

State of Colorado  
**Oil and Gas Conservation Commission**

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



FOR OGCC USE ONLY

REM 7466  
Received 9/29/2015  
Document 2315584

**SITE INVESTIGATION AND REMEDIATION WORKPLAN**

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

**CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED**

Spill or Release    Plug & Abandon    Central Facility Closure    Site/Facility Closure    Other (describe): \_\_\_\_\_

|   |                                   |
|---|-----------------------------------|
| OGCC Operator Number: _____   | Contact Name and Telephone: _____ |
| Name of Operator: _____   | _____                             |
| Address: _____  | No: _____                         |
| City: _____ State: _____ Zip: _____   | Fax: _____                        |
| API Number: _____   | County: _____                     |
| Facility Name: _____  | Facility Number: _____            |
| Well Name: _____  | Well Number: _____                |
| Location: (QtrQtr, Sec, Twp, Rng, Meridian): _____ Latitude: _____ Longitude: _____ |                                   |

**TECHNICAL CONDITIONS**

Type of Waste Causing Impact (crude oil, condensate, produced water, etc.): \_\_\_\_\_

**Site Conditions:** Is location within a sensitive area (according to Rule 901e)?    Y    N    If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): \_\_\_\_\_

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: \_\_\_\_\_

Potential receptors (water wells within 1/4 mi, surface waters, etc.): \_\_\_\_\_

\_\_\_\_\_

**Description of Impact** (if previously provided, refer to that form or document):

| Impacted Media (check): | Extent of Impact: | How Determined: |
|-------------------------|-------------------|-----------------|
| Soils                   | _____             | _____           |
| Vegetation              | _____             | _____           |
| Groundwater             | _____             | _____           |
| Surface Water           | _____             | _____           |

**REMEDIALTION WORKPLAN**

**Describe initial action taken** (if previously provided, refer to that form or document):

\_\_\_\_\_

**Describe how source is to be removed:**

\_\_\_\_\_

**Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:**

\_\_\_\_\_



Tracking Number: \_\_\_\_\_  
Name of Operator: \_\_\_\_\_  
OGCC Operator No: \_\_\_\_\_  
Received Date: \_\_\_\_\_  
Well Name & No: \_\_\_\_\_  
Facility Name & No: \_\_\_\_\_

Page 2

**REMEDIAL WORKPLAN (Cont.)**

OGCC Employee: \_\_\_\_\_

**If groundwater has been impacted, describe proposed monitoring plan** (# of wells or sample points, sampling schedule, analytical methods, etc.):

Available information indicates that the uppermost groundwater bearing zone is greater than 150 feet below the ground surface. Soil samples were collected for laboratory analysis of subliner material to confirm no groundwater impact potential exists (see Table 1).

**Describe reclamation plan.** Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

Please see Attachment II

**Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.**

**Is further site investigation required?** ☐ Y ☒ N If yes, describe:

Based on subliner sample results no additional assessment will be necessary beneath the Freshwater, Reserve, and Cuttings Pits #1 and #2 (see Table 1 through 4 (4 total)).

**Final disposition of E&P waste** (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

Synthetic liners from each of the pits and Freshwater and Reserve Pit contents have been removed and transported for offsite disposal at Wray Gulch landfill in Meeker, CO. Cuttings Pits #1 and #2 contents were Mix/Blend processed and/or TDU treated onsite and sampled to ensure Table 910-1 compliance. Mix/blend processed and TDU treated material was used for onsite fill (see Tables 3 through 4 (2 total)).

**IMPLEMENTATION SCHEDULE**

|   |  |   |
|---|--|---|
| Date Site Investigation Began: <u>8/28/12</u>   | Date Site Investigation Completed: <u>12/3/12</u>    | Date Remediation Plan Submitted: <u>12/3/12</u> |
| Remediation Start Date: <u>pending approval</u> | Anticipated Completion Date: <u>pending approval</u> | Actual Completion Date: <u>4/9/13</u>           |

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: Jessica Dooling

Signed: \_\_\_\_\_

Title: Piceance EHS Supervisor

Date: 9/28/2015

OGCC Approved: \_\_\_\_\_ Title: EPS Northwest Date: 9/29/15

Based upon review of information provided, it appears that no further action is required at this time and COGCC approve the closure request. However should future conditions at the site indicate contaminant concentrations exceeding COGCC standards or if groundwater is found to be significantly impacted, then further investigation and/or remediation may be required at this site.

## **ATTACHMENT I**

### **PCU T78X-12G Pit Closure Workplan, Form 27**

#### **Describe initial action taken:**

The site consists of Freshwater, Reserve and Cuttings #1 and #2 Pits (see Figure 1).

#### **1. Freshwater Pit**

- Freshwater Pit contents (de minimis) and associated synthetic liners were removed and transported to an offsite permitted disposal/recycling facility.
- The Freshwater Pit subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for EC (8.52), SAR (12.9), pH (9.08) and Arsenic (4.7 mg/kg) (see Table 1).

