APPENDIX 8.11-A

# Site Soil Pre-characterization Reports

**C10-SAI-RICHMOND-02-9566**

April 28, 2006

Mr. Ken Yee
Chevron Richmond Refinery
Environmental Operations/Hazardous Waste
841 Chevron Way
Richmond, CA 94802

**Re: Capital Projects: Hydrogen Plant Site Soil Pre-Characterization Results**
**HW Job #: S2996**

Dear Mr. Yee,

Science Applications International Corporation (SAIC) has prepared this letter report to summarize the findings of the pre-characterization that we performed for the upcoming Hydrogen Plant Project located at the South Yard "Y" within the Richmond Refinery.

## EXECUTIVE SUMMARY

Sixty-two composite soil samples, seven groundwater grab samples, and 11 soil re-use characteristics samples were collected to pre-characterize the proposed Hydrogen Plant Site (including the existing and proposed stormwater alignments). The summarized findings are:

- 40% of the samples exceeding the current Refinery re-use limits for either Total Petroleum Hydrocarbon (TPH)-gasoline or TPH-diesel.
- 42% of the samples contained TPH concentrations that were within the current re-use limits.
- 14% of the samples were designated as California hazardous waste.
- 4% of the samples were designated as a Federal hazardous waste.
- Groundwater occurred across the project site at shallow depths (1-4 feet bellow ground surface [bgs]), and free-phase liquid hydrocarbon (FPLH) was observed at nearly half of the locations. Several groundwater samples contained TPH-diesel or TPH-gasoline in excess of the maximum allowable contaminant limits (MACLs) established for the Refinery.

Based on the findings listed above, SAIC recommends the following:

- The team should revisit the goals of the Hydrogen Plant pre-construction project and evaluate site preparation requirements based on these findings. Specifically, the previously-stated goal of providing a "clean" site for the third party construction should be reevaluated since it is likely that any clean backfill would be recontaminated by hydrocarbon-impacted groundwater and FPLH beneath the site. As an alternative, the construction team would leave the majority of the site soils in-place and remove only the soils required to construct the facility. This alternative would likely require employing a contractor qualified in Hazardous Waste

Operations. This alternative would significantly reduce the costs for excavation, transportation and disposal of hazardous waste, and reduce the overall amount of truck traffic through the community caused by the project.

- If it is determined that large-scale excavation ('bathtubbing') of the Hydrogen Plant site is necessary, then SAIC estimates the following rough volumes would be generated from a 6-foot site-wide excavation:

    - 2,000 cubic yards (4%) would be designated as a Federal hazardous waste;
    - 8,600 cubic yards (14%) would be designated as a California (State) hazardous waste,
    - 24,000 cubic yards (40 %) would not meet the current TPH re-use limits for placement within the Refinery (i.e., could require Class II landfill disposal), and
    - 25,000 cubic yards (42%) would be suitable for re-use within the Refinery areas influence by the groundwater protection system (GPS).

  These volumes are based solely on the estimated size and depth of the proposed excavation (6 feet) provided to SAIC by the Capital Projects group. The total volume characterized is roughly 60,000 cubic yards. The actual total volume of soil required to create a "clean" site (i.e., by removing all hydrocarbon- and metals-impacted fill down to the Bay Mud interface at 9-12 feet bgs) could be as much as 50-100% greater. Furthermore, after replacing these soils with clean fill, a system of groundwater extraction trenches installed along the perimeter of the site would be necessary to prevent hydrocarbon-impacted groundwater and FPLH from re-contaminating the clean fill. The costs of installation and operation of such trenches would be significant to the project.

- If a large-scale excavation were required, several re-use and disposal options, including recycling (asphalt or concrete batching) and potential placement at the #1 Oxidation Ponds would need additional evaluation. Based on the regulatory assessment conducted recently, the #1 Oxidation Ponds would be suitable for disposal of non-hazardous soils generated during excavation, although the exact costs for placement and management of these soils still needs to be evaluated.

- If it is decided that the Site will not be "bathtubbed" the Capital Projects team should consider abandoning the 48-inch sewer line in-place rather than removing it, to avoid the excavation of soils that may not be suitable for re-use.

## HYDROGEN PLANT PRE-CHARACTERIZATION

### Pre-Characterization Approach

Per our March 3, 2006 memorandum entitled *Capital Projects: Sampling and Analysis Plan for Hydrogen, Cogen, CCR, and Hydrogen Purity Sites*, the prescribed approach for this project was to pre-characterize the proposed construction area footprints provided to us by the Capital Projects Group using a direct-push Geoprobe rig to collect in-place soil samples from 65 locations and groundwater grab samples from seven locations. Gregg Drilling and Testing (Gregg) of Martinez, California, was selected as the drilling subcontractor. Gregg performed the drilling from March 6 - 9, 2006.

All notifications and Health and Safety checklists and pre approvals were obtained for the work performed, including the RI-505 procedure, work permits from the applicable operating units, and notification of nearby operating units. Additionally, safety tailgate meetings were performed each morning before beginning work in order to communicate Chevron Richmond Refinery standards of safety to all subcontractors involved.

**Soil Boring Locations**

Figure 1 shows the locations for each of the 65 soil borings. Boring numbers HPP 1 through HPP 54 are located within the footprint of the proposed Hydrogen Plant. The grid superimposed over the footprint of the proposed Hydrogen Plant consists of cells roughly 55 by 85 feet in dimension. Based on a proposed excavation depth of six feet, each cell represents roughly 1,000 cubic yards of excavated soil. One boring was proposed in each of 54 rectangles based on the estimated 54,000 cubic yards in the proposed construction footprint.

Boring numbers HPP 55 through HPP 58 are located along the current alignment of the existing 48-inch stormwater line. The purpose of these three composite samples was to pre-characterize soils which will be excavated during the removal of the stormwater line.

Additionally, grab samples were collected from boring numbers 1H, 2H, 3H and 4H (located along Hydro Street), and boring numbers 1C, 2C and 3C (located adjacent to and along the pipeway west of Channel Street) for the purpose of pre-characterizing the approximate alignments of two proposed stormwater lines. Four composite samples were created from the vertical grab samples collected at locations 1H, 2H, H3/H4, and 1C/2C/3C.

The additional stormwater borings (HPP 55 through HPP 58, 1H, 2H, 3H/4H, and 1C/2C/3C) were collected to characterize approximately 6,000 cubic yards of soil.

In total, 62 composite samples were collected to characterize approximately 60,000 cubic yards of soil. Each of these 62 locations represents one vertical composite soil sample location. Borings locations were selected in areas free from concrete. After marking the locations a professional utility locator, Cruz Brothers Utility Locators of Hope Valley, California, cleared a ten foot by ten foot area around each of the proposed sampling locations.

Location HPP 25 was not sampled due to refusal from concrete just below the surface, and location HPP 29 could not be sampled past a depth of 4 feet due to refusal of an unknown nature. Areas of visual surface or suspected subsurface concrete were generally avoided during boring location placement within each grid cell. The relatively low percentage of borings where refusal occurred should not be used to estimate the distribution of underground obstructions. An extra sample was collected at location HPP 24A to make-up for the missing sample from HPP 25. Duplicate sample volumes were collected from the following locations: HPP 55, HPP 56, and 3H/4H.

**Soil Sampling and Analytical Methods**

At each location, the Geoprobe rig continuously sampled from ground surface to a depth of 6-feet bgs using a 2.5-inch diameter, 4-foot long stainless steel “Macrocore” sampler loaded with a clear polyvinyl chloride (PVC) sleeve. The sample cores were removed from the sampler and up to four

vertically discrete 6-inch sections of the core were cut and capped. The samples were transported under chain-of-custody to Lancaster Laboratories of Lancaster, Pennsylvania. The vertically discrete samples from each individual location were composited at the laboratory into a single sample. Samples from locations 3H/4H and 1C/2C/3C were combined to form composite samples.

Each sample was analyzed for the following parameters (EPA analytical method):

- TPH- Gasoline Range Organics (GRO) (EPA 8015m)
- TPH – Diesel Range Organics (DRO) (EPA 8015m)
- TPH – DRO with Silica Gel Cleanup (EPA 8015m)
- Total metals (EPA 6010/7000) plus waste extraction test (WET) for selected samples where total metals results exceeded 10x the Title 22 Soluble Threshold Limit Concentration (STLC)
- Toxicity Characteristic Leaching Procedure (TCLP) - metals only
- Volatile Organic Compounds (VOCs) - Skinner List (EPA 8260)
- Semi-volatile Organic Compounds (SVOCs) – Skinner List (EPA 8270)

Seven selected composite samples were split and sent to Alpha Analytical Laboratory of Ukiah, California, and analyzed for 96-hour acute toxicity fish bioassay.

Additionally, three representative composite samples were analyzed for characteristics of reactivity, corrosivity, and ignitability as specified in 22CCR66261.21 through 22CCR66261.23.

**Soils Results**

Results of the soil analyses are compiled in the attached Table 1.

***Organic Results***

Table 1 compares the analytical results with the Refinery's current re-use guidance limits for TPH-gasoline (100 mg/kg) and TPH-diesel (1,000 mg/kg). The re-use limits specify the allowable concentrations of TPH-gasoline and TPH-diesel that may be moved to another location within the influence of the Refinery's Groundwater Protection System (GPS) for either temporary stockpiling of final placement. Results that exceed these limits have been listed in bold font on the table.

Note that Lancaster Laboratory reported both organic and metals results that fall between the method detection limit (MDL) and the practical quantitation limit (PQL) or "reporting limit" and flagged these results with a "J" (estimated). For the purposes of this pre-characterization, these results can be treated as non-detect.

Eighteen of the 62 composite samples (29.5%) collected at the Hydrogen Plant site contained TPH-gasoline concentrations exceeding the current re-use limit (see Figure 1). These exceedences occurred in several locations across the proposed Hydrogen Plant footprint, and in three of the locations (HPP 55, HPP 57 and HPP 58) along the existing 48-inch stormwater line. However, TPH-gasoline exceedences did not occur in any of the four composite samples collected along the proposed new stormwater line alignments on Hydro Street and adjacent to the Channel Street pipeway.

TPH-diesel analyses were performed both with and without a silica gel cleanup, in order to identify whether naturally-occurring organic materials were present at the site and contributing to TPH-diesel concentrations. In general, the results were very similar, suggesting little naturally-occurring organic material was present in Hydrogen Plant soils. For the purposes of the pre-characterization, both results were compared to the re-use limits.

Twenty-two of the 62 composite samples (35%) contained TPH-diesel concentrations (either by standard extraction or with additional silica gel cleanup) is excess of the current re-use limit (see Figure 1). As with the TPH-gasoline detections, TPH-diesel exceedences were widespread across the proposed Hydrogen Plant footprint, and also occurred in two of the locations (HPP 57 and HPP 58) along the existing 48-inch stormwater line (see Figure 1). TPH-diesel exceedences did not occur in any of the four composite samples collected along the proposed new stormwater line alignments on Hydro Street and adjacent to the Channel Street pipeway.

In total, 25 of the 62 composite samples (40%) contained either TPH-gasoline or TPH-diesel concentrations in excess of the current Refinery re-use limits.

Note: SAIC's review of Lancaster's analytical quality control data showed some out-of-range surrogate spike recoveries for TPH-gasoline. In these instances, the recoveries of the surrogate analyte were lower than the laboratory's limits, indicating a low bias. However, recoveries of Laboratory Control Samples (LCSs) and Matrix Spike (MSs) were consistently "within range" and did not reflect the low bias exhibited through poor surrogate recovery. Therefore, the reported results for TPH-gasoline are considered acceptable for the purposes of this pre-characterization.

None of the 62 composite samples contained significant concentrations of VOCs or SVOCs, and the majority of compounds were non-detect. Where VOC and SVOC concentrations were detected, results were compared to an action limit of 20 times the TCLP limits listed in Title 22 of the California Code of Regulations (22CCR66261.24, Table 1) for that compound. None of the results exceeded this guideline; therefore, TCLP analyses for VOCs and SVOCs were not warranted as any resulting soluble concentrations from the sample leachates could not have exceeded the Title 22 TCLP limits.

Based on previous site use, pesticide contamination was not suspected; therefore, pesticide analyses were not performed for comparison with 22CCR66261.24 Table 1 limits.

***Metals Results***

Total metals results were compared to two sets of limits listed in Table 2 of 22CCR 6261.24.

First, they were compared to total threshold limit concentrations (TTLC's). Four of the 61 composite sample results exceeded TTLC for lead (1,000 mg/kg), designating them California hazardous waste. These results were from the locations HPP 9, HPP 26, HPP 33, and HPP 42 (Figure 1).

Secondly, the results were compared to a guideline of 10 times the soluble threshold limit concentrations (STLCs). This guideline establishes whether the sample has the potential for exceeding the soluble limit based on the total concentration. In addition to the four locations that exceeded the TTLC, seven other samples exceeded this guideline for total lead and two exceeded for arsenic. As a result, Lancaster performed the WET on each of these samples for comparison to the STLC. All seven

of the WET results exceeded the STLC limits listed in 22CCR66261.24, Table 2, designating them California hazardous waste. These results were from locations HPP1, HPP 8, HPP 14, HPP 20, HPP 27, HPP 36, and HPP 39 (Figure 1).

In total, 11 locations produced TTLC or STLC results which exceeded the California hazardous waste criteria.

Toxicity Characteristic Leaching Procedure (TCLP) metals analyses were performed (at a minimum) for all samples which contained total metals concentrations exceeding the guideline of 20 times the TCLP limits listed in 22CCR66261.24, Table 1. Two samples exceeded the TCLP limit for soluble lead (locations HPP 8 and HPP 33). Exceedences of a TCLP limit designate these samples as a Federal hazardous waste.

***Fish Bioassay Results***

Seven composite samples from representatively distributed boring locations within the proposed Hydrogen Plant footprint were submitted to Alpha Analytical for 96-hour acute toxicity fish bioassay. The results showed little or no fish mortality (see Table 1). Three of the seven samples resulted in 10-20% mortality in either the 250 mg/L or the 750 mg/L concentration split batches. The control batches (0 mg/L) had a similar (10%) mortality. None of the seven samples submitted had a 50% lethal concentration ($LC_{50}$) greater than 500 mg/L, and therefore did not have toxicity characteristics for a California hazardous waste per 22CCR66261.24(a)(6).

***Reactivity, Corrosivity, and Ignitability (RCI) Results***

None of the three composite samples (HPP 1, HPP 3, HPP 17) analyzed for of reactivity, corrosivity, and ignitability exhibited the characteristics.

**Occurrence of Groundwater and Free-phase Hydrocarbon at the Proposed Hydrogen Plant Site**

Based on recent water level monitoring conducted in the vicinity of the proposed Hydrogen Plant site, SAIC had estimated prior to the pre-characterization that groundwater beneath the site would occur at an approximate depth of 3-5 feet bgs. During drilling, groundwater was discovered at depths as shallow as 0.85 feet bgs (HPP 37) and typically found between 2.5 and 5 feet bgs. This elevated water table is likely influenced by heavy winter rains; however, even during the driest months (August/September) we would predict groundwater to occur at less than 5 feet bgs in the lower lying areas of the site. The shallow groundwater flow direction across the proposed Hydrogen Plant site is in a northwesterly direction and is locally influenced by surface recharge at the nearby Landfarm 1 (labeled on Figure 1).

