



May 19, 2015

Mr. Stan Spencer  
Colorado Oil and Gas Conservation Commission  
Environmental Protection Specialist  
Northwest Region  
Rifle, CO 81650

RE: Notification of Completion  
Love Ranch 8 Former Tank Containment Area, API # 05-103-10600, Facility ID # 278394  
Form 19 Doc #2216547

Dear Mr. Spencer,

XTO Energy (XTO) completed closure on April 10, 2015 of the Former Tank Containment Area associated with the Love Ranch 8, Facility ID 278394, Form 19 Doc #2216547.

XTO is herein submitting the completed Form 27, which includes the date of closure for the aforementioned area along with completed closure photos.

All impacted soils from the excavation area have been removed and transported offsite for disposal at Wray Gulch Landfill near Meeker, CO. Per COGCC's approval, XTO Energy has completed the proper plugging and abandonment of the project's groundwater monitoring wells (MW-1 through MW-6). The excavation area was backfilled and re-graded using clean, imported soils.

XTO Energy is herein requesting closure of and Notice of Completion for Form 19 Doc # 2216547 and attached Site Investigation and Remediation Workplan. COGCC approved closure of the remediation, excavation, and monitoring well abandonment on March 12, 2015 via S. Spencer email. If you should have any questions or comments please feel free to contact me at your earliest convenience (970) 675-4122.

Respectfully,

A handwritten signature in blue ink, appearing to read 'Jessica Dooling', written over a white background.

Jessica Dooling

Piceance EH&S Supervisor

[Jessica\\_dooling@xtoenergy.com](mailto:Jessica_dooling@xtoenergy.com)

Enclosures:

Completed Form 27 (pages 1 & 2)

Attachments I and II

Tables

Figures

Closure Photos

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	
OGCC Employee:	
Spill Inspection	Complaint NOAV
Tracking No:	

**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:

REMEDIATION WORKPLAN (Cont.)

OGCC Employee:

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

The groundwater bearing zone in and around the tank excavation area is approximately 15-20 feet below ground surface. Impacted soils beneath the former tank area extended approximately 2 to 3 feet beneath the groundwater surface; all of these impacted soils have been removed. Six monitoring wells were installed to assess potential groundwater impacts. Each of these wells has been sampled for Table 910-1 parameters on a quarterly basis for a minimum eight contiguous quarters; all results were below Table 910-1 concentration levels. Refer to Table 4 for a summary of the groundwater laboratory results through March 5, 2015 and to Figures 3 through 5.

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 [x] N If yes, describe:

Vertical and lateral soil assessment has been completed and impacts have been identified and removed. Quarterly groundwater monitoring and sampling of the six monitoring wells has been conducted since May 2013 with the most recent monitoring event in March 2015; results have all been below Table 910-1 concentration levels (see attachment II, Tables 1 through 6, and Figures 2 through 5 (6 total)).

No additional soil and/or groundwater assessment or remediation is required.

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

Impacted soils from the tank area have been removed and transported offsite for disposal at Wray Gulch Landfill near Meeker, CO.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: 5/19/11 Date Site Investigation Completed: in progress Date Remediation Plan Submitted: 12/16/2011 Remediation Start Date: pending approval Anticipated Completion Date: pending approval Actual Completion Date: 4/10/2015

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: [Signature] Title: Piceance EHS Supervisor Date: 5/19/2015

OGCC Approved: Title: Date:

## ATTACHMENT I

### Love Ranch 8 Tank Area Closure Workplan, Form 27 Page 1

#### **Background Arsenic:**

The site consists of a former tank containment area (see Figure 1).

See the COGCC approved Site Investigation and Remediation Workplan for Pit Closure (Rem # 8090, Doc # 2147033) that established a background Arsenic level of 17.5 mg/kg.

Arsenic samples were collected from the former tank containment area bottom and excavated material with results ranging from 4.4 mg/kg to 7.8 mg/kg. These Arsenic concentrations are within the allowable background Arsenic concentration of 17.5 mg/kg.

## ATTACHMENT II

### Love Ranch 8 Former Tank Containment Area Closure Workplan, Form 27 Pages 1 and 2

A historical release from aboveground storage tanks occurred within an unlined containment area at the subject site and impacted soils beneath the secondary containment area. Initial impacts beneath the former containment area were identified and reported via Form 19 (Doc. # 2216547). The tanks were put out of service and removed in July 2010. Refer to Figures 1 and 1A for site location and project area maps.

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

As requested by XTO Energy, KRW Consulting, Inc. (KRW) conducted an environmental site assessment to evaluate hydrocarbon impacts associated with the former tank containment area. This Attachment II presents a summary of laboratory analyses and site assessment findings associated with the following activities:

1. Test pit characterization efforts in the immediate vicinity of the release area;
2. A borehole investigation used to delineate extent of soil impacts and determine if groundwater had been impacted;
3. A phased groundwater delineation and monitoring well installation effort to characterize the extent of groundwater impacts;
4. The excavation and removal of impacted soils beneath the former tank containment area with appropriate confirmation sampling, and;
5. Initial and quarterly groundwater monitoring results of the project area.

#### **Background**

Test pit soil sampling activities were conducted at the site on May 27, 2010. These initial assessment activities were used to screen the extent of impact and determine if additional assessment and/or remediation would be required at the site. The assessment activities included one test pit within the former containment area (LR8-V-1) (see Figure 1A). Based on field observations, soils from the test pit appeared to be hydrocarbon impacted from the surface down to approximately 17 feet below ground surface (bgs), the maximum depth of exploration with the backhoe. Soil samples were collected from the test pit at select intervals (3 feet, 12 feet, and 17 feet bgs) and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels at LR8-V-1 for TPH (7,210 mg/kg at 3 feet bgs to 12,970 mg/kg at 17 feet bgs); Benzene (2.56 mg/kg at 17 feet bgs); Xylenes (314.5 mg/kg at 17 feet bgs); SAR (15.8 at 12 feet bgs); and pH (9.01 at 3 feet bgs to 9.76 at 12 feet bgs) (see Table 1). Groundwater was encountered in this test pit at approximately 16 feet bgs.

## **Additional Assessment Activities**

Additional soil and groundwater assessment was subsequently conducted within the vicinity of the former containment area in three phases.

### *Soils and Groundwater Assessment*

Soil and groundwater assessment activities were initiated the week of May 16, 2011. These activities included soils assessment in the immediate vicinity of the former containment area as well as initial groundwater assessment. Drill assessment was conducted using a CME- 75 rotary drilling rig platform, with hollow-stem auger continuous sampling capability. The borings were used to assess the lateral and vertical extent of hydrocarbon impacted soils (above Table 910-1 concentration levels) beneath the former containment area as well as to evaluate potential groundwater impacts beneath the project area.

Five boreholes were advanced to evaluate impacted soils in and around the former containment area; four boreholes outside of the former containment area (BH-01 thru BH-04), and one borehole within the former containment area (BH-05). Borehole depths ranged from 19 to 24 feet bgs. Groundwater was encountered at approximately 16 feet bgs in each of these borings. Three groundwater monitoring wells were also installed at this time; two in an assumed downgradient location (MW-01 and MW-02), and one in an assumed upgradient location (MW-03) from the release area. The monitoring well depths ranged from 19 feet bgs in wells MW-01 and MW-02, to 44 feet bgs in well MW-03. Refer to Figure 1A for assessment borings and monitoring well locations and Appendix A for monitoring well logs.

Soils were collected continuously from each boring using a CME 5-foot continuous sampler. The soils from each boring were logged and field screened using an FID and/or PID. The soil borings were generally extended into the water table, until field screening indicated no impact. Based on field observations, soil samples were selected for laboratory analyses to aid in assessing the vertical and lateral extent of hydrocarbon impacts above Table 910-1 concentration levels. Soil samples were analyzed for TPH and BTEX. One soil sample (BH-05 at 9 to 19 feet bgs) from beneath the former tank containment area was analyzed for the full COGCC Table 910-1 list of soil constituents.

Following completion of the soil borings, each boring was backfilled with bentonite chips to the surface and hydrated.

The groundwater monitoring wells were constructed of machine threaded, 2-inch diameter schedule 40 PVC pipe, and 0.010 slotted well screen, with threaded bottom and top slip caps. Wells MW-01 and MW-02 were completed with 15 feet of screen and well MW-03 was completed with 20 feet of screen. The annular space around the screened portion of each well was backfilled with 10/20 clean silica sand to approximately 1 foot above the screened interval. The remaining annulus of each well was plugged to just below the ground surface with hydrated bentonite. The groundwater monitoring wells were constructed so that the screened interval straddles an anticipated range of water table fluctuation so that separate phase hydrocarbons can be detected, monitored and removed, if present. Each well is protected with an aboveground locking well protector with three steel bollards set in concrete. Refer to Appendix A for monitoring well completion logs.

Each of the groundwater monitoring wells was developed, purged, and sampled following U.S. Environmental Protection Agency (EPA) protocol (SWS Contract Report 374, November 1985). In addition to the monitoring well samples, a groundwater grab sample was collected from within the auger stem in boring BH-05 during drilling operations. Each of the groundwater samples was analyzed for Table 910-1 parameters.

Soil and groundwater samples were properly containerized, placed on ice and shipped to Accutest Laboratories following appropriate chain-of-custody protocol.

The location of the soil borings and groundwater monitoring wells were surveyed both vertically and horizontally. Stabilized groundwater levels were measured to an accuracy of +/- 0.01 foot using an electronic water level meter, with a localized hydraulic gradient being calculated from this data. No separate phase hydrocarbons were detected in the monitoring wells during installation, development, and sampling events.

#### *Additional Soils and Groundwater Assessment*

Based on the initial assessment findings, additional soils and groundwater assessment activities were conducted at the site using direct push technology, specifically a track-mounted Geoprobe® sampler during the week of September 6, 2011. These activities were conducted to further assess potential groundwater impacts upgradient and downgradient from the release area, and further assess the lateral and vertical extent of hydrocarbon impacted soils beneath the former tank containment area, specifically in the smear zone.

A total of 14 direct push borings (DP-1 thru DP-14) were advanced across the project area. Boring depths ranged from 10 to 15 feet in locations that were sampled for groundwater (DP-1 thru DP-7), and 15 to 30 feet in borings used to assess smear zone impacts (DP-8 thru DP-14). Groundwater was encountered in each of the borings. Refer to Figure 1B for the location of these direct push borings.

Soils were collected continuously from each direct push boring using dedicated 5-foot acrylite sampling tubes. The soils from each boring were logged and field screened using an FID and/or PID. The soil borings were extended into the water table, until field screening indicated no further impacts. Based on field observations, soil samples were selected for laboratory analyses to aid in assessing the vertical and lateral extent of hydrocarbon impacts above Table 910-1 concentration levels. Soil samples were collected and analyzed for TPH and BTEX.

Groundwater samples were collected from direct push borings DP-1 thru DP-7 using a peristaltic pump. New pump tubing was used for each sample point. The tubing was placed through the hollow probe drill rod into an expendable screened sample point at the bottom tip of the drill rod. Groundwater samples were collected directly from the pump tubing into laboratory provided containers and submitted for BTEX analyses.

#### *Additional Groundwater Assessment*

Based on the groundwater assessment findings, three additional groundwater monitoring wells were installed upgradient (MW-05) and downgradient (MW-04 and MW-06) from the subject release

area. These additional groundwater assessment activities were conducted during the week of September 19, 2011. The additional monitoring wells were installed to further assess potential groundwater impacts, and to refine the understanding of hydraulic gradient and presumed groundwater flow direction beneath the site. Monitoring well MW-05 was installed adjacent to direct push location DP-1, with wells MW-04 and MW-06 installed adjacent to direct push locations DP-4 and DP-2, respectively (see Figure 3).

Monitoring wells MW-04 thru MW-06 were installed, developed, purged, and sampled as previously described. Each of these new wells was installed to 19 feet bgs with 15 feet of 0.010 slotted screen. Monitoring wells MW-01 thru MW-03 were also re-sampled during this monitoring event (September 22, 2011). Samples were containerized and transported to Accutest Laboratories under chain of custody documentation. Each of the groundwater samples was analyzed for Table 910-1 parameters. No soil samples were submitted for lab analyses during these assessment activities.

### **Assessment Findings**

In general, unconsolidated alluvial soils were encountered beneath the project area to the maximum depth explored of 44 feet bgs. These alluvial soils consist of a silty to clayey, medium to fine grained sand, with varying amounts of gravel. The exception to this alluvial material was the sandy, rocky fill material encountered beneath the Love Ranch 8 pad location in boring MW-3. At varying depths beneath the project area, but generally at the base of each boring, a 5 to 8-foot zone of dark brown to black organic rich material was encountered with a noted swampy odor. Groundwater was encountered in each of the borings at depths varying from approximately 5 to 27 feet bgs. Refer to Appendix A for a complete lithologic description in each of the well logs.

Soils assessment findings indicated that the lateral extent of hydrocarbon impacted soils in the vadose zone (soils above the water table) above the Table 910-1 concentration level (TPH > 500 mg/kg) appeared to be confined to the former containment area. Results exceeded Table 910-1 concentration levels in the following soil boring locations:

- BH-01 at 16.5' to 19' Benzene: 0.202 mg/kg
- BH-04 at 15.5' to 19' TPH: 1,180 mg/kg; Benzene: 0.689 mg/kg
- BH-05 at 9' to 19' TPH: 8,180 mg/kg; Benzene: 4.7 mg/kg; Toluene: 91.7 mg/kg; Xylenes: 360 mg/kg; SAR: 26.4; pH: 9.52; and Arsenic: 3.3 mg/kg
- BH-05 at 16.5 to 19' TPH: 6,100 mg/kg; Benzene: 2.34 mg/kg; and Xylenes: 241 mg/kg.

See Table 1 for a complete summary of the lab results and to Figure 1A for the location of these borings.

In general, the vertical extent of elevated hydrocarbon impacted soils immediately below the former containment appeared to extend downward from the surface into the saturated zone to a depth of approximately 20 feet bgs.

Smear zone soils above Table 910-1 concentration levels appeared to extend approximately 30 feet north (hydraulically downgradient) from the former containment area. Smear zone soils also extended to the south (upgradient) an approximate distance of 25 feet from the former containment area. Results exceeded Table 910-1 concentration levels in the following direct push locations:

- DP-8 15' to 20' TPH: 502 mg/kg
- DP-9 15' to 20' TPH: 624 mg/kg
- DP-10 5' to 10' TPH: 3,750 mg/kg
- DP-10 15' to 20' TPH: 1,430 mg/kg; Benzene: 0.336 mg/kg

See Table 2 for a complete summary of the lab results and Figure 1B for the location of these borings.

The assessment of the extent of smear zone soils to the south was limited by an existing natural gas manifold system with above and below-ground utilities.

TPH levels in the impacted zones ranged from 502 mg/kg in DP-8 (15 to 20 feet bgs) to 12,970 mg/kg in LR8-V-1 (17 feet bgs). Refer to Tables 1 and 2, and Figures 1A, 1B and 2 for the approximate lateral extent of impacted soils. Refer to Figures 2A and 2B for cross sections illustrating the approximate vertical delineation of impacted soils above the Table 910-1 concentration levels beneath the project area.

The groundwater grab sample collected through the hollow stem auger (May 19, 2011) during the drilling of BH-05 indicated groundwater immediately below the former containment area was impacted. Laboratory analyses of this grab sample indicated Benzene (4,790 µg/L), Toluene (25,800 µg/L), Ethylbenzene (1,780 µg/L), and Xylenes (28,700 µg/L); above Table 910-1 concentration levels (see Table 3).

Groundwater samples were collected from direct push sample locations DP-1 through DP-7 on September 6 and 7, 2011 and analyzed for BTEX; results were all below laboratory detection limits (ND) and below Table 910-1 concentration levels (see Table 3).

