CM Production, LLC
Oliver Warren #1 Former Skim Pits Excavation and Landfarm Remediation Work Plan
COGCC Remediation Project #8209
Hyde Field, Washington County, Colorado

Prepared for:

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November 19, 2014

Olsson Project #013-1681
Phase 102/Task 102001

OLSSON ASSOCIATES

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1.0 Introduction and Site Information

CM Production retained Olsson Associates to perform environmental oversight during remediation of petroleum hydrocarbon-impacted soils excavated from two former skim pits at the Oliver Warren #1 crude oil production site. Olsson performed a subsurface assessment of the skim pit on March 27, 2014 which identified petroleum impacts that were above the Colorado Oil and Gas Conservation Commission (COGCC) allowable concentrations.

Excavation and removal of the impacted soils from the former skim pits was performed on August 14 through August 22, 2014. The impacted soils were segregated from clean overburden soils, and the impacted materials were placed within a plastic-lined, earthen berm containment located to the north of the produced water tank and separator. Confirmation soil samples were collected from the skim pit side walls and the base of the excavation. The laboratory analyses for the confirmation soil samples show that the soils in the side wall and bottom of the excavation meet the Table 910-1 concentration levels with the exception of one sidewall sample collected from the northwest corner of the excavation. A line of utility poles and a guy wire and deadman anchors for supporting the utility poles limited the excavation in that area. The produced water pit and the tank battery were located to the north of the excavation.

The soil pH was above 9 standard units in all of the soil samples. The sodium adsorption ratio (SAR) was above 12 in three of the samples. The elevated pH and SAR are not expected to be an issue since these soil samples were all collected at depths greater than 3 feet below ground surface.

1.1 Site Location and Description

The Oliver Warren #1 skim pits (Remediation #8209), Location #317043, is located in the Southwest ¼ of the Northwest ¼ of Section 11, Township 2 North, Range 49 West of the 6th Principal Meridian. The Oliver Warren site is approximately five miles west of the town of Yuma, Colorado on Highway 34 and approximately three quarters of a mile north of Highway 34, on the east side of Washington County Road YY. A site location map is provided as Figure 1. A site map showing the site layout, skim pits, and confirmation soil sample locations and results is presented as Figure 2. The proposed land treatment area is shown as Figure 3.

1.2 Site Conceptual Model

The skim pits at the Oliver Warren #1 were not used for several years and were never used by CM Production. The pits were formerly used to 'skim' crude oil off of the produced water before discharging the produced water into the onsite produced water pit. Delta Petroleum Corporation installed a skim tank to replace the skim pits prior to CM Production becoming the operator in May 2010. The skim pits were reportedly closed in December 2013 without sampling for the presence of exploration and production (E&P) wastes and without proper notification from CM Production to the COGCC prior to their closing.

The March 27, 2014 site investigation conducted by CM Production and Olsson indicates that the vertical extent of impacts was limited to within 20 feet of ground surface based on soil

samples collected at depth. The E&P waste and impacted soils lay at depths between 4 feet and 10 feet bgs. Groundwater was not encountered in any of the trenches excavated to depths of 18 feet below ground surface (bgs). Reported groundwater levels in area water wells are more than 200 feet bgs as shown on Figure 4.

It is expected that the petroleum hydrocarbon impacts in the soils can be successfully treated using land treating techniques to reduce the petroleum hydrocarbon concentrations. The presence of inorganic constituents, such as arsenic, may be above the Table 910-1 concentration levels, but are representative of natural background soil conditions as demonstrated by a comparison with the March 2014 background soil samples.

Inorganic parameters may not be effectively treated using the prescribed techniques in this work plan. The electrical conductance (EC), soil pH, and sodium adsorption ratio (SAR) may need to be adjusted using soil amendments if the soils are to remain at the surface, or the COGCC may allow higher levels of these parameters to remain if buried beneath at least three feet of clean fill, and surface soil sample results document that the Table 910-1 concentration levels for soil parameters have been met.

1.3 Colorado Oil and Gas Conservation Commission Requirements

Mr. John Noto Oil and Gas Location Assessment Supervisor, and formerly the COGCC Northeast Region Environmental Specialist, indicated in an email dated May 28, 2014 that all visibly stained oily soil must be removed from the skim pit at the Oliver Warren #1 site. This included the impacted soil beneath the produced water flowline. The impacted soils were excavated and removed from the pits and taken to a lined treatment cell onsite.

Olsson personnel collect soil confirmation samples on September 3, 2014. Confirmation soil samples were submitted for laboratory analysis of total petroleum hydrocarbons (TPH) for gasoline range organics (GRO) and diesel range organics (DRO) by EPA modified Method 8015, polycyclic aromatic hydrocarbons (PAH) by EPA Method 8270, pH by EPA Method 150.1, EC by EPA Method 120.1, and SAR by USDA Handbook 60 Method 20B.

Total petroleum hydrocarbons as GRO and DRO and polycyclic aromatic hydrocarbons (PAH) analysis will be required to demonstrate that these compounds are below the Table 910-1 concentration levels. According to Mr. Noto's email the analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) was not required based on the results of the March 2014 assessment of the former skim pits which did not show these compounds to be present above the Table 910-1 concentration levels.

The COGCC may allow soils with EC, SAR, and pH reported above the Table 910-1 concentration levels for these parameters to remain in place if the soils are buried under at least three feet of "clean" fill. At least one sample of the fill material will be collected and analyzed for

the same Table 910-1 parameters as the confirmation soil samples to document what is placed back into the excavations.