During drilling, visible free-phase liquid hydrocarbon (FPLH) was observed in the soil cores at 27 of the boring locations (44%) at depths of up to 6 feet. While the pre-characterization soil borings were only advanced to a depth of 6 feet, it is likely that FPLH is present at depths down to the Bay Mud (i.e., 9-12 feet bgs).

The locations where FPLH was observed are noted on Table 1 and Figure 1. The distribution of these locations was predominantly in the southern half of the site, and generally corresponded to locations

where TPH-diesel or TPH-gasoline results exceeded re-use limits. However, roughly 10 instances occurred where FPLH was noted in the soil samples, but neither the TPH-gasoline nor the TPH-diesel results exceeded the re-use limits. Conversely, several instances occurred where no FPLH was noted in the soil cores, but either the TPH-gasoline or the TPH-diesel results exceeded the re-use limits. These instances could have been caused by heterogeneous soil samples or by compositing techniques at the laboratory, and make it difficult to correlate FPLH occurrence with TPH concentrations in soil.

**Groundwater Grab Sampling and Analytical Methods**

SAIC collected seven groundwater grab samples from representative locations within the proposed project footprint area (see locations on Figure 1) for the purpose of providing general groundwater quality data. The samples were collected from temporary 1-inch PVC piezometers installed to a depth of 6-feet using a peristaltic pump with dedicated tubing. Metals samples were field filtered using a 0.45 micron filter and preserved with nitric acid prior to shipping. A field blank was made for the site HPP 2 (Lab ID 2-8131). The samples were transported under chain-of-custody to Lancaster Laboratories, and each sample was analyzed for:

- TPH-GRO (EPA 8015m)
- TPH-DRO (EPA 8015m)
- Dissolved metals (EPA 6010/7000)

**Groundwater Grab Sampling Results**

Results of the groundwater analyses are presented in the attached Table 2.

***Organics Results***

Free phase liquid hydrocarbon (FPLH) was observed on top of groundwater at several locations, particularly in the southern half of the project site. See Table 1 for the site ID's marked with an asterisk for presence of FPLH.

TPH-gasoline was not detected in three of the seven groundwater grab samples or in the field blank (see sample 2-8132). TPH-gasoline was detected in the remaining four samples at concentrations ranging from 0.13 to 0.51 mg/L. All of these concentrations are below the maximum allowable concentration limits (MACLs) established as part of the Refinery Groundwater Monitoring Program (RGMP), which are listed on Table 2.

TPH-diesel was detected in each of the seven grab samples at concentrations ranging from 0.23 to 170 mg/L. Six of these concentrations were above the MACLs established for the RGMP.

These MACLs were established as part of the Regional Water Quality Control Board (RWQCB)'s Waste Discharge Order (WDO), and reflect the maximum allowable concentrations under which no remedial action is required. Exceedence of these limits, however, does not necessarily trigger remedial action. Traditionally, no remedial action has been required for organics or metals exceedences of the MACLs at any locations that are: a) interior to the Refinery's Groundwater Protection System (GPS); and, b) sampled from the first (shallow) aquifer.

***Metals Results***

The dissolved metals results were all below both the Refinery's Effluent Limits. Theses limits would be in effect should the selected site preparation alternative involve dewatering and discharge to the Refinery's separators.

## SOIL RE-USE CHARACTERISTICS ANALYSES

Chevron requested that SAIC use the Hydrogen Plant pre-characterization to assess alternative soil disposal/re-use alternatives, including use as a cogeneration fuel stock as well as feed stock for concrete and asphalt batch plants. SAIC prepared composite samples for submission to two companies: Energis, Inc. (Energis) and Portland Cement Company (Portland).

***Energis***

At the request of a sales manager from Energis, samples were sent to Wyoming Analytical of Laramie, Wyoming (WAL), and to Energis' own laboratory in Clarksville, Missouri, for the following re-use characteristics analyses:

- Ultimate Analyses (moisture/hydrogen/carbon/nitrogen/sulfur/oxygen/ash)
- Total Metals
- Total Oxides
- Total Halogens
- Other elements (Cl, Br, Fl, S, Ca, Mg, Na)
- Phosphates
- BTU's

Based on the results, Energis' Mike Hall provided the following feedback:

- The BTU results from Energis (510 BTUs per pound) and from WAL (1,025 BTUs per pound) were both too low for consideration as a cogeneration plant fuel source. Typically 8,000 BTUs per pound or more is required.
- Although some results are pending, the initial results of elemental properties also appear undesirable**.**

***Portland***

Portland was identified as a possible receiver of excavated Hydrogen Plant soils for use as a feed stock in their cement plant. Portland requested that samples be sent to them for analysis of the following re-use characteristics:

- Total Silica, Iron, Aluminum and Calcium
- Total Sodium, Potassium
- Metals
- VOCs and SVOCs

Portland has not provided results or feedback from their analyses. However, Portland's Dale Poole has made the following observation based on the Energis'/WAL's results:

- The low sodium and high silica contents could be positive for cement making qualities.
- The high moisture content of soils generated at the Hydrogen Plant site could make it undesirable to Portland.

Note: Portland has a limited capability to receive soil by rail car; typically they receive sand or other granular materials by rail hopper cars.

**Additional Analyses**

SAIC also sent samples to Lancaster for a similar suite of analyses in the event that Energis and Portland data was not made available. Some of the analyses could not be performed by Lancaster and were subcontracted to Columbia Analytical (Columbia). Lancaster was sent one sample from HPP 13, one from HPP 3 and a composite sample (HPPC1030706) from HPP 5, 6, 7 and 8. Columbia also received samples from HPP 13, 1H, and a composite from HPP 5,6,7, and 8.

Lancaster was asked to perform the following analyses:

- PCBs
- Reactivity, Corrosivity, Ignitability (RCI)
- Density (specific gravity)
- Phosphates
- Chloride, Bromide, Fluoride
- Mercury
- Moisture content

Columbia Analytical was asked to perform the following analyses:

- BTUs
- Extractable Organic Halides
- Soluble HCl /SiO2
- Soil Density (bulk density)
- Total Ash
- Total Silica
- Total Solids

These data are available to present to potential receiving facilities, and will be further evaluated during the next phase of project planning.

**SUMMARY AND RECOMMENDATIONS**

Sixty-two composite soil samples, seven groundwater grab samples, and 11 soil re-use characteristics samples were collected to pre-characterize the proposed Hydrogen Plant Site (including the existing and proposed stormwater alignments). A brief summary of the results follows:

- TPH results in soils were relatively high, with over 46% of the samples exceeding the current Refinery re-use limits for either TPH-gasoline or TPH-diesel.

- VOCs and SVOCs concentrations in soils were low, and will not impact the disposal or re-use alternatives selection.

- Lead or arsenic concentrations in 17% of the composite samples exceeded either the Title 22 TTLC or STLC limits. Soils excavated from these areas would likely be designated as a California hazardous waste.

- The lead concentration in two samples exceeded the Title 22 TCLP limit. Soils excavated from these areas would likely be designated as a Federal hazardous waste.

- The relatively widespread spatial distribution of the hazardous metals results (i.e., not confined to one portion of the site, see Figure 1) would make segregation of California and Federally hazardous soils difficult, should the comprehensive excavation alternative (i.e., "bathtubbing") be selected for pre-construction site preparation.

- Soils within the proposed Hydrogen Plant site did not exceed any of the other Title 22 hazardous waste criteria, including 96-hour acute aquatic toxicity (fish bioassay) and RCI analyses.

- Groundwater grab samples contained TPH-diesel or TPH-gasoline in excess of the MACLs established for the RGMP; however, the location of the project site (within the influence of the GPS) will likely preclude any further remedial action for groundwater at this site.

- Groundwater occurred across the project site at relatively shallow depths (1-4 feet bgs), and free-phase hydrocarbon was observed at nearly half of the locations.

- Soil re-use characteristics results have been compiled for use in the next phase of this project. Energis has expressed that Hydrogen Plant soils are unlikely to be suitable as a fuel or feed stock. Portland has not provided feedback on their analyses.

Based on the findings listed above, SAIC recommends the following:

- The team should revisit the goals of the Hydrogen Plant pre-construction project and evaluate site preparation requirements based on these findings. Specifically, the previously-stated goal of providing a "clean" site for the third party construction should be reevaluated since it is likely that any clean backfill would be recontaminated by hydrocarbon-impacted groundwater and FPLH beneath the site. As an alternative, the construction team would leave the majority

of the site soils in-place and remove only the soils required to construct the facility. This alternative would likely require employing a contractor qualified in Hazardous Waste Operations. This alternative would significantly reduce the costs for excavation, transportation and disposal of hazardous waste, and reduce the overall amount of truck traffic through the community caused by the project.

- If it is determined that large-scale excavation ('bathtubbing') of the Hydrogen Plant site is necessary, then SAIC estimates the following rough volumes would be generated from a 6-foot site-wide excavation:

    - 2,000 cubic yards (4%) would be designated as a Federal hazardous waste;
    - 8,600 cubic yards (14%) would be designated as a California (State) hazardous waste,
    - 24,000 cubic yards (40 %) would not meet the current TPH re-use limits for placement within the Refinery (i.e., could require Class II landfill disposal), and
    - 25,000 cubic yards (42%) would be suitable for re-use within the Refinery areas influence by the groundwater protection system (GPS).

  These volumes are based solely on the estimated size and depth of the proposed excavation (6 feet) provided to SAIC by the Capital Projects group. The actual total volume of soil required to create a "clean" site (i.e., by removing all hydrocarbon- and metals-impacted fill down to the Bay Mud interface at 9-12 feet bgs) could be as much as 50-100% greater. Furthermore, after replacing these soils with clean fill, a system of groundwater extraction trenches installed along the perimeter of the site would be necessary to prevent hydrocarbon-impacted groundwater and FPLH from re-contaminating the clean fill. The costs of installation and operation of such trenches would be significant to the project.

  If a large-scale excavation were required, several re-use and disposal options, including recycling (asphalt or concrete batching) and potential placement at the #1 Oxidation Ponds would need additional evaluation. Based on the regulatory assessment conducted recently, the #1 Oxidation Ponds would be suitable for disposal of non-hazardous soils generated during excavation, although the exact costs for placement and management of these soils still needs to be evaluated.

- If it is decided that the Site will not be "bathtubbed" the Capital Projects team should consider abandoning the 48-inch sewer line in-place rather than removing it, to avoid the excavation of soils that may not be suitable for re-use.

We appreciate the opportunity to provide environmental services to your team. If you have further questions about this project, please call Austin Bond at 2-2577, or Todd Baesen at 2-8254.

Regards,

Austin Bond, P.E.
SAIC Project Manager

**Attachments:**

| | |
|---|---|
| Figure 1 | Hydrogen Plant Project Site – Soil Pre-Characterization |
| Table 1 | Soil Pre-Characterization Results |
| Table 2 | Groundwater Grab Sample Results |

**CC:**

Tom DiPalma (Chevron Haz Waste)
Jan Oosthuizen (Chevron Capital Projects)
Bob Chamberlin (Chevron HES)
Jim Jacques (Harvest)
Mark Piersante (Mark Piersante & Assoc.)
Mr. Todd Baesen (SAIC)
Bailey Smith (SAIC)
Haz Waste Project File (copy includes all laboratory data reports as attachments)

## Legend

- Boring Location
- TPH, Diesel or Gasoline Concentrations above Refinery Reuse Limits
- California Hazardous Waste
- Federal Hazardous Waste
- Existing 48-inch Stormwater Pipe Alignment
- Groundwater Sample
- Proposed Stormwater Pipe Alignment
- Former Majka Ditch - Section I
- Former Majka Ditch - Section II
- Former Majka Ditch - Section III
  *Mijka Ditch Invetigation performed by Dames & Moore, 1989-1990*
- *1* Free Phase Liquid Hydrocarbon observed

***Figure 1.***
***Hydrogen Plant Project Site***
***Soil Pre-Characterization***

SAIC
From Science to Solutions™

| | |
|---|---|
| DATE: 04/13/2006 | JOB NO. S2996 |
| DRAWN: CLH | APPROVED:BS/AB |

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# Table 1
# Capital Projects - Hydrogen Plant
# Soil Pre-Characterization Results