#### **2. Reserve Pit**

- The Reserve Pit contents were sampled for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for EC (12.1), pH (12.53) and arsenic (10.2 mg/kg).
- Reserve Pit subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for pH (9.73) and Arsenic (6.6 mg/kg) (see Table 1).

#### **3. Cuttings Pit #1**

- Cuttings #1 contents were sampled for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for Benzene (0.744 mg/kg), EC (8.560), SAR (14.7), pH (12.49) and Arsenic (10.9 mg/kg).
- Cuttings Pit #1 subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for pH (9.65) and Arsenic (6.8 mg/kg) (see Table 1).
- Cuttings Pit #1 impacted material was mix/blend processed with clean onsite material or treated with a Thermal Desorption Unit (TDU) to below Table 910-1 concentration levels. Mix/Blend confirmation and TDU output samples were analyzed for constituents of concern to assess Table 910-1 compliance, all results were below Table 910-1 concentration levels (See Table 3).

#### **4. Cuttings Pit #2**

- Cuttings Pit #2 contents were sampled for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for TPH (601 mg/kg), Benzene (0.419 mg/kg), EC (13.5), SAR (62.7), pH (12.35) and arsenic (14.2 mg/kg).
- Cuttings Pit #2 subliner composite samples were collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for pH (9.58) and arsenic (6.5 mg/kg) (see Table 1)
- Cuttings Pit #2 impacted material was mix/blend processed with clean onsite material or treated with a TDU to below Table 910-1 concentration levels. Mix/Blend confirmation and TDU output samples were analyzed for constituents of concern to assess Table 910-1 compliance, all results were below Table 910-1 concentration levels (see Table 4).
- Freshwater Pit contents (de minimis), Reserve Pit contents and all synthetic liners were removed and transported offsite for disposal at Wray Gulch landfill near Meeker, CO. Disposal manifests are available on request
- The Freshwater, Reserve, and Cuttings #1 and #2 Pits were backfilled with Mix/blend and/or TDU processed material having met Table 910-1 concentration levels for constituents of concern (see Table 3 through 4).
- Soil samples were collected by KRW following proper sampling and shipping protocol and submitted to Accutest Laboratories in Wheat Ridge, Colorado. QAQC of the laboratory results indicated no outstanding anomalies. The laboratory test results are summarized in the attached tables. Complete laboratory reports are available on request.
- Refer to Table 1 through 4 for a summary of the laboratory results and Figure 1 for layout of the pits and sample locations.
- Any remaining elevated levels of Electrical Conductivity (EC), SAR and pH detected beneath the pit area as well as any backfill material were covered with a minimum 3 feet of clean, native soils per COGCC guidance. No additional treatment of these soils was required.
- Reclamation activities were performed in accordance with applicable COGCC 900, 1000 Series rules and as specified in the Surface Use Plan and BLM Conditions of Approval.