Mr. Noto, indicated that the following information would be required for land treatment of the oily waste from the skim pits:

1. A copy of the Surface Owner Agreement for the land Application (Appendix B)
2. A map/aerial photograph of the proposed treatment/spread field property (Figure 3)
3. A Waste Management Plan with land application procedures, waste tracking, sampling, and planned schedule (contained herein)
4. An evaluation of surface drainage and site-specific storm water best management practices (BMPs)
5. An evaluation of shallow groundwater based on existing data and identification of nearby wells and uses.
6. Although not required, it was stated that pre-application "background" soil analysis may be useful for "site specific" comparison of the fluids and cuttings to background conditions as well as Table 910-1 values.

1.4 Soil Properties

A review of the Washington County, Colorado Soil Survey (1986) for the Keith-Kuma complex soils (Unit #33) describes these soil types as loam to silty loam. Water management for these soils indicates that there is some seepage with permeability ranging from 0.6 to 2.0 inches per hour, dikes and levees are prone to piping, drainage indicates that it is deep to water with the water table greater than 6 feet, and that terraces and diversions constructed in these soil types are susceptible to erosion. Soil salinity is < 2 millimohs per centimeter (mmohs/cm), and the pH ranges from 6.1 to 8.4 standard units for the 0 to 6-inches depth, but pH ranges from 7.9 to 9.0 from 22 to 60-inches for the Kuma soils, and 7.4 to 8.4 for the same depth in the Keith soils. Summarily, the soil survey indicates alkalinity increases with depth in these soils.

Soil types and conditions are expected to be similar to those encountered at the S.J. Warren to the south. A composite soil sample from the impacted soil stockpile at the S.J. Warren was submitted for analysis of potassium, nitrate/nitrite, orthophosphate, and sulfate to see which nutrients and minerals might need to be added to land treat these soils. The soil sample results for potassium were 2,210 milligrams per kilogram (mg/kg), nitrate was 9.3 mg/kg, nitrite was not detected, orthophosphate was 1 mg/kg, and sulfate was reported at 48.3 mg/kg. Therefore, a fertilizer with higher nitrate and phosphorus content would be recommended for land treatment of the impacted soils.

1.5 Groundwater Assessment Based on Existing Data and Area Wells

The water resources in the area are contained within the High Plains aquifer. Olsson reviewed information on the COGCC GIS website, including area water wells permitted by the Colorado Natural Resources - Division of Water Resources. The reported depth to groundwater in permitted water wells in the vicinity of the sites is greater than 170 feet bgs based on top of screen intervals reported, and static water levels are reported at more than 200 feet bgs. The listed water use from these wells is primarily for crop irrigation; however, livestock, domestic, and commercial uses are also identified. Figure 4 shows water wells within one mile of the site.

2.0 Scope-of-Work

The proposed work involves treating approximately 2,500 cubic yards of petroleum hydrocarbon impacted soils by land treatment to meet the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 concentration levels for petroleum hydrocarbon constituents.

It is expected that the impacted soils at the Oliver Warren can be land treated within three years to meet the Table 910-1 concentration levels per COGCC Rule 907. Management of E&P Waste. This scope-of-work was developed based on correspondence with Mr. John Teff, Business Manager, and Mr. Curtis Ditzell, Vice President and Chief Exploration Officer, of CM Production, LLC.

2.1 Completed Tasks

- CM Production hired a contractor, Ridgeline Excavation, to excavate the impacted soils from the former skim pit at the Oliver Warren on August 14 through August 22, 2014. Impacted soils were segregated and stockpiled separately from non-impacted soils.
- Heavily impacted soils were separated from less impacted soils, to the extent possible, as determined by visual observation of staining, olfactory inspection of the excavated soil, and headspace screening using a handheld photoionization detector (PID) to screen for the presence of volatile organic compounds in a sealable plastic bag.
- Confirmation soil samples were collected from the sidewalls and base of the excavation to demonstrate that the horizontal and vertical extent of the impact has been removed.

2.2 Future Tasks

- Soils will be land treated on location in accordance with the surface owner agreement included in Attachment A.
- The land treatment will be performed in accordance with COGCC Rule 907. There is no potable water source or electricity at the Oliver Warren tank battery and produced water pit location. Therefore, it is expected that water will need to be hauled to the site for use in the treatment of the impacted soils.
- Storm water best management practices (BMPs) will be used in conjunction with a site specific storm water and erosion control plan to prevent impacted soil from leaving the treatment area.
- Collection of samples of the treated soil for laboratory analysis will be conducted periodically following treatment to evaluate the success of the treatment. Soils will be analyzed for total petroleum hydrocarbon ranges to assess progress.

- Semi-annual reports detailing the results of the petroleum impacted soil remediation and the request for closure of the former skim pits will be submitted to the COGCC once complete.

2.3 Health and Safety

Olsson personnel has prepared a site specific health and safety plan (HASP) for the former skim pit assessment and excavation activities and will prepare a job safety analysis (JSA) prior to conducting the remediation activities. Daily tailgate safety meetings will be conducted prior to initiating work or whenever there is a significant change in the operations or site conditions.

Safety data sheets for all fertilizers and treatment chemicals will be maintained onsite, unless they are deemed non-hazardous. Personnel will use appropriate personal protective equipment (PPE) when mixing or applying fertilizers and other amendments to prevent splash or exposure to these materials. Adequate rest intervals and fresh, cool drinking water will need to be provided to prevent heat stress, cold stress, and dehydration.

3.0 Excavation and Soil Confirmation Sample Results

The following sections present the observations and results of the excavation of the Oliver Warren skim pits.

3.1 Excavation Observations

Olsson personnel performed environmental oversight on August 14, 2014 to observe the removal of impacted soils from the former skim pits. The excavation was advanced to a total depth of 17 feet below ground surface (bgs) and was larger than originally estimated. The excavation removed impacted soils from both skim pits and from beneath the produced water flow line from the separator to the produced water tank and produced water pit. The impacted soils in the pits were excavated and removed by Ridgeline Excavating.