| | | | Site ID: | HPP 1[1] | HPP 2[1] | HPP 3 | HPP 4[1] | HPP 5[1] | HPP 6 | HPP 7[1] | HPP 8[1] | HPP 9[1] | HPP 10[1] | HPP 11[1] | HPP 12[1] | HPP 13 | HPP 14 | HPP 15 | HPP 16[1] | HPP 17[1] | HPP 18 | HPP 19 | HPP 20 | HPP 21 | HPP 22 | HPP 23 | HPP 24[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | | | **Lab ID:** | **3-17857** | **3-17859** | **3-17861** | **3-17862** | **3-17863** | **3-17864** | **3-17865** | **3-17866** | **3-17867** | **3-17868** | **3-17869** | **3-17870** | **3-17871** | **3-17872** | **3-17873** | **3-17874** | **3-17875** | **3-17876** | **3-17877** | **3-17878** | **3-17879** | **3-17880** | **3-17881** | **3-17882** |
| **Total Petroleum Hydrocarbons** | **Excavated Soil Re-Use Limits (mg/kg)** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPH-Gasoline | | 100 | | 8.6 | 0.2 J | **580** | 67 | **450** | ND (16) | **120** | **600** | **3700** | 23 | **220** | **160** | **160** | 11 J | 8.1 J | **150** | 19 | ND (16) | ND (4.0) | 0.2 J | **630** | ND (4.0) | 0.6 J | 63 |
| TPH-Diesel w/ Silica Gel | | 1,000 | | **1,100** | 100 | **8,100** | **1,400** | **1,200** | **1,700** | **4,100** | **2,000** | 350 | **2,200** | **1,200** | 510 | 550 | 340 | 960 | **1,300** | **2,700** | **5,000** | 890 | 64 | **11,000** | 150 | **1,300** | 780 |
| TPH-Diesel | | 1,000 | | 950 | 98 | **8,500** | **1,300** | **1,100** | **1,700** | **4,000** | **2,100** | 360 | **2,300** | **1,100** | 590 | 520 | 490 | **1,300** | **1,500** | **2,800** | **6,700** | **1,700** | 82 | **12,000** | 310 | **2,400** | 830 |
| | **Title 22 Limits** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TTLC/STLC Metals** | STLC (mg/L) | 10x STLC (mg/kg) | TTLC (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Antimony | 15.0 | 150 | 500 | ND | ND | ND | ND | ND | ND | ND | 2.24 | ND | ND | ND | ND | ND | 1.14 J | ND | ND | ND | ND | ND | 1.02 J | ND | ND | ND | ND |
| Arsenic | 5.0 | 50 | 500 | **179/ 12.2** | 67.6/ 2.88 | 11.2 | 14.5 | 7.98 | 26.5 | 33.7 | 171/ 3.23 | 52 | 18.3 | 19.8 | 19.8 | 11.9 | 67.2/ 0.895 | 23.6 | 45.3 | 4.05 | 7.51 | 24.3 | 32.6 | 13.4 | 54.3/ 1.72 | 22 | 7.65 |
| Barium | 100.0 | 1,000 | 10,000 | 198 | 218 | 177 | 183 | 181 | 181 | 155 | 191 | 1540 | 176 | 195 | 143 | 155 | 175 | 131 | 138 | 157 | 29.8 | 177 | 159 | 103 | 83.3 | 107 | 160 |
| Beryllium | 0.75 | 7.5 | 75 | 0.534 | 0.398 J | 0.799 | 0.842 | 0.597 | 0.666 | 0.618 | 0.748 | 0.575 | 0.616 | 0.972 | 0.769 | 0.726 | 0.56 | 0.68 | 0.704 | 0.751 | 0.291 | 0.699 | 0.642 | 0.737 | 0.899 | 0.354 J | 0.533 |
| Cadmium | 1.0 | 10 | 100 | ND | ND | 0.573 | 0.336 J | ND | ND | ND | 0.493 | 0.928 | ND | 0.861 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.167 J | 0.603 | ND | 0.193 J |
| Chromium | 5.0 | 50 | 2,500 | 69.7/ 0.453 | 61.9/ 0.519 | 35.6 | 34.7 | 46.4 | 45.5 | 33.3 | 34.1 | 24 | 34.1 | 73.8/ 0.404 | 37.6 | 32.6 | 39 | 31.3 | 69.1/ 0.193 J | 103/ 0.127 J | 21.7 | 77.9/ 0.661 | 28.9 | 62.7/ 0.712 | 87/ 0.310 J | 24.9 | 110/ 0.198 J |
| Cobalt | 80 | 800 | 8,000 | 11.6 | 10 | 9.88 | 10 | 9.72 | 9.88 | 8.26 | 12 | 7.17 | 8.11 | 14.2 | 10.7 | 12.8 | 10.6 | 9.12 | 11 | 14.2 | 17 | 8.45 | 9.79 | 8.92 | 9.75 | 4.5 | 12.8 |
| Copper | 25 | 250 | 2,500 | 97.5 | 100 | 48.9 | 36.9 | 30.4 | 59.4 | 38.6 | 66.7 | 48.7 | 52.0 | 27.9 | 22.2 | 30.1 | 108 | 25.6 | 28.9 | 24 | 35.2 | 33.2 | 54.7 | 22.6 | 20.4 | 43.7 | 27.4 |
| Lead | 5.0 | 50 | 1,000 | 155/ 3.07 | 90.7/ 20.1 | 69.2/ 1.87 | 52.8/ 2.38 | 94/ 2.63 | 35.9 | 39.3 | **911/ 33.8** | **1050*** | 141/ 5.65 | 26.5 | 23 | 23.7 | **371/ 17.1** | 21.8 | 80.5/ 4.34 | 37.9 | 17 | 85.1/ 0.603 | **275/ 6.47** | 53.1/ 2.71 | 21 | 115/ 4.34 | 113/ 3.09 |
| Mercury | 0.2 | 2 | 20 | 4.33/ ND | 4.79/ ND | 1.39 | 3.31/ ND | 0.645 | 1.71 | 0.329 | 12.3/ ND | 5.48 | 1.58 | 2.14/ ND | 0.298 | 0.203 | 1.59 | 0.297 | 0.634 | 0.0917 J | 0.23 | 0.29 | 0.516 | 0.588 | 0.0613 J | 0.540 J | 0.356 |
| Molybdenum | 350 | 3,500 | 3,500 | 0.744 J | 1.84 | 0.916 J | 5.25 | 3.06 | 1.27 | 0.648 J | 1.56 | 0.719 J | 1.27 | 5.12 | 1.39 | 58.5 | 1.82 | 1.2 | 1.37 | ND | ND | 2.62 | 0.579 J | ND | ND | 0.498 J | 0.736 J |
| Nickel | 20 | 200 | 2,000 | 78.5 | 136 | 38.8 | 34.4 | 55.3 | 53.5 | 63.6 | 47.2 | 28.5 | 33.0 | 30.2 | 39 | 34.6 | 44.9 | 35.7 | 62.4 | 112 | 30.2 | 62.1 | 39.5 | 39.3 | 73 | 44.1 | 104 |
| Selenium | 1.0 | 10 | 100 | 2.73 | 2.55 | ND | ND | ND | 1.68 J | 1.76 J | 52.9ND | 50.3 | 0.992 J | ND | ND | ND | 1.28 J | ND | ND | ND | 1.12 | 1.07 J | 1.32 J | ND | ND | 2.89 | ND |
| Silver | 5 | 50 | 500 | 0.314 J | 0.189 J | 0.464 J | 0.420 J | 0.472 J | 0.528 | 0.575 | 0.704 | 0.769 | 0.369 J | ND | ND | 0.346 J | ND | ND | ND | 0.474 J | 0.91 | 0.401 J | 0.353 J | 0.438 J | 0.471 J | 0.287 J | 0.448 J |
| Thallium | 7.0 | 70 | 700 | 3.16 | 4.13 | 2.14 | 1.23 J | 2.03 | 1.73 J | 1.36 J | 3.48 | 2.17 | ND | ND | ND | 2.53 | ND | ND | 0.995 J | 1.15 J | 3.79 | 1.81 J | 1.05 J | 1.58 J | ND | ND | 1.99 J |
| Vanadium | 24 | 240 | 2,400 | 41.5 | 37.4 | 37.9 | 34.8 | 43.1 | 32.1 | 33.6 | 36.8 | 32.4 | 33.8 | 37.4 | 35.3 | 34.5 | 40 | 35.2 | 37.5 | 43.5 | 114 | 47.7 | 37.9 | 46.7 | 57.7 | 27.5 | 41.4 |
| Zinc | 250 | 2,500 | 5,000 | 102 | 81.4 | 92.4 | 86.8 | 85.3 | 75.5 | 70.9 | 82.7 | 907 | 132 | 189 | 61.4 | 64.4 | 195 | 61.9 | 71.3 | 95.6 | 63.9 | 83.2 | 73.4 | 64.8 | 65 | 40.4 | 95.9 |
| **TCLP Metal** | | | TCLP (mg/L) | | | | | | | | | | | | | | | | | | | | | | | | |
| Arsenic (As) | | | 5.0 | 0.300 | | | | | | | 0.0739 | | | | | | | | | ND | 0.0519 | 0.0249 | 0.0359 | ND | 0.112 | 0.0204 | 0.010 J |
| Barium (Ba) | | | 100.0 | | | | | | | | | | | | | | | | | 0.435 | 0.251 | 1.36 | 1.01 | 0.392 | 0.386 | 0.748 | 0.373 |
| Cadmium (Cd) | | | 1.0 | | | | | | | | | | | | | | | | | 0.0012 J | ND | 0.0020 J | ND | 0.0024 J | 0.0033 J | ND | ND |
| Chromium (Cr) | | | 5.0 | | | | | | | | | | | | | | | | | ND | 0.0056 J | ND | 0.0059 J | 0.0067 J | ND | ND | ND |
| Lead (Pb) | | | 5.0 | 0.168 | | | | | | | **5.05** | 3.34 | 0.0382 | | | | 0.774 | | | 0.106 | 0.0379 | 0.439 | 0.0145 J | 0.0621 | ND | 0.0786 | 0.102 |
| Mercury (Hg) | | | 0.2 | ND | ND | | | | | | | ND | | | | | | | | ND | ND | ND | ND | 0.0171 J | ND | ND | ND |
| Selenium (Se) | | | 1.0 | | | | | | | | ND | ND | | | | | | | | ND | 0.0154 J | 0.0100 J | ND | ND | ND | ND | ND |
| Silver (Ag) | | | 5.0 | | | | | | | | | | | | | | | | | ND | ND | ND | ND | ND | ND | ND | ND |
| **96-Hour Aquatic Accute Toxicity** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Mortality (from 10 fish per 10 Liter tank) | | | Control A | | | 1 | | | | | | | | | 1 | | | | | | | | | | | 1 | |
| | | | Control B | | | 0 | | | | | | | | | 0 | | | | | | | | | | | 0 | |
| | | | 250 mg A | | | 0 | | | | | | | | | 0 | | | | | | | | | | | 0 | |
| | | | 250 mg B | | | 0 | | | | | | | | | 0 | | | | | | | | | | | 0 | |
| | | | 750 mg A | | | 0 | | | | | | | | | 0 | | | | | | | | | | | 0 | |
| | | | 750 mg B | | | 1 | | | | | | | | | 0 | | | | | | | | | | | 0 | |
| **VOCs (EPA 8260 Skinner List)** | | TCLP (mg/L) | 20x TCLP (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| 1,1-DICHLORO-ETHENE | | 0.7 | 14 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-DIBROMO-ETHANE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.13 J | ND | ND | ND |
| 1,2-DICHLORO-ETHANE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DIOXANE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-BUTANONE (MEK) | | 200.0 | 4,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.01 | 0.006 J | ND | 0.015 J | ND | ND | ND | ND | ND | ND | 0.034 J |
| BENZENE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.0005 J | ND | ND | ND | 0.0007 J | ND |
| CARBON DISULFIDE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.001 J | 0.002 J | ND | 0.004 J | ND | ND | ND | ND | 0.001 J | ND | ND |
| CARBON TETRACHLORIDE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHLOROBENZENE | | 100.0 | 2,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHLOROFORM | | 6.0 | 120 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ETHYL BENZENE | | | | 0.002 J | ND | ND | ND | ND | 0.002 J | ND | 0.89 | 1000 | 0.13 J | 0.009 J | ND | 0.003 J | 0.01 | 0.004 J | 0.04 | ND | ND | ND | ND | 0.23 J | ND | 0.002 J | ND |
| METHYLENE CHLORIDE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.003 J | 0.002 J | ND | 0.002 J | ND | ND |
| STYRENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TETRA-CHLOROETHENE | | 0.7 | 14 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TOLUENE | | | | 0.003 J | 0.001 J | ND | ND | ND | 0.003 J | ND | ND | 180 | ND | 0.010 J | ND | 0.003 J | 0.01 J | 0.006 | 0.024 J | 0.003 J | ND | 0.002 J | ND | ND | 0.001 J | 0.003 J | ND |
| TOTAL XYLENES | | | | 0.007 | 0.003 J | ND | ND | ND | 0.005 | 1.2 | 1.7 | 3700 | 0.76 | 0.026 | 0.001 J | 0.013 | 0.033 | 0.012 | 0.14 | 0.008 J | 0.010 J | 0.003 J | 0.001 J | ND | 0.002 J | 0.009 | 0.028 |
| TRICHLORO-ETHENE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| VINYL CHLORIDE | | 0.2 | 4 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**Notes: Bold results exceed action levels, results with**
*** (asterisk) exceeded TTLC limit without STLC analysis.**
**[1] - Free Phase Liquid Hydrocarbon found in this location.**
ND - Not detected above the laboratory reporting limit
J - Estimated result between the Method Detection Limit
(MDL) and the Practical Quantitation Limit (PQL)
mg/L - milligrams/liter mg/kg - milligrams/kilogram
STLC - Soluble Threshold Limit Concentration
TTLC - Total Threshold Limit Concentration
TCLP - Toxicity Characteristic Leaching Procedure
X - Analysis assigned, data pending.