**Table 1**  
**Location: PCU T78X-12G**  
**Lab Summary**

Last update 9/16/2015

| Analytical Parameter               | Fresh Water Pit                    |                  | Reserve Pit      |                  | Cuttings #1        |                 | Cuttings #2        |                 | Background Arsenic |      |      |      |      |      |      |      | COGCC                            | Maximum based on Background |
|------------------------------------|------------------------------------|------------------|------------------|------------------|--------------------|-----------------|--------------------|-----------------|--------------------|------|------|------|------|------|------|------|----------------------------------|-----------------------------|
| (with units)                       | FW Pit Contents                    | FW Pit Subliner  | RP Post Solid.   | RP Subliner      | Cut #1 Post Solid. | Cut #1 Subliner | Cut #2 Post Solid. | Cut #2 Subliner | BG-1               | BG-2 | BG-3 | BG-4 | BG-5 | BG-6 | BG-7 | BG-8 | Table 910-1 Concentration Levels |                             |
| Accutest Job #                     | Freshwater Pit Contents De Minimis | D38644 (9/10/12) | D38940 (9/18/12) | D38939 (9/18/12) | D38518 (9/6/12)    | D38599 (9/7/12) | D38518 (9/6/12)    | D38605 (9/7/12) | D38124 (8/28/12)   |      |      |      |      |      |      |      | -                                | -                           |
| Sample type (Composite/Discrete)   |                                    | C                | C                | C                | C                  | C               | C                  | C               | D                  | D    | D    | D    | D    | D    | D    | D    | -                                | -                           |
| TPH (GRO) (mg/Kg)                  |                                    | ND               | ND               | ND               | 46.7               | ND              | 77.6               | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | -                                | -                           |
| TPH (DRO) (mg/Kg)                  |                                    | 141              | 301              | 29.9             | 310                | 32.4            | 523                | 18.4            | -                  | -    | -    | -    | -    | -    | -    | -    | -                                | -                           |
| TPH (GRO + DRO) (mg/Kg)            |                                    | 141              | 301              | 29.9             | 357                | 32.4            | 601                | 18.4            | -                  | -    | -    | -    | -    | -    | -    | -    | 500                              | -                           |
| Benzene (mg/Kg)                    |                                    | ND               | ND               | ND               | 0.744              | ND              | 0.419              | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 0.170                            | -                           |
| Toluene (mg/Kg)                    |                                    | ND               | ND               | ND               | 1.78               | ND              | 1.93               | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 85                               | -                           |
| Ethylbenzene (mg/Kg)               |                                    | ND               | ND               | ND               | 0.277              | ND              | 0.370              | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 100                              | -                           |
| Xylenes (total) (mg/Kg)            |                                    | ND               | ND               | ND               | 1.56               | ND              | 1.95               | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 175                              | -                           |
| Acenaphthene (mg/Kg)               |                                    | ND               | ND               | ND               | ND                 | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 1000                             | -                           |
| Anthracene (mg/Kg)                 |                                    | ND               | ND               | ND               | ND                 | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 1000                             | -                           |
| Benzo(A)anthracene (mg/Kg)         |                                    | ND               | ND               | ND               | ND                 | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 0.22                             | -                           |
| Benzo(B)fluoranthene (mg/Kg)       |                                    | ND               | ND               | ND               | ND                 | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 0.22                             | -                           |
| Benzo(K)fluoranthene (mg/Kg)       |                                    | ND               | ND               | ND               | ND                 | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 2.2                              | -                           |
| Benzo(A)pyrene (mg/Kg)             |                                    | ND               | ND               | ND               | ND                 | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 0.022                            | -                           |
| Chrysene (mg/Kg)                   |                                    | 0.0076           | ND               | ND               | 0.0621             | ND              | 0.0280             | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 22                               | -                           |
| Dibenzo(A,H)anthracene (mg/Kg)     |                                    | ND               | ND               | ND               | ND                 | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 0.022                            | -                           |
| Fluoranthene (mg/Kg)               |                                    | ND               | ND               | ND               | 0.0165             | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 1000                             | -                           |
