mxd



Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit 3, Pit 4)
LBG Site Investigation, including field observations and verbal description by Miguel Perez, resident. (unnamed pits)

TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

Sample Type
○ Soil Boring
△ Sediment
-·-·-▶ Stream
▭ Residence

TPH (ppm):
○ Non-Detect [1]
● < 100
● 101 - 500
● 501 - 1000
● 1001 - 2500
● 2501 - 5000
● > 5000

Production Area
⬚ Platform

Pit Status
🟦 RAP - Remediated
🟨 RAP - NFA
🟦 Unconfirmed

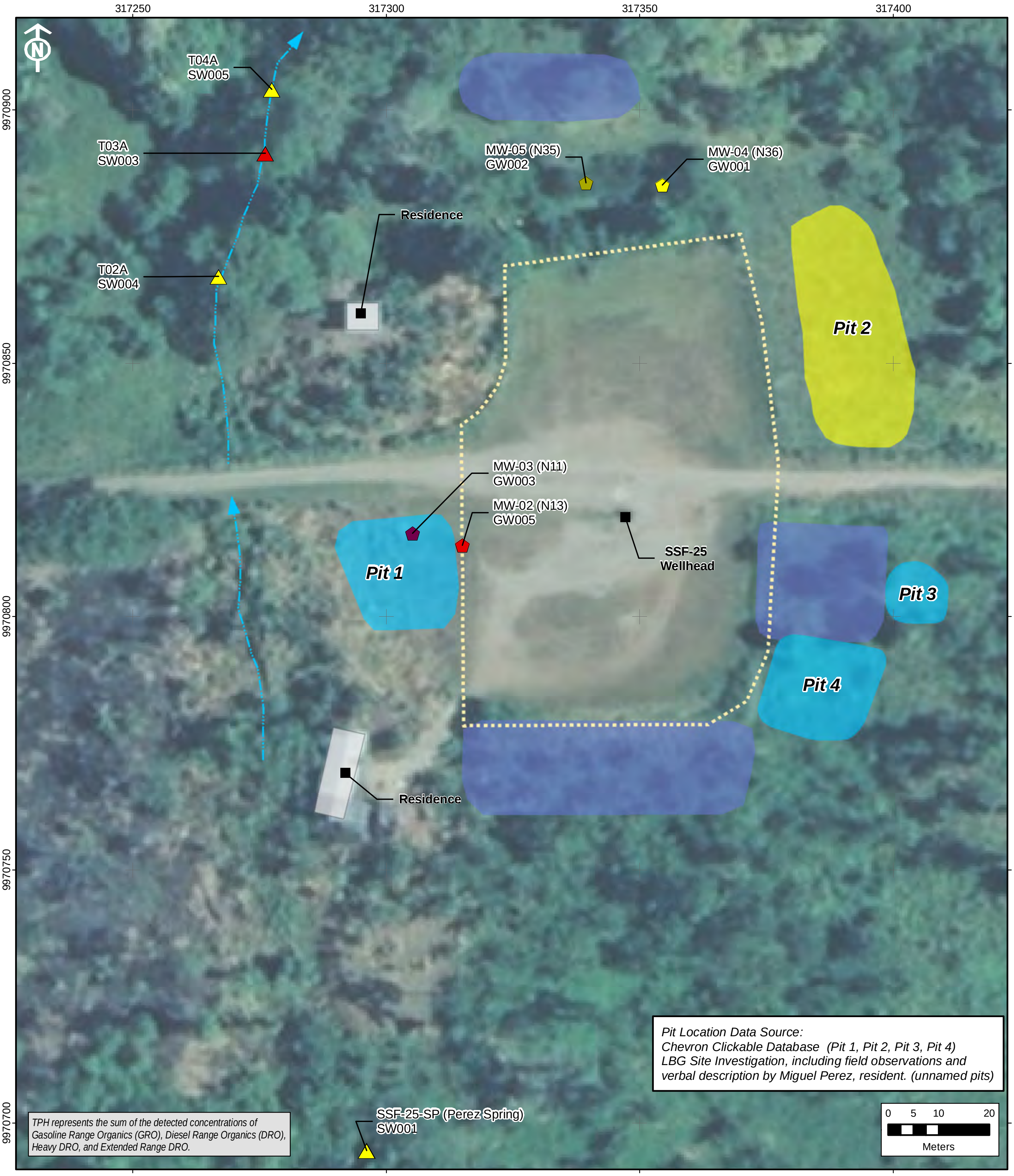
[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.5-1
TPH in Soil and Sediment Samples