Initial groundwater monitoring wells MW-01, MW-02, and MW-03 were installed based on topography and the northerly flow of Piceance Creek, with anticipated groundwater flows to the east/northeast beneath the site area. Wells MW-02 and MW-03 were installed between the release area and Piceance Creek for the specific purpose of assessing potential risks to the creek. Groundwater analytical results from the initial sampling (May 27, 2011) indicated BTEX results were all below laboratory detection limits (ND) and below Table 910-1 concentration levels. Based on the initial groundwater elevations from these three wells, the calculated hydraulic gradient suggested that groundwater actually flowed in a northwesterly direction beneath the project area. This hydraulic gradient information was factored in to locating monitoring well MW-05 upgradient, and wells MW-04 and MW-06 downgradient from the release area. The second round of groundwater sampling (September 22, 2011) indicated BTEX results also below Table 910-1 concentration levels (ND) in all six wells. It should also be noted that no separate phase hydrocarbons were encountered in any of the wells sampled in the May and September 2011 sampling events (see Tables 3 and 4).

Refer to Tables 1 through 4 for a summary of these soil and groundwater laboratory analytical results.

Refer to Figure 3 for specific groundwater elevations and estimated groundwater elevation contours beneath the project area as measured on September 29, 2011. Groundwater appeared to flow in a northwesterly direction beneath the former containment area and to the north of the project area. Groundwater elevations measured beneath the site and Piceance Creek stream elevations indicated that Piceance Creek is a losing stream adjacent to the project area during the June to December 2011 monitoring period. Refer to Table 5 for a summary of groundwater levels and groundwater elevations measured in the project monitoring wells. Based on groundwater elevation data collected to date, the maximum fluctuation in groundwater levels measured beneath the project area appears to be less than 2 feet. Refer to Figures 2A and 2B for the approximate high and low groundwater levels beneath the site.

### **Excavation and Removal of Impacted Soils**

Impacted soils in the former tank area were initially removed to a depth of approximately 17.5 feet bgs with a composite sample collected (10/23/13) from the bottom of the excavation and analyzed for TPH and BTEX. Results exceeded Table 910-1 concentration levels for TPH (1,023 mg/kg) (see Table 6 and Figure 4).

Soils across the bottom of the excavation area were then removed to a depth of approximately 19 feet bgs with a confirmation sample collected and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for Arsenic (4.4 mg/kg) (see Table 6 and Figure 4).

During this additional excavation, soil staining was noted on the north side of the current excavation. Impacted soils were subsequently removed from this area with a confirmation soil sample (Subtank North (-19')) collected at the base of the excavation approximately 19 feet bgs and analyzed for Table 910-1 parameters. Results exceeded Table 910-1 concentration levels for SAR (13.3), pH (9.26) and Arsenic (5.6 mg/kg) (see Table 6 and Figure 4).

The excavation extended approximately 2 to 3 feet beneath the existing groundwater table. A groundwater sample was collected from the excavation following the removal of impacted materials to 19 feet bgs and analyzed for Table 910-1 parameters. Results for BTEX constituents were all below Table 910-1 concentration levels (ND to laboratory detection limits) (see Table 4 and Figure 5).

Impacted soils identified during the test pit and drilling/direct push assessment activities have been removed. Based on confirmation sample results, no additional excavation was required beneath the former tank containment area (see Tables 1, 2, and 6 and Figures 2, 2A, 2B, and 4).

Overburden materials (soils that were removed to access the deeper impacted soils) were sampled for Table 910-1 parameters. This included the following: Excavated Material sampled 7/15/13; Stockpile #1 and Stockpile #2 sampled 2/4/14; and Excavated Material (EMES Stockpile) sampled

4/11/14. Results exceeded Table 910-1 concentration levels for EC (4.780 mmhos/cm to 6.450 mmhos/cm); SAR (15.9), pH (9.36) and Arsenic (5.3 mg/kg to 7.8 mg/kg) (see Table 6).

### **Continued Groundwater Assessment and Quarterly Groundwater Monitoring**

As discussed previously, an initial groundwater sample was collected from immediately below the former tank containment area through the drill rig auger at BH-05 and analyzed for BTEX constituents. Results exceeded Table 910-1 concentration levels for Benzene (4,790 µg/L); Toluene (25,800 µg/L); Ethylbenzene (1,780 µg/L); and Xylenes (28,700 µg/L) (see Table 3, and Figure 3).

Following the initial sampling of the six monitoring wells (MW-1 through MW-6) in September 2011, the wells have been sampled on a quarterly basis since May 2013 and analyzed for Table 910-1 parameters. Each of these wells has been sampled a minimum of eight consecutive quarters, most recently in March 2015. Results have all been below Table 910-1 concentration levels (See Table 4).

Groundwater levels have been measured during each of the quarterly sampling events for these wells (see Table 5). Groundwater flow direction continues to be to the north/northwest beneath the former tank containment area, away from Piceance Creek. Piceance Creek continues to be a “losing” stream in the surrounding project area (see Figure 5 for the March 2015 groundwater analytical results and flow direction).

MW-1 through MW-6 were properly plug and abandoned on March 3<sup>rd</sup>, 2015 according to State Water Well Construction Rules (2 CCR 402-2 Sections 16 and 17). Please refer to attached Well Abandonment Reports for MW-1 through MW-6 for documentation and methods.

Closure of the Former Tank Containment Area excavation was completed April 10, 2015 in accordance with COGCC and BLM rules.

- Impacted material was transported to Wray Gulch Landfill in Meeker, CO. Disposal manifests are available on request
- Excavated material meeting Table 910-1 standards was used as backfill for the Love Ranch 8 pad ongoing pit closure (Rem # 8090).
- Soil and groundwater 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 Tables 1 through 6 and Figures 1 through 5 (9 total) for a summary of the laboratory results, groundwater elevations and for layout of the containment area and sample

locations. Refer to Appendix A for a copy of the boring logs, monitoring well completion reports and monitoring well plug and abandonment reports.

- Elevated Arsenic levels above Table 910-1 concentration level were detected beneath the tank area. See the COGCC approved Form 27 for pit closure (Rem #8090) which established a background Arsenic level of 17.5 mg/kg for the location.
- Any remaining elevated levels of Electrical Conductivity, SAR and pH detected beneath the tank area as well as any backfill material will be covered with a minimum 3 feet of clean, native soils per COGCC guidance. No additional treatment of these soils will be required.
- Reclamation activities will be 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: Love Ranch 8 Former Tank Containment Area**  
**Lab Summary - Vertical and Lateral Soil Assessment**

Last update 2/20/2015

Analytical Parameter  (with units)	Initial Assessment Samples			1st Drill Assessment Samples						Monitoring Well Soil Assessment			COGCC	Maximum based on Background
	LR8-V-1 @ 3'	LR8-V-1 @ 12'	LR8-V-1 @ 17'	LR8_BH-01 @ 16.5'-19'	LR8_BH-02 @ 14'-15'	LR8_BH-03 @ 14'-15'	LR8_BH-04 @ 15.5'-19'	LR8_BH-05 @ 9'-19'	LR8_BH-05 @ 16.5'-19'	LR8_MW-01 @ 15'-19'	LR8_MW-02 @ 16.5'-19'	LR8_MW-03 @ 34'-39'	Table 910-1 Concentration Levels	
Accutest Job #	D13773 (5/27/10)			D23677 (5/17/11)				D23671 (5/19/11)	D23678 (5/19/11)	D23676 (5/18/11)		D23678 (5/19/11)	-	-
Sample type (Composite/Discrete)	D	D	D	D	D	D	D	D	D	D	D	D	-	-
TPH (GRO) (mg/Kg)	3,030	3,660	7,230	251	ND	ND	840	5,190	3,310	ND	ND	ND	-	-
TPH (DRO) (mg/Kg)	4,180	4,160	5,740	223	ND	ND	340	2,990	2,790	ND	ND	ND	-	-
TPH (GRO + DRO) (mg/Kg)	7,210	7,820	12,970	474	ND	ND	1,180	8,180	6,100	ND	ND	ND	500	-
Benzene (mg/Kg)	ND	ND	2.560	0.202	ND	ND	0.689	4.700	2.340	ND	ND	ND	0.170	-
Toluene (mg/Kg)	6.570	14.200	81.500	0.741	ND	ND	11.500	91.700	57.800	ND	ND	ND	85	-
Ethylbenzene (mg/Kg)	2.760	2.550	22.100	0.781	ND	ND	3.780	20.600	14.900	ND	ND	ND	100	-
Xylenes (total) (mg/Kg)	132.100	166.700	314.500	20.900	ND	ND	64.100	360.000	241.000	0.0962	ND	ND	175	-
Acenaphthene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	1000	-
Anthracene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	1000	-
Benzo(A)anthracene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	0.22	-
Benzo(A)pyrene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	0.022	-
Benzo(B)fluoranthene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	2.2	-
Chrysene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	0.022	-
Fluoranthene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	1000	-
Fluorene (mg/Kg)	-	-	-	-	-	-	-	0.458	-	-	-	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	0.22	-
Naphthalene (mg/Kg)	-	-	-	-	-	-	-	3.120	-	-	-	-	23	-
Pyrene (mg/Kg)	-	-	-	-	-	-	-	ND	-	-	-	-	1000	-
Electrical Conductivity (mmhos/cm)	0.519	1.500	1.590	-	-	-	-	1.460	-	-	-	-	4	-
Sodium Adsorption Ratio (SAR)	3.1	15.8	9.5	-	-	-	-	26.4	-	-	-	-	12	-
pH	9.01	9.76	9.17	-	-	-	-	9.52	-	-	-	-	6-9	-
Arsenic (mg/kg)	-	-	-	-	-	-	-	3.3	-	-	-	-	0.39	17.5
Barium (mg/kg)	-	-	-	-	-	-	-	203	-	-	-	-	15000	-
Cadmium (mg/kg)	-	-	-	-	-	-	-	<1.2	-	-	-	-	70	-
Chromium (III) (mg/Kg)	-	-	-	-	-	-	-	22.0	-	-	-	-	120000	-
Chromium (VI) (mg/Kg)	-	-	-	-	-	-	-	0.64	-	-	-	-	23	-
Copper (mg/kg)	-	-	-	-	-	-	-	8.3	-	-	-	-	3100	-
Lead (inorganic) (mg/kg)	-	-	-	-	-	-	-	9.8	-	-	-	-	400	-
Mercury (mg/kg)	-	-	-	-	-	-	-	<0.11	-	-	-	-	23	-
Nickel (mg/kg)	-	-	-	-	-	-	-	11.3	-	-	-	-	1600	-
Selenium (mg/kg)	-	-	-	-	-	-	-	<6.1	-	-	-	-	390	-
Silver (mg/kg)	-	-	-	-	-	-	-	<3.7	-	-	-	-	390	-
Zinc (mg/kg)	-	-	-	-	-	-	-	34.3	-	-	-	-	23000	-
% Solids	80.9	87.6	75.5	76.9	78.6	84.1	75.9	83.5	82.5	77.9	78.7	77.4	-	-

Notes:

- 1) ND = not detectible 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 Figure 1A for sample locations.
- 5) Initial samples collected 5/27/10 from test pits. Samples collected 5/17-19/11 were from hollow stem auger drill rig.

**Table 2**  
**Location: Love Ranch 8 Former Tank Containment Area**  
**Lab Summary - Direct Push Soil Assessment**

Last update 2/20/2015

Analytical Parameter (with units)	2nd Drill Assessment Samples																	COGCC	Maximum based on Background	
	DP-1 10'-15'	DP-2 10'-15'	DP-3 10'-15'	DP-4 10'-15'	DP-5 5'-10'	DP-6 5'-10'	DP-7 5'-15'	DP-8 15'-20'	DP-9 15'-20'	DP-9 25'-30'	DP-10 5'-10'	DP-10 15'-20'	DP-11 15'-20'	DP-12 10'-15'	DP-12 15'-20'	DP-13 15'-20'	DP-14 10'-15'	Table 910-1 Concentration Levels		
Accutest Job #	D27451 (9/6/11), (9/7/11), (9/8/11)																	-	-	
Sample type (Composite/Discrete)	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	-	-
TPH (GRO) (mg/Kg)	ND	ND	ND	ND	ND	ND	ND	250	329	ND	1,340	759	ND	ND	ND	ND	ND	-	-	
TPH (DRO) (mg/Kg)	ND	ND	ND	ND	ND	ND	ND	252	295	ND	2,410	671	ND	10.2	ND	ND	ND	-	-	
TPH (GRO + DRO) (mg/Kg)	ND	ND	ND	ND	ND	ND	ND	502	624	ND	3,750	1,430	ND	10.2	ND	ND	ND	500	-	
Benzene (mg/Kg)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.336	ND	ND	ND	ND	ND	0.170	-	
Toluene (mg/Kg)	ND	ND	ND	ND	ND	ND	ND	0.167	ND	ND	2.450	11.200	ND	ND	ND	ND	ND	85	-	
Ethylbenzene (mg/Kg)	ND	ND	ND	ND	ND	ND	ND	1.320	1.320	ND	2.750	4.290	ND	ND	ND	ND	ND	100	-	
Xylenes (total) (mg/Kg)	ND	ND	ND	ND	ND	ND	ND	27.500	5.250	ND	67.500	61.600	0.184	ND	ND	ND	ND	175	-	
Acenaphthene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-	
Anthracene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000	-	
Benzo(A)anthracene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-	
Benzo(A)pyrene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.022	-	
Benzo(B)fluoranthene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.22	-	
Benzo(K)fluoranthene (mg/Kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.2	-	
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)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.39	17.5	
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	80.9	79.1	81.8	77.1	73.5	72.2	70.6	78.7	71.8	79.3	83.7	72.9	75.4	82.7	74.8	73.8	84.4	-	-	

- Notes:
- 1) ND = not detectable to the laboratory detection limit.
  - 2) Results highlighted in yellow exceed Table 910-1 concentration levels.
  - 3) "-" indicates no analysis.
  - 4) See Figure 1B for sample locations.

**Table 3**  
**Location: Love Ranch 8 Former Tank Containment Area**  
**Lab Summary: Direct Push Groundwater Samples**

Updated 2/20/2015

Analytical Parameters	(with units)	Laboratory Project #	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (total) (µg/L)
Borehole 05 <sup>3</sup>	LR8_BH-05 (5/19/11) (collected through drill auger beneath tank location)	D23671	4,790	25,800	1,780	28,700
Direct Push Ground Water Samples	LR8_DP-1 (9/6/11)	D27361	ND	ND	ND	ND
	LR8_DP-2 (9/6/11)	D27361	ND	ND	ND	ND
	LR8_DP-3 (9/7/11)	D27358	ND	ND	ND	ND
	LR8_DP-4 (9/7/11)		ND	ND	ND	ND
	LR8_DP-5 (9/7/11)		ND	ND	ND	ND
	LR8_DP-6 (9/7/11)		ND	ND	ND	ND
	LR8_DP-7 (9/7/11)		ND	ND	ND	ND
COGCC	Table 910-1 Concentration Levels		5	560 to 1000	700	1400 to 10000

Notes:

- 1) ND = not detectable at the laboratory detection limit.
- 2) Results highlighted in yellow exceed Table 910-1 concentration levels.
- 3) BH-05 sample collected with a disposable bailer through the hollow stem auger associated with soil sampling activities.