| Fluorene (mg/Kg)                   |                                    | ND               | ND               | ND               | 0.102              | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 1000                             | -                           |
| Indeno(1,2,3,C,D)pyrene (mg/Kg)    |                                    | ND               | ND               | ND               | ND                 | ND              | ND                 | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 0.22                             | -                           |
| Naphthalene (mg/Kg)                |                                    | 0.0248           | 0.0354           | ND               | 0.519              | 0.0201          | 0.336              | 0.0178          | -                  | -    | -    | -    | -    | -    | -    | -    | 23                               | -                           |
| Pyrene (mg/Kg)                     |                                    | 0.0257           | ND               | ND               | 0.0380             | ND              | 0.0389             | ND              | -                  | -    | -    | -    | -    | -    | -    | -    | 1000                             | -                           |
| Electrical Conductivity (mmhos/cm) |                                    | 8.52             | 12.100           | 0.835            | 8.560              | 0.851           | 13.500             | 0.477           | -                  | -    | -    | -    | -    | -    | -    | -    | 4                                | -                           |
| Sodium Adsorption Ratio (SAR)      |                                    | 12.9             | 6.94             | 5.56             | 14.7               | 5.35            | 62.7               | 2.89            | -                  | -    | -    | -    | -    | -    | -    | -    | 12                               | -                           |
| pH                                 |                                    | 9.08             | 12.53            | 9.73             | 12.49              | 9.65            | 12.35              | 9.58            | -                  | -    | -    | -    | -    | -    | -    | -    | 6-9                              | -                           |
| Arsenic (mg/kg)                    |                                    | 4.7              | 10.2             | 6.6              | 10.9               | 6.8             | 14.2               | 6.5             | 5.5                | 5.5  | 5.8  | 5.3  | 4.8  | 4.4  | 4.8  | 6.3  | 0.39                             | 6.9                         |
| Barium (mg/kg)                     |                                    | 1780             | 4220             | 914              | 2020               | 1340            | 2100               | 1530            | -                  | -    | -    | -    | -    | -    | -    | -    | 15000                            | -                           |
| Cadmium (mg/kg)                    |                                    | <1.2             | <1.6             | <1.1             | <1.2               | <1.2            | <1.2               | <1.2            | -                  | -    | -    | -    | -    | -    | -    | -    | 70                               | -                           |
| Chromium (III) (mg/Kg)             |                                    | 39.3             | <22              | 41.4             | 12.1               | 49.1            | 17.4               | 56.2            | -                  | -    | -    | -    | -    | -    | -    | -    | 120000                           | -                           |
| Chromium (VI) (mg/Kg)              |                                    | <1.0             | <20              | <1.0             | <1.0               | <1.0            | <1.0               | <1.0            | -                  | -    | -    | -    | -    | -    | -    | -    | 23                               | -                           |
| Copper (mg/kg)                     |                                    | 15.7             | 18.2             | 10.3             | 28.2               | 11.4            | 31.6               | 10.3            | -                  | -    | -    | -    | -    | -    | -    | -    | 3100                             | -                           |
| Lead (inorganic) (mg/kg)           |                                    | 15.5             | 19.8             | 11.1             | 20.4               | 12.8            | 15.5               | 12.6            | -                  | -    | -    | -    | -    | -    | -    | -    | 400                              | -                           |
| Mercury (mg/kg)                    |                                    | <0.12            | <0.16            | <0.11            | <0.12              | <0.11           | <0.12              | <0.11           | -                  | -    | -    | -    | -    | -    | -    | -    | 23                               | -                           |
| Nickel (mg/kg)                     |                                    | 19.6             | 130              | 18.5             | 85.9               | 19.5            | 52.8               | 19.6            | -                  | -    | -    | -    | -    | -    | -    | -    | 1600                             | -                           |
| Selenium (mg/kg)                   |                                    | <6.2             | <7.9             | <5.4             | <6.0               | <5.9            | <6.1               | <5.8            | -                  | -    | -    | -    | -    | -    | -    | -    | 390                              | -                           |
| Silver (mg/kg)                     |                                    | <3.7             | <4.7             | <3.3             | <3.6               | <3.5            | <3.7               | <3.5            | -                  | -    | -    | -    | -    | -    | -    | -    | 390                              | -                           |
| Zinc (mg/kg)                       |                                    | 50.1             | 54.3             | 39.2             | 40.5               | 47.1            | 49.4               | 46.2            | -                  | -    | -    | -    | -    | -    | -    | -    | 23000                            | -                           |
| % Solids                           |                                    | 82.7             | 62.8             | 92.8             | 81.3               | 86.4            | 79.9               | 85.6            | 93.4               | 96.9 | 94.8 | 95.5 | 95.5 | 96.0 | 95.9 | 95.6 | -                                | -                           |