# Table 1
## Capital Projects - Hydrogen Plant
## Soil Pre-Characterization Results

| | | Site ID: | HPP 1[1] | HPP 2[1] | HPP 3 | HPP 4[1] | HPP 5[1] | HPP 6 | HPP 7[1] | HPP 8[1] | HPP 9[1] | HPP 10[1] | HPP 11[1] | HPP 12[1] | HPP 13 | HPP 14 | HPP 15 | HPP 16[1] | HPP 17[1] | HPP 18 | HPP 19 | HPP 20 | HPP 21 | HPP 22 | HPP 23 | HPP 24[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | | **Lab ID:** | **3-17857** | **3-17859** | **3-17861** | **3-17862** | **3-17863** | **3-17864** | **3-17865** | **3-17866** | **3-17867** | **3-17868** | **3-17869** | **3-17870** | **3-17871** | **3-17872** | **3-17873** | **3-17874** | **3-17875** | **3-17876** | **3-17877** | **3-17878** | **3-17879** | **3-17880** | **3-17881** | **3-17882** |
| **SVOCs (EPA 8270 Skinner List)** | TCLP MCL (mg/L) | 20x TCLP (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| 1,2-DICHLORO-BENZENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,3-DICHLORO-BENZENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DICHLORO-BENZENE | 7.5 | 150 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1-METHYL-NAPTHALENE | | | 0.26 J | 1.1 | 14 | 3.5 | 0.38 J | 1.7 | 26 | 61 | 6.5 | 3.9 | 0.79 J | ND | 10 | ND | ND | 3.6 | ND | ND | ND | ND | 6.5 J | ND | 16 | ND |
| 2,4,5-TRICHLORO-PHENOL | 400 | 8,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4,6-TRICHLORO-PHENOL | 2.0 | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DIMETHYL-PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DINITRO-PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DINITRO-TOLUENE | 0.13 | 2.6 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-METHYL-NAPHTHALENE | | | ND | ND | 0.77 J | ND | 0.36 J | 3.5 | 39 | 96 | 9 | 0.26 J | ND | ND | 5.8 | ND | ND | 0.35 J | ND | ND | ND | ND | 7.7 J | ND | 32 | ND |
| 3/4-METHYL-PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 4-NITROPHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 6-METHYL-CHRYSENE | | | ND | ND | ND | ND | ND | 0.32 J | 1.2 J | ND | ND | ND | ND | ND | ND | ND | ND | 0.21 J | ND | ND | ND | ND | ND | ND | 2.7 J | ND |
| 7,12-DIMETHYL-BENZ(A) ANTHRACENE | | | ND | ND | ND | ND | ND | 0.51 J | ND | 9.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ANTHRACENE | | | ND | 0.24 J | 0.94 J | 0.32 J | ND | 0.60 J | 4.8 | 4.2 | 0.71 J | 0.60 J | 0.17 J | ND | 1.1 | ND | ND | 0.32 J | ND | ND | ND | ND | ND | ND | 5.5 J | ND |
| BENZENETHIOL (THIOPHENOL) | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(A)-ANTHRACENE | | | ND | ND | ND | ND | ND | 0.55 J | 2.7 | 9.9 | ND | 0.28 J | ND | ND | 0.49 J | ND | ND | 0.26 J | ND | ND | ND | ND | ND | ND | 5.3 J | ND |
| BENZO(A)-PYRENE | | | ND | ND | ND | ND | ND | 0.45 J | 1.6 J | 8.3 | ND | 0.28 J | ND | ND | 0.34 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | 3.5 J | ND |
| BENZO(B)FLUORANTHENE | | | ND | ND | ND | ND | ND | 0.29 J | 0.92 J | 4.3 | ND | 0.25 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(K)FLUORANTHENE | | | ND | ND | ND | ND | ND | ND | ND | 0.77 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BIS(2-ETHYLHEXYL) PHTHALATE | | | ND | ND | ND | ND | ND | 0.88 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.1 J | ND | ND | ND | ND | ND | ND | ND | ND |
| BUTYLBENZYLPHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.47 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHRYSENE | | | ND | ND | 0.38 J | ND | ND | 1.4 | 5.8 | 14 | 0.54 J | 0.51 J | ND | ND | 0.44 J | ND | ND | 0.52 J | ND | ND | ND | ND | ND | ND | 12 J | ND |
| DIBENZ(A,H) ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | 1.1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIBENZO(A,H) ACRIDINE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIETHYLPHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIMETHYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DI-N-BUTYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DI-N-OCTYL PHTHALATE | | | ND | ND | ND | ND | ND | 1.3 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| FLUORANTHENE | | | 0.23 J | ND | ND | ND | ND | 0.23 | 1.9 | 2.6 | 0.40 J | 0.30 J | 0.38 J | ND | 0.71 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | 3.3 J | ND |
| HEXACHLORO-BENZENE | 0.13 | 2.6 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLORO-BUTADIENE | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLORO-ETHANE | 3.0 | 60 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| INDENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| NAPHTHALENE | | | ND | ND | ND | ND | ND | 1 | 5.9 | 57 | 8.6 | 0.33 J | ND | ND | 0.86 J | ND | ND | 0.29 J | ND | ND | ND | ND | 2.7 J | ND | 6.2 J | ND |
| NITROBENZENE | 2.0 | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| O-CRESOL (2-Methylphenol) | 200 | 4,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PENTACHLORO-PHENOL | 100 | 2,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PHENANTHRENE | | | 0.26 J | 0.19 J | 4.0 | 0.57 | 0.47 J | 2.1 | 20 | 30 | 4.9 | 1.7 | 0.85 | ND | 3.2 | ND | ND | 4.2 | ND | ND | ND | ND | 2.8 J | ND | 15 | ND |
| PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PYRENE | | | 0.29 J | 0.40 J | 0.94 J | 0.32 J | ND | 1.3 | 8.4 | 16 | 1.0 J | 1.0 | 0.40 J | ND | 1.8 | 0.38 J | ND | 0.94 | ND | ND | ND | ND | ND | ND | 19 | ND |
| PYRIDINE | 5.0 | 100 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| QUINOLINE | | | ND | ND | ND | ND | ND | ND | ND | 2 | ND | 0.23 J | ND | ND | 1.1 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**Notes: Bold results exceed action levels, results with**
*** (asterisk) exceeded TTLC limit without STLC analysis.**
**[1] - Free Phase Liquid Hydrocarbon was found in these locations.**
ND (0.95) - Not Detected (method detection limit)
J - Estimated result between the Method Detection Limit
(MDL) and the Practical Quantitation Limit (PQL)
mg/L - milligrams/liter mg/kg - milligrams/kilogram
STLC - Soluble Threshold Limit Concentration
TTLC - Total Threshold Limit Concentration
TCLP - Toxicity Characteristic Leaching Procedure
X - Analysis assigned, data pending.

# Table 1
# Capital Projects - Hydrogen Plant
# Soil Pre-Characterization Results

| | | | Site ID: | HPP 24A[1] | HPP 24A FD[1] | HPP 26[1] | HPP 27 | HPP 28 | HPP 29 | HPP 30 | HPP 31 | HPP 32 | HPP 33 | HPP 34 | HPP 35 | HPP 36 | HPP 37 | HPP 38[1] | HPP 39 | HPP 40[1] | HPP 41[1] | HPP 42 | HPP 43 | HPP 44[1] | HPP 45 | HPP 46 | HPP 47 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | | | **Lab ID:** | **3-17883** | **3-17883 FD** | **3-17884** | **3-17885** | **3-17886** | **3-17887** | **3-17888** | **3-17889** | **3-17890** | **3-17891** | **3-17892** | **3-17893** | **3-17894** | **3-17895** | **3-17896** | **3-17897** | **3-17898** | **3-17899** | **3-17900** | **3-17901** | **3-17902** | **3-17903** | **3-17904** | **3-17905** |
| **Total Petroleum Hydrocarbons** | **Excavated Soil Re-Use Limits (mg/kg)** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TPH-Gasoline | | 100 | | **140** | 71 | ND (8.0) | ND (4.0) | ND (0.2) | 0.4 J | ND (80) | ND (8.0) | **4,500** | 9.1 J | **100** | ND (4.0) | 8.1 | 3.2 | ND (8.0) | ND (8.0) | ND (0.2) | **310** | ND (0.2) | 5.8 J | 17 J | ND (0.2) | ND (0.2) | ND (1.6) |
| TPH-Diesel w/ Silica Gel | | 1,000 | | **1,900** | **1,200** | 160 | 150 | 34 | 54 | 410 | 220 | 600 | 230 | 860 | 910 | **22,000** | 410 | 250 | 41 | 15 | **9,500** | 86 | 240 | 790 | 58 | ND (4.0) | 9.2 J |
| TPH-Diesel | | 1,000 | | **1,700** | **1,200** | 210 | 290 | 34 | 77 | 580 | 380 | 790 | 280 | **1,100** | 930 | **16,000** | 460 | 250 | 69 | 18 | **9,300** | 93 | 220 | 660 | 73 | ND (4.0) | 11 J |
| | **Title 22 Limits** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **TTLC/STLC Metals** | STLC (mg/L) | 10x STLC (mg/kg) | TTLC (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Antimony | 15.0 | 150 | 500 | ND | ND | ND | 0.999 J | ND | ND | ND | ND | ND | ND | ND | 1.57 J | ND | 2.06 | ND | ND | ND | ND | 1.05 J | ND | ND | ND | ND | ND |
| Arsenic | 5.0 | 50 | 500 | 5.88 | 6.8 | 60.3 | 216/ ND | 7.95 | 57.8/ 3.44 | 7.85 | 8.27 | 17.7 | 18.9 | 2.24 | 58/ 0.811 | **95.2/ 5.79** | 12.6 | 8.39 | 96.6/ 3.38 | 24.7 | 32.3 | 107 | 37.2 | 13.6 | 7.38 | 12.2 | 5.04 |
| Barium | 100.0 | 1,000 | 10,000 | 63.3 | 72.3 | 201 | 176 | 171 | 89.5 | 162 | 150 | 207 | 146 | 53.8 | 120 | 205 | 153 | 153 | 134 | 146 | 122 | 196 | 203 | 200 | 148 | 190 | 184 |
| Beryllium | 0.75 | 7.5 | 75 | 0.309 J | 0.346 J | 0.455 J | 0.611 | 0.648 | 0.899 | 0.582 | 0.523 | 0.49 | 0.382 J | 0.144 J | 0.57 | 0.613 | 0.602 | 0.668 | 0.378 J | 0.592 | 0.668 | 0.594 | 0.798 | 0.518 | 0.443 J | 0.606 | 0.606 |
| Cadmium | 1.0 | 10 | 100 | 0.360 J | 0.355 J | 0.182 J | 0.0019 J | ND | 0.325 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.335 J | ND | 0.221 J | 0.165 J | 0.169 J | 0.156 J |
| Chromium | 5.0 | 50 | 2,500 | 21.5 | 22.1 | 39.1 | 126/ 0.363 J | 26.3 | 46.1 | 30.3 | 147/ 0.308 J | 24 | 62.4 | 6.38 | 31 | 124/ 0.404 | 57.4/ 0.314 J | 23.9 | 57.2/ 0.418 | 39.5 | 90.6/ ND | 60.2 | 52.4/ ND | 76.5/ ND | 25.1 | 22.8 | 23.2 |
| Cobalt | 80 | 800 | 8,000 | 4.65 | 4.8 | 6.32 | 13.5 | 10.3 | 5.99 | 7.71 | 17.9 | 7.98 | 7.76 | 2.04 | 7.39 | 17 | 8.93 | 8.1 | 9.19 | 9.14 | 15 | 9.65 | 12.5 | 13.2 | 7.33 | 8.88 | 7.07 |
| Copper | 25 | 250 | 2,500 | 10.8 | 10.6 | 36.6 | 140 | 29.3 | 22.8 | 22.6 | 38.3 | 42.4 | 106 | 6.36 | 145 | 48 | 39.2 | 23.3 | 29.7 | 49.3 | 55.8 | 55 | 78.6 | 30.4 | 22.7 | 24.4 | 15.6 |
| Lead | 5.0 | 50 | 1,000 | 16.5 | 17.6 | **2520*** | **246/ 5.33** | 16.9 | 39.2 | 10.8 | 40.3 | 53/ 3.76 | **1010*** | 7.23 | 109/ 3.20 | **209/ 9.21** | 46.8 | 20.2 | **181/ 7.48** | 149/ 3.75 | 39 | **1260 *** | 35.8 | 35.1 | 12 | 13.7 | 11.7 |
| Mercury | 0.2 | 2 | 20 | 0.138 | 0.152 | 0.692 | 1.7 | 0.192 | 0.204 | 0.286 | 0.668 | 0.256 | 0.53 | 4.56/ ND | 0.316 | 0.246 | 0.31 | 0.241 | 2.25/ ND | 3.38/ ND | 0.633 | 1.96 | 0.212 | 0.69 | 0.0558 J | 0.0815 J | 0.158 |
| Molybdenum | 350 | 3,500 | 3,500 | ND | ND | 0.747 J | 5.4 | 0.659 J | 0.746 J | ND | 1.11 | 0.573 J | ND | 0.416 J | 0.985 J | 0.941 J | 2.81 | 0.741 J | 0.717 J | 0.429 J | 1.28 | 1.54 | 0.633 J | ND | 0.603 J | 0.397 J | ND |
| Nickel | 20 | 200 | 2,000 | 22.0 | 22.3 | 43.4 | 120 | 33.1 | 26.1 | 37.5 | 202/ 0.651 | 50.4 | 76.9 | 8.08 | 29.3 | 153 | 195 | 33.7 | 78.7 | 57.9 | 45.1 | 66.2 | 62.8 | 90.4 | 21.2 | 23.9 | 21.8 |
| Selenium | 1.0 | 10 | 100 | ND | ND | 0.995 J | ND | ND | ND | ND | 1.02 J | 2.01 | 1.03 J | ND | 1.17 J | 1.64 J | 1.06 J | ND | ND | ND | ND | 2.7 | ND | ND | ND | ND | ND |
| Silver | 5 | 50 | 500 | ND | ND | 0.468 J | 0.636 | 0.413 J | 0.387 J | 0.475 J | 0.554 | 0.444 J | 0.471 J | ND | 0.564 | 0.731 | 0.472 J | 0.382 J | 0.270 J | 0.408 J | 0.709 | 0.54 | 0.384 J | ND | ND | ND | ND |
| Thallium | 7.0 | 70 | 700 | ND | ND | ND | 2 | 1.61 J | 1.23 J | ND | ND | ND | ND | ND | ND | 1.66 J | 1.10 J | 1.20 J | 1.38 J | 1.66 J | ND | 2.29 | 2.97 | 1.03 J | ND | 3.04 | ND |
| Vanadium | 24 | 240 | 2,400 | 29.0 | 30.2 | 44.5 | 50.3 | 35.3 | 50.2 | 34.4 | 53.4 | 43.5 | 30.1 | 8.16 | 37.3 | 54.5 | 35.7 | 28.8 | 38.8 | 35 | 35.4 | 39.9 | 43.1 | 45.1 | 38.2 | 38 | 34.5 |
| Zinc | 250 | 2,500 | 5,000 | 33.3 | 35 | 65.7 | 113 | 61.5 | 68.8 | 63.4 | 77.5 | 65.3 | 171 | 19.1 | 86 | 143 | 182 | 75.2 | 68.2 | 75.8 | 61.3 | 294 | 80.9 | 68.5 | 50.5 | 55.3 | 42.2 |
| **TCLP Metal** | | | TCLP (mg/L) | | | | | | | | | | | | | | | | | | | | | | | | |
| Arsenic (As) | | | 5.0 | 0.0103 J | 0.0130 J | 0.0247 | 0.125 | 0.0121 J | 0.158 | 0.0338 | ND | 0.0243 | 0.0274 | ND | 0.0205 | 0.189 | 0.0173 J | 0.0133 J | 0.142 | 0.110 | 0.0211 | 0.0255 | 0.0322 | 0.0166 J | 0.0138 J | 0.0247 | ND |
| Barium (Ba) | | | 100.0 | 0.367 | 0.276 | 1.11 | 0.652 | 1.10 | 0.516 | 0.476 | 0.466 | 0.825 | 0.258 | 0.728 | 0.477 | 1.17 | 0.630 | 0.841 | 0.568 | 0.374 | 0.603 | 0.996 | 0.816 | 0.842 | 0.557 | 0.941 | 0.893 |
| Cadmium (Cd) | | | 1.0 | 0.0017 J | 0.0013 J | 0.0019 J | ND | ND | 0.0025 J | ND | 0.0042 J | 0.0012 J | 0.0042 J | 0.0013 J | ND | 0.0096 | 0.0016 J | 0.0012 J | ND | 0.0017 J | 0.0036 J | 0.0078 | ND | ND | N.D | ND | ND |
| Chromium (Cr) | | | 5.0 | 0.0119 J | 0.0114 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.0068 J | ND | ND | ND | ND | ND | ND | N.D | ND | ND |
| Lead (Pb) | | | 5.0 | 0.0189 J | 0.0205 | 3.59 | 0.334 | 0.0087 J | 0.0297 | ND | 0.157 | 0.0380 | **7.54** | 0.0149 J | 0.169 | 0.256 | 0.0158 J | 0.0230 | 0.0448 | 0.162 | 0.0430 | 1.04 | 0.0133 J | 0.0228 | N.D | 0.0085 J | 0.0165 J |
| Mercury (Hg) | | | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | N.D | ND | ND |
| Selenium (Se) | | | 1.0 | ND | ND | ND | 0.0105 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | N.D | ND | ND |
| Silver (Ag) | | | 5.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | N.D | ND | ND |
| **96-Hour Aquatic Accute Toxicity** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Mortality (from 10 fish per 10 Liter tank) | | | Control A | | | | | 1 | | | | | | | 1 | | | | | | | | | 1 | | | |
| | | | Control B | | | | | 0 | | | | | | | 0 | | | | | | | | | 0 | | | |
| | | | 250 mg A | | | | | 0 | | | | | | | 0 | | | | | | | | | 1 | | | |
| | | | 250 mg B | | | | | 0 | | | | | | | 0 | | | | | | | | | 0 | | | |
| | | | 750 mg A | | | | | 0 | | | | | | | 0 | | | | | | | | | 0 | | | |
| | | | 750 mg B | | | | | 0 | | | | | | | 0 | | | | | | | | | 0 | | | |
| **VOCs (EPA 8260 Skinner List)** | | TCLP (mg/L) | 20x TCLP (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| 1,1-DICHLORO-ETHENE | | 0.7 | 14 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-DIBROMO-ETHANE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-DICHLORO-ETHANE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DIOXANE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-BUTANONE (MEK) | | 200.0 | 4,000 | ND | ND | ND | ND | ND | ND | 0.015 | 0.029 | ND | ND | ND | 0.005 J | 0.024 | ND | ND | ND | 0.004 | ND | ND | ND | ND | ND | ND | 0.01 |
| BENZENE | | 0.5 | 10 | ND | ND | 0.0006 J | 0.001 J | ND | ND | 0.0005 J | 0.002 J | ND | ND | ND | 0.0009 J | 0.0008 J | ND | ND | ND | ND | ND | 0.002 J | 0.004 J | ND | ND | ND | ND |
| CARBON DISULFIDE | | | | ND | ND | ND | ND | ND | ND | 0.003 J | 0.01 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CARBON TETRACHLORIDE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHLOROBENZENE | | 100.0 | 2,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHLOROFORM | | 6.0 | 120 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ETHYL BENZENE | | | | 0.19 J | 0.84 | ND | 0.002 J | ND | ND | ND | 0.002 J | 1.3 | 0.002 J | ND | 0.002 J | ND | ND | ND | ND | ND | ND | 0.004 J | 0.068 | ND | ND | ND | ND |
| METHYLENE CHLORIDE | | | | ND | ND | 0.002 J | 0.003 J | ND | ND | ND | ND | ND | ND | ND | 0.002 J | ND | ND | ND | ND | ND | ND | ND | 0.004 J | ND | ND | ND | ND |
| STYRENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TETRA-CHLOROETHENE | | 0.7 | 14 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TOLUENE | | | | ND | ND | 0.002 J | 0.005 J | ND | ND | 0.002 J | 0.006 J | ND | 0.003 J | ND | 0.003 J | 0.002 J | ND | ND | ND | ND | ND | 0.007 J | 0.019 | ND | ND | ND | ND |
| TOTAL XYLENES | | | | 5.6 | 63 | 0.002 J | 0.01 | 0.001 J | 0.001 J | 0.008 | 0.009 J | 460 | 0.024 | 0.002 J | 0.008 | 0.002 J | 0.001 J | ND | ND | ND | 0.17 J | 0.012 J | 0.031 | ND | ND | ND | ND |
| TRICHLORO-ETHENE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| VINYL CHLORIDE | | 0.2 | 4 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**Notes: Bold results exceed action levels, results with**
*** (asterisk) exceeded TTLC limit without STLC analysis.**
**[1] - Free Phase Liquid Hydrocarbon found in this location.**
ND - Not detected above the laboratory reporting limit
J - Estimated result between the Method Detection Limit
(MDL) and the Practical Quantitation Limit (PQL)
mg/L - milligrams/liter mg/kg - milligrams/kilogram
STLC - Soluble Threshold Limit Concentration
TTLC - Total Threshold Limit Concentration
TCLP - Toxicity Characteristic Leaching Procedure
X - Analysis assigned, data pending.