**Table 4**  
**Location: Love Ranch 8 Former Tank Containment Area**  
**Lab Summary: Groundwater Sample Analytical Data**

Updated 3/16/2015

Analytical Parameters	(with units)	Laboratory Project #	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (total) (µg/L)	Chlorides (mg/L)	Total Dissolved Solids (mg/L)	Sulfates (mg/L)
Monitoring Well 1 <sup>4</sup>	LR8_MW-01 (5/27/11)	D23877	ND	ND	ND	ND	-	-	-
	LR8_MW-01 (9/22/11)	D27974	ND	ND	ND	ND	-	-	-
	LR8_MW-01 (5/7/13)	D46001	ND	ND	ND	ND	29.4	1460	267
	LR8_MW-01 (ALS) (5/7/13)	1305406	ND	ND	ND	ND	35.0	1300	300
	LR8_MW-01 (9/18/13)	D50686	ND	ND	ND	ND	28.4	1430	203
	LR8_MW-01 (12/10/13)	D53337	ND	ND	ND	ND	27.8	1380	204
	LR8_MW-01 (3/06/14)	D55713	ND	ND	ND	ND	28.9	1370	219
	LR8_MW-01 (6/19/14)	D59047	ND	ND	ND	ND	25.2	1390	283
	LR8_MW-01 (9/18/14)	D62475	ND	ND	ND	ND	32.1	1450	222
	LR8_MW-01 (12/16/14)	D65920	ND	ND	ND	ND	34.0	1440	285
LR8_MW-01 (3/5/15)	D68333	ND	ND	ND	ND	42.2	1480	317	
Monitoring Well 2 <sup>4</sup>	LR8_MW-02 (5/27/11)	D23877	ND	ND	ND	ND	-	-	-
	LR8_MW-02 (9/22/11)	D27974	ND	ND	ND	ND	-	-	-
	LR8_MW-02 (5/7/13)	D46001	ND	ND	ND	ND	28.3	1430	225
	LR8_MW-02 (ALS) (5/7/13)	1305406	ND	ND	ND	ND	34.0	1300	260
	LR8_MW-02 (9/18/13)	D50686	ND	ND	ND	ND	26.8	1440	247
	LR8_MW-02 (12/10/13)	D53337	ND	ND	ND	ND	29.0	1430	283
	LR8_MW-02 (3/06/14)	D55713	ND	ND	ND	ND	33.6	1460	274
	LR8_MW-02 (6/19/14)	D59047	ND	ND	ND	ND	34.0	1380	131
	LR8_MW-02 (9/18/14)	D62475	0.60	ND	ND	ND	31.8	1380	175
	LR8_MW-02 (12/16/14)	D65920	ND	ND	ND	ND	31.9	1400	241
LR8_MW-02 (3/5/15)	D68333	ND	ND	ND	ND	60.2	1480	259	
Monitoring Well 3 <sup>4</sup>	LR8_MW-03 (5/27/11)	D23877	ND	ND	ND	ND	-	-	-
	LR8_MW-03 (9/22/11)	D27974	ND	ND	ND	ND	-	-	-
	LR8_MW-03 (5/7/13)	D46001	ND	ND	ND	ND	27.8	1070	<2.5
	LR8_MW-03 (ALS) (5/7/13)	1305406	ND	ND	ND	ND	32.0	950	6.5
	LR8_MW-03 (9/18/13)	D50686	ND	ND	ND	ND	26.4	1030	<1.0
	LR8_MW-03 (12/10/13)	D53337	ND	ND	ND	ND	27.1	1030	4.1
	LR8_MW-03 (3/06/14)	D55713	ND	ND	ND	ND	30.3	1040	2.2
	LR8_MW-03 (6/19/14)	D59047	ND	ND	ND	ND	30.5	1090	7.2
	LR8_MW-03 (9/18/14)	D62475	ND	ND	ND	ND	29.3	1060	<1.0
	LR8_MW-03 (12/16/14)	D65920	ND	ND	ND	ND	31.3	992	<10
LR8_MW-03 (3/5/15)	D68333	ND	ND	ND	ND	32.3	1040	1.1	
Monitoring Well 4 <sup>4</sup>	LR8_MW-04 (9/22/11)	D27974	ND	ND	ND	ND	-	-	-
	LR8_MW-04 (5/7/13)	D46001	ND	ND	ND	ND	33.4	1450	112
	LR8_MW-04 (ALS) (5/7/13)	1305406	ND	ND	ND	ND	39.0	1300	120
	LR8_MW-04 (9/18/13)	D50686	ND	ND	ND	ND	32.1	1380	75.7
	LR8_MW-04 (12/10/13)	D53337	ND	ND	ND	ND	33.3	1360	84.3
	LR8_MW-04 (3/06/14)	D55713	ND	ND	ND	ND	33.4	1440	58.9
	LR8_MW-04 (6/19/14)	D59047	ND	ND	ND	ND	92.9	2090	645
	LR8_MW-04 (9/18/14)	D62475	ND	ND	ND	ND	76.0	1880	521
	LR8_MW-04 (12/16/14)	D65920	ND	ND	ND	ND	64.0	1760	459
	LR8_MW-04 (3/5/15)	D68333	ND	ND	ND	ND	58.0	1660	363
Monitoring Well 5 <sup>4</sup>	LR8_MW-05 (9/22/11)	D27974	ND	ND	ND	ND	-	-	-
	LR8_MW-05 (5/7/13)	D46001	ND	ND	ND	ND	27.3	1320	305
	LR8_MW-05 (ALS) (5/7/13)	1305406	ND	ND	ND	ND	33.0	1200	340
	LR8_MW-05 (9/18/13)	D50686	ND	ND	ND	ND	27.8	1270	245
	LR8_MW-05 (12/10/13)	D53337	ND	ND	ND	ND	28.0	1270	270
	LR8_MW-05 (3/06/14)	D55713	ND	ND	ND	ND	29.0	1270	264
	LR8_MW-05 (6/19/14)	D59047	ND	ND	ND	ND	28.4	1420	385
	LR8_MW-05 (9/18/14)	D62475	ND	ND	ND	ND	32.5	1430	425
	LR8_MW-05 (12/16/14)	D65920	ND	ND	ND	ND	34.1	1360	439
	LR8_MW-05 (3/5/15)	D68333	ND	ND	ND	ND	125.0	1490	457
Monitoring Well 6 <sup>4</sup>	LR8_MW-06 (9/22/11)	D27974	ND	ND	ND	ND	-	-	-
	LR8_MW-06 (5/7/13)	D46001	ND	ND	ND	ND	36.1	1520	191
	LR8_MW-06 (ALS) (5/7/13)	1305406	ND	ND	ND	ND	42.0	1300	220
	LR8_MW-06 (9/18/13)	D50686	ND	ND	ND	ND	36.8	1550	284
	LR8_MW-06 (12/10/13)	D53337	ND	ND	ND	ND	33.7	1420	204
	LR8_MW-06 (3/06/14)	D55713	ND	ND	ND	ND	33.6	1340	168
	LR8_MW-06 (6/19/14)	D59047	ND	ND	ND	ND	34.8	1450	172
	LR8_MW-06 (9/18/14)	D62475	ND	ND	ND	ND	39.8	1460	180
	LR8_MW-06 (12/16/14)	D65920	ND	ND	ND	ND	41.7	1410	148
	LR8_MW-06 (3/5/15)	D68333	ND	ND	ND	ND	56.9	1460	185
Subtank <sup>3</sup>	Subtank GW (10/2/13)	D51269	ND	ND	ND	ND	30.9	1640	559
COGCC	Table 910-1 Concentration Levels		5	560 to 1000	700	1400 to 10000			

Notes:

- 1) ND = not detectable at the laboratory detection limit; and "-" indicates no analysis.
- 2) MW samples collected with a disposable bailer from fully developed permanent monitoring wells.
- 3) Subtank sample was collected from groundwater seeping into the excavation following impacted material removal.
- 4) Duplicate samples were collected on 5/17/13 and submitted to two different laboratories for Quality Assurance purposes.
- 5) See figures 3 and 5 for Monitoring Well locations

**Table 5**  
**Location: Love Ranch 8 Former Tank Containment Area**  
**Groundwater Level / Groundwater Elevation Data**

Updated 3/6/2015

Groundwater Levels																		
Well #	Well Elev.	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level	GW level
	(TOC)	6/1/2011	6/15/2011	6/23/2011	7/19/2011	7/26/2011	8/2/2011	8/9/2011	9/22/2011	9/29/2011	5/7/2013	9/18/2013	12/10/2013	3/6/2014	6/19/2014	9/18/2014	12/16/2014	3/5/2015
LR8_MW-01	6122.17	8.10	8.74	8.85	7.44	7.93	8.16	8.33	9.29	9.02	9.48	10.67	9.82	8.95	9.32	9.87	9.28	8.79
LR8_MW-02	6121.72	7.46	8.10	8.21	6.85	7.31	7.53	7.71	8.66	8.40	8.87	10.01	9.18	8.34	8.71	9.27	8.65	8.17
LR8_MW-03	6142.23	28.41	28.98	29.17	27.62	28.13	28.41	28.56	29.53	29.20	29.71	30.94	30.10	29.16	29.51	30.06	29.54	29.04
LR8_MW-04	6123.83	NA	NA	NA	NA	NA	NA	NA	11.88	11.56	12.09	13.55	12.59	11.48	12.11	12.53	11.97	11.41
LR8_MW-05	6126.14	NA	NA	NA	NA	NA	NA	NA	12.65	12.41	12.97	14.05	13.27	12.46	12.77	13.44	12.74	12.26
LR8_MW-06	6126.05	NA	NA	NA	NA	NA	NA	NA	14.31	13.96	14.60	16.13	15.14	13.97	13.73	15.13	14.54	13.93

Groundwater Elevations																		
Well #	Well Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.	GW Elev.
	(TOC)	6/1/2011	6/15/2011	6/23/2011	7/19/2011	7/26/2011	8/2/2011	8/9/2011	9/22/2011	9/29/2011	5/7/2013	9/18/2013	12/10/2013	3/6/2014	6/19/2014	9/18/2014	12/16/2014	3/5/2015
LR8_MW-01	6122.17	6114.07	6113.43	6113.32	6114.73	6114.24	6114.01	6113.84	6112.88	6113.15	6112.69	6111.50	6112.35	6113.22	6112.85	6112.3	6112.89	6113.38
LR8_MW-02	6121.72	6114.26	6113.62	6113.51	6114.87	6114.41	6114.19	6114.01	6113.06	6113.32	6112.85	6111.71	6112.54	6113.38	6113.01	6112.45	6113.07	6113.55
LR8_MW-03	6142.23	6113.82	6113.25	6113.06	6114.61	6114.10	6113.82	6113.67	6112.70	6113.03	6112.52	6111.29	6112.13	6113.07	6112.72	6112.17	6112.69	6113.19
LR8_MW-04	6123.83	NA	NA	NA	NA	NA	NA	NA	6111.95	6112.27	6111.74	6110.28	6111.24	6112.35	6111.72	6111.30	6111.86	6112.42
LR8_MW-05	6126.14	NA	NA	NA	NA	NA	NA	NA	6113.49	6113.73	6113.17	6112.09	6112.87	6113.68	6113.37	6112.7	6113.4	6113.88
LR8_MW-06	6126.05	NA	NA	NA	NA	NA	NA	NA	6111.74	6112.09	6111.45	6109.92	6110.91	6112.08	6112.32	6110.92	6111.51	6112.12

- Notes:
1. Groundwater (GW) levels measured from top of well casing (TOC)
  2. All measurements are in feet
  3. NA - Not available (Monitoring wells MW-04, 05, and 06 were installed in September 2011.)
- Gray Highlight = GW Samples collected.

**Table 6**  
**Location: Love Ranch 8 Former Tank Containment Area**  
**Lab Summary - Sub-Tank and Excavated Material**

Last update 2/20/2015

Analytical Parameter (with units)	Subtank (-17.5')	Subtank (-19')	Subtank North (-19')	Excavated Material	Overburden Stockpiles		Excavated Material	COGCC	Maximum based on Background
	Subtank Composite	Subtank Composite	Subtank North Composite	Subtank Ex Material	Stockpile #1	Stockpile #2	EMES Stockpile	Table 910-1 Concentration Levels	
Accutest Job #	D51867 (10/23/13)	D52704 (11/15/13)	D55063 (2/2/14)	D48219A (7/15/13)	D54798 (2/4/14)		D56824 (4/11/14)	-	-
Sample type (Composite/Discrete)	C	C	C	C	C	C	C	-	-
TPH (GRO) (mg/Kg)	389	36.3	93.5	31.3	ND	ND	6.65	-	-
TPH (DRO) (mg/Kg)	634	28.8	103	89.7	13.1	33.5	11.7	-	-
TPH (GRO + DRO) (mg/Kg)	1023	65.1	197	121	13.1	33.5	18.4	500	-
Benzene (mg/Kg)	ND	ND	ND	ND	ND	ND	ND	0.170	-
Toluene (mg/Kg)	ND	ND	0.133	ND	ND	ND	ND	85	-
Ethylbenzene (mg/Kg)	3.02	0.0393	0.374	ND	ND	ND	ND	100	-
Xylenes (total) (mg/Kg)	11.4	0.327	4.69	ND	ND	ND	ND	175	-
Acenaphthene (mg/Kg)	-	ND	ND	ND	ND	ND	-	1000	-
Anthracene (mg/Kg)	-	ND	ND	ND	ND	ND	-	1000	-
Benzo(A)anthracene (mg/Kg)	-	ND	ND	ND	ND	ND	-	0.22	-
Benzo(A)pyrene (mg/Kg)	-	ND	ND	ND	ND	ND	-	0.022	-
Benzo(B)fluoranthene (mg/Kg)	-	ND	ND	ND	ND	ND	-	0.22	-
Benzo(K)fluoranthene (mg/Kg)	-	ND	ND	ND	ND	ND	-	2.2	-
Chrysene (mg/Kg)	-	ND	ND	ND	ND	ND	-	22	-
Dibenzo(A,H)anthracene (mg/Kg)	-	ND	ND	ND	ND	ND	-	0.022	-
Fluoranthene (mg/Kg)	-	ND	ND	ND	ND	ND	-	1000	-
Fluorene (mg/Kg)	-	ND	0.0251	0.0060	ND	ND	-	1000	-
Indeno(1,2,3,C,D)pyrene (mg/Kg)	-	ND	ND	ND	ND	ND	-	0.22	-
Naphthalene (mg/Kg)	-	0.0151	0.151	ND	ND	ND	-	23	-
Pyrene (mg/Kg)	-	ND	ND	ND	ND	ND	-	1000	-
Electrical Conductivity (mmhos/cm)	-	1.430	2.250	4.780	6.450	5.410	-	4	-
Sodium Adsorption Ratio (SAR)	-	6.31	13.3	15.9	11.6	11.0	-	12	-
pH	-	8.97	9.26	9.36	8.76	8.80	-	6-9	-
Arsenic (mg/kg)	-	4.4	5.6	5.3	7.8	5.8	-	0.39	17.5
Barium (mg/kg)	-	187	171	432	706	1620	-	15000	-
Cadmium (mg/kg)	-	<0.74	<1.2	<1.1	<1.2	<1.1	-	70	-
Chromium (III) (mg/Kg)	-	22.1	26.0	26.4	21.7	21.5	-	120000	-
Chromium (VI) (mg/Kg)	-	<1.0	<1.0	<1.0	<1.0	<1.0	-	23	-
Copper (mg/kg)	-	9.1	9.9	10.0	9.2	10.3	-	3100	-
Lead (inorganic) (mg/kg)	-	8.9	12.6	11.1	10.4	10.1	-	400	-
Mercury (mg/kg)	-	<0.10	<0.095	<0.095	<0.097	<0.092	-	23	-
Nickel (mg/kg)	-	10.7	13.7	12.8	12.3	12.9	-	1600	-
Selenium (mg/kg)	-	<3.7	<6.1	<5.4	<5.8	<5.5	-	390	-
Silver (mg/kg)	-	<2.2	<3.7	<3.2	<3.5	<3.3	-	390	-
Zinc (mg/kg)	-	32	41.9	41.6	35.5	36.4	-	23000	-
% Solids	75.5	79.0	81.1	88.0	85.6	86.1	85.7	-	-

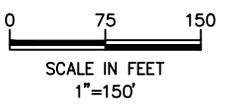
Notes:

- 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 Figure 4 for sample locations.