Notes:

1) ND = not detectable to the laboratory detection limit.

2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.

3) "-" indicates no analysis.

4) See site map for sample locations.

**Table 2**  
**Location: PCU T78X-12G**  
**Lab Summary - Arsenic Summary**

Last update 9/16/2015

| Analytical Parameter               | Reserve Pit Discrete Arsenic |      |      |      |      | Cuttings #1 Discrete Arsenic |      |      |      |      | Cuttings #2 Discrete Arsenic |      |      |      |      | Background (8/28/12) |      |      |      |      |      |      |      | COGCC                                  | Maximum<br>based on<br>Background |   |
|------------------------------------|------------------------------|------|------|------|------|------------------------------|------|------|------|------|------------------------------|------|------|------|------|----------------------|------|------|------|------|------|------|------|--|-----------------------------------|---|
| (with units)                       | #1                           | #2   | #3   | #4   | #5   | #1                           | #2   | #3   | #4   | #5   | #1                           | #2   | #3   | #4   | #5   | BG-1                 | BG-2 | BG-3 | BG-4 | BG-5 | BG-6 | BG-7 | BG-8 | Table 910-1<br>Concentration<br>Levels |                                   |   |
| Accutest Job #                     | D40650 (11/5/12)             |      |      |      |      | D40648 (11/6/12)             |      |      |      |      | D40649 (11/6/12)             |      |      |      |      | D38124               |      |      |      |      |      |      |      | -                                      | -                                 |   |
| Sample type (Composite/Discrete)   | D                            | D    | D    | D    | D    | D                            | D    | D    | D    | D    | D                            | D    | D    | D    | D    | D                    | D    | D    | D    | D    | D    | D    | D    | D                                      | -                                 | - |
| TPH (GRO) (mg/Kg)                  | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | -                                 | - |
| TPH (DRO) (mg/Kg)                  | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | -                                 | - |
| TPH (GRO + DRO) (mg/Kg)            | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 500                               | - |
| Benzene (mg/Kg)                    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 0.170                             | - |
| Toluene (mg/Kg)                    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 85                                | - |
| Ethylbenzene (mg/Kg)               | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 100                               | - |
| Xylenes (total) (mg/Kg)            | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 175                               | - |
| Acenaphthene (mg/Kg)               | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 1000                              | - |
| Anthracene (mg/Kg)                 | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 1000                              | - |
| Benzo(A)anthracene (mg/Kg)         | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 0.22                              | - |
| Benzo(B)fluoranthene (mg/Kg)       | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 0.22                              | - |
| Benzo(K)fluoranthene (mg/Kg)       | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 2.2                               | - |
| Benzo(A)pyrene (mg/Kg)             | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 0.022                             | - |
| Chrysene (mg/Kg)                   | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 22                                | - |
| Dibenzo(A,H)anthracene (mg/Kg)     | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 0.022                             | - |
| Fluoranthene (mg/Kg)               | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 1000                              | - |
| Fluorene (mg/Kg)                   | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 1000                              | - |
| Indeno(1,2,3,C,D)pyrene (mg/Kg)    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 0.22                              | - |
| Naphthalene (mg/Kg)                | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 23                                | - |
| Pyrene (mg/Kg)                     | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 1000                              | - |
| Electrical Conductivity (mmhos/cm) | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 4                                 | - |
| Sodium Adsorption Ratio (SAR)      | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 12                                | - |
| pH                                 | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 6-9                               | - |
| Arsenic (mg/kg)                    | 6.7                          | 7.3  | 6.3  | 7.4  | 6.4  | 12.5                         | 9.8  | 16.4 | 9.0  | 8.6  | 13.2                         | 14.2 | 12.6 | 12.4 | 9.0  | 5.5                  | 5.5  | 5.8  | 5.3  | 4.8  | 4.4  | 4.8  | 6.3  | 0.39                                   | 6.9                               |   |
| Barium (mg/kg)                     | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 15000                             | - |
| Cadmium (mg/kg)                    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 70                                | - |
| Chromium (III) (mg/Kg)             | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 120000                            | - |
| Chromium (VI) (mg/Kg)              | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 23                                | - |
| Copper (mg/kg)                     | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 3100                              | - |
| Lead (inorganic) (mg/kg)           | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 400                               | - |
| Mercury (mg/kg)                    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 23                                | - |
| Nickel (mg/kg)                     | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 1600                              | - |
| Selenium (mg/kg)                   | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 390                               | - |
| Silver (mg/kg)                     | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 390                               | - |
| Zinc (mg/kg)                       | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                            | -    | -    | -    | -    | -                    | -    | -    | -    | -    | -    | -    | -    | -                                      | 23000                             | - |
| % Solids                           | 65.3                         | 63.8 | 66.2 | 66.9 | 65.6 | 93.0                         | 97.8 | 96.5 | 96.6 | 94.9 | 92.3                         | 93.5 | 96.7 | 89.6 | 85.2 | 93.4                 | 96.9 | 94.8 | 95.5 | 95.5 | 96.0 | 95.9 | 95.6 | -                                      | -                                 | - |