# Table 1
## Capital Projects - Hydrogen Plant
## Soil Pre-Characterization Results

| | | Site ID: | HPP 24A[1] | HPP 24A FD[1] | HPP 26[1] | HPP 27 | HPP 28 | HPP 29 | HPP 30 | HPP 31 | HPP 32 | HPP 33 | HPP 34 | HPP 35 | HPP 36 | HPP 37 | HPP 38[1] | HPP 39 | HPP 40[1] | HPP 41[1] | HPP 42 | HPP 43 | HPP 44[1] | HPP 45 | HPP 46 | HPP 47 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | | **Lab ID:** | **3-17883** | **3-17883 FD** | **3-17884** | **3-17885** | **3-17886** | **3-17887** | **3-17888** | **3-17889** | **3-17890** | **3-17891** | **3-17892** | **3-17893** | **3-17894** | **3-17895** | **3-17896** | **3-17897** | **3-17898** | **3-17899** | **3-17900** | **3-17901** | **3-17902** | **3-17903** | **3-17904** | **3-17905** |
| **SVOCs (EPA 8270 Skinner List)** | TCLP MCL (mg/L) | 20x TCLP (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| 1,2-DICHLORO-BENZENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,3-DICHLORO-BENZENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DICHLORO-BENZENE | 7.5 | 150 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1-METHYL-NAPTHALENE | | | 12 | 12 | 4.7 | ND | ND | ND | ND | ND | 8.4 | ND | ND | ND | ND | ND | ND | ND | 2.2 J | 6.6 J | 8.4 | 13 | ND | ND | ND | ND |
| 2,4,5-TRICHLORO-PHENOL | 400 | 8,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4,6-TRICHLORO-PHENOL | 2.0 | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DIMETHYL-PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DINITRO-PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DINITRO-TOLUENE | 0.13 | 2.6 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-METHYL-NAPHTHALENE | | | 15 | 15 | 4.7 | ND | ND | ND | ND | ND | 18 | ND | ND | ND | ND | ND | ND | ND | 5.6 J | ND | ND | 20 | ND | ND | ND | ND |
| 3/4-METHYL-PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 4-NITROPHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 6-METHYL-CHRYSENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 7,12-DIMETHYL-BENZ(A) ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 7.8 | ND | ND | ND | ND |
| ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | ND | 1.8 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.93 J | ND | ND | ND | ND |
| BENZENETHIOL (THIOPHENOL) | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(A)-ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.7 J | 7.5 | ND | ND | ND | ND |
| BENZO(A)-PYRENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.1 K | 7.4 J | ND | ND | ND | ND |
| BENZO(B)FLUORANTHENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.3 | 3.8 J | ND | ND | ND | ND |
| BENZO(K)FLUORANTHENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.7 J | ND | ND | ND | ND | ND |
| BIS(2-ETHYLHEXYL) PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BUTYLBENZYLPHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHRYSENE | | | ND | ND | ND | ND | ND | ND | ND | ND | 4.3 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | 3.8 J | 13 | ND | ND | ND | ND |
| DIBENZ(A,H) ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIBENZO(A,H) ACRIDINE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIETHYLPHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIMETHYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DI-N-BUTYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DI-N-OCTYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| FLUORANTHENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 3.8 J | 1.1 J | ND | ND | ND | ND |
| HEXACHLORO-BENZENE | 0.13 | 2.6 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLORO-BUTADIENE | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLORO-ETHANE | 3.0 | 60 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| INDENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| NAPHTHALENE | | | 11 | 11 | 1.6 J | ND | ND | ND | ND | ND | 3.1 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 3.1 J | ND | ND | ND | ND |
| NITROBENZENE | 2.0 | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| O-CRESOL (2-Methylphenol) | 200 | 4,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PENTACHLORO-PHENOL | 100 | 2,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PHENANTHRENE | | | 1.8 J | 1.9 J | ND | ND | ND | ND | ND | ND | 8.2 J | ND | ND | ND | ND | ND | ND | ND | 2.5 J | 1.8 J | 3.4 J | 8.9 | ND | ND | ND | ND |
| PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PYRENE | | | ND | ND | ND | ND | ND | ND | ND | ND | 4.3 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | 5.9 | 9.9 | ND | ND | ND | ND |
| PYRIDINE | 5.0 | 100 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| QUINOLINE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**Notes: Bold results exceed action levels, results with**
*** (asterisk) exceeded TTLC limit without STLC analysis.**
**[1] - Free Phase Liquid Hydrocarbon was found in these locations.**
ND (0.95) - Not Detected (method detection limit)
J - Estimated result between the Method Detection Limit
(MDL) and the Practical Quantitation Limit (PQL)
mg/L - milligrams/liter mg/kg - milligrams/kilogram
STLC - Soluble Threshold Limit Concentration
TTLC - Total Threshold Limit Concentration
TCLP - Toxicity Characteristic Leaching Procedure
X - Analysis assigned, data pending.

# Table 1
## Capital Projects - Hydrogen Plant
## Soil Pre-Characterization Results

| | | | Site ID: | HPP 48[1] | HPP 49 | HPP 50 | HPP 51 | HPP 52 | HPP 53 | HPP 54 | HPP 55 | HPP 55 FD | HPP 56 | HPP 56 FD | HPP 57[1] | HPP 58[1] | 1H[1] | 2H[1] | 3H[1]/4H[1] | 3H[1]/4H[1 FD] | 1C[1], 2C, 3C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | | | **Lab ID:** | **3-17906** | **3-17907** | **3-17908** | **3-17909** | **3-17910** | **3-17911** | **3-17912** | **3-17914** | **3-17914 FD** | **3-17915** | **3-17915 FD** | **3-17916** | **3-17917** | **3-17858** | **3-17860** | **3-17913** | **3-17913 FD** | **3-17918** |
| **Total Petroleum Hydrocarbons** | **Excavated Soil Re-Use Limits (mg/kg)** | | | | | | | | | | | | | | | | | | | | |
| TPH-Gasoline | | 100 | | ND (0.2) | **150** | ND (0.2) | 4.8 J | 0.5 J | 24 J | ND (8.0) | **7,700** | **6,800** | 23 | 8.4 | **270** | **720** | 0.9 J | 0.5 J | 10 J | 25 | ND (0.2) |
| TPH-Diesel w/ Silica Gel | | 1,000 | | 29 | 83 | 10 J | 130 | 770 | **13,000** | 17 | 220 | 23 | 150 | 230 | **1300** | **1,300** | 11 J | 190 | 69 | 71 | ND (4.0) |
| TPH-Diesel | | 1,000 | | 35 | 75 | 11 J | 130 | 530 | **11,000** | 10 J | 190 | 28 | 130 | 210 | 730 | **1,200** | 15 | 240 | 62 | 110 | 4.5 J |
| | **Title 22 Limits** | | | | | | | | | | | | | | | | | | | | |
| **TTLC/STLC Metals** | STLC (mg/L) | 10x STLC (mg/kg) | TTLC (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Antimony | 15.0 | 150 | 500 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.47 J | ND | ND | ND | ND |
| Arsenic | 5.0 | 50 | 500 | 15.2 | 8.17 | 8.14 | 11.1 | 11 | 23.4 | 38.6 | 6.61 | 8.82 | 4.69 | 3.39 | 44.5 | 12.1 | 145/ 1.44 | 6.76 | 14.5 | 15.8 | 12.9 |
| Barium | 100.0 | 1,000 | 10,000 | 215 | 266 | 200 | 207 | 182 | 175 | 154 | 180 | 186 | 127 | 110 | 180 | 242 | 125 | 158 | 186 | 237 | 226 |
| Beryllium | 0.75 | 7.5 | 75 | 0.583 | 0.651 | 0.468 J | 0.459 J | 0.646 | 0.477 J | 0.447 J | 0.663 | 0.582 | 0.651 | 0.66 | 0.5 | 0.789 | 0.746 | 0.665 | 0.541 | 0.577 | 0.756 |
| Cadmium | 1.0 | 10 | 100 | 0.319 J | 0.273 J | 0.276 J | 0.246 J | 0.235 J | 0.290 J | 0.223 J | 0.345 J | 0.283 J | 0.213 J | 0.199 J | 0.212 J | ND | ND | ND | 0.316 J | 0.286 J | 0.391 J |
| Chromium | 5.0 | 50 | 2,500 | 31.4 | 24.4 | 61.9/ ND | 71.7/ 0.158 J | 32 | 45.1 | 45.4 | 26.6 | 26.8 | 16.3 | 14.1 | 33.7 | J | 47 | 23.6 | 30.0 | 31.3 | 24.6 |
| Cobalt | 80 | 800 | 8,000 | 11.1 | 12 | 14.3 | 10.4 | 8.23 | 9.89 | 11.5 | 9.56 | 13.6 | 5.97 | 5.71 | 9.7 | 12.6 | 9.65 | 10.5 | 10.6 | 8.88 | 8.47 |
| Copper | 25 | 250 | 2,500 | 71.1 | 30.4 | 34.8 | 32 | 20.5 | 34.2 | 24.1 | 31.8 | 33.5 | 16.4 | 10.8 | 38 | 53.5 | 59.8 | 25.7 | 32.1 | 30.1 | 21.7 |
| Lead | 5.0 | 50 | 1,000 | 24.4 | 17.1 | 38.5 | 117/ 2.48 | 12.5 | 28.8 | 23.7 | 11.8 | 13 | 9.69 | 8.29 | 19.6 | 128/ 0.0389 | 128/ 2.75 | 18.3 | 29.8 | 44.8 | 27.1 |
| Mercury | 0.2 | 2 | 20 | 0.311 | 0.101 | 0.164 | 0.179 | 0.117 | 0.374 | 0.0800 J | 0.108 | 0.0472 J | 0.118 | 0.0850 J | 0.374 | 5.18/ ND | 1.11 | 1.75 | 0.141 | 0.158 | 1.39 |
| Molybdenum | 350 | 3,500 | 3,500 | 0.556 J | ND | 0.462 J | ND | 0.624 J | ND | ND | 1.24 | 3.82 | ND | ND | 0.737 J | 3.15 | ND | 0.562 J | 0.484 J | 0.472 J | 1.54 |
| Nickel | 20 | 200 | 2,000 | 32.4 | 30.2 | 74.6 | 75.6 | 41.5 | 51.1 | 50.2 | 50.6 | 52.9 | 17.1 | 15.3 | 37.3 | 76.8 | 45.7 | 28.2 | 34.0 | 31.9 | 27.6 |
| Selenium | 1.0 | 10 | 100 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.08 J | 2.62 | ND | ND | ND | ND |
| Silver | 5 | 50 | 500 | 0.393 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.453 J | 0.496 | ND | ND | ND | ND | ND |
| Thallium | 7.0 | 70 | 700 | 2.49 | ND | ND | 1.31 J | 1.45 J | 1.01 J | 1.65 J | 2.06 | 0.961 J | 1.44 J | ND | 4.17 | 2.24 | 2.81 | ND | ND | 1.03 J | ND |
| Vanadium | 24 | 240 | 2,400 | 41.7 | 36.3 | 45.2 | 42.7 | 35.1 | 52.2 | 42.3 | 36.2 | 36.3 | 27.1 | 29.4 | 35.3 | 43.3 | 36.8 | 28.8 | 36.5 | 37.5 | 43.3 |
| Zinc | 250 | 2,500 | 5,000 | 78.9 | 69.4 | 72.3 | 71.3 | 48.4 | 66 | 54.3 | 69.4 | 70.9 | 42.3 | 34.9 | 63.5 | 179 | 93.6 | 54.1 | 73.9 | 65.7 | 60 |
| **TCLP Metal** | | | TCLP (mg/L) | | | | | | | | | | | | | | | | | | |
| Arsenic (As) | | | 5.0 | 0.0111 J | ND | 0.010 J | 0.0243 | 0.0247 | 0.0380 | 0.0102 J | ND | ND | ND | ND | 0.0458 | ND | 0.0327 | | N.D | N.D | 0.0110 J |
| Barium (Ba) | | | 100.0 | 0.456 | 1.11 | 0.688 | 0.245 | 0.995 | 0.944 | 0.441 | 0.866 | 0.904 | 0.768 | 0.816 | 1.56 | 1.25 | | | 1.34 | 1.41 | 0.534 |
| Cadmium (Cd) | | | 1.0 | ND | ND | ND | ND | ND | ND | 0.0015 J | ND | ND | ND | ND | ND | 0.0016 J | | | 0.0011 J | N.D | ND |
| Chromium (Cr) | | | 5.0 | ND | ND | ND | 0.0118 J | ND | ND | 0.0130 J | ND | ND | ND | ND | ND | ND | | | ND | N.D | ND |
| Lead (Pb) | | | 5.0 | 0.0351 | ND | 0.0197 J | 0.0321 | 0.149 | 0.0138 J | 0.0219 | ND | ND | ND | ND | 0.0092 | 0.0599 | 0.0613 | | ND | N.D | 0.138 |
| Mercury (Hg) | | | 0.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | ND | N.D | ND |
| Selenium (Se) | | | 1.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | ND | N.D | ND |
| Silver (Ag) | | | 5.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | | | ND | N.D | ND |
| **96-Hour Aquatic Accute Toxicity** | | | | | | | | | | | | | | | | | | | | | |
| Total Mortality (from 10 fish per 10 Liter tank) | | | Control A | | | 1 | | | | | | | | | | | | | | | |
| | | | Control B | | | 0 | | | | | | | | | | | | | | | |
| | | | 250 mg A | | | 2 | | | | | | | | | | | | | | | |
| | | | 250 mg B | | | 0 | | | | | | | | | | | | | | | |
| | | | 750 mg A | | | 0 | | | | | | | | | | | | | | | |
| | | | 750 mg B | | | 0 | | | | | | | | | | | | | | | |
| **VOCs (EPA 8260 Skinner List)** | | TCLP (mg/L) | 20x TCLP (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| 1,1-DICHLORO-ETHENE | | 0.7 | 14 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-DIBROMO-ETHANE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-DICHLORO-ETHANE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DIOXANE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-BUTANONE (MEK) | | 200.0 | 4,000 | ND | ND | 0.004 J | 0.007 J | 0.005 J | ND | 0.007 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZENE | | 0.5 | 10 | ND | ND | ND | ND | 0.0008 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.0006 J | ND | ND | ND |
| CARBON DISULFIDE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CARBON TETRACHLORIDE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHLOROBENZENE | | 100.0 | 2,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHLOROFORM | | 6.0 | 120 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ETHYL BENZENE | | | | ND | 0.23 J | ND | ND | 0.004 J | ND | ND | ND | ND | ND | ND | 0.13 J | ND | ND | 0.001 J | ND | ND | ND |
| METHYLENE CHLORIDE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| STYRENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TETRA-CHLOROETHENE | | 0.7 | 14 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | |
| TOLUENE | | | | ND | ND | ND | ND | 0.01 | ND | 0.001 J | ND | ND | ND | ND | ND | ND | ND | 0.004 J | ND | ND | ND |
| TOTAL XYLENES | | | | ND | ND | ND | 0.003 J | 0.019 | ND | 0.002 J | 17 | 2.9 | 0.012 | 0.005 | 1.3 | ND | ND | 0.004 J | ND | 0.019 | ND |
| TRICHLORO-ETHENE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| VINYL CHLORIDE | | 0.2 | 4 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**Notes: Bold results exceed action levels, results with**
*** (asterisk) exceeded TTLC limit without STLC analysis.**
**[1] - Free Phase Liquid Hydrocarbon found in this location.**
ND - Not detected above the laboratory reporting limit
J - Estimated result between the Method Detection Limit
(MDL) and the Practical Quantitation Limit (PQL)
mg/L - milligrams/liter mg/kg - milligrams/kilogram
STLC - Soluble Threshold Limit Concentration
TTLC - Total Threshold Limit Concentration
TCLP - Toxicity Characteristic Leaching Procedure
X - Analysis assigned, data pending.