SHUSHUFINDI 25

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_5-1 SSF-25_TPH_Solids.mxd



Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit 3, Pit 4)
LBG Site Investigation, including field observations and verbal description by Miguel Perez, resident. (unnamed pits)

TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

Sample Type
⬠ Ground Water
△ Surface Water
-··-▶ Stream
▭ Residence

TPH (ppm)
● Non-Detect [1]
● < 0.100
● 0.101 - 0.325
● 0.326 - 0.500
● 0.501 - 1.000
● > 1.000

Production Area
▭ Platform
Pit Status
🟦 RAP - Remediated
🟨 RAP - NFA
🟪 Unconfirmed

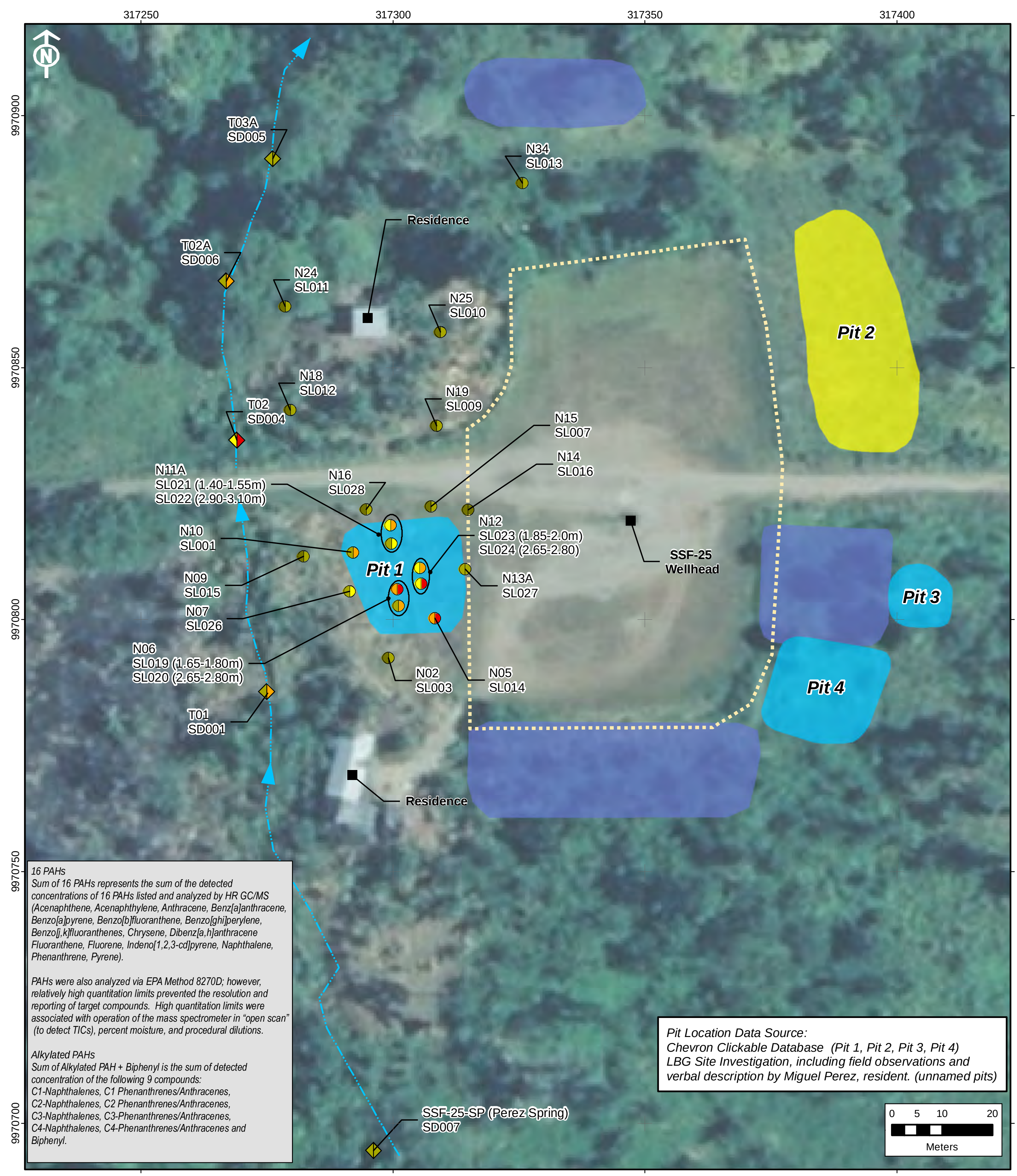
[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.5-2
TPH in Surface Water and Groundwater Samples

SHUSHUFINDI 25

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_5-2 SSF-25_TPH_Aqueous.mxd



16 PAHs
Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in “open scan” (to detect TICs), percent moisture, and procedural dilutions.