## Notes:

- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.

**Table 3**  
**Location: PCU 78-12**  
**Lab Summary - Cut 1 Mix/Blend and (TDU) Output Summary**

Last update 9/16/2015

| Analytical Parameter<br>(with units) | Cuttings Pit #1     |                       | Mix/Blend                          | Cut #1 TDU Output   |                     |                    |                    | COGCC                                  | Maximum<br>based on<br>Background |
|--------------------------------------|---------------------|-----------------------|------------------------------------|---------------------|---------------------|--------------------|--------------------|--|-----------------------------------|
|                                      | Cut #1<br>Contents  | Cut #1 Post<br>Solid. | Cut #1<br>Mix/blend Trial<br>(3:1) | 0-400 Ton           | 400-800 Ton         | 800-1200<br>Ton    | 1200-1535<br>Ton   | Table 910-1<br>Concentration<br>Levels |                                   |
| Accutest Job #                       | D38138<br>(8/23/12) | D38518<br>(9/6/12)    | D40081<br>(10/17/12)               | D43764<br>(2/20/13) | D43802<br>(2/25/13) | D44012<br>(3/4/13) | D44142<br>(3/6/13) | -                                      | -                                 |
| Sample type (Composite/Discrete)     | C                   | C                     | C                                  | C                   | C                   | C                  | C                  | -                                      | -                                 |
| TPH (GRO) (mg/Kg)                    | 78.5                | 46.7                  | -                                  | -                   | -                   | -                  | -                  | -                                      | -                                 |
| TPH (DRO) (mg/Kg)                    | 494                 | 310                   | -                                  | -                   | -                   | -                  | -                  | -                                      | -                                 |
| TPH (GRO + DRO) (mg/Kg)              | 573                 | 357                   | -                                  | -                   | -                   | -                  | -                  | 500                                    | -                                 |
| Benzene (mg/Kg)                      | 0.881               | 0.744                 | ND                                 | ND                  | 0.0464              | ND                 | ND                 | 0.170                                  | -                                 |
| Toluene (mg/Kg)                      | 4.18                | 1.78                  | -                                  | -                   | -                   | -                  | -                  | 85                                     | -                                 |
| Ethylbenzene (mg/Kg)                 | 0.789               | 0.277                 | -                                  | -                   | -                   | -                  | -                  | 100                                    | -                                 |
| Xylenes (total) (mg/Kg)              | 3.73                | 1.56                  | -                                  | -                   | -                   | -                  | -                  | 175                                    | -                                 |
| Acenaphthene (mg/Kg)                 | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | 1000                                   | -                                 |
| Anthracene (mg/Kg)                   | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | 1000                                   | -                                 |
| Benzo(A)anthracene (mg/Kg)           | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | 0.22                                   | -                                 |
| Benzo(B)fluoranthene (mg/Kg)         | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | 0.22                                   | -                                 |
| Benzo(K)fluoranthene (mg/Kg)         | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | 2.2                                    | -                                 |
| Benzo(A)pyrene (mg/Kg)               | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | 0.022                                  | -                                 |
| Chrysene (mg/Kg)                     | 0.0539              | 0.0621                | -                                  | -                   | -                   | -                  | -                  | 22                                     | -                                 |
| Dibenzo(A,H)anthracene (mg/Kg)       | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | 0.022                                  | -                                 |
| Fluoranthene (mg/Kg)                 | ND                  | 0.0165                | -                                  | -                   | -                   | -                  | -                  | 1000                                   | -                                 |
| Fluorene (mg/Kg)                     | 0.0986              | 0.102                 | -                                  | -                   | -                   | -                  | -                  | 1000                                   | -                                 |
| Indeno(1,2,3,C,D)pyrene (mg/Kg)      | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | 0.22                                   | -                                 |
| Naphthalene (mg/Kg)                  | 0.601               | 0.519                 | -                                  | -                   | -                   | -                  | -                  | 23                                     | -                                 |
| Pyrene (mg/Kg)                       | 0.0396              | 0.0380                | -                                  | -                   | -                   | -                  | -                  | 1000                                   | -                                 |
| Electrical Conductivity (mmhos/cm)   | 1.780               | 8.560                 | -                                  | -                   | -                   | -                  | -                  | 4                                      | -                                 |
| Sodium Adsorption Ratio (SAR)        | 24.4                | 14.7                  | -                                  | -                   | -                   | -                  | -                  | 12                                     | -                                 |
| pH                                   | 9.15                | 12.49                 | -                                  | -                   | -                   | -                  | -                  | 6-9                                    | -                                 |
| Arsenic (mg/kg)                      | 14.4                | 10.9                  | -                                  | -                   | -                   | -                  | -                  | 0.39                                   | 6.9                               |
| Barium (mg/kg)                       | 7340                | 2020                  | -                                  | -                   | -                   | -                  | -                  | 15000                                  | -                                 |
| Cadmium (mg/kg)                      | <1.4                | <1.2                  | -                                  | -                   | -                   | -                  | -                  | 70                                     | -                                 |
| Chromium (III) (mg/Kg)               | 12.7                | 12.1                  | -                                  | -                   | -                   | -                  | -                  | 120000                                 | -                                 |
| Chromium (VI) (mg/Kg)                | <1.0                | <1.0                  | -                                  | -                   | -                   | -                  | -                  | 23                                     | -                                 |
| Copper (mg/kg)                       | 30.9                | 28.2                  | -                                  | -                   | -                   | -                  | -                  | 3100                                   | -                                 |
| Lead (inorganic) (mg/kg)             | 15.9                | 20.4                  | -                                  | -                   | -                   | -                  | -                  | 400                                    | -                                 |
| Mercury (mg/kg)                      | <0.13               | <0.12                 | -                                  | -                   | -                   | -                  | -                  | 23                                     | -                                 |
| Nickel (mg/kg)                       | 20.2                | 85.9                  | -                                  | -                   | -                   | -                  | -                  | 1600                                   | -                                 |
| Selenium (mg/kg)                     | <6.8                | <6.0                  | -                                  | -                   | -                   | -                  | -                  | 390                                    | -                                 |
| Silver (mg/kg)                       | <4.1                | <3.6                  | -                                  | -                   | -                   | -                  | -                  | 390                                    | -                                 |
| Zinc (mg/kg)                         | 55.6                | 40.5                  | -                                  | -                   | -                   | -                  | -                  | 23000                                  | -                                 |
| % Solids                             | 73.4                | 81.3                  | 87.9                               | 87.0                | 86.8                | 81.3               | 88.2               | -                                      | -                                 |

Notes:

- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.