Ridgeline excavated more of the impacted materials on August 22, 2014 and Olsson personnel conducted environmental oversight. The produced water flowline was supported by tying it off to a two-inch diameter pipe that spanned the excavation. The impacted soil in the two skim pits was removed except for the impacted soils at approximately 7 feet bgs in the northwest corner of the excavation where the impacted materials could not be excavated due to the presence of a buried deadman anchors and guywires that support a series of power poles along County Road YY. CM Production will need to discuss the impacted soil in this area with the utility and determine how to safely remove or treat the remaining impacted soil in this area.

On September 3, 2014, Olsson personnel collected seven confirmation soil samples from the side walls and base of the excavation. The excavation measured approximately 50 feet by 80 feet and was between 16 feet and 17 feet deep.

The sample jars were labeled with the sample id, analytical parameters, time, date, and sampler's signature, and were placed into a cooler and stored on ice pending delivery to the laboratory under chain-of-custody protocol. The samples were submitted to Accutest Mountain States Laboratory in Wheat Ridge, Colorado.

3.2 Soil Analytical Results

Seven soil samples were submitted for analysis of the COGCC Table 910-1 soil parameters, except for benzene, toluene, ethylbenzene, and xylenes and total metals analysis which the COGCC did not require based on the results reported in the laboratory analysis conducted during the March 2014 site assessment. The metals results were consistent with natural background. The SAR, EC, and pH concentrations in soils that were reported above the Table 910-1 concentrations may be left in place with COGCC approval if these soils are buried below three feet of soil cover that meets the Table 910-1 concentration levels.

The laboratory analytical results for six of the seven soil confirmation samples collected from the side walls and bottom of the excavation show that petroleum hydrocarbon concentrations were not detected above the laboratory reporting limits or were reported at concentrations below the respective COGCC Table 910-1 concentration levels for GRO, DRO, and PAHs. The laboratory reported that benzo(k)fluoranthene, benzo(a)pyrene, and dibenzo(a,h)anthracene were not detected at or above the laboratory reporting limits; however, the reporting limits for these compounds are above the COGCC Table 910-1 concentration level of 0.022 mg/kg for these compounds. The laboratory reported that other PAH compounds were not detected at or above the laboratory reporting limits in these soil samples, and the reporting limits for the other PAH compounds were below the Table 910-1 concentration levels.

Soils that were above the Table 910-1 concentration levels, but which could not be excavated due to the proximity of the tank battery, produced water pond, and deadman anchors and guywires for a power pole were documented by soil sample CMOW-PC-7 N/W 1/2.The laboratory reported the DRO concentration in soil sample CMOW-PC-7 N/W 1/2 at 7,940 mg/kg which exceeded the Table 910-1 concentration level of 500 mg/kg. The GRO concentration in this sample was reported at 111 mg/kg in the CMOW-PC-7 N/W 1/2 sample.

The laboratory estimated benzo(a)pyrene concentration of 0.441 mg/kg “J” was above the Table 910-1 concentration level of 0.022 mg/kg in the CMOW-PC-7 N/W 1/2 sample. Benzo(a)pyrene was the only PAH compound that was reported detected above the Table 910-1 concentration level. The laboratory reported that benzo(k)fluoranthene and dibenzo(a,h)anthracene were not detected at or above the laboratory reporting limits for these compounds. However, the reporting limits were above the COGCC Table 910-1 concentration level of 0.022 mg/kg for these compounds. The laboratory reported that benzo(b)fluoranthene was detected at 0.872 mg/kg, chysene at 3.61 mg/kg, fluoranthene at 0.859 mg/kg, fluorene at 3.8 mg/kg, naphthalene at 1.41 mg/kg, and pyrene at 1.5 mg/kg; however, none of these compounds were above their respective Table 910-1 concentration levels in the CMOW-PC-7 N/W 1/2 sample. The laboratory reported that the other PAH compounds in Table 910-1 were not detected at or above their reporting limits, and were below their respective Table 910-1 concentration levels in the CMOW-PC-7 N/W 1/2 soil sample.

4.0 Remediation Action and Waste Management Plan

The following sections present the remediation objectives, techniques, and identification of impacted and non-impacted soil horizons within the former pits, identification of potential treatment areas, sampling, and laboratory analytical results.

The E&P wastes and impacted soils will be managed in accordance with the COGCC 900 Series Rules, specifically Rule 907, with the objective of meeting the Table 910-1 soil parameter concentration levels as identified in the COGCC conditional approval of the Form 27 dated May 28, 2014.

Although not required, the COGCC suggested that pre-application "background" soil analysis may be useful for "site specific" comparison of the 'fluids and cuttings' (E&P waste) to background conditions as well as Table 910-1 values. Olsson collected three background soil samples at the time of the assessment activities, but it may be advantageous to collect background soil samples from the proposed treatment areas prior to land application to document the conditions prior to treatment so pre-treatment conditions can be documented once it is time to return the site to its previous conditions. The results can also be used to support those background results obtained previously and better define site specific conditions.

4.1 Remediation Objectives

The remediation objectives are to treat the petroleum hydrocarbon impacted soils excavated from the skim pits at the Oliver Warren #1 (Remediation #8209) to meet the Table 910-1 concentration levels for soil parameters as requested by the COGCC.

4.2 Impacted Soil Remedy Application

The impacted soils will be remediated by land treating the soils using fertilizer and soil amendments on land adjacent to the tank battery facility. CM Production has an agreement with the landowner to allow for the land treatment of the impacted soils. A copy of the signed agreement is included in Appendix A.

The soils will be thin-spread within a soil land treatment area surrounded with an earthen berm. CM Production is requesting that the total area from the surface owner will encompass approximately one acre, but it is likely that smaller treatment cells will be set up within that area and the impacted soils land treated in stages. A tractor with tiller attachment will be used to periodically turn the soils. CM may choose to spray the soils with water to maintain moisture levels needed by microorganisms to breakdown the hydrocarbons, and nutrients as needed to effectively treat the impacted soils. CM Production will continue to treat the impacted soil until the Table 910-1 concentration levels are achieved.