Alkylated PAHs
Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds:
C1-Naphthalenes, C1 Phenanthrenes/Anthracenes,
C2-Naphthalenes, C2 Phenanthrenes/Anthracenes,
C3-Naphthalenes, C3-Phenanthrenes/Anthracenes,
C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit 3, Pit 4)
LBG Site Investigation, including field observations and verbal description by Miguel Perez, resident. (unnamed pits)

Sample Type
◐ Soil Boring
◇ Sediment
-··-▶ Stream
▭ Residence

16 PAHs (ppm)
◐ < 0.01
◐ 0.02 - 1.00
◐ 1.01 - 10.00
◐ 10.01 - 100.00
◐ > 100.00

Alkylated PAHs (ppm)
◐ < 0.01
◐ 0.02 - 1.00
◐ 1.01 - 10.00
◐ 10.01 - 100.00
◐ 100.01 - 1000.00
◐ > 1000.00

Production Area
⬚ Platform

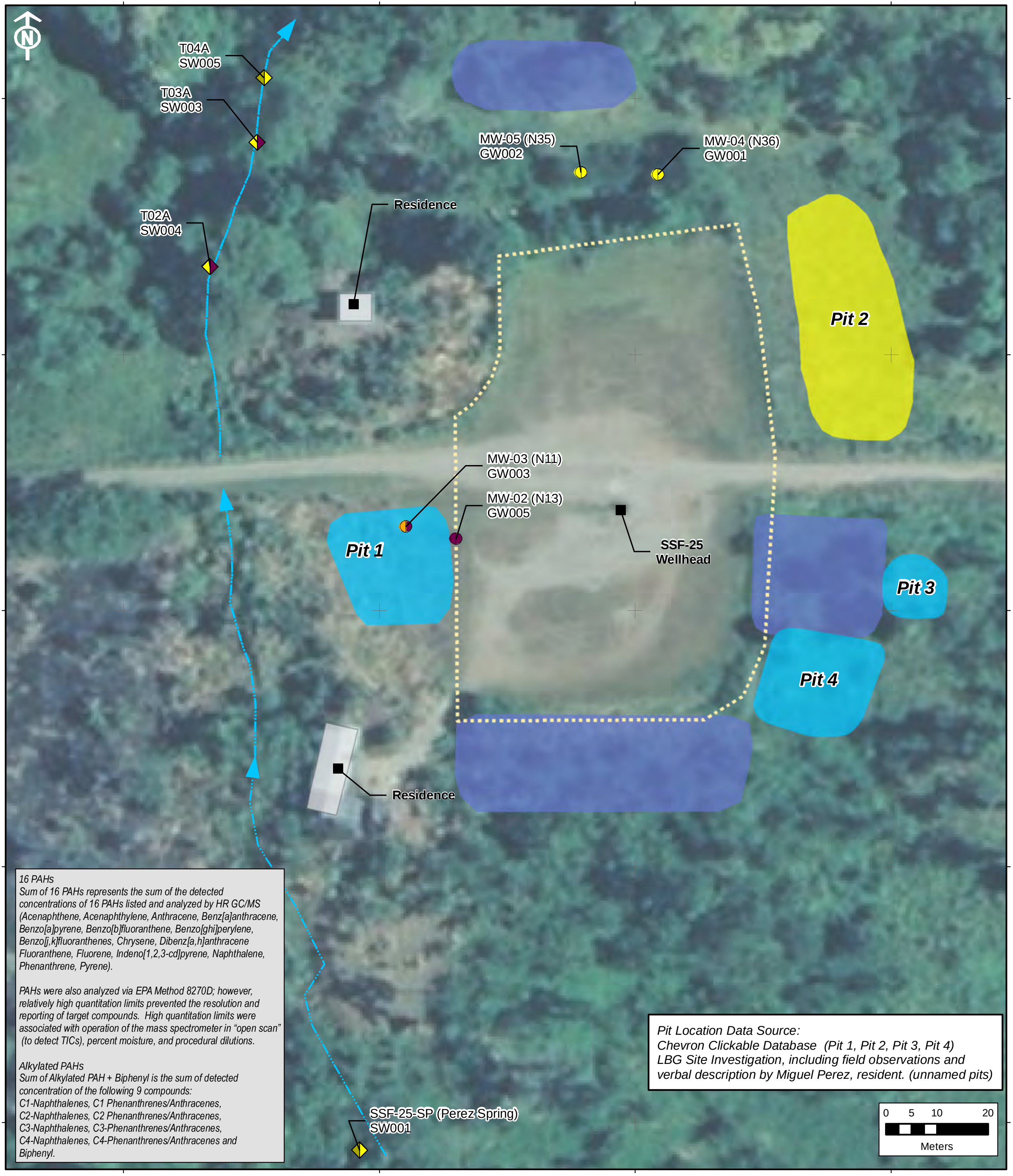
Pit Status
🟦 RAP - Remediated
🟨 RAP - NFA
🟪 Unconfirmed