\\hyper-v03\lkwd-co\sdk\proj\cto environmental\1104-01b arcadis love ranch 8\drawings\gw\_092911.dwg.3/11/15



LEGEND	
MNFLD	MANIFOLD
CIA	CHEMICAL INJECTOR AREA
_____	CONTAINMENT AREA



DESIGNED: MJ	CHECKED: DK	<b>FIGURE</b>  1	NOTES:
DATE: 3/10/15	DRAWN: DRF		
FILE NAME: gw_092911	SHEET NO. 1 of 9	DATE	REVISIONS
PROJECT NO. 1104-01B	SCALE: 1"=150'		

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

**FIGURE 1**  
PICEANCE CREEK  
LOVE RANCH 8  
FORMER TANK CONTAINMENT AREA  
SITE LOCATION MAP  
  
PREPARED FOR XTO ENERGY

\\hyper-v03\lkwd-co\sdk\proj\cto environmental\1104-01b arcadis love ranch 8\drawings\site15a.dwg,3/11/15

DEPTH (ft)	TPH	BENZENE	TOLUENE	XYLENES
9-19	8,180	4.70	91.7	360
16.5-19	6,100	2.34	57.8	241

DEPTH (ft)	TPH	BENZENE
16.5-19	474	0.202

DEPTH (ft)	TPH
15-19	ND

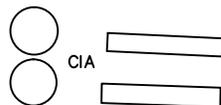
DEPTH (ft)	TPH
14-15	ND

DEPTH (ft)	TPH
16.5-19	ND

DEPTH (ft)	TPH	BENZENE	XYLENES
3	7,210	ND	132.1
12	7,820	ND	166.7
17	12,970	2.56	314.5

DEPTH (ft)	TPH	BENZENE
15.5-19	1,180	0.689

DEPTH (ft)	TPH
34-39	ND



**LEGEND & NOTES**

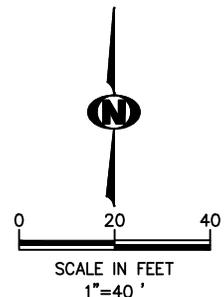
- GPU  
MANIFOLD
- CIA
- 
- 
- 
- 

- GAS PROCESSING UNIT
- MANIFOLD
- CHEMICAL INJECTOR AREA
- STUB UP
- CONTAINMENT AREA
- TOP OF SLOPE
- TOE OF SLOPE

- ⊗ BH-## BORE HOLE SAMPLE LOCATION WITH LAB RESULTS
- V-1 TEST PIT SAMPLE LOCATION WITH LAB RESULTS
- ⊗ LR8-MW-## MONITOR WELL SAMPLE LOCATION WITH SOIL BORING LAB RESULTS
- INDICATES LAB RESULTS GREATER THAN TABLE 910-1

**NOTES:**

1. ALL LABORATORY ANALYTICAL RESULTS ARE IN mg/kg UNITS
2. ND INDICATES NOT DETECTED TO LABORATORY DETECTION LIMIT

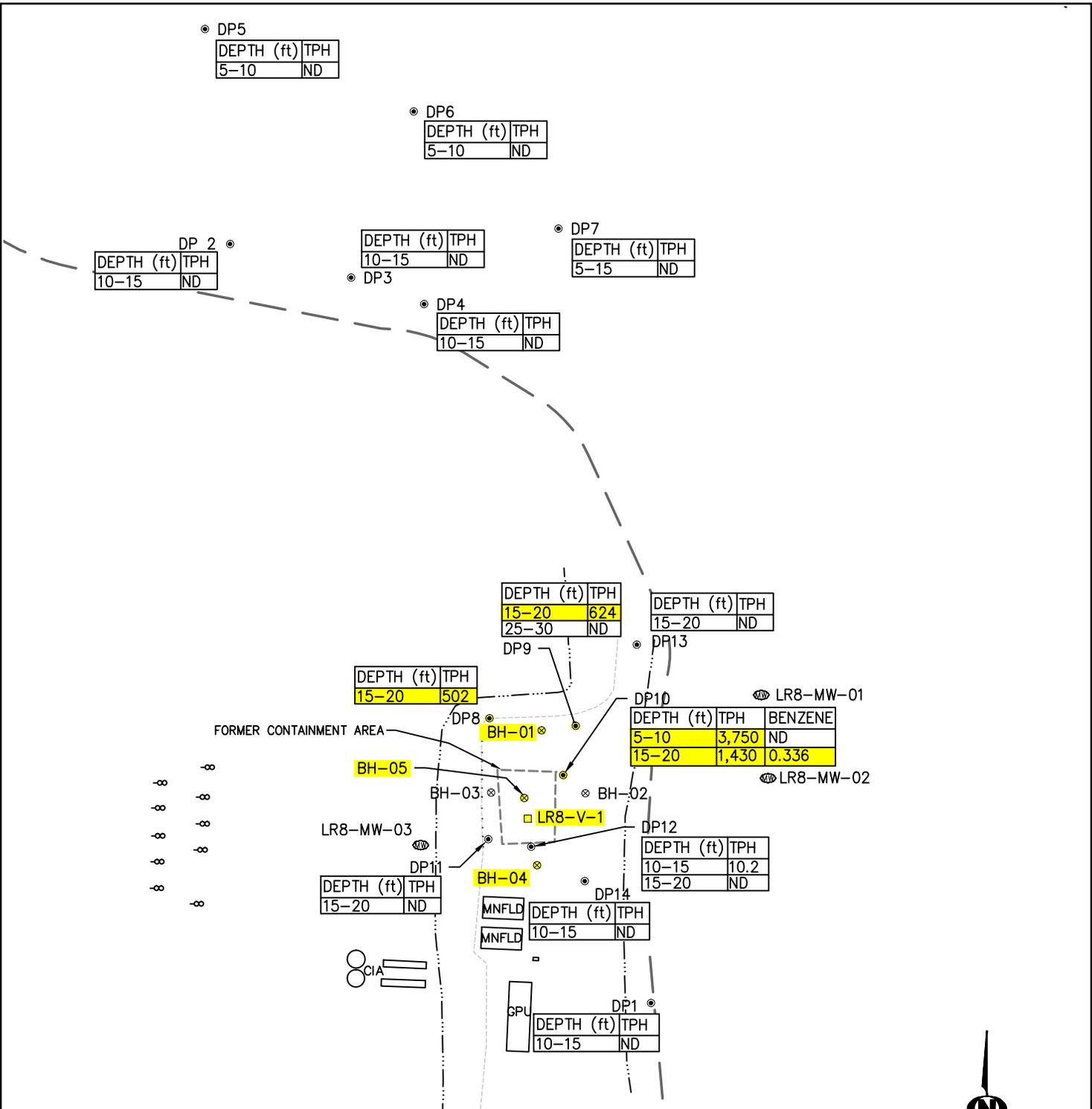


GPS: TH	CHECKED: JH	FIGURE 1A	DATE	REVISIONS
DATE: 3/10/15	DRAWN: DC			
FILE NAME: site15a	SHEET NO. 2 of 9			
PROJECT NO. 1104-01B	SCALE: 1" = 40'			

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

**FIGURE 1A**  
 PICEANCE CREEK  
 LOVE RANCH 8  
 FORMER TANK CONTAINMENT  
 AREA ASSESSMENT  
 PREPARED FOR XTO ENERGY

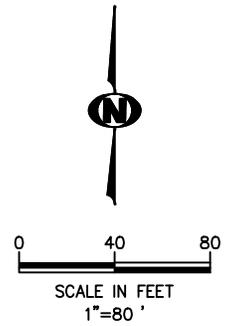
\\hyper-v03\lkw-d-co\sdk\proj\cto\environmental\1104-01b\arcadis\_love\_ranch\_8\drawings\site15b.dwg,3/11/15



**LEGEND & NOTES**

GPU	GAS PROCESSING UNIT	⊗ BH-##	BORE HOLE SAMPLE LOCATION
MNFLD	MANIFOLD	□ V-1	TEST PIT SAMPLE LOCATION
CIA	CHEMICAL INJECTOR AREA	⊗ LR8-MW-##	MONITOR WELL SAMPLE LOCATION
---	EDGE OF PAD DISTURBANCE	⊙ DP#	DIRECT PUSH SAMPLE LOCATION WITH LAB RESULTS
---	CONTAINMENT AREA	■	INDICATES LAB RESULTS GREATER THAN TABLE 910-1
---	TOP OF SLOPE		
---	TOE OF SLOPE		

**NOTES:**  
 1. ALL LABORATORY ANALYTICAL RESULTS ARE IN mg/kg UNITS  
 2. ND INDICATES NOT DETECTED TO LABORATORY DETECTION LIMIT

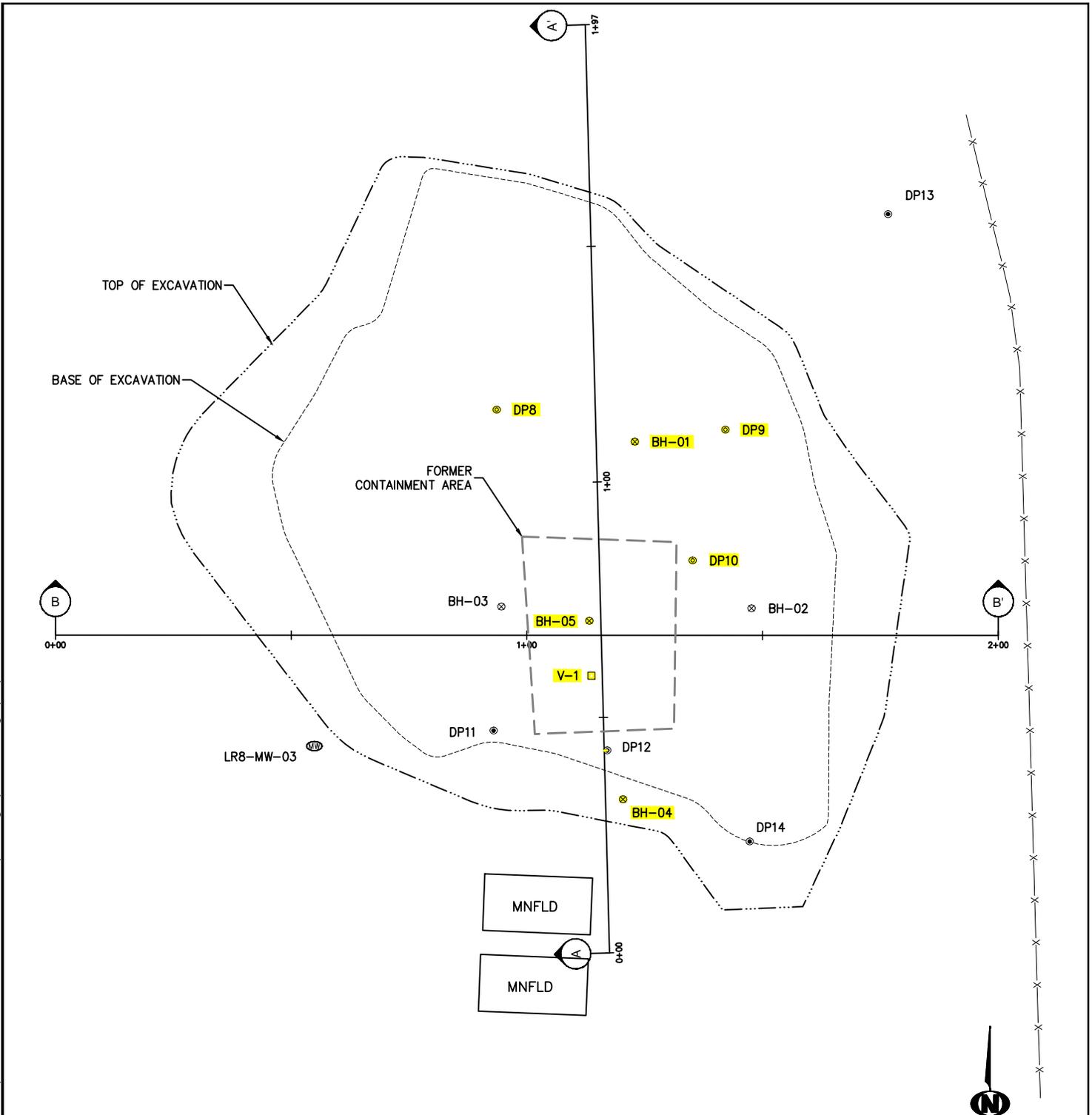


GPS: TH	CHECKED: JH	FIGURE 1B	DATE	REVISIONS
DATE: 3/11/15	DRAWN: DC			
FILE NAME: site15b	SHEET NO. 3 of 9			
PROJECT NO. 1104-01B	SCALE: 1" = 80'			

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

**FIGURE 1B**  
 PICEANCE CREEK  
 LOVE RANCH 8  
 FORMER TANK CONTAINMENT  
 AREA ASSESSMENT  
 PREPARED FOR XTO ENERGY

\\hyper-v03\lkw-co\sdk\proj\cto\environmental\1104-01b\arcadis\_love\_ranch\_8\drawings\excav15.dwg,3/11/15



LEGEND			
	MNFLD		BH-## BORE HOLE SAMPLE LOCATION
	MANIFOLD		V-1 TEST PIT SAMPLE LOCATION
	FENCE		LR8-MW-## MONITOR WELL SAMPLE LOCATION
	CONTAINMENT AREA		DP# DIRECT PUSH SAMPLE LOCATION
	TOP OF SLOPE		INDICATES LAB RESULTS GREATER THAN TABLE 910-1
	TOE OF SLOPE		

GPS: TH	CHECKED: JH	FIGURE 2	DATE	REVISIONS
DATE: 3/10/15	DRAWN: DC			
FILE NAME: excav15	SHEET NO. 4 of 9			
PROJECT NO. 1104-01B	SCALE: 1" = 30'			

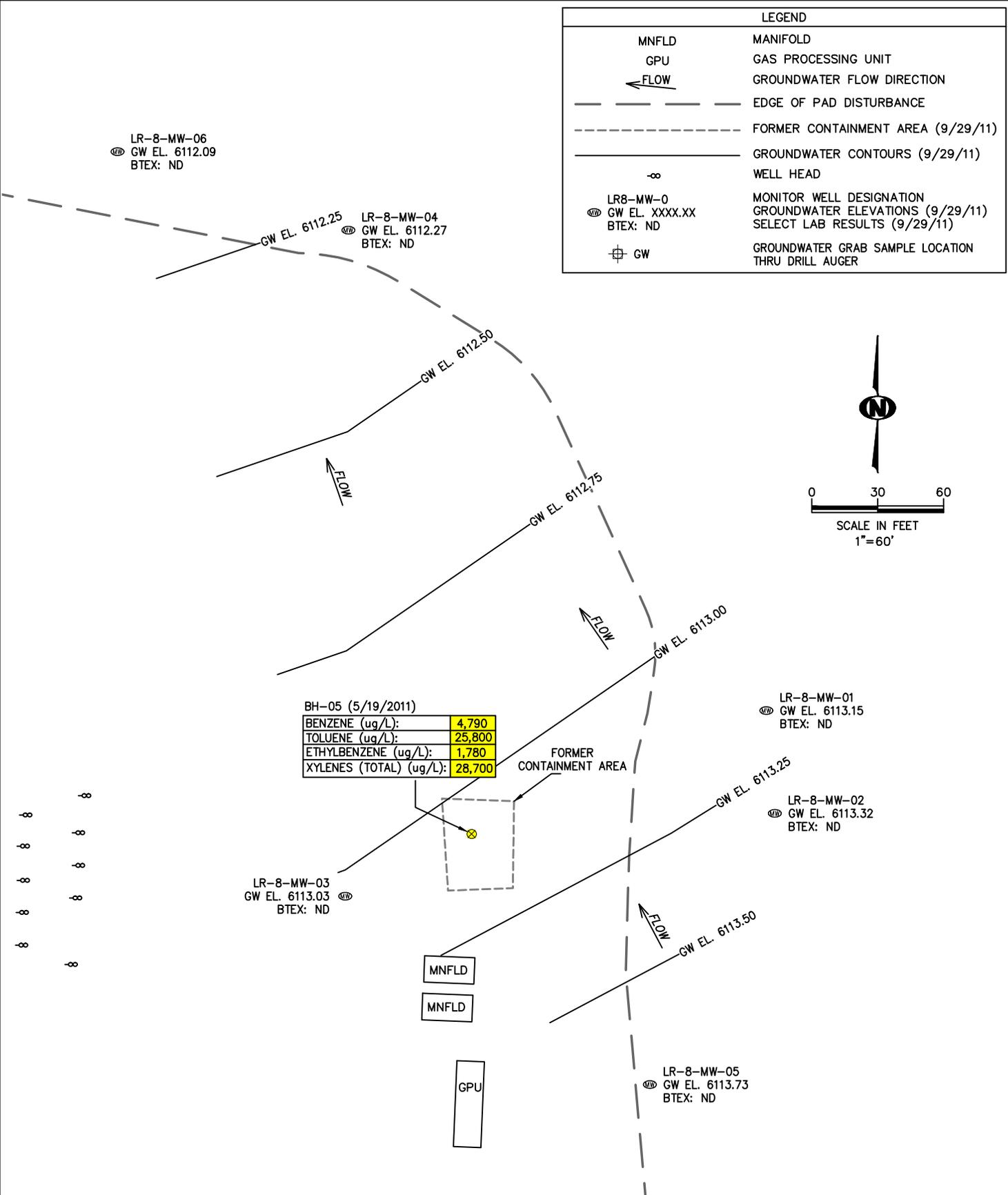
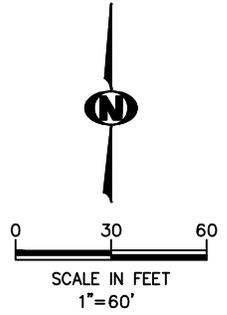
**KRW CONSULTING, INC.**  
 8000 W. 14TH AVENUE, SUITE 200  
 LAKEWOOD, COLORADO  
 (303) 239-9011