4.3 Soil Sampling

The following sections present the sampling techniques used during the collection of excavation confirmation soil samples from the side walls and the bottom of each excavation on August 13, 2014, land farm progress samples, and final confirmation samples that the treated soils have been remediated.

4.3.1 Excavation Confirmation Soil Samples

Mr. Noto with the COGCC indicated in an email dated May 28, 2014 that all visibly stained oily soil must be removed from the skim pit at the S.J. Warren #1 site. This was performed on August 13, 2014. Confirmation soil samples were submitted for laboratory analysis of total petroleum hydrocarbons (TPH) for GRO and DRO PAH, pH, EC by EPA Method 120.1, and SAR by USDA Handbook 60 Method 20B.

The PAH and BTEX analytical results demonstrate that these compounds were not detected or are below the Table 910-1 concentration levels. The COGCC may allow soils with EC, SAR, and pH reported above the Table 910-1 concentration levels for these parameters to remain in place if the soils are buried under at least three feet of “clean” fill. At least one sample of the fill material will be collected and analyzed for the same Table 910-1 parameters as the confirmation soil samples to document what is placed back into the excavations.

A minimum of five confirmation soil samples were to be collected, including one soil sample from the bottom of the pit, and one soil sample from each side wall. On September 3, 2014 Olsson collected a total of seven soil samples, including the five side wall samples and two bottom samples were submitted for laboratory analysis to demonstrate that the remaining soils are below Table 910-1 concentration levels once the visibly stained oily soil had been removed.

4.3.2 Treatment Progress Soil Samples

Soil samples will be collected of the treated soils to document progress of the remedy process. It is expected that a representative number of soil samples collected from a systematic random sampling grid over the thin-spread treated soils, or a minimum of one soil sample for every 100 cubic yards of treated soil, will be collected to assess the progress. The soil samples will be submitted for the TPH ranges of GRO and DRO and used to assess the progress of land treatment. If the laboratory results show that the GRO and DRO results are less than 500 milligrams per kilogram (mg/kg) the soil samples will be analyzed for PAH, EC, pH, and SAR to demonstrate that the soils meet the Table 910-1 concentration levels and can be used on the surface of the lease. CM Production may request that the COGCC approve soil with EC, pH, and SAR above the Table 910-1 concentration levels if the soils are buried below three (3) feet of clean fill pending laboratory analysis to document these results. Soil sampling will be performed periodically after the treatment to assess the reduction of petroleum hydrocarbon

constituents. The laboratory report is included as Appendix B. Site photographs taken during the skim pit excavation are included as Appendix C.

4.4 Project Schedule

The land treatment of the soils began in the fall of 2014. It is expected that the remediation of the soils to meet Table 910-1 soil parameters concentration levels can be achieved in three years; however, it is possible that it may require more time to meet the Table 910-1 concentration levels. It is expected that as long as CM Production is able to demonstrate progress in reducing the Table 910-1 soil parameter concentration levels and that CM Production communicates the results of the remedy efforts to the surface owner and COGCC on a semi-annual basis that the COGCC and surface owner will be willing to work with CM Production to extend the treatment dates as necessary to meet the Table 910-1 levels.

CM Production will add soil amendments including fertilizer (such as diammonium phosphate) and organic material (mulch, compost, or manure) to the soils to stimulate biodegradation of petroleum hydrocarbon constituents. Product brochures and/or safety data sheets (SDS) for commercially available fertilizers and soil amendments will be provided to the surface owner and to COGCC for approval at least one week prior to use. Use of locally available soil amendments such as manure or corn stalks will be communicated to the surface owner and to the COGCC if requested. Weeds will be controlled in and around the treatment area.

In summary, the wastes will be treated onsite by land farming and periodically tilling and turning the soil and adding soil amendments to promote biodegradation. Soil samples will be collected periodically of the treated soils to access remediation progress.

Waste tracking is not expected to be necessary unless the soils are transported offsite to a commercial landfill facility. In the event that the E&P wastes are disposed at a commercial facility, CM Production will provide copies of the bills of lading, manifests, waste characterization analytical results (if required), and the name of the receiving facility to the surface landowner and to the COGCC.

4.5 Reports

Semi-annual reports will be submitted to the COGCC to document the progress of the soil land treatment. It is expected that the treatment will be completed within three years, or that CM Production will be able to demonstrate that sufficient progress is being made in remediating the soils that an extension may be requested of the Director.

Laboratory analytical results will be summarized in a table and the soil sample locations will be shown on a figure to be included in a final report submitted to the COGCC once the Table 910-1 concentration levels have been met. CM Production will request closure for the Oliver Warren skim pit remediation.