Figure 5.5-3
PAH in Soil and Sediment Samples

SHUSHUFINDI 25

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI Report Nov18\5-Analytical Results\Figure 5 5-3 SSF-25 PAH Solids.mxd



16 PAHs
Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.

Alkylated PAHs
Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds:
C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit 3, Pit 4)
LBG Site Investigation, including field observations and verbal description by Miguel Perez, resident. (unnamed pits)

Sample Type
◐ Groundwater
◇ Surface Water
-·-·-▶ Stream
☐ Residence

16 PAHs (ppm)
◐ < 0.000030
◐ 0.000031 - 0.000300
◐ 0.000301 - 0.001000
◐ 0.001001 - 0.003000
◐ > 0.003000

Alkylated PAHs (ppm)
◐ < 0.000030
◐ 0.000031 - 0.000300
◐ 0.000301 - 0.001000
◐ 0.001001 - 0.003000
◐ > 0.003000

Production Area
⬚ Platform

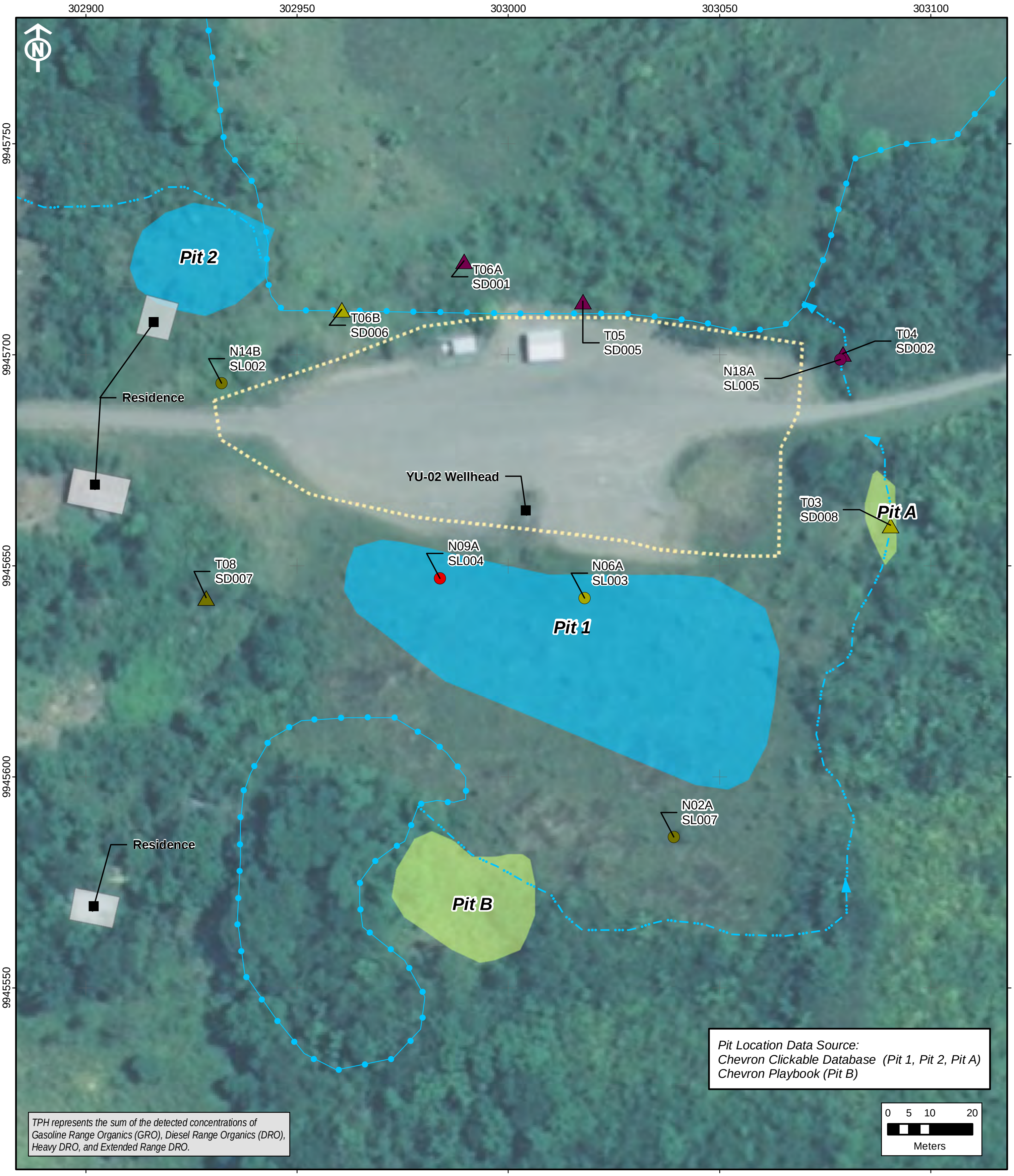
Pit Status
🟦 RAP - Remediated
🟨 RAP - NFA
🟪 Unconfirmed