**FIGURE 2**  
 PICEANCE CREEK  
 LOVE RANCH 8  
 FORMER TANK CONTAINMENT AREA  
 POST-EXCAVATION  
 PREPARED FOR XTO ENERGY





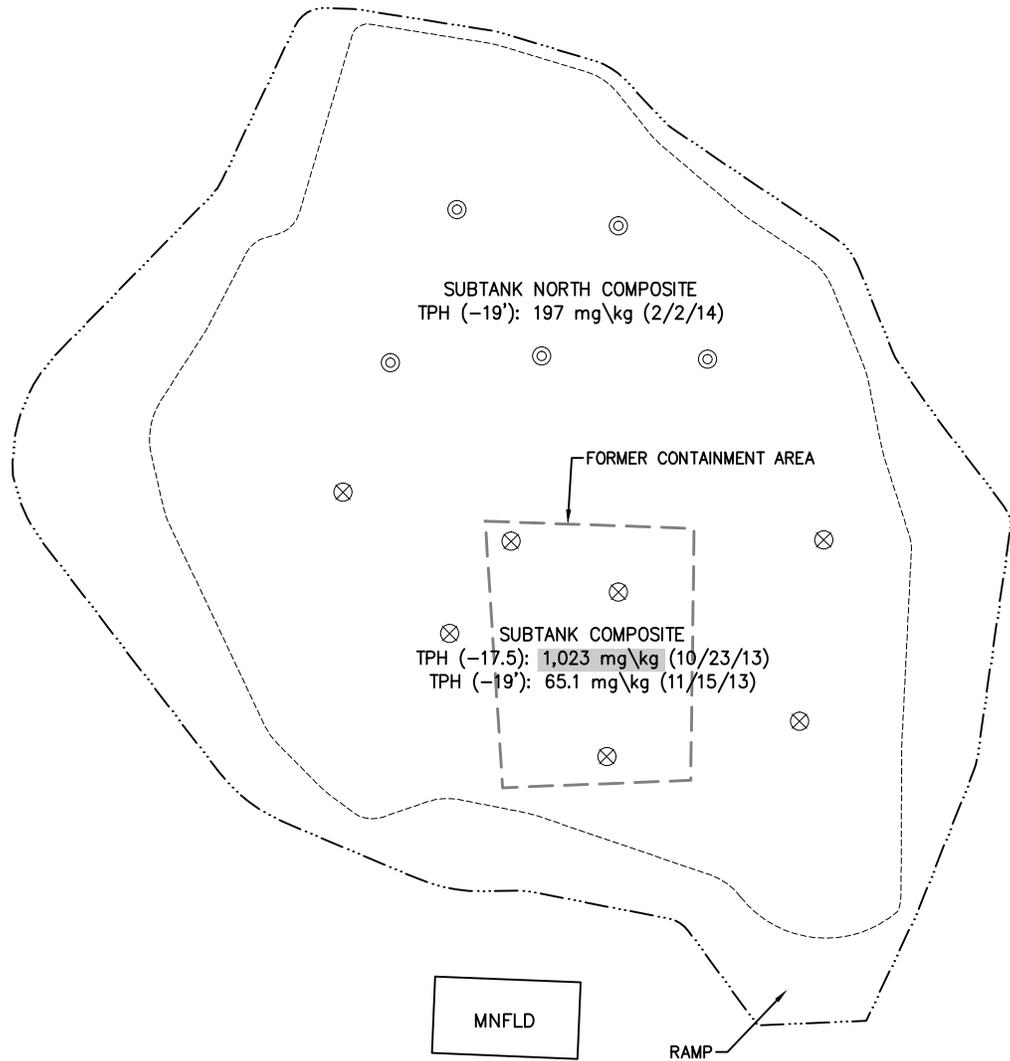
LEGEND	
MNFLD	MANIFOLD
GPU	GAS PROCESSING UNIT
← FLOW	GROUNDWATER FLOW DIRECTION
---	EDGE OF PAD DISTURBANCE
- - - - -	FORMER CONTAINMENT AREA (9/29/11)
—	GROUNDWATER CONTOURS (9/29/11)
⊙	WELL HEAD
⊙ LR8-MW-0 GW EL. XXXX.XX BTEX: ND	MONITOR WELL DESIGNATION GROUNDWATER ELEVATIONS (9/29/11) SELECT LAB RESULTS (9/29/11)
⊗ GW	GROUNDWATER GRAB SAMPLE LOCATION THRU DRILL AUGER



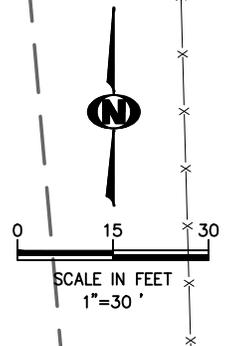
\\hyper-v03\kwd-co\sdk\proj\environmental\1104-01b arcadis love ranch 8\drawings\_gw\_092911a.dwg\_3/11/15

GPS: TH	CHECKED: JH	FIGURE 3	DATE	REVISIONS	<b>KRW CONSULTING, INC.</b> 8000 W. 14TH AVENUE, SUITE 200 LAKEWOOD, COLORADO (303) 239-9011	<b>FIGURE 3</b> PICEANCE CREEK LOVE RANCH 8 FORMER TANK CONTAINMENT AREA GW ASSESSMENT DATA 9.29.11 PREPARED FOR XTO ENERGY
DATE: 3/10/15	DRAWN: DC					
FILE NAME: gw_092911a	SHEET NO. 7 of 9					
PROJECT NO. 1104-01B	SCALE: 1" = 60'					

\\hyper-v03\kwd-co\sdk\proj\cto environmental\1104-01b arcadis love ranch 8\drawings\comp15.dwg,3/11/15



LEGEND	
GPU	GAS PROCESSING UNIT
MNFLD	MANIFOLD
⊗	SUBTANK COMPOSITE SAMPLE LOCATIONS (APPROX.)
⊙	SUBTANK NORTH COMPOSITE SAMPLE LOCATIONS (APPROX.)
---	EDGE OF PAD DISTURBANCE
-x-x-x-x-	FENCE
----	CONTAINMENT AREA
----	TOP OF SLOPE
----	TOE OF SLOPE
█	INDICATES IMPACTED SOILS WITH TPH > 500 mg/kg THAT HAVE BEEN REMOVED

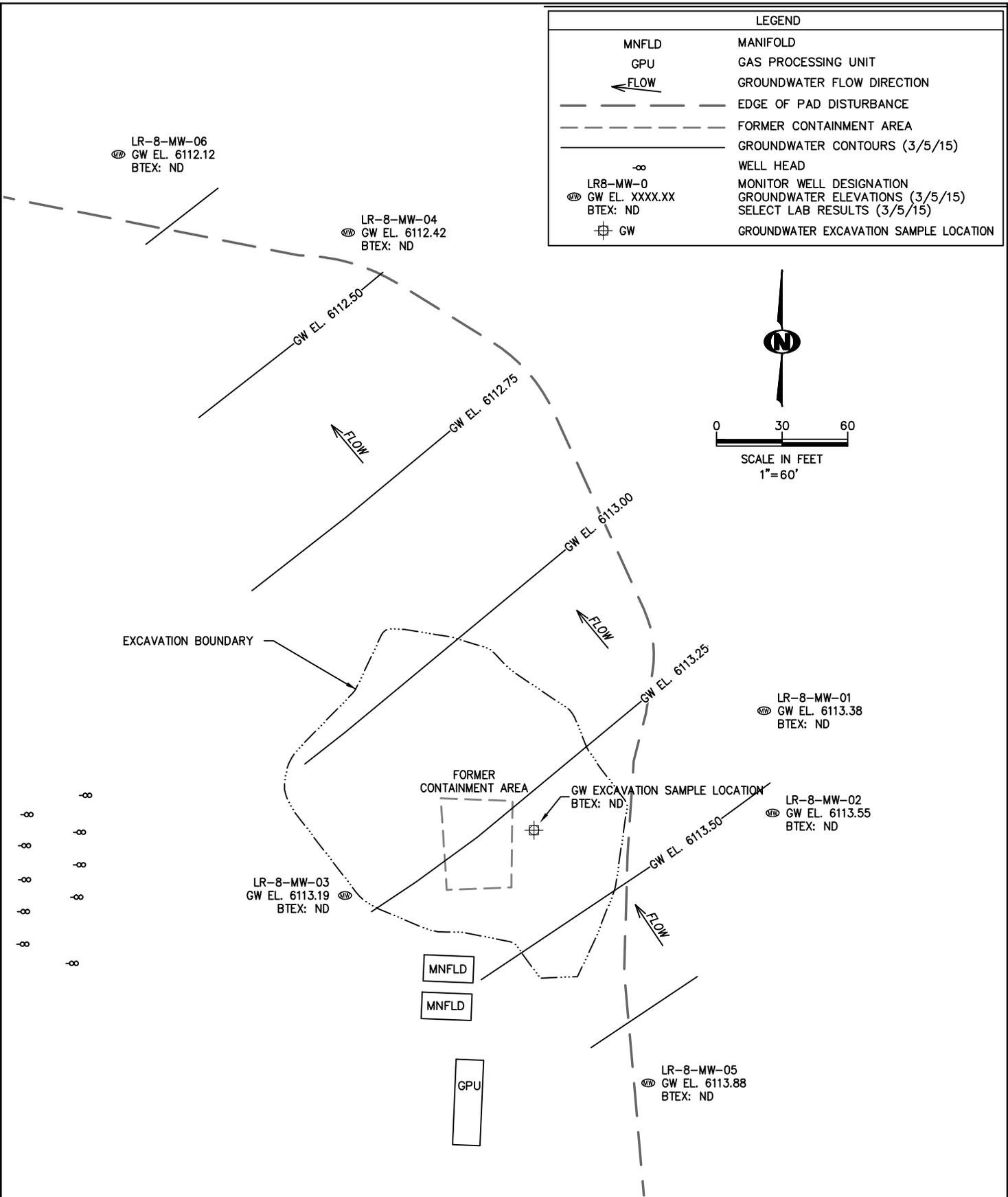


GPS: TH	CHECKED: JH	FIGURE 4	DATE	REVISIONS
DATE: 3/11/15	DRAWN: DC			
FILE NAME: comp15	SHEET NO. 8 of 9			
PROJECT NO. 1104-01B	SCALE: 1" = 30'			

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

**FIGURE 4**  
 PICEANCE CREEK  
 LOVE RANCH 8  
 FORMER TANK CONTAINMENT AREA  
 CONFIRMATION SAMPLING  
 PREPARED FOR XTO ENERGY

\\hyper-v03\kwd-co\sdk\proj\environmental\1104-01b arcadis love ranch 8\drawings\gw 121614.dwg,3/11/15



GPS: TH	CHECKED: JH	FIGURE 5	DATE	REVISIONS
DATE: 3/10/15	DRAWN: DC			
FILE NAME: gw 121614	SHEET NO. 9 of 9			
PROJECT NO. 1104-01B	SCALE: 1" = 60'			

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

**FIGURE 5**  
 PICEANCE CREEK  
 LOVE RANCH 8  
 FORMER TANK CONTAINMENT AREA  
 GW ASSESSMENT DATA 3.5.15  
 PREPARED FOR XTO ENERGY

**APPENDIX A**  
**MONITORING WELL LOGS AND WELL COMPLETION REPORTS**  
**MONITORING WELL PLUG AND ABANDON REPORTS**

Project Name/Number: 1104-01B

Boring No.: LR8\_MW-01

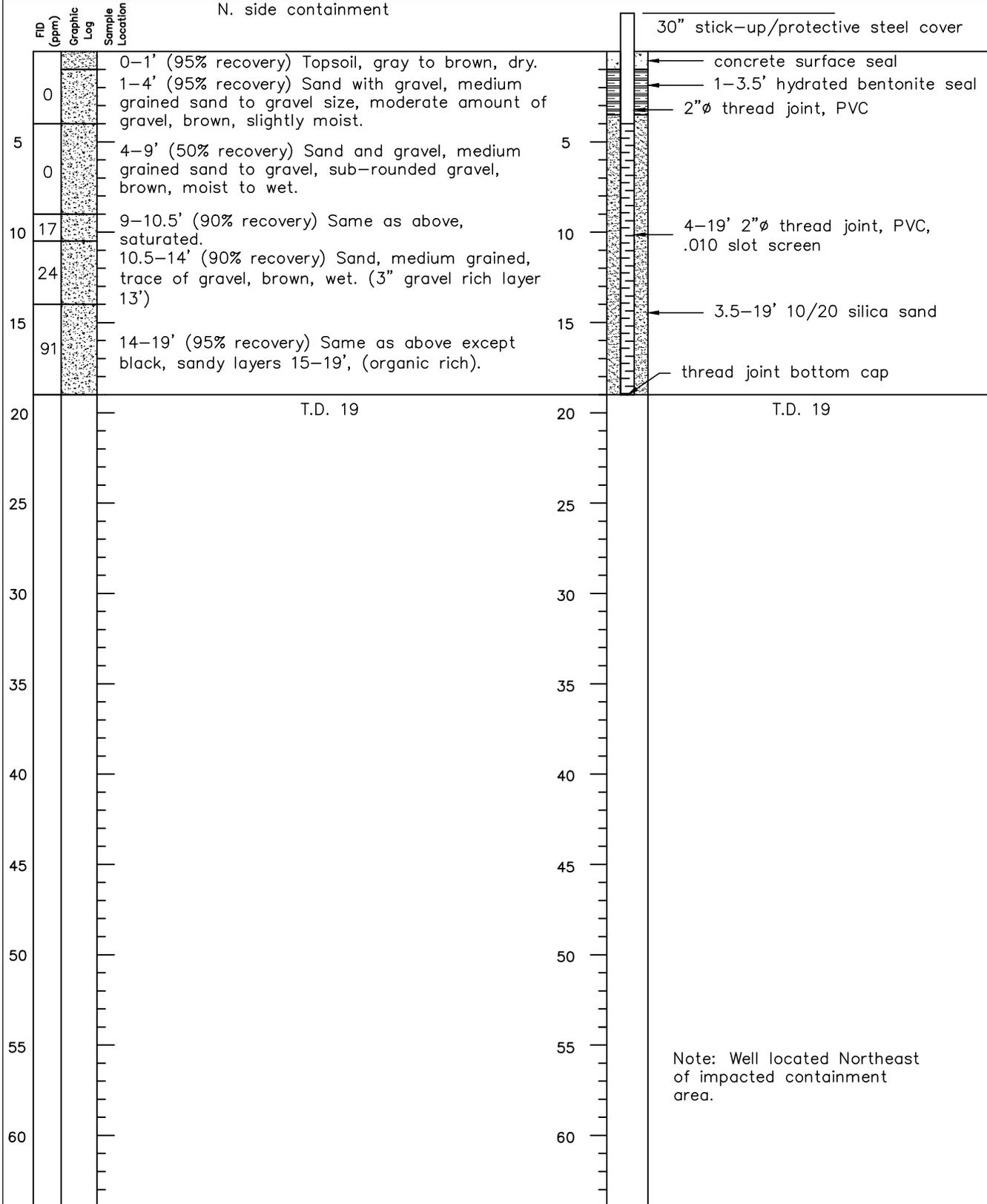
Project Location: Love #8

Logged By: G. Knell

Date: May 18, 2011

Sheet: 1 of 1

N. side containment



Note: Well located Northeast of impacted containment area.