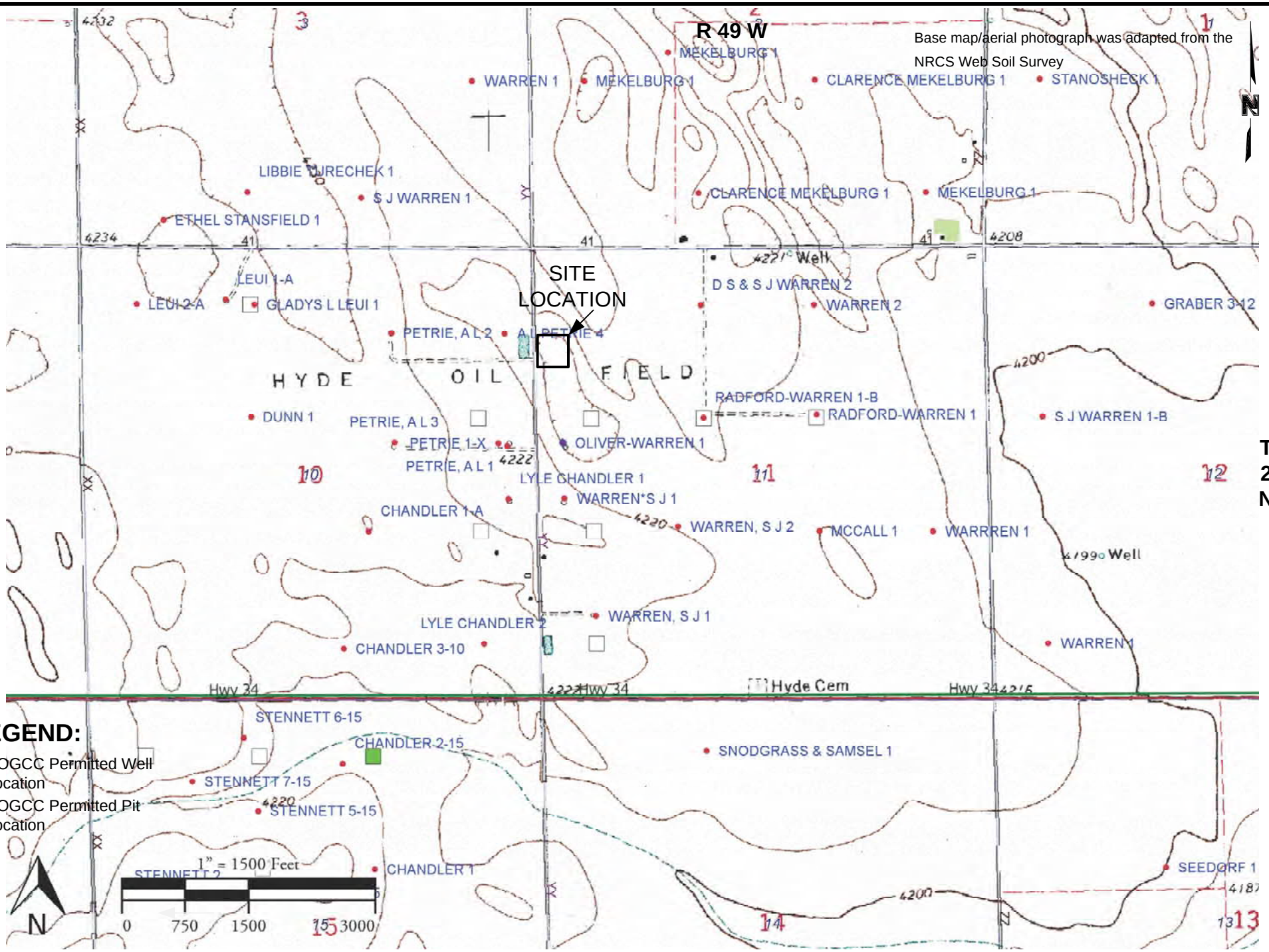
5.0 Site Specific Storm Water Best Management Practices

The Oliver Warren #1 tank battery and produced water facility and surrounding areas are relatively flat lying. Figure 1 shows the general site location and topography of the sites. The topography in the vicinity of the treatment area slopes to the east and southeast. There is a slight east slope near the Oliver Warren #1.

A perimeter earthen berm will be constructed of “clean” fill materials around the perimeter of the treatment cell, compacted with the excavator, and monitored during remediation activities for signs of erosion. A gravel covered entrance will be constructed on the high side of the earthen berm for the tractor to drive over the berm to treat the impacted soils. A diversion ditch may be required to divert storm water run-on from the northwest away from the treatment cell and re-direct it to the southeast through energy dissipating best management practices (BMPs) such as a gravel apron, or rock filled geotextile bag, or sediment control logs and needed at the site.

There are no surface waters in close proximity to the sites. Based on observations made during the assessment activities, a review of existing data, and identification of nearby water wells and use, shallow groundwater does not appear to be present in the vicinity of the site. CM Personnel and contractors will observe site conditions during the routine visits to the sites to make sure erosive conditions do not exist, and that the E&P wastes do not become entrained in storm water runoff and that the wastes remain onsite. Site conditions will be documented in a field form to be completed at the time of the soil treatment. An example of the field form is included in Appendix D.