Figure 5.5-4
PAH in Surface Water and Groundwater Samples

SHUSHUFINDI 25

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_5-4 SSF-25_PAH_Aqueous.mxd



Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit A)
Chevron Playbook (Pit B)

TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

Sample Type
○ Soil Boring
△ Sediment
Stream
Wetland
▭ Residence

TPH (ppm):
○ Non-Detect [1]
● < 100
● 101 - 500
● 501 - 1000
● 1001 - 2500
● 2501 - 5000
● > 5000

Production Area
Platform
Pit Status
🟦 RAP - Remediated
🟩 Non RAP - Not Remediated

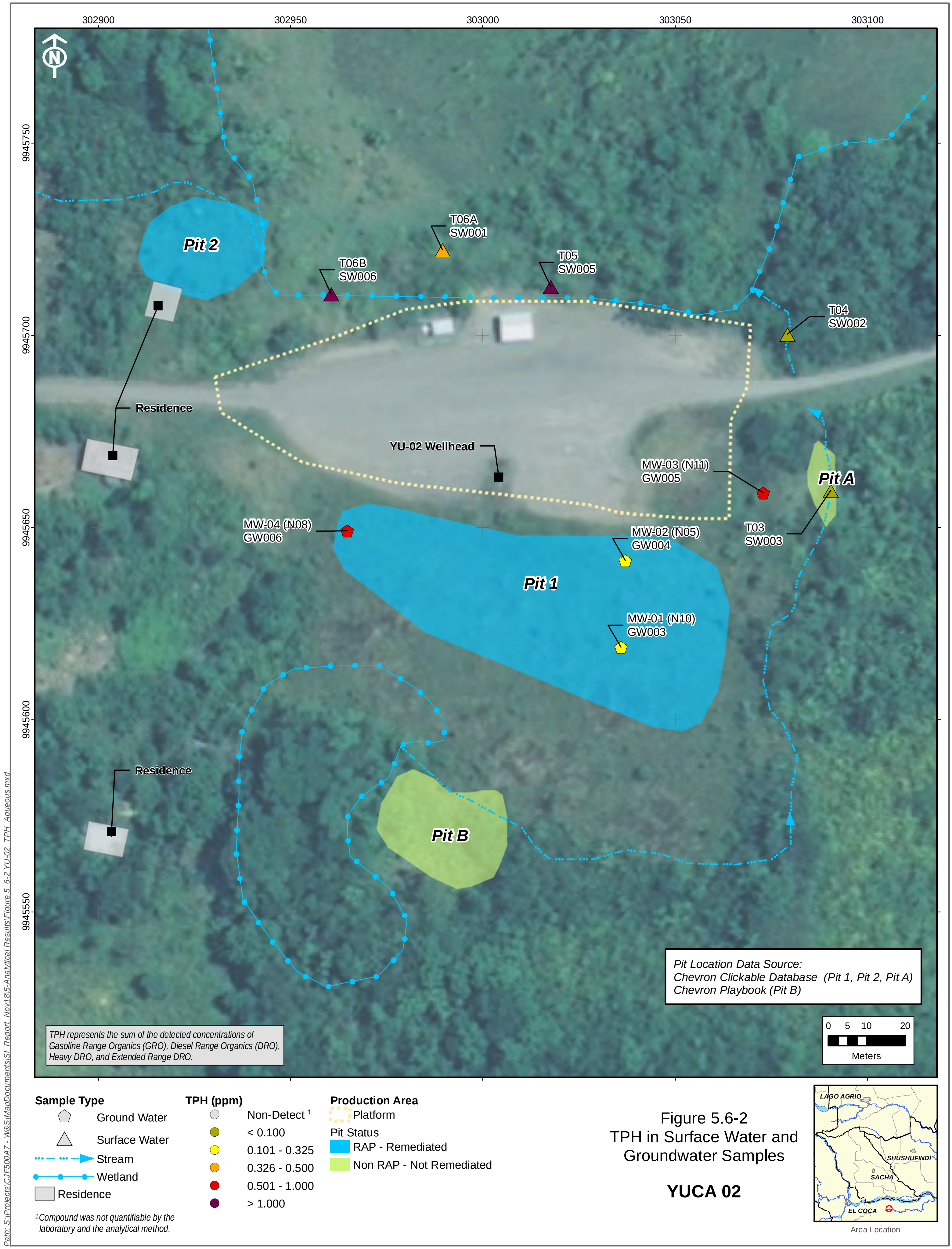
[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.6-1
TPH in Soil and Sediment Samples