# Table 1
# Capital Projects - Hydrogen Plant
# Soil Pre-Characterization Results

| | | | Site ID: | HPP 48[1] | HPP 49 | HPP 50 | HPP 51 | HPP 52 | HPP 53 | HPP 54 | HPP 55 | HPP 55 FD | HPP 56 | HPP 56 FD | HPP 57[1] | HPP 58[1] | 1H[1] | 2H[1] | 3H[1]/4H[1] | 3H[1]/4H[1] FD | 1C[1], 2C, 3C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | | | **Lab ID:** | **3-17906** | **3-17907** | **3-17908** | **3-17909** | **3-17910** | **3-17911** | **3-17912** | **3-17914** | **3-17914 FD** | **3-17915** | **3-17915 FD** | **3-17916** | **3-17917** | **3-17858** | **3-17860** | **3-17913** | **3-17913 FD** | **3-17918** |
| **SVOCs (EPA 8270 Skinner List)** | TCLP MCL (mg/L) | 20x TCLP (mg/kg) | | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| 1,2-DICHLORO-BENZENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,3-DICHLORO-BENZENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DICHLORO-BENZENE | 7.5 | 150 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1-METHYL-NAPTHALENE | | | | 24 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.3 J | ND | 0.4 J | ND | ND | ND |
| 2,4,5-TRICHLORO-PHENOL | 400 | 8,000 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4,6-TRICHLORO-PHENOL | 2.0 | 40 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DIMETHYL-PHENOL | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DINITRO-PHENOL | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DINITRO-TOLUENE | 0.13 | 2.6 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-METHYL-NAPHTHALENE | | | | 36 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 4.6 J | ND | ND | ND | ND | ND |
| 3/4-METHYL-PHENOL | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 4-NITROPHENOL | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 6-METHYL-CHRYSENE | | | | ND | ND | ND | 0.64 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 7,12-DIMETHYL-BENZ(A) ANTHRACENE | | | | 16 | ND | ND | 0.74 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ANTHRACENE | | | | 1.9 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.3 J | ND | ND | ND | ND |
| BENZENETHIOL (THIOPHENOL) | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(A)-ANTHRACENE | | | | 13 | ND | ND | 0.71 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.37 J | ND | ND | ND | ND |
| BENZO(A)-PYRENE | | | | 12 | ND | ND | 0.65 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(B)FLUORANTHENE | | | | 5.5 J | ND | ND | 0.29 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(K)FLUORANTHENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BIS(2-ETHYLHEXYL) PHTHALATE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 43 |
| BUTYLBENZYLPHTHALATE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHRYSENE | | | | 20 | ND | ND | 1.2 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.42 J | ND | ND | ND | ND |
| DIBENZ(A,H) ANTHRACENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIBENZO(A,H) ACRIDINE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIETHYLPHTHALATE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIMETHYL PHTHALATE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DI-N-BUTYL PHTHALATE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DI-N-OCTYL PHTHALATE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| FLUORANTHENE | | | | 1.8 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.45 | ND | ND | ND | ND |
| HEXACHLORO-BENZENE | 0.13 | 2.6 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLORO-BUTADIENE | 0.5 | 10 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLORO-ETHANE | 3.0 | 60 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| INDENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| NAPHTHALENE | | | | 5.8 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| NITROBENZENE | 2.0 | 40 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| O-CRESOL (2-Methylphenol) | 200 | 4,000 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PENTACHLORO-PHENOL | 100 | 2,000 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PHENANTHRENE | | | | 16 | ND | ND | ND | ND | 1.8 J | ND | ND | ND | ND | ND | ND | 3.3 J | 1.8 | ND | ND | ND | 4.3 J |
| PHENOL | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 5.2 J |
| PYRENE | | | | 18 | ND | ND | 0.73 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.1 J | ND | ND | ND | ND |
| PYRIDINE | 5.0 | 100 | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| QUINOLINE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**Notes: Bold results exceed action levels, results with**
*** (asterisk) exceeded TTLC limit without STLC analysis.**
**[1] - Free Phase Liquid Hydrocarbon was found in these locations.**
ND (0.95) - Not Detected (method detection limit)
J - Estimated result between the Method Detection Limit
(MDL) and the Practical Quantitation Limit (PQL)
mg/L - milligrams/liter mg/kg - milligrams/kilogram
STLC - Soluble Threshold Limit Concentration
TTLC - Total Threshold Limit Concentration
TCLP - Toxicity Characteristic Leaching Procedure
X - Analysis assigned, data pending.

**Table 2**
**Capital Projects - Hydrogen Plant**
**Grab Water Sample Results**

| | Site ID | HPP 2 | HPP 2 Field Blank | HPP 13 | HPP23 | HPP23 FD | HPP34 | HPP37 | HPP 40/ HPP 43 Composite *[2] | HPP47 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Compound** | **Lab ID** | **2-8131** | **2-8132** | **2-8133** | **2-8134** | **2-8135** | **2-8136** | **2-8137** | **2-8138** | **2-8139** |
| **Organics** | RGMP MACL's mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| TPH-Gasoline | 1.2 | 0.51 | ND | 0.11 J | 0.17 J | 0.14 | ND (.020) | ND (.020) | 0.13 | ND (.020) |
| TPH-Diesel w/ Silica Gel 8015 B | 0.64 | **170** | ND | **14** | 8.6 | **14** | 0.44 * | **1.3** | **33 **** | 0.23 * |
| TPH-Diesel 8015 B | 0.64 | **89** | ND | **16** | 7.1 | **16** | 0.69 | **1.4** | **37 **** | 0.33 |
| **Metals** | Refinery Effluent Limits mg/L [1] | | | | | | | | | |
| Antimony | n/a | ND | ND | ND | ND | ND | 0.0114 J | ND | ND | ND |
| Arsenic | 1.328 | 0.0157 J | ND | 0.285 | 0.0508 | 0.0523 | 0.0294 | ND | 0.117 | ND |
| Barium | n/a | 0.0622 | ND | 0.148 | 0.194 | 0.193 | 0.047 | 0.0897 | 0.164 | 0.0838 |
| Beryllium | n/a | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Cadmium | n/a | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Chromium | 0.32 | ND | ND | ND | ND | ND | ND | ND | ND | 0.0093 |
| Cobalt | n/a | ND | ND | ND | ND | ND | ND | ND | 0.0016 J | ND |
| Copper | 0.208 | ND | ND | ND | ND | ND | 0.0069 J | 0.0045 J | ND | ND |
| Lead | 0.368 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Mercury | n/a | ND | ND | ND | ND | ND | ND | 0.000074 J | ND | ND |
| Molybdenum | n/a | 0.0225 | ND | 0.0621 | ND | ND | 0.0066 J | 0.0083 J | 0.0047 J | 0.0053 |
| Nickel | 0.48 | ND | ND | ND | ND | ND | ND | ND | 0.0071 J | ND |
| Selenium | n/a | ND | ND | ND | ND | ND | 0.0110 J | ND | ND | ND |
| Silver | n/a | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Thallium | n/a | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Vanadium | n/a | 0.0025 J | ND | 0.0017 J | 0.0034 J | 0.0038 J | 0.0021 J | ND | 0.0059 | ND |
| Zinc | 0.944 | ND | ND | ND | ND | ND | ND | ND | ND | ND |

Notes:

**Any sample results exceeding action levels appear in bold.**

ND (0.95) - Not Detected (method detection limit)

J - Estimated result. Quantity falls between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL)

mg/L - milligrams per liter

* DRO was detected in the method blank at a concentration of 0.048 mg/L. This blank value was not subtracted from the analytical result.

** Due to the nature of the matrix, a reduced aliquot was used for analysis. The reporting limits were raised accordingly.

1 - Additional effluent limits include ammonia, phenol, pH, salinity and TOC were not measured for these groundwater grab samples.

2 - Sites HPP 40 and 43 failed to provide sufficient water for the entire grab sample set and the water from each well was composited for analysis.

**C10-SAI-RICHMOND-02- 9567**

May 9, 2006

Mr. Ken Yee
Chevron Richmond Refinery
Environmental Operations/Hazardous Waste
841 Chevron Way
Richmond, CA 94802

**Re: Capital Projects: COGEN Project Site Soil Pre-Characterization Results**
**HW Job #: S2997**

Dear Mr. Yee,

Science Applications International Corporation (SAIC) has prepared this letter report to summarize the findings of the pre-characterization that we performed for the proposed Capital Projects Cogeneration Site (COGEN) on the south east corner of Petrolite Street and Cracking Street.

## EXECUTIVE SUMMARY

Twenty-five composite soil samples were collected from two sub-sites (A & B). The findings are:

- Eight of the 25 samples (32%) exceeded the current Refinery re-use limits for TPH (four from Sub-site A and four from Sub-site B).
- Two of the 25 samples (8%) exceeded the Title 22 State hazardous waste limits for metals (one from Sub-site A for total mercury and one from Sub-site B for soluble lead).
- None of the samples exceeded concentration limits for Federal Hazardous Waste characteristics.
- VOCs and SVOCs were generally non-detected and will not impact the disposal or re-use alternatives.
- No samples exceeded other Title 22 hazardous waste criteria, including RCI and 96-hour acute aquatic toxicity (fish bioassay).

Based on the findings listed above, SAIC recommends the following:

- Approximately 92% of the soils are suitable for reuse within the same excavation from which they are derived. If these soils are NOT reused at the construction site, more than half of these soils would be suitable for re-use at other locations within the refinery. The remainder would need to be shipped offsite for Class II disposal.
- The remaining 8% would likely be designated as California hazardous waste and would need to be segregated for transportation to a Class I waste disposal facility.

## COGEN SITE PRE-CHARACTERIZATION

### Pre-Characterization Approach

Per our earlier memorandum *Capital Projects: Sampling and Analysis Plan for Hydrogen, COGEN, CCR, and Hydrogen Purity Sites* dated March 3, 2006, the prescribed approach for this project was to pre-characterize the proposed construction area footprints provided to us by the Capital Projects Group using a direct-push Geoprobe rig to collect in-place soil samples from 23 locations. The selected drilling subcontractor was Gregg Drilling and Testing of Martinez, California. Drilling was performed during the week of March 13, 2006.

### Soil Boring Locations

Thirty-five boring locations were originally proposed to characterize an estimated volume of 35,000 cubic yards (one boring per 1,000 cubic yards). Prior to drilling, Jim Jacques of the Capital Projects group reduced the proposed depth of the characterization from 6 feet to 4 feet below ground surface (bgs), which reduced the overall volume to roughly 23,000 cubic yards (13,000 in Sub-site A and 10,000 in Sub-site B). This resulted in a reduction in the number of borings to 25.

Figure 1 shows the locations of the 25 borings from which the composite samples were collected. Fifteen borings were within Sub-site A and 10 borings were within Sub-site B. Each location represents one vertically-composited sample.