FIGURES

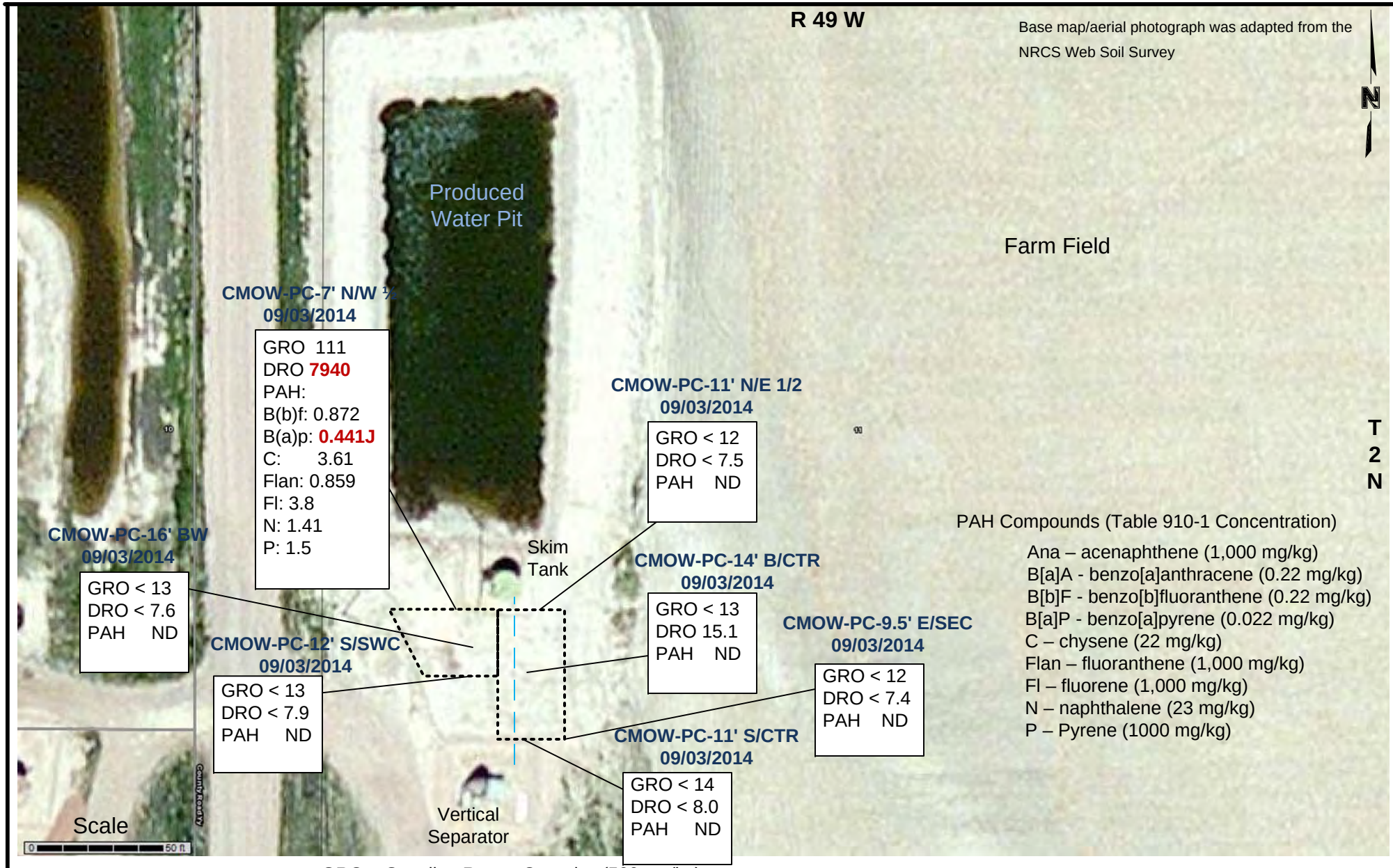


LEGEND:

- COGCC Permitted Well Location
- COGCC Permitted Pit Location

PROJECT NO: 013-1681 DRAWN BY: JWH DATE: 11/14/2014	CM Production, LLC Oliver Warren #1 – Former Skim Pits Excavation Site Location Map	OLSSON ASSOCIATES 4690 Table Mountain Drive #200 Golden, Colorado 80403 TEL 303.237.2072 FAX 303.237.2659

FIGURE 1



LEGEND:

Extent of Excavation of Former Skim Pits

Buried Water Line

GRO – Gasoline Range Organics (500 mg/kg)

DRO – Diesel Range Organics (500 mg/kg)

PAH – Polycyclic Aromatic Hydrocarbons

< or ND – Less than Laboratory Reporting Limit or Not Detected

J – Estimated Value Below the Laboratory Reporting Limit

Note: All results are reported in milligrams per kilogram (mg/kg) Concentrations above the COGCC Table 910-1 are shown in bold red font. Table 910-1 concentration levels are Shown in parentheses after parameter name in the legend.

PROJECT NO: 013-1681 DRAWN BY: JWH DATE: 04/14/14	CM Production, LLC Oliver Warren #1 Skim Pits – Organic Compound Results Hyde Field, Washington County, Colorado	OLSSON ASSOCIATES 4690 Table Mountain Drive #200 Golden, Colorado 80403 TEL 303.237.2072 FAX 303.237.2659

FIGURE 2

Base Map Adapted from the NRCS – Websoil Survey

LEGEND:

Former Skim Pits Excavation

Area of Proposed Land Treatment Cell

FIGURE 3
Proposed Land Treatment Cell

Oliver Warren #1 Tank Battery – Former Skim Pits
SW ¼ NW ¼ Section 11 T2N R49W 6 P.M.
Washington County, Colorado

Revision Date:	11/19/2014
Revision Number	
Revised by:	JWH
Approved by:	
Project Number:	013-1681
Scale:	As Shown