Rig Type/Drilling Method: CME-75, hollow stem auger

Test Boring Elevation: \_\_\_\_\_

Hole Diameter: .8"

**KRW CONSULTING, INC.**

Project Name/Number: 1104-01B

Boring No.: LR8\_MW-02

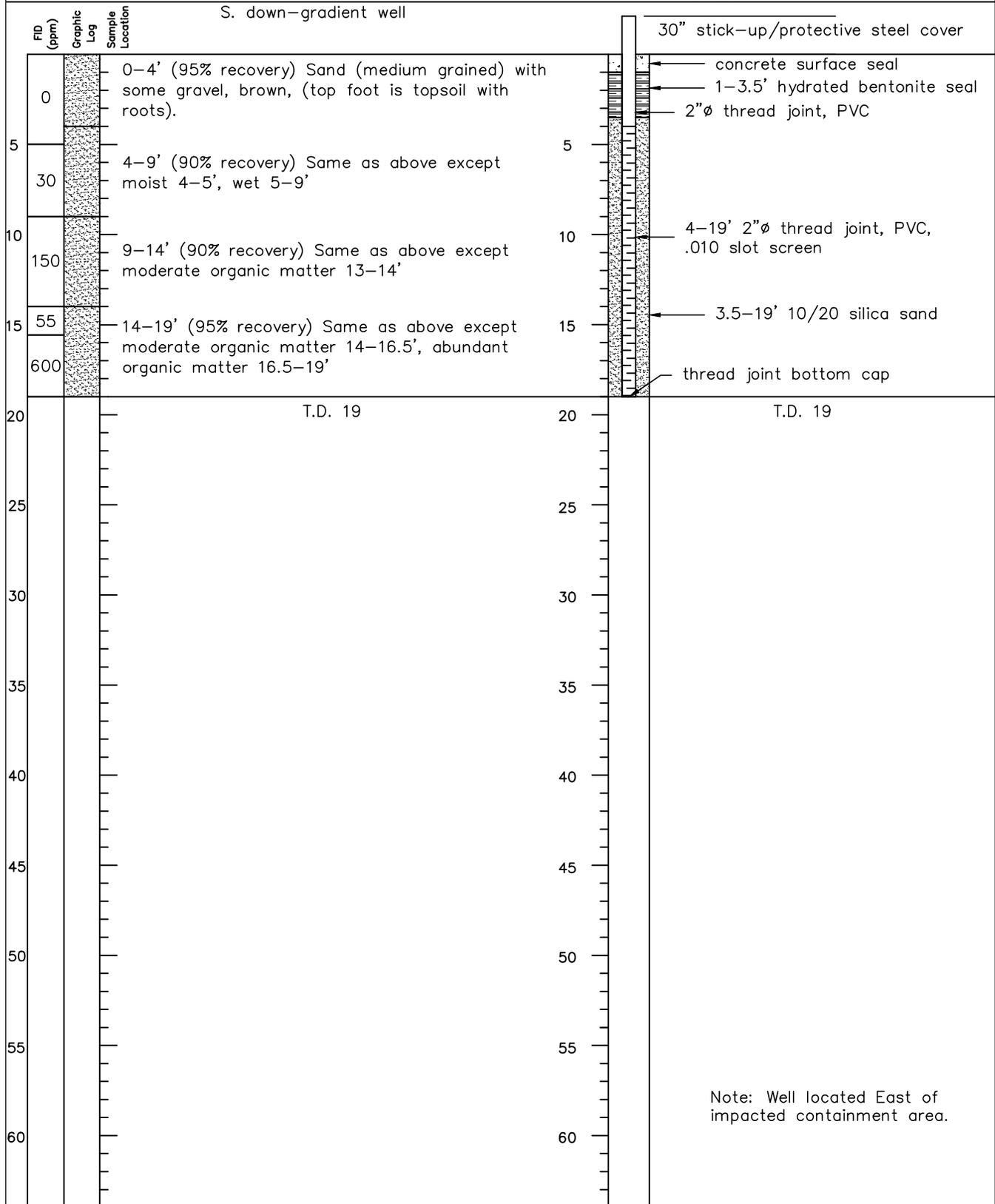
Project Location: Love #8

Logged By: G. Knell

Date: May 18, 2011

Sheet: 1 of 1

S. down-gradient well



Rig Type/Drilling Method: CME-75, hollow stem auger

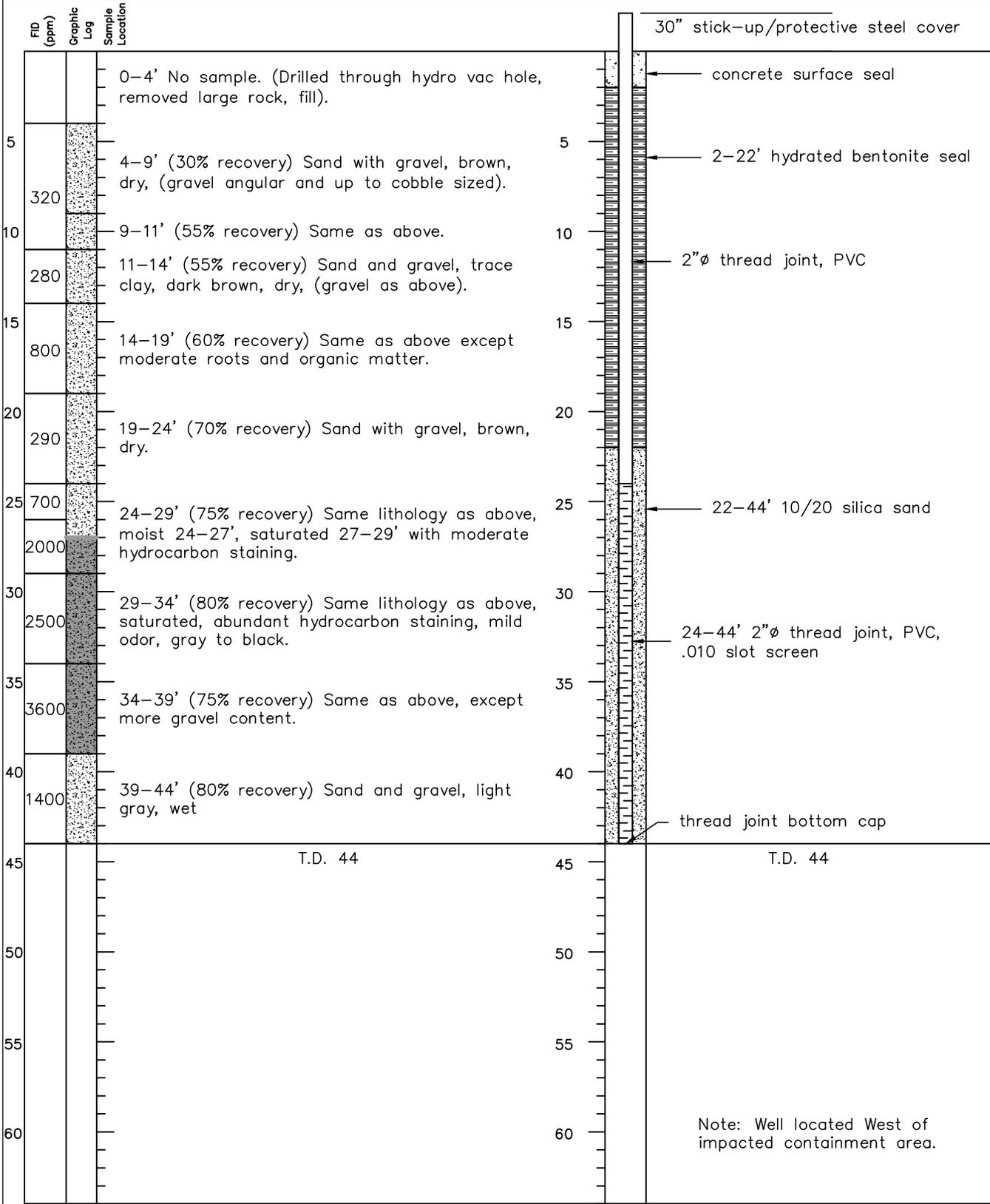
Test Boring Elevation: \_\_\_\_\_

Hole Diameter: .8"

**KRW CONSULTING, INC.**

Project Name/Number: 1104-01B  
 Project Location: Love #8  
 Date: May 19, 2011

Boring No.: LR8\_MW-03  
 Logged By: G. Knell  
 Sheet: 1 of 1



Rig Type/Drilling Method: CME-75, hollow stem auger  
 Hole Diameter: .8"

Test Boring Elevation: \_\_\_\_\_

Project Name/Number: 1104-01B

Boring No.: LR8\_MW-04

Project Location: Love #8

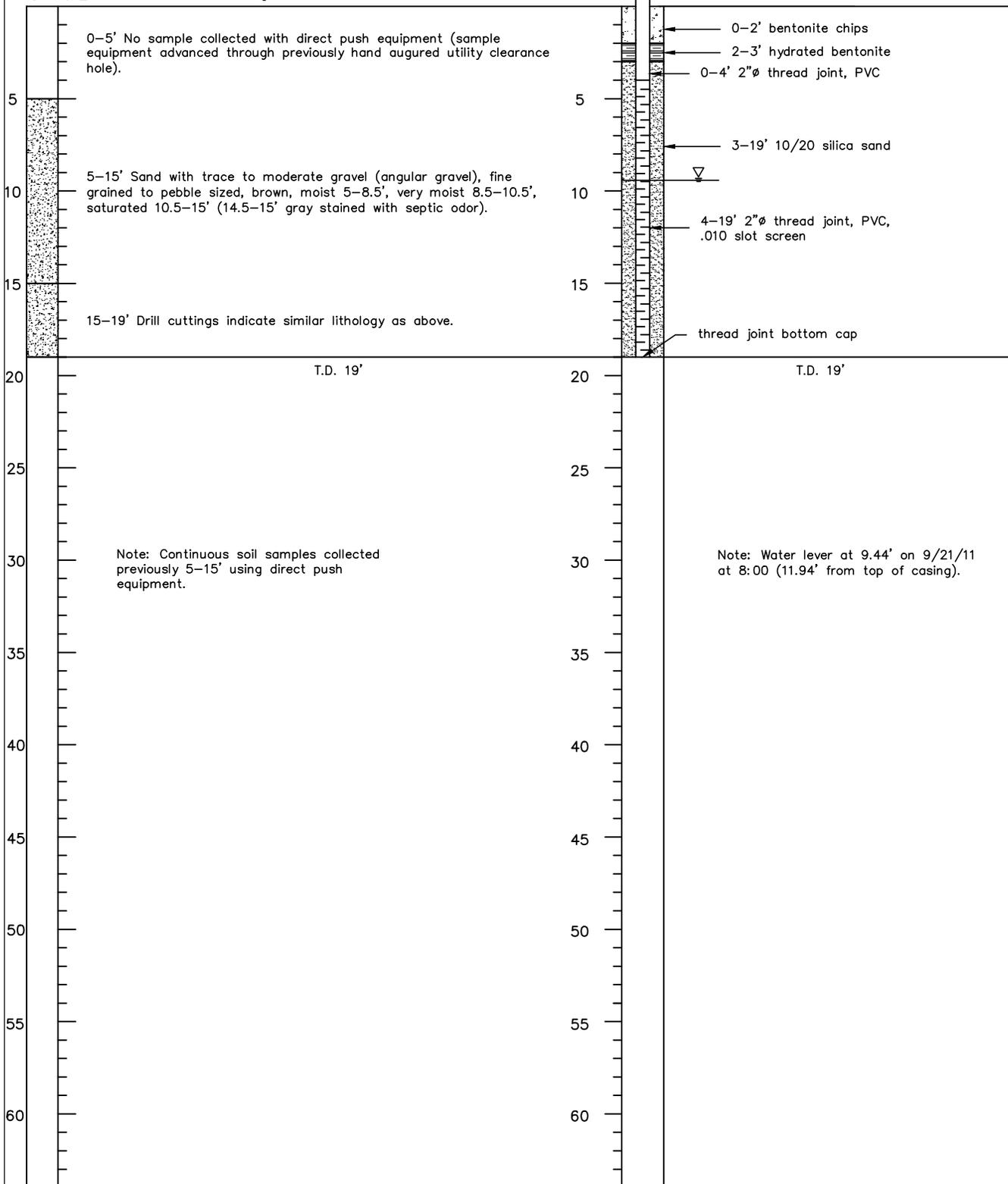
Logged By: G. Knell

Date: September 20 and 21, 2011

Sheet: 1 of 1

Graphic Log  
Sample Location

east most down gradient



Rig Type/Drilling Method: CME-75, hollow stem auger

Test Boring Elevation: \_\_\_\_\_

Hole Diameter: .8"

**KRW CONSULTING, INC.**

Project Name/Number: 1104-01B

Boring No.: LR8\_MW-05

Project Location: Love #8

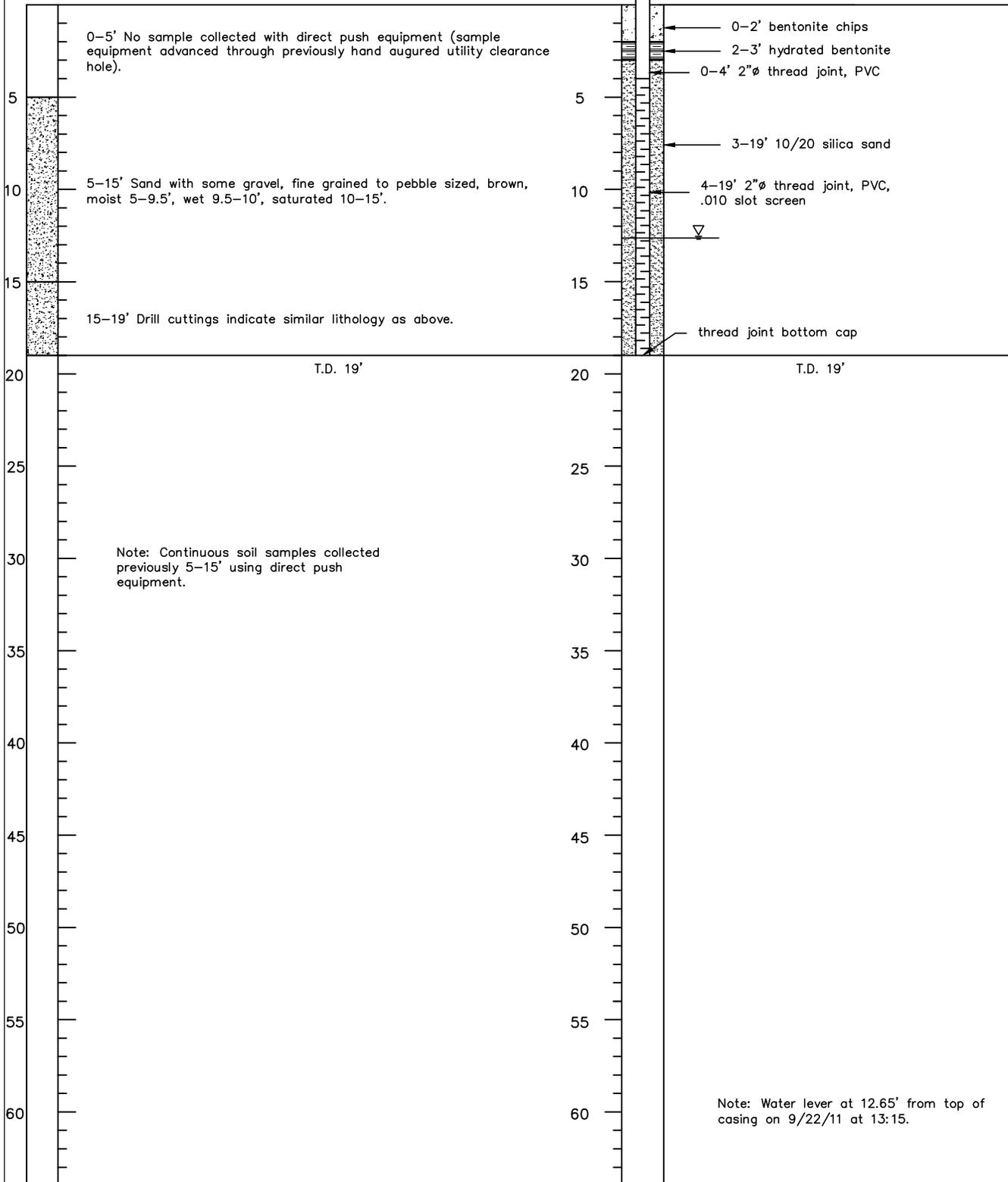
Logged By: G. Knell

Date: September 22, 2011

Sheet: 1 of 1

Graphic Log  
Sample Location

up gradient



Rig Type/Drilling Method: CME-75, hollow stem auger

Test Boring Elevation: \_\_\_\_\_

Hole Diameter: .8"