YUCA 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI Report Nov18\5-Analytical Results\Figure 5 6-1 YU-02 TPH Solids.mxd



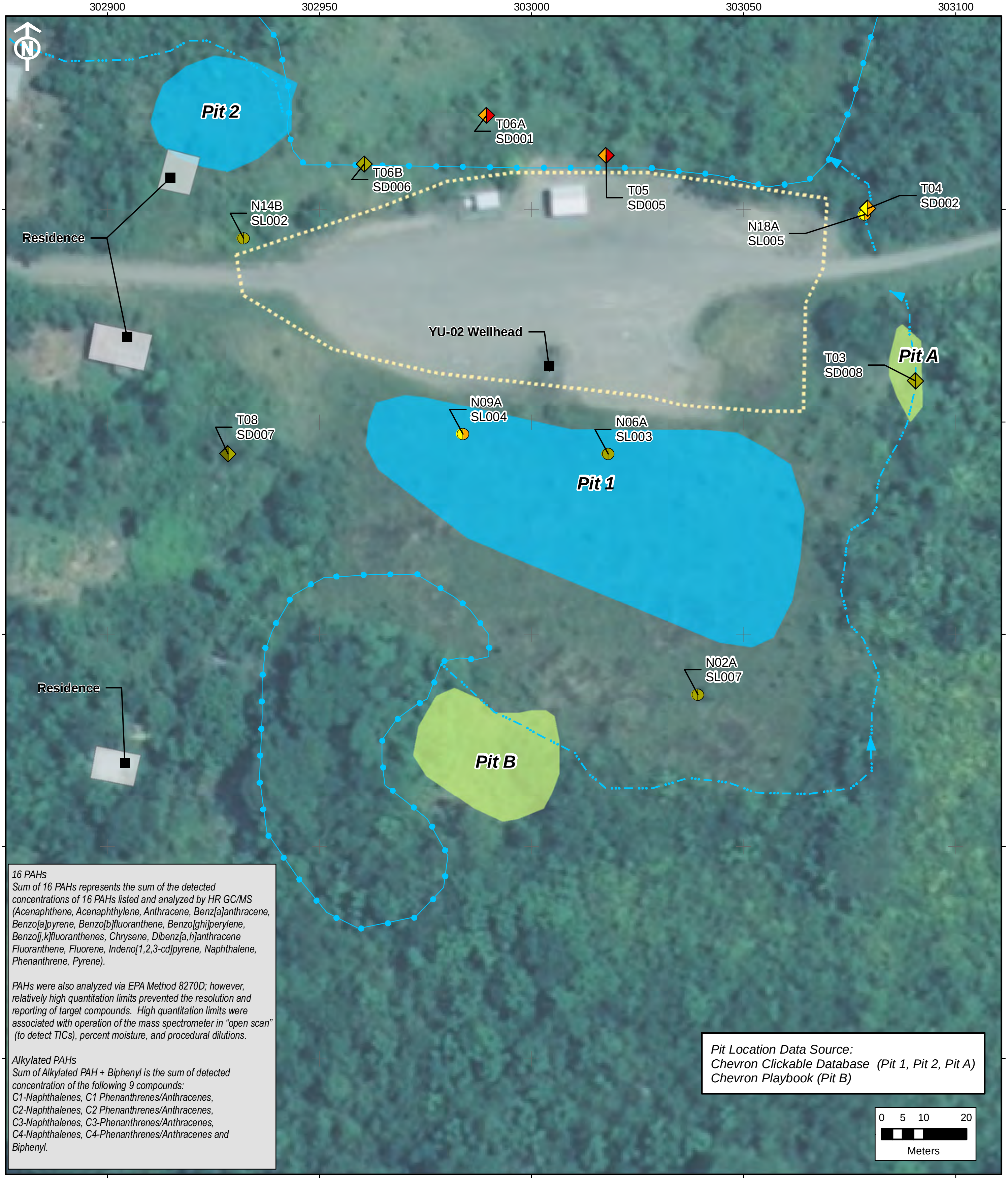
Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit A)
Chevron Playbook (Pit B)