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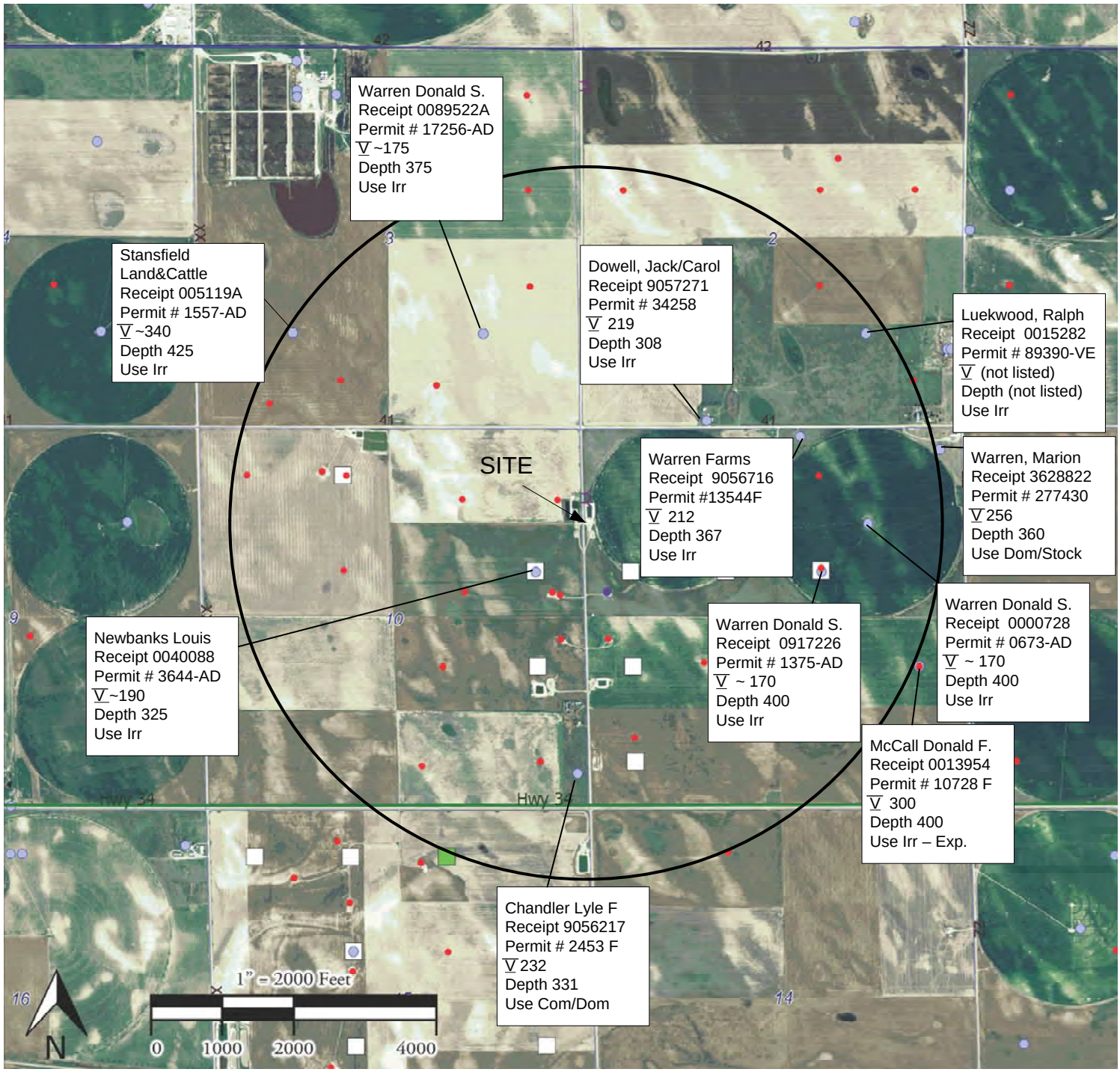

LEGEND:

- Oil / Gas Well Location
- Permitted Water Well Location

Approximate 1-mile radius from location of the skim pits

COGCC Permitted Pit Location

∇ Static Water Level – Colorado State Engineer's Office Division of Water Resources

Depth Total Depth of the Well in Feet

Receipt – Receipt Number Colorado State Engineer's Office, Groundwater Resources

Permit # - Colorado State Engineer's Office Groundwater Well Permit

Use
Irr – Irrigation
Comm – Commercial
Dom – Domestic
Stock - Livestock

FIGURE 4
Groundwater Evaluation Map
Oliver Warren #1 Tank Battery – Former Skim Pits
SW ¼ NW ¼ Section 11 T2N R49W 6 P.M.
Washington County, Colorado

Revision Date:	
Revision Number	
Revised by:	
Approved by:	
Project Number:	
Scale:	

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TABLES

Table 1
ANALYTICAL SUMMARY - ORGANIC COMPOUNDS IN SOIL

Skim Pit Excavation - E&P Waste Removal
CM Production LLC - Oliver Warren #1
SW 1/4 NW 1/4 Section 11 Township 2 North, Range 49 West
Washington County, Colorado

		Volatile Organic Compounds and Hydrocarbons					
Sample ID	**Date**	**Benzene (mg/kg)**	**Toluene (mg/kg)**	**Ethylbenzene (mg/kg)**	**Total Xylenes (mg/kg)**	**GRO (mg/kg)**	**DRO (mg/kg)**
COGCC T 910-1		**0.17**	**85**	**100**	**175**	**500**	**500**
CMOW-PC-11 N/E 1/2	9/3/2014	NA	NA	NA	NA	< 12	< 7.5
CMOW-PC-7 N/W 1/2	9/3/2014	NA	NA	NA	NA	111	**7940**
CMOW-PC-12 S/SWC	9/3/2014	NA	NA	NA	NA	< 13	< 7.9
CMOW-PC-16 BW	9/3/2014	NA	NA	NA	NA	< 13	< 7.6
CMOW-PC-14 B/CTR	9/3/2014	NA	NA	NA	NA	< 13	15.1
CMOW-PL-9.5 E/SEC	9/3/2014	NA	NA	NA	NA	< 12	< 7.4
CMOW-PC-11S/CTR	9/3/2014	NA	NA	NA	NA	< 14	< 8.0

		Polycyclic Aromatic Hydrocarbons												
Sample ID	**Date**	**Acenaphthene (mg/kg)**	**Anthracene (mg/kg)**	**Benzo(a) anthracene (mg/kg)**	**Benzo(b) fluoranthene (mg/kg)**	**Benzo(k) fluoranthene (mg/kg)**	**Benzo(a) pyrene (mg/kg)**	**Chrysene (mg/kg)**	**Dibenzo(a,h) anthracene (mg/kg)**	**Fluoranthene (mg/kg)**	**Fluorene (mg/kg)**	**Indeno (1,2,3-cd) pyrene (mg/kg)**	**Naphthalene (mg/kg)**	**Pyrene (mg/kg)**
COGCC T 910-1		**1000**	**0.22**	**0.22**	**2.2**	**0.022**	**0.022**	**22**	**0.022**	**1000**	**1000**	**0.22**	**23**	**1000**
CMOW-PC-11 N/E 1/2	9/3/2014	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075	< 0.075
CMOW-PC-7 N/W 1/2	9/3/2014	< 0.570	< 0.570	< 0.570	0.872	< 0.570	**0.441 J**	3.61	< 0.570	0.859	3.8	< 0.570	1.41	1.5
CMOW-PC-12 S/SWC	9/3/2014	< 0.078	< 0.078	< 0.078	< 0.078	< 0.079	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078
CMOW-PC-16 BW	9/3/2014	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076	< 0.076
CMOW-PC-14 B/CTR	9/3/2014	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078	< 0.078
CMOW-PL-9.5 E/SEC	9/3/2014	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074	< 0.074
CMOW-PC-11S/CTR	9/3/2014	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080	< 0.080

mg/kg - milligrams per kilogram
GRO: gasoline range organics
DRO: diesel range organics
TPH: Total petroleum hydrocarbons (Sum of GRO plus DRO concentrations)