Two different grids were used to distribute the two sub-sites. Sub-site A consisted of cells of roughly 60 feet by 90 feet in dimension. Sub-site B consisted of cells of roughly 75 feet by 65 feet in dimension. The cell dimensions were established based on the originally-proposed site dimensions and depth.

### Soil Sampling and Analytical Methods

At each location, the Geoprobe rig continuously sampled to a depth of 4 feet bgs using a 2.5-inch diameter, 4-foot long stainless steel “Macrocore” sampler loaded with clear polyvinyl chloride (PVC) sleeves. The sample cores were removed from the sampler and up to four vertically-discrete, 6-inch sections of the core were cut and capped. Twenty-five composite samples were collected and transported under chain-of-custody to Lancaster Laboratories of Lancaster, Pennsylvania (Lancaster). The vertically-discrete samples from each location were composited at the laboratory into a single sample.

Each sample was analyzed for the following parameters (EPA analytical method):

- TPH- Gasoline Range Organics (GRO) (EPA 8015m)
- TPH – Diesel Range Organics (DRO) (EPA 8015m)
- TPH – DRO with Silica Gel Cleanup (EPA 8015m)
- Total metals (EPA 6010/7000) plus waste extraction test (WET) for selected samples where total metals results exceeded 10x the Title 22 Soluble Threshold Limit Concentration (STLC)
- Toxicity Characteristic Leaching Procedure (TCLP) - metals only

- Volatile Organic Compounds (VOCs) - Skinner List (EPA 8260)
- Semi-volatile Organic Compounds (SVOCs) – Skinner List (EPA 8270)
- Reactivity, corrosivity and ignitability (RCI) – on selected samples

Additionally, 10 percent of the composite samples were split and sent to Alpha Analytical Laboratory of Ukiah, California, and analyzed for LC 50 96-hour acute toxicity fish bioassay. These Fish Bio Assay Screens were conducted to give some idea of the site's characteristics in case Fish Bio Assay sampling becomes necessary due to landfill disposal requirements.

**Soils Results**

Results of the soil analyses are compiled in the attached Table 1.

***Organic Results***

Table 1 compares the analytical results with the Refinery's current re-use guidance limits for TPH-gasoline (100 mg/kg) and TPH-diesel (1,000 mg/kg). The re-use limits specify the allowable concentrations of TPH-gasoline and TPH-diesel that may be moved to another location within the influence of the Refinery's Groundwater Protection System (GPS) for either temporary stockpiling or final placement. Results that exceed these limits have been listed in bold font on the table.

Note that Lancaster Laboratory has reported both organic and metals results that fall between the method detection limit (MDL) and the practical quantitation limit (PQL) or "reporting limit" and flagged these results with a "J" (estimated). For the purposes of this pre-characterization, these results can be treated as non-detect.

Three of the 25 composite samples (12%) contained TPH-gasoline concentrations exceeding the current re-use limit (see Figure 1). Two were in Sub-site A, and a third was in Sub-site B.

Seven of the 25 composite samples (28 %) contained TPH-diesel concentrations (either by standard extraction or with additional silica gel cleanup) exceeding the current re-use limit. As with the TPH-gasoline detections, the seven TPH-diesel exceedences were distributed across both Sub-sites A and B.

In total, 8 of the 25 (32%) samples contained either TPH-gasoline or TPH-diesel concentrations exceeding the current re-use limits. Soil from these areas will likely require off-site disposal at a Class II landfill should excavation of the sites occur.

None of the 25 samples contained significant concentrations of VOCs or SVOCs, and the majority of compounds were non-detect. Where VOC and SVOC concentrations were detected, results were compared to an action limit of 20 times the TCLP limits listed in Title 22 of the California Code of Regulations for that compound. None of the results exceeded this guideline; therefore, TCLP analyses for VOCs and SVOCs were not warranted as any resulting soluble concentrations from the sample leachates could not have exceeded the Title 22 TCLP limits.

Based on previous site use, pesticide contamination was not suspected; therefore, pesticide analyses were not performed for comparison with Title 22 limits.

***Metals Results***

Total metals results on Table 1 were compared to the two sets of Title 22 limits.

First, they were compared to total threshold limit concentrations (TTLC's). One of the 25 samples, CGN 18 (Figure 1), exceeded TTLC for mercury, thereby designating this sample as a California hazardous waste.

The results were then compared to a guideline of 10 times the soluble threshold limit concentrations (STLC's). This guideline establishes whether the sample has the potential for exceeding the soluble limit based on the total concentration. One sample, CGN B10 (Figure 1), exceeded the guideline for soluble lead. This sample was analyzed by Lancaster for the WET to compare with the STLC. The WET result exceeded the STLC limit for lead, thereby designating this sample as a California hazardous waste.

TCLP metals analyses were also performed for comparison to the Title 22 TCLP limits. None of the TCLP metals results exceeded the limits.

***Reactivity, Corrosivity, and Ignitability (RCI) Results***

Neither of the two samples submitted for RCI analysis (CGN 4 and CGN 14) exhibited characteristics of reactivity, corrosivity, or ignitability as specified in 22CCR66261.21 through 22CCR66261.23.

***Fish Bioassay Results***

Three composite samples (CGN 4, CGN 14, and CGN B10) were submitted to Alpha Analytical for 96-hour acute aquatic toxicity (fish bioassay). The results showed little or no fish mortality. One of the three samples resulted in 10% mortality at the 750 mg/L concentration (same as the control) and the remaining samples showed no mortality. Based on these results, none of the three samples exceed the aquatic toxicity characteristic for a California hazardous waste per 22CCR66261.24(a)(6).

**Occurrence of Groundwater at the Proposed COGEN Project Site**

Based on recent water level monitoring conducted in the vicinity of the proposed COGEN site, SAIC had estimated prior to the pre-characterization that groundwater beneath the site would occur at a depth approximately five to eight feet below ground surface (bgs). During drilling groundwater was not encountered above the four foot maximum boring depths, except at one location (CGN 17) where it was observed at a depth of 1.9 feet bgs.

Based on recent water-level surveys conducted as part of the Refinery Groundwater Monitoring Program (RGMP), regional groundwater flow direction across the proposed COGEN Project site is in an easterly direction from San Pablo Ridge to the west toward the 50/100 foot channel and the Bio Reactor to the east.

**Occurrence of Free Phase Liquid Hydrocarbon (FPLH) at the COGEN Project Site**

FPLH was encountered in soil at three boring locations: CGN 10, CGN 19, and CGN B11. Soil samples at each of these locations also contained TPH concentrations above the current Refinery re-use limits.

## SUMMARY AND RECOMMENDATIONS

A brief summary of the results for the 25 composite soil samples follows:

- Eight of the 25 samples (32%) exceeded the current Refinery re-use limits for TPH (four from Sub-site A and four from Sub-site B).
- Two of the 25 samples (8%) exceeded the Title 22 State hazardous waste limits for metals (one from Sub-site A for total mercury and one from Sub-site B for soluble lead).
- None of the samples exceeded concentration limits for Federal Hazardous Waste characteristics.
- VOCs and SVOCs were generally non-detected and will not impact the disposal or re-use alternatives.
- No samples exceeded other Title 22 hazardous waste criteria, including RCI and 96-hour acute aquatic toxicity (fish bioassay).

Based on the findings listed above, SAIC recommends the following:

- Approximately 92% of the soils are suitable for reuse within the same excavation from which they are derived. If these soils are NOT reused at the construction site, more than half of these soils would be suitable for reuse at other locations within the refinery, and the remainder would need to be shipped offsite for Class II disposal
- The remaining 8% would likely be designated as California hazardous waste and would need to be segregated for transportation to a Class I waste disposal facility.

We appreciate the opportunity to provide environmental services to your team. If you have further questions, please call Austin Bond at 2-2577, or Todd Baesen at 2-8254.

Regards,

Austin Bond, P.E.
SAIC Project Manager

**Attachments:**

Figure 1 – Soil Boring Locations
Table 1 - Soil Pre-Characterization Results

**CC:**

Tom DiPalma (Chevron Haz Waste)
John MacDonald (Chevron Capital Projects, COGEN Project Manager)
Bob Chamberlin (Chevron HES)
Jim Jacques (Harvest)
Todd Baesen (SAIC)
Bailey Smith (SAIC)
Haz Waste Project File (copy includes all laboratory data reports in attachments)

## Legend

- ○ Boring Location
- ● TPH-Diesel or TPH-Gasoline Concentrations above Refinery Reuse Limits
- ● California Hazardous Waste
- ● Federal Hazardous Waste

*1* Free Phase Liquid Hydrocarbon observed

*2* Exceeded TTLC for Hg

*3* Exceeded STLC for Pb

***Figure 1.***
***Cogen Project Site***
***Soil Pre-Characterization***

SAIC
From Science to Solutions™

| | |
|---|---|
| DATE: 04/20/2006 | JOB NO. S2997 |
| DRAWN: CLH | APPROVED:BS/AB |

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Table 1
Capital Projects - Cogen Plant
Soil Pre-Characterization Results