TPH represents the sum of the detected concentrations of Gasoline Range Organics (GRO), Diesel Range Organics (DRO), Heavy DRO, and Extended Range DRO.

[1] *Compound was not quantifiable by the laboratory and the analytical method.*

Figure 5.6-2
TPH in Surface Water and
Groundwater Samples

YUCA 02



16 PAHs
Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthene, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.

Alkylated PAHs
Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds: C1-Naphthalenes, C1 Phenanthrenes/Anthracenes, C2-Naphthalenes, C2 Phenanthrenes/Anthracenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and Biphenyl.

Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit A)
Chevron Playbook (Pit B)

Sample Type
◐ Soil Boring
◇ Sediment
- - -▶ Stream
●—● Wetland
▭ Residence

16 PAHs (ppm)
◐ < 0.01
◐ 0.02 - 1.00
◐ 1.01 - 10.00
◐ 10.01 - 100.00
◐ > 100.00

Alkylated PAHs (ppm)
◐ < 0.01
◐ 0.02 - 1.00
◐ 1.01 - 10.00
◐ 10.01 - 100.00
◐ 100.01 - 1000.00
◐ > 1000.00

Production Area
⬚ Platform

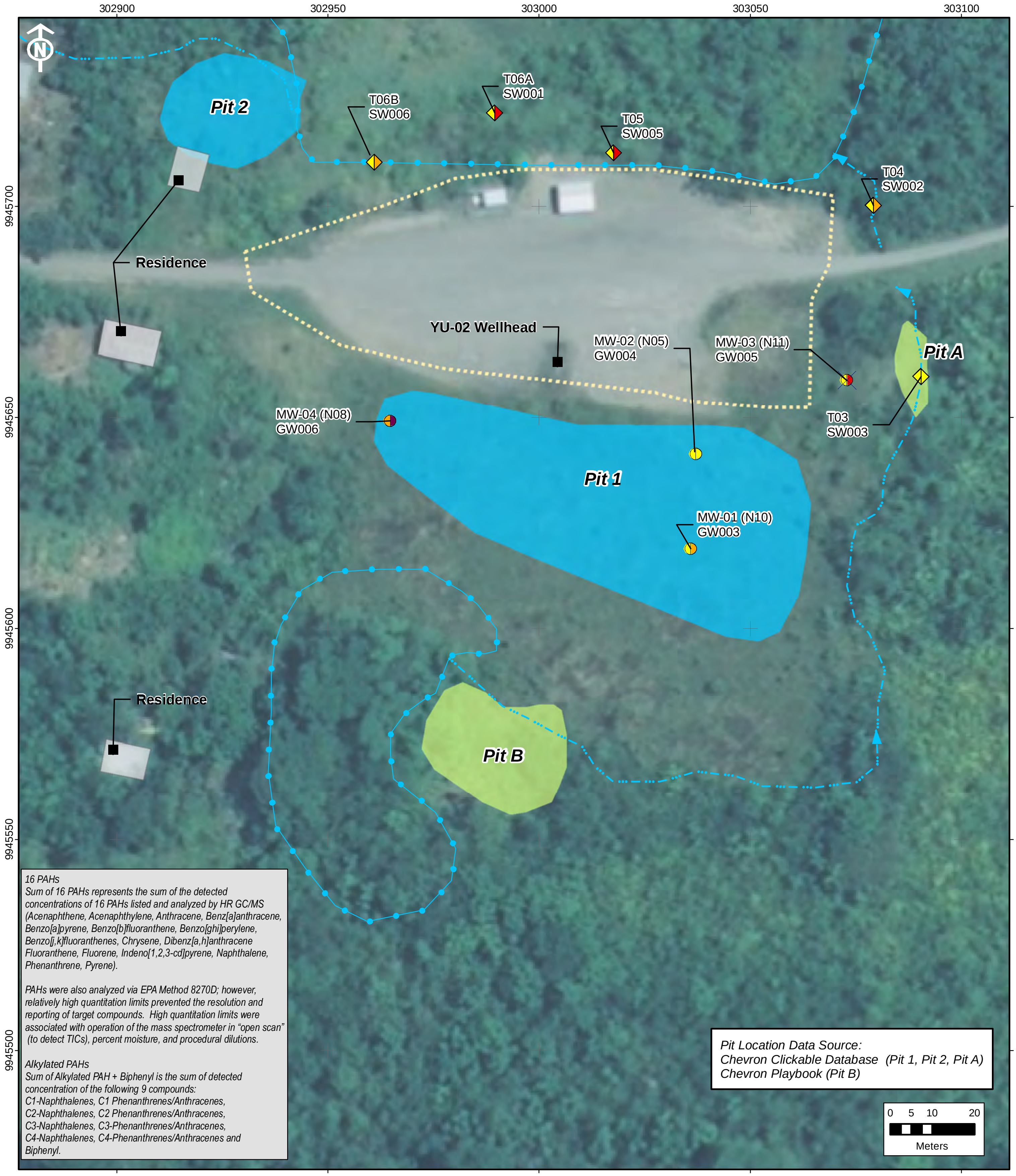
Pit Status
🟦 RAP - Remediated
🟩 Non RAP - Not Remediated