**Table 4**  
**Location: PCU 78-12**  
**Lab Summary - Cut 2 Mix/Blend and (TDU) Output Summary**

Last update 9/16/2015

| Analytical Parameter<br>(with units) | Cuttings Pit #2     |                       | Mix/Blend                          | Cut #2 TDU Output   |                     |                    |                    |                     |                     |                     | COGCC                                  | Maximum<br>based on<br>Background |
|--------------------------------------|---------------------|-----------------------|------------------------------------|---------------------|---------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--|-----------------------------------|
|                                      | Cut #2<br>Contents  | Cut #2 Post<br>Solid. | Cut #2<br>Mix/blend<br>trial (3:1) | 0-400 Ton           | 400-800<br>Ton      | 800-1200<br>Ton    | 1200-1600<br>Ton   | 1600-2000<br>Ton    | 2000-2400<br>Ton    | 2400-2550<br>Ton    | Table 910-1<br>Concentration<br>Levels |                                   |
| Accutest Job #                       | D38138<br>(8/23/12) | D38518<br>(9/6/12)    | D40081<br>(10/17/12)               | D42946<br>(1/28/13) | D42988<br>(1/29/13) | D43088<br>(2/4/13) | D43353<br>(2/8/13) | D43394<br>(2/11/13) | D43574<br>(2/16/13) | D43593<br>(2/18/13) | -                                      | -                                 |
| Sample type (Composite/Discrete)     | C                   | C                     | C                                  | C                   | C                   | C                  | C                  | C                   | C                   | C                   | -                                      | -                                 |
| TPH (GRO) (mg/Kg)                    | 54.7                | 77.6                  | ND                                 | ND                  | ND                  | ND                 | ND                 | ND                  | ND                  | ND                  | -                                      | -                                 |
| TPH (DRO) (mg/Kg)                    | 428                 | 523                   | 203                                | 197                 | 159                 | 130                | 111                | 156                 | 176                 | 179                 | -                                      | -                                 |
| TPH (GRO + DRO) (mg/Kg)              | 483                 | 601                   | 203                                | 197                 | 159                 | 130                | 111                | 156                 | 176                 | 179                 | 500                                    | -                                 |
| Benzene (mg/Kg)                      | 0.596               | 0.419                 | ND                                 | ND                  | 0.0534              | ND                 | ND                 | 0.0451              | ND                  | 0.0554              | 0.170                                  | -                                 |
| Toluene (mg/Kg)                      | 2.25                | 1.93                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 85                                     | -                                 |
| Ethylbenzene (mg/Kg)                 | 0.427               | 0.370                 | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 100                                    | -                                 |
| Xylenes (total) (mg/Kg)              | 2.05                | 1.95                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 175                                    | -                                 |
| Acenaphthene (mg/Kg)                 | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 1000                                   | -                                 |
| Anthracene (mg/Kg)                   | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 1000                                   | -                                 |
| Benzo(A)anthracene (mg/Kg)           | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 0.22                                   | -                                 |
| Benzo(B)fluoranthene (mg/Kg)         | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 0.22                                   | -                                 |
| Benzo(K)fluoranthene (mg/Kg)         | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 2.2                                    | -                                 |
| Benzo(A)pyrene (mg/Kg)               | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 0.022                                  | -                                 |
| Chrysene (mg/Kg)                     | 0.0453              | 0.0280                | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 22                                     | -                                 |
| Dibenzo(A,H)anthracene (mg/Kg)       | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 0.022                                  | -                                 |
| Fluoranthene (mg/Kg)                 | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 1000                                   | -                                 |
| Fluorene (mg/Kg)                     | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 1000                                   | -                                 |
| Indeno(1,2,3,C,D)pyrene (mg/Kg)      | ND                  | ND                    | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 0.22                                   | -                                 |
| Naphthalene (mg/Kg)                  | 0.555               | 0.336                 | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 23                                     | -                                 |
| Pyrene (mg/Kg)                       | 0.0356              | 0.0389                | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 1000                                   | -                                 |
| Electrical Conductivity (mmhos/cm)   | 1.630               | 13.500                | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 4                                      | -                                 |
| Sodium Adsorption Ratio (SAR)        | 23.9                | 62.7                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 12                                     | -                                 |
| pH                                   | 9.91                | 12.35                 | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 6-9                                    | -                                 |
| Arsenic (mg/kg)                      | 13.3                | 14.2                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 0.39                                   | 6.9                               |
| Barium (mg/kg)                       | 6430                | 2100                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 15000                                  | -                                 |
| Cadmium (mg/kg)                      | <1.3                | <1.2                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 70                                     | -                                 |
| Chromium (III) (mg/Kg)               | 15.1                | 17.4                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 120000                                 | -                                 |
| Chromium (VI) (mg/Kg)                | <1.0                | <1.0                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 23                                     | -                                 |
| Copper (mg/kg)                       | 36.5                | 31.6                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 3100                                   | -                                 |
| Lead (inorganic) (mg/kg)             | 19.3                | 15.5                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 400                                    | -                                 |
| Mercury (mg/kg)                      | <0.14               | <0.12                 | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 23                                     | -                                 |
| Nickel (mg/kg)                       | 21.5                | 52.8                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 1600                                   | -                                 |
| Selenium (mg/kg)                     | <6.5                | <6.1                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 390                                    | -                                 |
| Silver (mg/kg)                       | <3.9                | <3.7                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 390                                    | -                                 |
| Zinc (mg/kg)                         | 60                  | 49.4                  | -                                  | -                   | -                   | -                  | -                  | -                   | -                   | -                   | 23000                                  | -                                 |
| % Solids                             | 76.1                | 79.9                  | 88.8                               | 85.3                | 90.0                | 83.4               | 87.7               | 85.5                | 90.9                | 86.0                | -                                      | -                                 |

## Notes:

- 1) ND = not detectable to the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels. Results highlighted in Gray exceed Table 910-1, but are below background levels.
- 3) "-" indicates no analysis.