| Compound | | | Site ID | CGN 1 | CGN 3 | CGN 4 | CGN 5 | CGN 7 | CGN 8 | CGN 9 | CGN 10[1] | CGN 12 | CGN 13 | CGN 14 | CGN 15 | CGN 17 | CGN 18 | CGN 19[1] | CGN B2 | CGN B4 | CGN B5 | CGN B6 | CGN B8 | CGN B9 | CGN B10 | CGN B11[1] | CGN B13 | CGN B14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Lab ID | 3-17947 | 3-17948 | 3-17949 | 3-17950 | 3-17951 | 3-17952 | 3-17953 | 3-17954 | 3-17955 | 3-17956 | 3-17957 | 3-17958 | 3-17959 | 3-17960 | 3-17961 | 3-17963 | 3-17964 | 3-17965 | 3-17966 | 3-17967 | 3-17970 | 3-17962 | 3-17969 | 3-17971 | 3-17968 |
| **Organics** | Excavated Soil Reuse Guidance Re-Use Limits | | | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| TPH-Gasoline | | 100 | 5,900 | 7.5 J | 12 J | 34 J | 0.9 J | 0.2 J | 46 | 0.9 J | **270** | ND | ND | ND | 36 | ND | 4.7 | **210** | 1.1 | 4.4 | 14 J | 16 J | ND | ND | 5.1 J | 4.8 J | ND | **450** |
| TPH-Diesel w/ Silica Gel 8015 B | | 1,000 | 20,000 | 250 | 370 | **1,000** | 180 | 55 | 330 | 160 | **1,100** | 220 | 150 | 81 | **1,100** | 560 | 610 | **1,700** | 460 | 120 | **1,000** | 250 | 280 | 560 | **2,300** | **1,900** | 17 | 120 |
| TPH-Diesel 8015 B | | 1,000 | 20,000 | 230 | 280 | **1,000** | 150 | 52 | 260 | 140 | **1,500** | 190 | 70 | 78 | **1,100** | 500 | 380 | **1,400** | 530 | 120 | 970 | 220 | 370 | 370 | **2,100** | **1,700** | 16 | 100 |
| **Metals** | STLC (mg/L) | Title 22 Limits 10x STLC (mg/kg) | TTLC (mg/kg) | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Antimony | 15.0 | 150 | 500 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 2.00 | ND | ND |
| Arsenic | 5.0 | 50 | 500 | 9.20 | 7.95 | 9.73 | 11.9 | 8.62 | 10.9 | 9.3 | 10.2 | 10.2 | 6.78 | 6.42 | 9.58 | 9.3 | 5.95 | 23.6 | 6.77 | 16.1 | 8.18 | 7.82 | 10.8 | 12.5 | 12.8 | 19.1 | 9.02 | 6.78 |
| Barium | 100.0 | 1,000 | 10,000 | 269 | 177 | 260 | 204 | 211 | 213 | 167 | 166 | 191 | 192 | 193 | 165 | 143 | 127 | 167 | 187 | 170 | 143 | 220 | 161 | 183 | 220 | 160 | 173 | 185 |
| Beryllium | 0.75 | 7.5 | 75 | 0.799 | 0.473 J | 0.573 | 0.626 | 0.745 | 0.701 | 0.621 | 0.606 | 0.583 | 0.667 | 0.663 | 0.632 | 0.475 J | 0.438 J | 0.681 | 0.521 | 0.458 J | 0.520 | 0.65 | 0.537 | 0.758 | 0.78 | 0.644 | 0.801 | 0.766 |
| Cadmium | 1.0 | 10 | 100 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.767 | 0.616 | 1.34 | 0.668 | 0.59 | 0.620 | 0.836 | ND | 0.585 | 0.803 | 0.777 | 0.464 J | ND |
| Chromium | 5.0 | 50 | 500 | 26.9 | 38.5 | 43.8 | 67.7/ 0.223 J | 32.8 | 40.1 | 46.9 | 59.3/ 0.132 J | 36.3 | 31.2 | 28.3 | 52.0/ 0.369 J | 33.5 | 34.4 | 237/ 0.335 J | 40.7 | 50.1/ 0.189 J | 40.5 | 43.3 | 36.5 | 49.6 | 53.7/ 0.329 J | 68.7/ 0.548 | 43.1 | 30.1 |
| Cobalt | 80 | 800 | 8,000 | 14.3 | 11.4 | 10.1 | 10.7 | 12.5 | 11 | 11.3 | 11.7 | 9.22 | 10.8 | 10.9 | 11.9 | 9.01 | 14.3 | 22.4 | 9.55 | 9.62 | 10.4 | 9.28 | 9.55 | 11.5 | 12.6 | 12.1 | 13.5 | 10.4 |
| Copper | 25 | 250 | 2,500 | 35.6 | 57.9 | 37.4 | 52.3 | 31.4 | 36.9 | 57.8 | 48.3 | 50.6 | 30.9 | 29.6 | 43.2 | 37.5 | 53.6 | 71.2 | 35.1 | 27.5 | 32.9 | 182 | 36.8 | 43.5 | 45.7 | 94.1 | 40.1 | 30.5 |
| Lead | 5.0 | 50 | 500 | 20.0 | 40.2 | 56.9/ 4.89 | 54.5/ 2.36 | 29.2 | 77.4/ 2.01 | 91.1/ 2.06 | 221/ 2.55 | 41 | 20.1 | 15.4 | 64.8/ 1.91 | 58.4/ 1.34 | 46.5 | 22.9 | 53.3/ 2.10 | 38.4 | 35.7 | 50.8/ ND | 40.9 | 63.4/ 2.26 | **143/ 5.73** | 127/ 4.49 | 24.1 | 23.7 |
| Mercury | 0.2 | 2 | 20 | 0.256 | 0.983 | 2.75/ N.D. | 2.57/ N.D. | 0.93 | 1.7 | 3.49/ N.D. | 7.55/ N.D. | 0.739 | 0.243 | 0.172 | 3.03/ ND | 2.29/ ND | **34.3*** | 4.02/ ND | 0.344 | 0.226 | 1.55 | 3.91/ ND | 6.48/ ND | 4.4/ ND | 3.88/ ND | 2.84/ ND | 0.194 | 0.282 |
| Molybdenum | 350 | 3,500 | 3,500 | ND | 1.94 | 2.09 | 1.22 | 0.532 | 0.619 | 1.35 | 1.35 | 1.24 | 0.706 | 0.532 | 33.3 | 1.9 | 0.634 J | 1.64 | 0.877 | 0.871 J | 1.21 | 4.65 | 5.89 | 12.8 | 5.34 | 4.87 | 0.741 J | 0.594 J |
| Nickel | 20 | 200 | 2,000 | 35.7 | 51.1 | 45.3 | 77 | 39.5 | 45.1 | 55.9 | 74.9 | 40.2 | 35.8 | 33.1 | 49.1 | 31.2 | 43.6 | 307/ 0.755 | 52.5 | 50.6 | 47.1 | 44.7 | 34.6 | 56.3 | 63.8 | 69.8 | 57 | 36.2 |
| Selenium | 1.0 | 10 | 100 | ND | ND | ND | ND | ND | ND | 1.83 | 1.8 | ND | ND | ND | 1.67 J | ND | 2.84 | 1.21 J | ND | ND | ND | ND | ND | ND | ND | 1.45 J | ND | ND |
| Silver | 5 | 50 | 500 | 0.373 J | 0.588 | 0.47 | 0.567 | 0.463 | 0.491 | 0.558 | 0.528 | 0.589 | 0.547 | 0.472 | 0.53 | ND | ND | ND | ND | ND | ND | ND | 0.457 J | ND | ND | ND | ND | 0.477 J |
| Thallium | 7.0 | 70 | 700 | 1.44 J | ND | 1.57 | 2.08 | ND | ND | 1.67 | 2.48 | ND | 1.06 | ND | 1.78 J | ND | ND | ND | ND | ND | ND | ND | ND | 0.978 J | ND | 1.29 J | 1.08 J | 2.21 |
| Vanadium | 24 | 240 | 2,400 | 37.8 | 56.6 | 45.2 | 48.1 | 36 | 39.1 | 39.1 | 41.1 | 42.7 | 44.6 | 34.8 | 44.6 | 43.1 | 27.6 | 65.3 | 46.4 | 46.9 | 49.9 | 33.4 | 36.9 | 47.1 | 42.9 | 50.8 | 42.1 | 35.9 |
| Zinc | 250 | 2,500 | 5,000 | 71.7 | 82.9 | 88.2 | 94.4 | 71.4 | 70.8 | 106 | 131 | 90.9 | 66.8 | 65.7 | 82.1 | 89 | 89.2 | 80.9 | 90 | 78.9 | 79.2 | 105 | 92.6 | 109 | 103 | 151 | 77.5 | 74.3 |
| **TCLP Metals** | | **TCLP Limit mg/L** | **20 x TCLP Limit mg/kg** | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L | mg/L |
| Arsenic (As) | | 5.0 | 100.0 | ND | 0.0113 J | ND | 0.0097 J | ND | 0.0116 J | 0.0108 J | ND | 0.0110 J | ND | ND | 0.120 J | 0.0111 J | ND | 0.0146 J | 0.0098 J | 0.0096 J | ND | ND | 0.0153 J | ND | ND | 0.175 J | ND | ND |
| Barium (Ba) | | 100.0 | 2000.0 | 0.466 | 0.706 | 0.451 | 0.225 | 0.764 | 0.502 | 0.468 | 1.01 | 0.430 | 0.899 | 0.789 | 0.444 | 0.824 | 0.683 | 0.448 | 0.539 | 0.993 | 0.692 | 0.775 | 0.221 | 0.469 | 1.06 | 0.607 | 0.481 | 0.561 |
| Cadmium (Cd) | | 1.0 | 20.0 | ND | 0.0016 J | 0.0017 J | 0.0026 J | ND | 0.0011 J | 0.0011J | 0.0033 J | 0.0019 J | 0.0013 J | 0.0011 J | 0.0036 J | 0.0034 J | 0.0011 J | 0.0059 | 0.0018 J | 0.0018 J | 0.0024 J | 0.0030 J | ND | 0.0023 J | 0.0024 J | 0.0045 J | ND | ND |
| Chromium (Cr) | | 5.0 | 100.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.0186 | ND | ND | ND | ND | ND |
| Lead (Pb) | | 5.0 | 100.0 | ND | 0.0142 J | 1.53 | ND | 0.0192 J | 0.0495 | 0.295 | 0.156 | 0.241 | ND | ND | 0.0379 | 0.0285 | 0.0112 J | 0.125 | ND | 0.0160 J | 0.0095 J | ND | ND | ND | 0.0299 | 0.702 | 0.0155 J | ND |
| Mercury (Hg) | | 0.2 | 4.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.000083 J | ND | ND | ND | ND | 0.000078 J | ND | ND | ND | ND | ND | ND |
| Selenium (Se) | | 1.0 | 20.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.0099 J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| Silver (Ag) | | 5.0 | 100.0 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **96-Hour Aquatic Accute Toxicity** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Mortality (from 10 fish per 10 Liter tank) | | | Control A | | | 1 | | | | | | | | ND | | | | | | | | | | | ND | | | |
| | | | Control B | | | ND | | | | | | | | ND | | | | | | | | | | | ND | | | |
| | | | 250 mg A | | | ND | | | | | | | | ND | | | | | | | | | | | ND | | | |
| | | | 250 mg B | | | ND | | | | | | | | ND | | | | | | | | | | | ND | | | |
| | | | 750 mg A | | | 1 | | | | | | | | ND | | | | | | | | | | | ND | | | |
| | | | 750 mg B | | | ND | | | | | | | | ND | | | | | | | | | | | ND | | | |
| **VOCs** | | TCLP Limit (mg/L) | 20 x TCLP Limit (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| 1,1-DICHLOROETHENE | | 0.7 | 14 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-DIBROMOETHANE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-DICHLOROETHANE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DIOXANE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-BUTANONE (MEK) | | 200.0 | 4,000 | ND | 0.006 J | 0.006 J | ND | ND | 0.004 J | 0.008 J | 0.027 J | ND | ND | ND | 0.013 J | ND | ND | ND | 0.009 J | 0.004 J | ND | ND | ND | ND | ND | 0.006 J | ND | ND |
| BENZENE | | 0.5 | 10 | 0.0009 J | 0.002 J | 0.0009 J | 0.0008 J | 0.001 J | 0.002 J | 0.0009 J | 0.047 | 0.003 J | 0.001 J | 0.001 J | 0.003 J | 0.001 J | ND | 0.087 J | 0.002 J | 0.0009 J | 0.001 J | 0.0007 J | 0.001 J | ND | 0.002 J | 0.001 J | ND | ND |
| CARBON DISULFIDE | | | | ND | ND | ND | ND | ND | ND | 0.001 J | 0.013 J | ND | ND | ND | 0.002 J | ND | ND | ND | 0.001 J | ND | ND | ND | ND | ND | 0.002 J | ND | ND | ND |
| CARBON TETRACHLORIDE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHLOROBENZENE | | 100.0 | 2,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHLOROFORM | | 6.0 | 120 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ETHYL BENZENE | | | | ND | 0.003 J | ND | ND | 0.001 J | 0.019 | ND | 1.4 | 0.003 J | 0.002 J | ND | 0.11 | 0.016 | 0.36 J | 0.51 J | 0.003 J | ND | 0.071 | 0.003 J | 0.002 J | ND | 0.007 J | 0.002 J | ND | 0.71 |
| METHYLENE CHLORIDE | | | | ND | 0.003 J | ND | 0.002 J | 0.003 J | 0.002 J | 0.002 J | 0.012 J | 0.003 J | 0.002 J | 0.003 J | ND | 0.002 J | ND | ND | 0.003 J | ND | ND | 0.006 | ND | 0.006 | ND | ND | 0.005 | ND |
| STYRENE | | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TOLUENE | | 0.13 | 2.6 | 0.002 J | 0.006 | 0.002 J | 0.002 J | 0.003 J | 0.001 J | 0.002 J | 0.018 J | 0.007 | 0.005 J | 0.002 J | 0.017 | 0.004 J | 0.48 J | ND | 0.008 | 0.002 J | 0.01 | 0.004 J | 0.005 J | ND | 0.008 J | 0.003 J | ND | ND |
| TOTAL XYLENES | | | | 0.002 J | 0.010 | 0.002 J | 0.004 J | 0.003 J | 0.005 J | 0.001 J | 0.6 | 0.007 | 0.007 | 0.002 J | 0.070 | 0.1 | 2.6 | 0.49 J | 0.009 | 0.002 J | 1.6 | 0.007 | 0.007 | ND | 0.012 | 0.004 J | ND | 4.4 |
| TETRACHLOROETHENE | | 0.7 | 14 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TRICHLOROETHENE | | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| VINYL CHLORIDE | | 0.2 | 4 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**Notes: Bold results exceed action levels, results with**
*** (asterisk) exceeded TTLC limit without STLC analysis.**
[1] - FPLH observed in these locations.
ND (0.95) - Not Detected (method detection limit)
J - Estimated result between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL) and can be treated as ND for this prescreening.
mg/L - milligrams/liter mg/kg - milligrams/kilogram
STLC - Soluble Threshold Limit Concentration
TTLC - Total Threshold Limit Concentration
TCLP - Toxicity Characteristic Leaching Procedure

Table 1
Capital Projects - Cogen Plant
Soil Pre-Characterization Results

| Compound | TCLP Limit (mg/L) | 20 x TCLP Limit (mg/kg) | CGN 1 | CGN 3 | CGN 4 | CGN 5 | CGN 7 | CGN 8 | CGN 9 | CGN 10[1] | CGN 12 | CGN 13 | CGN 14 | CGN 15 | CGN 17 | CGN 18 | CGN 19[1] | CGN B2 | CGN B4 | CGN B5 | CGN B6 | CGN B8 | CGN B9 | CGN B10 | CGN B11[1] | CGN B13 | CGN B14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Site ID | CGN 1 | CGN 3 | CGN 4 | CGN 5 | CGN 7 | CGN 8 | CGN 9 | CGN 10[1] | CGN 12 | CGN 13 | CGN 14 | CGN 15 | CGN 17 | CGN 18 | CGN 19[1] | CGN B2 | CGN B4 | CGN B5 | CGN B6 | CGN B8 | CGN B9 | CGN B10 | CGN B11[1] | CGN B13 | CGN B14 |
| | | Lab ID | 3-17947 | 3-17948 | 3-17949 | 3-17950 | 3-17951 | 3-17952 | 3-17953 | 3-17954 | 3-17955 | 3-17956 | 3-17957 | 3-17958 | 3-17959 | 3-17960 | 3-17961 | 3-17963 | 3-17964 | 3-17965 | 3-17966 | 3-17967 | 3-17970 | 3-17962 | 3-17969 | 3-17971 | 3-17968 |
| **SVOCs** | | | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| 1,2-DICHLOROBENZENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,3-DICHLOROBENZENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DICHLOROBENZENE | 7.5 | 150 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1-METHYLNAPTHALENE | | | ND | 1.2 J | ND | ND | ND | ND | ND | 13 | ND | ND | ND | ND | ND | 2.3 J | 4.7 J | ND | ND | 2.2 J | ND | ND | ND | ND | 1.1 J | ND | 4.2 |
| 2,4,5-TRICHLOROPHENOL | 400 | 8,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4,6-TRICHLOROPHENOL | 2.0 | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DIMETHYLPHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DINITROPHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2,4-DINITROTOLUENE | 0.13 | 2.6 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-METHYLNAPHTHALENE | | | ND | ND | ND | ND | ND | ND | ND | 17 | ND | ND | ND | ND | ND | 2.8 J | 3.5 J | ND | ND | 2.1 J | ND | ND | ND | ND | 1.6 J | ND | 7.0 |
| 3/4-METHYLPHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 4-NITROPHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 6-METHYLCHRYSENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 7,12-DIMETHYLBENZ(A)ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | 0.97 J | ND | ND | ND | ND | ND | ND | 1.8 J | 4.1 J | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZENETHIOL (THIOPHENOL) | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(A)ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 9 | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(A)PYRENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 6.9 J | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BENZO(B)FLUORANTHENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 8.0 J | ND | ND | ND | ND | ND | ND | ND | 0.35 J | ND |
| BENZO(K)FLUORANTHENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 3.6 J | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BIS(2-ETHYLHEXYL) PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BUTYL BENZYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CHRYSENE | | | ND | ND | ND | ND | ND | ND | ND | 0.91 J | ND | ND | ND | ND | ND | ND | ND | 8.9 | ND | ND | ND | ND | ND | ND | ND | 0.034 J | ND |
| DIBENZ(A,H)ANTHRACENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIBENZO(A,H)ACRIDINE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIETHYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DIMETHYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DI-N-BUTYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DI-N-OCTYL PHTHALATE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| FLUORANTHENE | | | ND | 1.4 J | ND | ND | ND | ND | ND | 1.6 J | ND | ND | ND | ND | ND | ND | ND | 21 | ND | ND | ND | ND | ND | ND | 1.2 J | 0.038 J | ND |
| HEXACHLOROBENZENE | 0.13 | 2.6 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLOROBUTADIENE | 0.5 | 10 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLOROETHANE | 3.0 | 60 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| INDENE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| NAPHTHALENE | | | ND | ND | ND | ND | ND | ND | ND | 14 | ND | ND | ND | ND | ND | ND | 1.7 J | ND | ND | 2.2 J | ND | ND | ND | ND | 1.7 J | ND | 5.3 |
| NITROBENZENE | 2.0 | 40 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| O-CRESOL (2-Methylphenol) | 200 | 4,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PENTACHLOROPHENOL | 100 | 2,000 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| PHENANTHRENE | | | ND | 2.2 J | ND | ND | ND | ND | ND | 4.0 J | ND | ND | ND | ND | ND | 2.2 J | 6.9 J | 9 | ND | 2.4 J | ND | ND | ND | ND | 2.6 J | 0.048 J | 0.23 J |
| PHENOL | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 1.8 J | ND | ND |
| PYRENE | | | ND | 1.6 J | ND | ND | ND | ND | ND | 2.0 J | ND | ND | ND | ND | ND | ND | 3.1 J | 19 | ND | ND | ND | ND | ND | ND | 1.5 J | 0.052 J | 0.17 J |
| PYRIDINE | 5.0 | 100 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| QUINOLINE | | | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

**Notes:**

**Bold** results exceed action levels. * (asterisk) results exceeded TTLC limit without STLC analysis.
[1] - Apparent oil sheen on borings or Free Phase Liquid Hydrocarbon found in these locations.
ND (0.95) - Not Detected (method detection limit)
J - Estimated result between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL)
mg/L - milligrams/liter mg/kg - milligrams/kilogram
STLC - Soluble Threshold Limit Concentration
TTLC - Total Threshold Limit Concentration
TCLP - Toxicity Characteristic Leaching Procedure