Figure 5.6-3
PAH in Soil and Sediment Samples

YUCA 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_6-3 YU-02_PAH_Solids.mxd



16 PAHs
Sum of 16 PAHs represents the sum of the detected concentrations of 16 PAHs listed and analyzed by HR GC/MS (Acenaphthene, Acenaphthylene, Anthracene, Benz[a]anthracene, Benzo[a]pyrene, Benzo[b]fluoranthene, Benzo[ghi]perylene, Benzo[j,k]fluoranthenes, Chrysene, Dibenz[a,h]anthracene Fluoranthene, Fluorene, Indeno[1,2,3-cd]pyrene, Naphthalene, Phenanthrene, Pyrene).

PAHs were also analyzed via EPA Method 8270D; however, relatively high quantitation limits prevented the resolution and reporting of target compounds. High quantitation limits were associated with operation of the mass spectrometer in "open scan" (to detect TICs), percent moisture, and procedural dilutions.

Alkylated PAHs
Sum of Alkylated PAH + Biphenyl is the sum of detected concentration of the following 9 compounds:
C1-Naphthalenes, C1 Phenanthrenes/Anthracenes,
C2-Naphthalenes, C2 Phenanthrenes/Anthracenes,
C3-Naphthalenes, C3-Phenanthrenes/Anthracenes,
C4-Naphthalenes, C4-Phenanthrenes/Anthracenes and
Biphenyl.

Pit Location Data Source:
Chevron Clickable Database (Pit 1, Pit 2, Pit A)
Chevron Playbook (Pit B)

Sample Type
- ◐ Groundwater
- ◇ Surface Water
- ➝ Stream
- ●—● Wetland
- ☐ Residence

16 PAHs (ppm)
- ◐ < 0.000030
- ◐ 0.000031 - 0.000300
- ◐ 0.000301 - 0.001000
- ◐ 0.001001 - 0.003000
- ◐ > 0.003000

Alkylated PAHs (ppm)
- ◑ 0.000000 - 0.000030
- ◑ 0.000031 - 0.000300
- ◑ 0.000301 - 0.001000
- ◑ 0.001001 - 0.003000
- ◑ 0.003001 - 1442.613800

Production Area
- ⬚ Platform

Pit Status
- 🟦 RAP - Remediated
- 🟩 Non RAP - Not Remediated

Figure 5.6-4
PAH in Surface Water and Groundwater Samples

YUCA 02

Area Location

Path: S:\Projects\CJF500A7 - W&S\MapDocuments\SI_Report_Nov18\5-Analytical Results\Figure 5_6-4 YU-02_PAH_Aqueous.mxd