**KRW CONSULTING, INC.**

Project Name/Number: 1104-01B

Boring No.: LR8\_MW-06

Project Location: Love #8

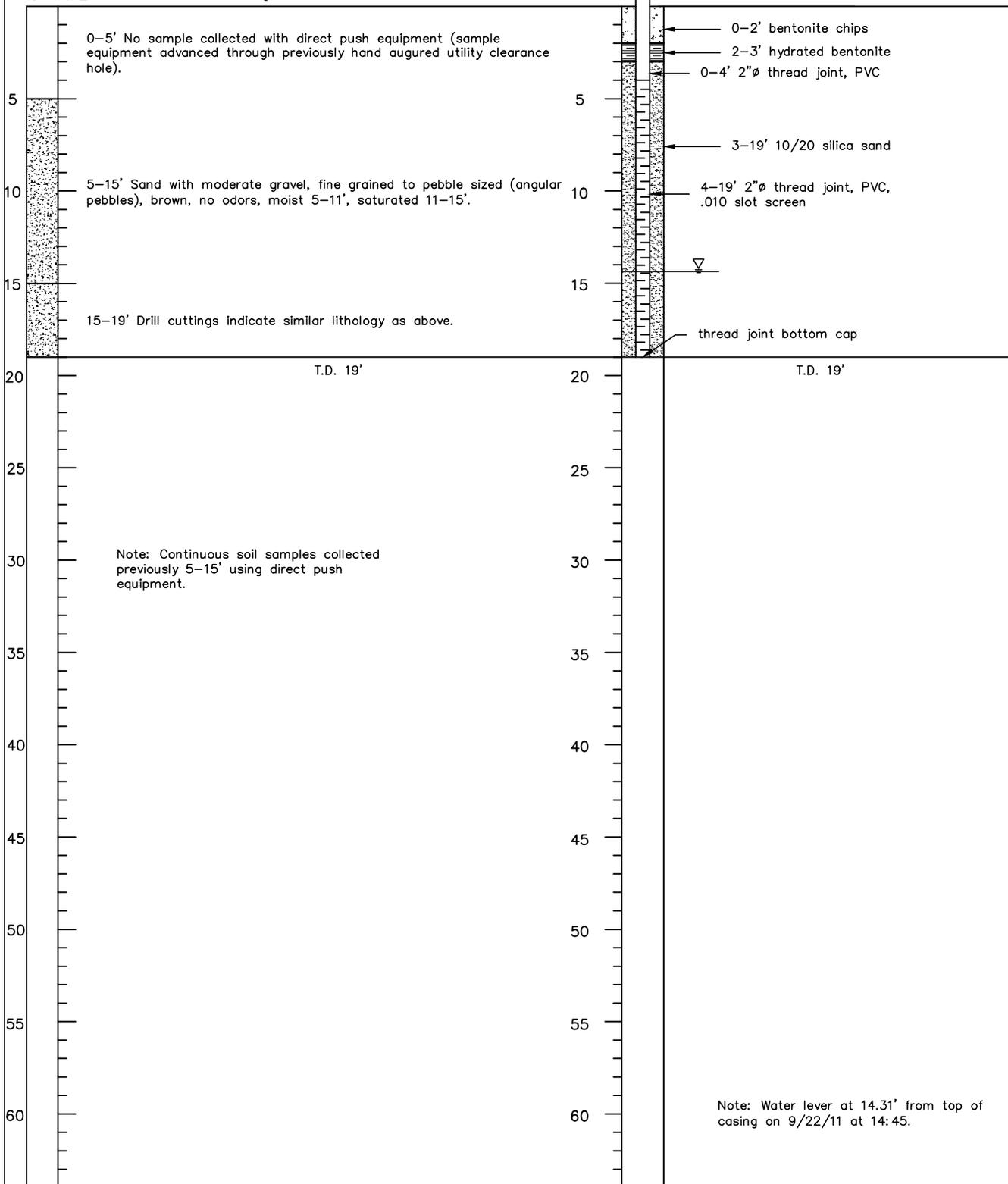
Logged By: G. Knell

Date: September 22, 2011

Sheet: 1 of 1

Graphic Log  
Sample Location

west most down gradient



Rig Type/Drilling Method: CME-75, hollow stem auger

Test Boring Elevation: \_\_\_\_\_

Hole Diameter: .8"

**KRW CONSULTING, INC.**

### Information and Standards

Conditions of approval of a replacement well permit generally require that the old well be plugged and sealed according to the Water Well Construction Rules. A blank report form is provided to the well owner when a replacement permit is issued. This report is also used to affirm that other types of wells and holes have been plugged and sealed. These reports must be completed and submitted to the Division of Water Resources, usually within 90 days of plugging and sealing the well/hole.

This form may be reproduced by photocopy or computer means. **If filing online please see online filing instructions** for further information at [www.water.state.co.us](http://www.water.state.co.us) You may also save, print and email the completed form to: [dwrpermitsonline@state.co.us](mailto:dwrpermitsonline@state.co.us)

#### **RULE 16 STANDARDS FOR PLUGGING, SEALING, AND ABANDONING WELLS AND BOREHOLES**

**16.1 General** - The plugging, sealing and abandonment of all wells, monitoring and observation wells, monitoring and observation holes and test holes that are no longer intended for use, and the plugging, sealing, and abandonment of dry holes, collapsed or unusable boreholes, and other incomplete wells or excavations is necessary to prevent contamination of ground water and the migration of water through the borehole. It is the ultimate responsibility of the well owner to have an existing well properly plugged, sealed and abandoned. The well construction contractor or authorized individual is responsible for notifying the well owner in writing of these plugging requirements.

**16.1.1** In the event a borehole(s) is not completed for the intended purpose, the contractor will notify the well owner of the well owner's responsibility for the proper abandonment of the borehole(s) according to Rule 16.1. If the well owner does not agree to allow the contractor to abandon the borehole(s), the contractor shall notify the Board of Examiners, in writing, of the existence of the borehole(s) and the contractor's effort to notify the well owner of the well owner's abandonment responsibilities under Rule 16.1

**16.1.2** Persons authorized to install pumping equipment may plug, seal and abandon wells that do not require the removal of casing that penetrates more than one aquifer or the ripping or perforating of casing opposite confining layers.

**16.1.3** Materials used for backfilling shall be clean, inert, and free from contaminants. The well casing may be cut off below land surface so that it will not interfere with the anticipated use of the land. If the casing is cut off below land surface, the uppermost five (5) feet of the remaining casing shall be filled with grout or a watertight cover shall be permanently attached to the remaining casing and the excavation shall be filled with materials that are not more permeable than the surrounding soils and adequately compacted to prevent settling.

**16.2 Wells or Boreholes in Type II and Type III Aquifers** - Wells completed into unconfined aquifers and unconsolidated aquifers shall be plugged, sealed and abandoned by filling the well to the static water level with drill cuttings, clean sand or clean gravel, then with clean native clays, cement or high solid bentonite grout to the ground surface. The uppermost five (5) feet of casing shall be filled with grout or a permanent watertight cover shall be installed at the top of the casing. If casing is removed, the hole shall be filled as described above to within five (5) feet of the ground surface. The top five (5) feet of the hole shall be filled with materials less permeable than the surrounding soils that are adequately compacted to prevent settling.

**16.2.1** Dewatering wells, horizontal drains, monitoring and observation holes, percolation holes, piezometer holes, sumps, test holes and dry holes shall be plugged, sealed, and abandoned either pursuant to Rule 16.2 or by removing all casing that was installed and by filling the hole(s) with drill cuttings, clean native clays, cement or high solid bentonite grout to within five (5) feet of the ground surface. The top five (5) feet of the hole shall be filled with materials less permeable than the surrounding soils that are adequately compacted to prevent settling.

**16.3 Wells or Boreholes in Type I Aquifers** - Wells which were constructed through more than one aquifer shall be plugged and sealed by placing a cement grout plug at the confining layer above each aquifer. If records do not show that the casing opposite each confining layer has been grouted when originally installed, the casing shall be either completely removed from the hole, or perforated or ripped opposite such layer prior to placing the grout plug. Plugs shall be no less than forty (40) feet in length and shall be designed to withstand the maximum potential hydrostatic pressure differential between the aquifers. The well casing, except for the grout plug intervals, shall be completely filled to the land surface with clean native clays, cement or high solid bentonite grout. A watertight cover shall be permanently welded or attached to the top of the casing.

If you have questions, contact the Denver or the Division Office where your well is located.

Division 1 810 9 <sup>th</sup> St. 2 <sup>nd</sup> Floor Greeley, CO 80631 (970) 352-8712 Fax (970) 392-1816	Division 2 310 E. Abriendo Ave Ste B Pueblo, CO 81004 (719) 542-3368 Fax (719) 544-0800	Division 3 301 Murphy Drive Alamosa, CO 81101 (719) 589-6683 Fax (719) 589-6685	Division 4 1871 East Main St. Montrose, CO 81401 (970) 249-6622 Fax (970) 249-8728
Division 5 Direct mail to Box 396 202 Center Drive Glenwood Spgs., CO 81601 (970) 945-5665 Fax (970) 945-8741	Division 6 Direct mail to Box 773450 505 Anglers Dr. Suite 101 Steamboat Spgs, CO 80477 (970) 879-0272 Fax (970) 879-1070	Division 7 160 Rock Point Dr., STE. E Durango, CO 81301 (970) 247-1845 Fax (970) 259-0944	Denver Office 1313 Sherman St. Rm. 821 Denver, CO 80203 (303) 866-3581 Fax (303) 866-3589

Form No. GWS-09 4/2012	<b>STATE OF COLORADO, OFFICE OF THE STATE ENGINEER</b> 821 Centennial Bldg., 1313 Sherman St., Denver, CO 80203 (303) 866-3581 Fax (303) 866-3589 <a href="mailto:dwrpermitsonline@state.co.us">dwrpermitsonline@state.co.us</a>	For Office Use Only
<b>WELL ABANDONMENT REPORT</b>		
Use to report plugging and sealing of permitted wells, monitoring and other holes. This form can be computer generated, typed or printed in black or blue ink. Instructions and plugging standards are on reverse side of form.		
Well Permit Number of the well being plugged <u>287043</u> or MH File Number MH- _____ Hole ID #/Name <u>LR8 MW-01</u>		
Individual/Company responsible for plugging and sealing the well:		
Name(s) <u>KRW Consulting INC.</u>		
Mailing Address <u>2106 Access RD. Unit 1C</u>		
City, St., Zip <u>Rifle, CO, 81650</u>		
Phone (area code & no.) <u>(970) 488-1098</u> Email: <u>NGrove@krwconsulting.com</u>		
Well (Hole) Owner:		
NAME(S) <u>ExxonMobil Oil Corp.</u> Phone (include area code) <u>(970) 675-4122</u>		
Mailing Address, City, St., Zip <u>21459 County RD. 5 Rifle, CO, 81650</u>		
ACTUAL WELL LOCATION: County <u>Rio Blanco</u>		
Property Address, City, St, Zip _____		
<u>SW</u> 1/4 of the <u>NW</u> 1/4, Sec. <u>9</u> , Twp. <u>2</u> <input type="checkbox"/> N. or <input checked="" type="checkbox"/> S., Range <u>97</u> <input type="checkbox"/> E. or <input checked="" type="checkbox"/> W., <u>SIXTH</u> P.M.		
Distance from Section Lines <u>2463</u> Ft. from <input checked="" type="checkbox"/> N. or <input type="checkbox"/> S., <u>576</u> Ft. from <input type="checkbox"/> E. or <input checked="" type="checkbox"/> W. Line.		
Subdivision Name _____ Lot _____, Block _____, Filing/Unit _____		
Optional: GPS well location information in UTM format. You must check GPS unit for required settings as follows: Format must be UTM, zone 12 <input type="checkbox"/> or zone 13 <input checked="" type="checkbox"/> ; Units must be meters; Datum must be NAD83; Unit must be set to true north.		
Easting _____ Northing _____		
I (we) report the existing well (hole) was plugged and sealed on the date of <u>03/03/2015</u> for the following reason(s):		
<input type="checkbox"/> The well was plugged and sealed as required under Well Permit Number _____.		
<input type="checkbox"/> The well was not in use and was plugged and sealed.		
<input checked="" type="checkbox"/> Other (please explain) <u>Groundwater assessment and monitoring was completed for this project.</u>		
The well was plugged with the following materials placed at the indicated intervals:		
Amount and Type of Material	Method of Placement	Interval
<u>Permanent Cap</u>	<u>Primer and Glue</u>	from _____ feet to <u>2</u> feet
<u>Hydrated Bentonite</u>	<u>by hand</u>	from <u>2</u> feet to <u>4</u> feet
<u>Sand</u>	<u>by hand</u>	from <u>4</u> feet to <u>19</u> feet
<b>Intervals of casing removed/ripped in feet</b>		from <u>0</u> feet to <u>2</u> feet
Report must be signed or name entered by person who performed the well plugging work or by the well owner if this person is unknown or not reachable. I (we) have read the statements made herein, know the contents thereof, and that they are true to my (our) knowledge.		
Sign or enter full name	If signing print name & title	Date (mm/dd/yyyy)
<u>Nathan Grove</u>	<u>Field Engineer</u>	<u>04/23/2015</u>
It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement.		