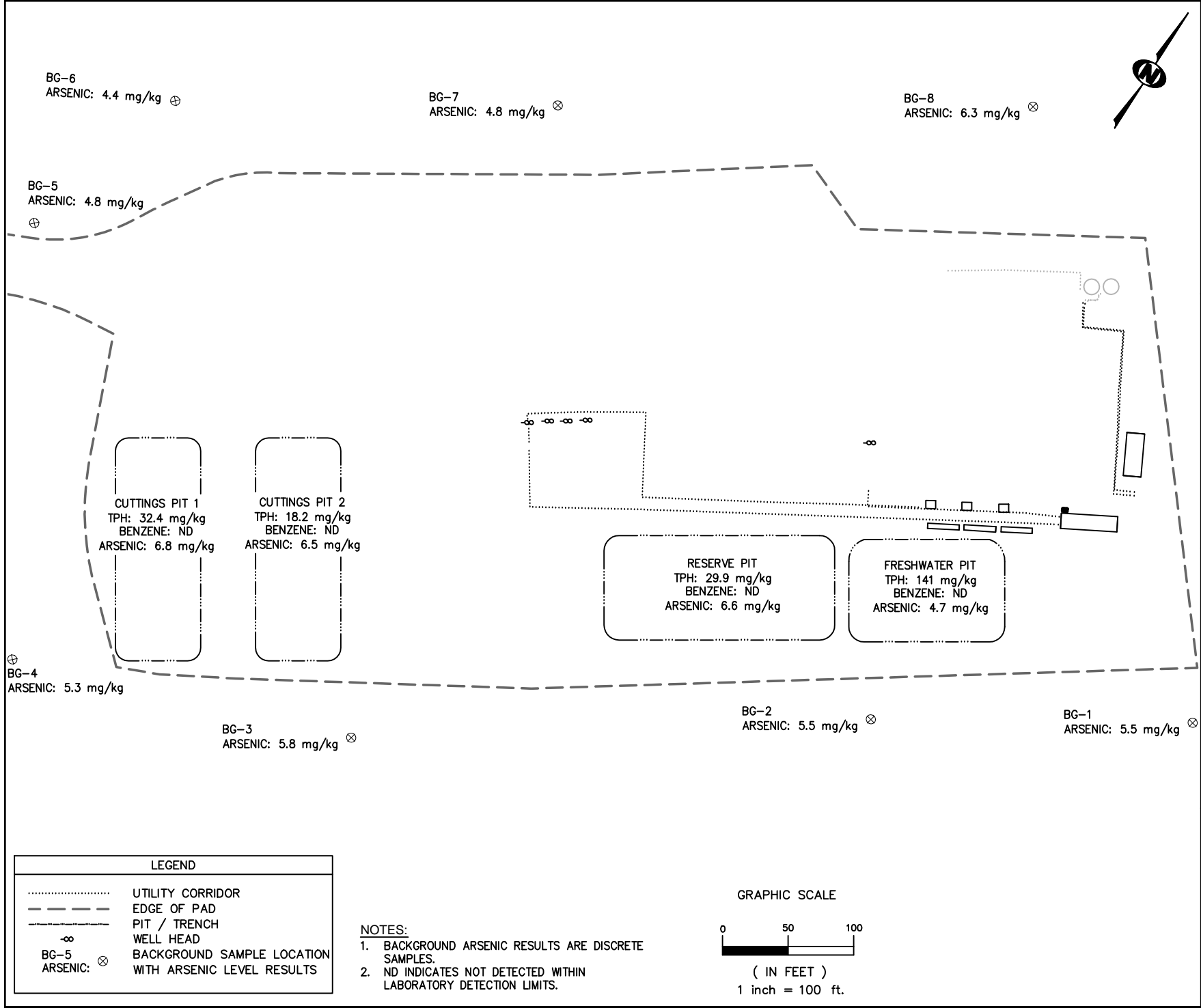


FIGURE 1  
PICEANCE CREEK  
PCU T78X-12G  
SAMPLE LOCATIONS WITH  
BACKGROUND ARSENIC  
PREPARED FOR XTO ENERGY

KRW CONSULTING, INC.  
8000 W. 14TH AVENUE, SUITE 200  
LAKEWOOD, COLORADO  
(303) 239-9011

|           |          |          |        |                  |             |                |  |
|-----------|----------|----------|--------|------------------|-------------|----------------|--|
| NOTES:    |          | FIGURE 1 |        | SHEET NO. 1 of 1 |             | SCALE: 1"=100' |  |
| DESIGNED: | CHECKED: | DATE:    | DRAWN: | FILE NAME:       | PROJECT NO. |                |  |
| I         | DK       | 11/12/12 | DRF    | SOMP             | 1007-06     |                |  |

# COMPLETED PIT CLOSURE



Photograph #1 – west side of pad looking east



Photograph #2 – east side of pad looking west



**Piceance Creek Unit T78-12G**  
SESE, Sec 12, T2S, R97W, NAD 83, 6<sup>th</sup> PM  
Lat. 39.8849  
Long: -108.22245

SITE  
PHOTOGRAPHS  
Photos Taken:  
5/7/2013