Form No. GWS-09 4/2012	<b>STATE OF COLORADO, OFFICE OF THE STATE ENGINEER</b> 821 Centennial Bldg., 1313 Sherman St., Denver, CO 80203 (303) 866-3581 Fax (303) 866-3589 <a href="mailto:dwrpermitsonline@state.co.us">dwrpermitsonline@state.co.us</a>	For Office Use Only
<b>WELL ABANDONMENT REPORT</b>		
Use to report plugging and sealing of permitted wells, monitoring and other holes. This form can be computer generated, typed or printed in black or blue ink. Instructions and plugging standards are on reverse side of form.		
Well Permit Number of the well being plugged <u>287044</u> or MH File Number MH- _____ Hole ID #/Name <u>LR8 MW-02</u>		
Individual/Company responsible for plugging and sealing the well:		
Name(s) <u>KRW Consulting INC.</u>		
Mailing Address <u>2106 Access RD. Unit 1C</u>		
City, St., Zip <u>Rifle, CO, 81650</u>		
Phone (area code & no.) <u>(970) 488-1098</u> Email: <u>NGrove@krwconsulting.com</u>		
Well (Hole) Owner:		
NAME(S) <u>ExxonMobil Oil Corp.</u> Phone (include area code) <u>(970) 675-4122</u>		
Mailing Address, City, St., Zip <u>21459 County RD. 5 Rifle, CO, 81650</u>		
ACTUAL WELL LOCATION: County <u>Rio Blanco</u>		
Property Address, City, St, Zip _____		
<u>SW</u> 1/4 of the <u>NW</u> 1/4, Sec. <u>9</u> , Twp. <u>2</u> <input type="checkbox"/> N. or <input checked="" type="checkbox"/> S., Range <u>97</u> <input type="checkbox"/> E. or <input checked="" type="checkbox"/> W., <u>SIXTH</u> P.M.		
Distance from Section Lines <u>2510</u> Ft. from <input checked="" type="checkbox"/> N. or <input type="checkbox"/> S., <u>581</u> Ft. from <input type="checkbox"/> E. or <input checked="" type="checkbox"/> W. Line.		
Subdivision Name _____ Lot _____, Block _____, Filing/Unit _____		
Optional: GPS well location information in UTM format. You must check GPS unit for required settings as follows: Format must be UTM, zone 12 <input type="checkbox"/> or zone 13 <input type="checkbox"/> ; Units must be meters; Datum must be NAD83; Unit must be set to true north.		
Easting _____ Northing _____		
I (we) report the existing well (hole) was plugged and sealed on the date of <u>03/03/2015</u> for the following reason(s):		
<input type="checkbox"/> The well was plugged and sealed as required under Well Permit Number _____.		
<input type="checkbox"/> The well was not in use and was plugged and sealed.		
<input checked="" type="checkbox"/> Other (please explain) <u>Groundwater assessment and monitoring was completed for this project.</u>		
The well was plugged with the following materials placed at the indicated intervals:		
Amount and Type of Material	Method of Placement	Interval
<u>Permanent Cap</u>	<u>Primer and Glue</u>	from _____ feet to <u>2</u> feet
<u>Hydrated Bentonite</u>	<u>by hand</u>	from <u>2</u> feet to <u>4</u> feet
<u>Sand</u>	<u>by hand</u>	from <u>4</u> feet to <u>19</u> feet
<b>Intervals of casing removed/ripped in feet</b>		from <u>0</u> feet to <u>2</u> feet
Report must be signed or name entered by person who performed the well plugging work or by the well owner if this person is unknown or not reachable. I (we) have read the statements made herein, know the contents thereof, and that they are true to my (our) knowledge.		
Sign or enter full name	If signing print name & title	Date (mm/dd/yyyy)
<u>Nathan Grove</u>	<u>Field Engineer</u>	<u>04/23/2015</u>
It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement.		

Form No. GWS-09 4/2012	<b>STATE OF COLORADO, OFFICE OF THE STATE ENGINEER</b> 821 Centennial Bldg., 1313 Sherman St., Denver, CO 80203 (303) 866-3581 Fax (303) 866-3589 <a href="mailto:dwrpermitsonline@state.co.us">dwrpermitsonline@state.co.us</a>	For Office Use Only
------------------------------	--	---------------------

**WELL ABANDONMENT REPORT**

Use to report plugging and sealing of permitted wells, monitoring and other holes. This form can be computer generated, typed or printed in black or blue ink. Instructions and plugging standards are on reverse side of form.

**Well Permit Number of the well being plugged** 287046 **or**  
**MH File Number MH-** \_\_\_\_\_ **Hole ID #/Name** LR8 MW-03

Individual/Company responsible for plugging and sealing the well:

Name(s) KRW Consulting INC.  
Mailing Address 2106 Access RD. Unit 1C  
City, St., Zip Rifle, CO, 81650  
Phone (area code & no.) (970) 488-1098 Email: NGrove@krwconsulting.com

Well (Hole) Owner:

NAME(S) ExxonMobil Oil Corp. Phone (include area code) (970) 675-4122  
Mailing Address, City, St., Zip 21459 County RD. 5 Rifle, CO, 81650

ACTUAL WELL LOCATION: County Rio Blanco

Property Address, City, St, Zip \_\_\_\_\_

SW 1/4 of the NW 1/4, Sec. 9, Twp. 2  N. or  S., Range 97  E. or  W., SIXTH P.M.

Distance from Section Lines 2550 Ft. from  N. or  S., 386 Ft. from  E. or  W. Line.

Subdivision Name \_\_\_\_\_ Lot \_\_\_\_\_, Block \_\_\_\_\_, Filing/Unit \_\_\_\_\_

Optional: GPS well location information in UTM format. You must check GPS unit for required settings as follows:

Format must be UTM, zone 12  or zone 13 ; Units must be meters; Datum must be NAD83; Unit must be set to true north.

Easting \_\_\_\_\_ Northing \_\_\_\_\_

I (we) report the existing well (hole) was plugged and sealed on the date of 03/03/2015 for the following reason(s):

- The well was plugged and sealed as required under Well Permit Number \_\_\_\_\_.
- The well was not in use and was plugged and sealed.
- Other (please explain) Groundwater assessment and monitoring was completed for this project.

The well was plugged with the following materials placed at the indicated intervals:

Amount and Type of Material	Method of Placement	Interval
<u>Permanent Cap</u>	<u>Primer and Glue</u>	from _____ feet to <u>8</u> feet
<u>Hydrated Bentonite</u>	<u>by hand</u>	from <u>8</u> feet to <u>20</u> feet
<u>Sand</u>	<u>by hand</u>	from <u>20</u> feet to <u>44</u> feet
<b>Intervals of casing removed/ripped in feet</b>		from <u>0</u> feet to <u>8</u> feet

Report must be signed or name entered by person who performed the well plugging work or by the well owner if this person is unknown or not reachable. I (we) have read the statements made herein, know the contents thereof, and that they are true to my (our) knowledge.

Sign or enter full name  <u>Nathan Grove</u>	If signing print name & title  <u>Field Engineer</u>	Date (mm/dd/yyyy)  <u>04/23/2015</u>
--	--	--

It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement.

Form No. GWS-09 4/2012	<b>STATE OF COLORADO, OFFICE OF THE STATE ENGINEER</b> 821 Centennial Bldg., 1313 Sherman St., Denver, CO 80203 (303) 866-3581 Fax (303) 866-3589 <a href="mailto:dwrpermitonline@state.co.us">dwrpermitonline@state.co.us</a>	For Office Use Only
------------------------------	--	---------------------

**WELL ABANDONMENT REPORT**

Use to report plugging and sealing of permitted wells, monitoring and other holes. This form can be computer generated, typed or printed in black or blue ink. Instructions and plugging standards are on reverse side of form.

**Well Permit Number of the well being plugged** 287047 **or**  
**MH File Number MH-** \_\_\_\_\_ **Hole ID #/Name** LR8 MW-04

Individual/Company responsible for plugging and sealing the well:

Name(s) KRW Consulting INC.  
 Mailing Address 2106 Access RD. Unit 1C  
 City, St., Zip Rifle, CO, 81650  
 Phone (area code & no.) (970) 488-1098 Email: NGrove@krwconsulting.com

Well (Hole) Owner:

NAME(S) ExxonMobil Oil Corp. Phone (include area code) (970) 675-4122  
 Mailing Address, City, St., Zip 21459 County RD. 5 Rifle, CO, 81650

ACTUAL WELL LOCATION: County Rio Blanco

Property Address, City, St, Zip \_\_\_\_\_

SW 1/4 of the NW 1/4, Sec. 9, Twp. 2  N. or  S., Range 97  E. or  W., SIXTH P.M.

Distance from Section Lines 2247 Ft. from  N. or  S., 381 Ft. from  E. or  W. Line.

Subdivision Name \_\_\_\_\_ Lot \_\_\_\_\_, Block \_\_\_\_\_, Filing/Unit \_\_\_\_\_

Optional: GPS well location information in UTM format. You must check GPS unit for required settings as follows:

Format must be UTM, zone 12  or zone 13 ; Units must be meters; Datum must be NAD83; Unit must be set to true north.

**Easting** \_\_\_\_\_ **Northing** \_\_\_\_\_

I (we) report the existing well (hole) was plugged and sealed on the date of 03/03/2015 for the following reason(s):

- The well was plugged and sealed as required under Well Permit Number \_\_\_\_\_.
- The well was not in use and was plugged and sealed.
- Other (please explain) Groundwater assessment and monitoring was completed for this project.

The well was plugged with the following materials placed at the indicated intervals:

Amount and Type of Material	Method of Placement	Interval
<u>Permanent Cap</u>	<u>Primer and Glue</u>	from _____ feet to <u>2</u> feet
<u>Hydrated Bentonite</u>	<u>by hand</u>	from <u>2</u> feet to <u>4</u> feet
<u>Sand</u>	<u>by hand</u>	from <u>4</u> feet to <u>19</u> feet
<b>Intervals of casing removed/ripped in feet</b>		from <u>0</u> feet to <u>2</u> feet

Report must be signed or name entered by person who performed the well plugging work or by the well owner if this person is unknown or not reachable. I (we) have read the statements made herein, know the contents thereof, and that they are true to my (our) knowledge.

Sign or enter full name  <u>Nathan Grove</u>	If signing print name & title  <u>Field Engineer</u>	Date (mm/dd/yyyy)  <u>04/23/2015</u>
--	--	--

It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement.

Form No. GWS-09 4/2012	<b>STATE OF COLORADO, OFFICE OF THE STATE ENGINEER</b> 821 Centennial Bldg., 1313 Sherman St., Denver, CO 80203 (303) 866-3581 Fax (303) 866-3589 <a href="mailto:dwrpermitonline@state.co.us">dwrpermitonline@state.co.us</a>	For Office Use Only
------------------------------	--	---------------------

**WELL ABANDONMENT REPORT**

Use to report plugging and sealing of permitted wells, monitoring and other holes. This form can be computer generated, typed or printed in black or blue ink. Instructions and plugging standards are on reverse side of form.

**Well Permit Number of the well being plugged** 287048 **or**  
**MH File Number MH-** \_\_\_\_\_ **Hole ID #/Name** LR8 MW-05

Individual/Company responsible for plugging and sealing the well:  
 Name(s) KRW Consulting INC.  
 Mailing Address 2106 Access RD. Unit 1C  
 City, St., Zip Rifle, CO, 81650  
 Phone (area code & no.) (970) 488-1098 Email: NGrove@krwconsulting.com

Well (Hole) Owner:  
 NAME(S) ExxonMobil Oil Corp. Phone (include area code) (970) 675-4122  
 Mailing Address, City, St., Zip 21459 County RD. 5 Rifle, CO, 81650

ACTUAL WELL LOCATION: County Rio Blanco  
 Property Address, City, St, Zip \_\_\_\_\_  
 SW 1/4 of the NW 1/4, Sec. 9, Twp. 2  N. or  S., Range 97  E. or  W., SIXTH P.M.  
 Distance from Section Lines 2634 Ft. from  N. or  S., 527 Ft. from  E. or  W. Line.  
 Subdivision Name \_\_\_\_\_ Lot \_\_\_\_\_, Block \_\_\_\_\_, Filing/Unit \_\_\_\_\_  
 Optional: GPS well location information in UTM format. You must check GPS unit for required settings as follows:  
 Format must be UTM, zone 12  or zone 13 ; Units must be meters; Datum must be NAD83; Unit must be set to true north.  
 Easting \_\_\_\_\_ Northing \_\_\_\_\_

I (we) report the existing well (hole) was plugged and sealed on the date of 03/03/2015 for the following reason(s):  
 The well was plugged and sealed as required under Well Permit Number \_\_\_\_\_.  
 The well was not in use and was plugged and sealed.  
 Other (please explain) Groundwater assessment and monitoring was completed for this project.

The well was plugged with the following materials placed at the indicated intervals:

Amount and Type of Material	Method of Placement	Interval
<u>Permanent Cap</u>	<u>Primer and Glue</u>	from _____ feet to <u>2</u> feet
<u>Hydrated Bentonite</u>	<u>by hand</u>	from <u>2</u> feet to <u>4</u> feet
<u>Sand</u>	<u>by hand</u>	from <u>4</u> feet to <u>19</u> feet
<b>Intervals of casing removed/ripped in feet</b>		from <u>0</u> feet to <u>2</u> feet

Report must be signed or name entered by person who performed the well plugging work or by the well owner if this person is unknown or not reachable. I (we) have read the statements made herein, know the contents thereof, and that they are true to my (our) knowledge.

Sign or enter full name	If signing print name & title	Date (mm/dd/yyyy)
<u>Nathan Grove</u>	<u>Field Engineer</u>	<u>04/23/2015</u>

It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement.

Form No. GWS-09 4/2012	<b>STATE OF COLORADO, OFFICE OF THE STATE ENGINEER</b> 821 Centennial Bldg., 1313 Sherman St., Denver, CO 80203 (303) 866-3581 Fax (303) 866-3589 <a href="mailto:dwrpermitsonline@state.co.us">dwrpermitsonline@state.co.us</a>	For Office Use Only
------------------------------	--	---------------------

**WELL ABANDONMENT REPORT**

Use to report plugging and sealing of permitted wells, monitoring and other holes. This form can be computer generated, typed or printed in black or blue ink. Instructions and plugging standards are on reverse side of form.

**Well Permit Number of the well being plugged** 287049 **or**  
**MH File Number MH-** \_\_\_\_\_ **Hole ID #/Name** LR8 MW-06

Individual/Company responsible for plugging and sealing the well:

Name(s) KRW Consulting INC.  
 Mailing Address 2106 Access RD. Unit 1C  
 City, St., Zip Rifle, CO, 81650  
 Phone (area code & no.) (970) 488-1098 Email: NGrove@krwconsulting.com

Well (Hole) Owner:

NAME(S) ExxonMobil Oil Corp. Phone (include area code) (970) 675-4122  
 Mailing Address, City, St., Zip 21459 County RD. 5 Rifle, CO, 81650

ACTUAL WELL LOCATION: County Rio Blanco

Property Address, City, St, Zip \_\_\_\_\_

SW 1/4 of the NW 1/4, Sec. 9, Twp. 2  N. or  S., Range 97  E. or  W., SIXTH P.M.

Distance from Section Lines 2213 Ft. from  N. or  S., 275 Ft. from  E. or  W. Line.

Subdivision Name \_\_\_\_\_ Lot \_\_\_\_\_, Block \_\_\_\_\_, Filing/Unit \_\_\_\_\_

Optional: GPS well location information in UTM format. You must check GPS unit for required settings as follows:

Format must be UTM, zone 12  or zone 13 ; Units must be meters; Datum must be NAD83; Unit must be set to true north.

**Easting** \_\_\_\_\_ **Northing** \_\_\_\_\_

I (we) report the existing well (hole) was plugged and sealed on the date of 03/03/2015 for the following reason(s):

- The well was plugged and sealed as required under Well Permit Number \_\_\_\_\_.
- The well was not in use and was plugged and sealed.
- Other (please explain) Groundwater assessment and monitoring was completed for this project.

The well was plugged with the following materials placed at the indicated intervals:

Amount and Type of Material	Method of Placement	Interval
<u>Permanent Cap</u>	<u>Primer and Glue</u>	from _____ feet to <u>2</u> feet
<u>Hydrated Bentonite</u>	<u>by hand</u>	from <u>2</u> feet to <u>4</u> feet
<u>Sand</u>	<u>by hand</u>	from <u>4</u> feet to <u>19</u> feet
<b>Intervals of casing removed/ripped in feet</b>		from <u>0</u> feet to <u>2</u> feet

Report must be signed or name entered by person who performed the well plugging work or by the well owner if this person is unknown or not reachable. I (we) have read the statements made herein, know the contents thereof, and that they are true to my (our) knowledge.

Sign or enter full name  <u>Nathan Grove</u>	If signing print name & title  <u>Field Engineer</u>	Date (mm/dd/yyyy)  <u>04/23/2015</u>
--	--	--

It is the responsibility of the well owner to have the well/hole properly plugged and sealed. The Well Construction Contractor is responsible for notifying the owner of this requirement.

# Love Ranch 8 Tank Area Closure Photos



VIEW FACING EAST  
4/14/2015



VIEW FACING NORTH  
4/14/2015



**Love Ranch 8 Fee**  
SWNW, Sec 9, TWP 2S  
Rng 97W, Nad 83, 6<sup>th</sup> PM  
Lat: 39.89146  
Long: -108.29566