- Values in bold and red shading are above the COGCC Table 910-1 concentration level
- Laboratory reporting limit is above the COGCC Table 910-1 concentration level even though compound was not detected. The method detetion limit (MDL) is 0.020 for these compounds

< - Analyte was not detected at or above the laboratory reporting limit
NA - Analyte was not analyzed

See attached map for soil sample locations:
CMOW-PC-11 N/E 1/2: Confirmation soil sample from the north wall - east half of the skim pit excavation at 11 feet bgs
CMOW-PC-7 N/ W 1/2: Confirmation soil sample from the north wall - west half of the skim pit excavation at 7 feet bgs
CMOW-PC-12 S/SWC: Confirmation soil sample from the south wall - southwest corner of the skim pit excavation at 12 feet bgs
CMOW-PC-16 BW: Confirmation soil sample from the bottom center west half of skim pit excavation at 16 feet bgs
CMOW-PC-14 B/CTR: Confirmation soil sample from the bottom center of the skim pit excavation at 14 feet bgs
CMOW-PC-9.5 E/SEC: Confirmation soil sample from the east sidewall - southeast corner at 9.5 feet bgs
CMOW-PC0-11 S/CTR: Confirmation soil sample from the south sidewall - center at 11 feet bgs

Table 2
ANALYTICAL SUMMARY - INORGANIC COMPOUNDS IN SOIL

Skim Pit Excavation - E&P Waste Removal
CM Production LLC - Oliver Warren #1
SW 1/4 NW 1/4 Section 11 Township 2 North, Range 49 West
Washington County, Colorado

Sample ID	Date	pH (s.u.)	Specific Conductivity (mmohs/cm)	Calcium (mg/l)	Magnesium (mg/l)	Sodium (mg/l)	SAR
COGCC T 910-1			**< 4 mmhos/cm or 2x background**	**N/A**	**N/A**	**N/A**	**< 12**
CMOW-PC-11 N/E 1/2	9/3/2014	**9.64**	0.863	9.11	5.53	175	11.3
CMOW-PC-7 N/W 1/2	9/3/2014	**9.73**	0.967	4.65	< 1.0	224	**25.4**
CMOW-PC-12 S/SWC	9/3/2014	**9.84**	1.47	8.28	2.21	271	**21.6**
CMOW-PC-16BW	9/3/2014	**10.30**	0.676	17.0	3.85	145	8.26
CMOW-PC-14 B/CTR	9/3/2014	**10.10**	0.693	41.7	3.61	136	5.42
CMOW-PC-9.5 E/SEC	9/3/2014	**10.16**	1.53	10.8	2.26	250	**18.1**
CMOW-PC-11 S/CTR	9/3/2014	**10.12**	0.996	17.1	4.62	192	10.6

pH (s.u.) - standard units
mmohs/cm - millimohs per centimeter
mg/l - milligrams per liter
SAR - Sodium Adsorption Ratio
N/A - Not Applicable

BOLD - Above Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 concentration levels

Note: According to the Washington County, Colorado Soil Survey (Peterson, Crabb, Larsen, 1986) the soils onsite are the Keith-Kuma Complex (Unit 33), and Table 14 - Physical and Chemical Properties incidate that at a depth of 22-60 inches the Keith soils have a pH ranging from 7.4 to 8.4 and that the Kuma soils at depths ranging from 45-60 inches have a pH range of 7.9 to 9.0.

Soil salinity is reportedly less than 2 mmhos/cm

See attached map for soil sample locations:
CMOW-PC-11 N/E 1/2: Confirmation soil sample from the north wall - east half of the skim pit excavation at 11 feet bgs
CMOW-PC-7 N/ W 1/2: Confirmation soil sample from the north wall - west half of the skim pit excavation at 7 feet bgs
CMOW-PC-12 S/SWC: Confirmation soil sample from the south wall - southwest corner of the skim pit excavation at 12 feet bgs
CMOW-PC-16 BW: Confirmation soil sample from the bottom center west half of skim pit excavation at 16 feet bgs
CMOW-PC-14 B/CTR: Confirmation soil sample from the bottom center of the skim pit excavation at 14 feet bgs
CMOW-PC-9.5 E/SEC: Confirmation soil sample from the east sidewall - southeast corner at 9.5 feet bgs
CMOW-PC0-11 S/CTR: Confirmation soil sample from the south sidewall - center at 11 feet bgs

According to the COGCC frequently asked questions, question #32, *How will the COGCC apply the Table 910-1 concentration levels for pH, sodium adsorption ratio (SAR), and electrical conductivity (EC)?*
December 9, 2009: Consistent with its prior practice and Rule 1003, the COGCC will generally apply the Table 910-1 concentration levels for pH, SAR, and EC to soils that are within three (3) feet of the ground surface because elevated levels of pH, SAR, and EC in deeper soils should not adversely affect the successful reclamation of the site, which is the objective of these concentration levels. In addition, the COGCC requires that materials with elevated pH, SAR, or EC be buried under a minimum of three (3) feet of backfill cover and soil that satisfies either the Table 901-1 levels for pH, SAR, and EC or the background levels for such contaminants within three (3) feet of the ground surface at the stie. In addition the soil horizons must be replaced in their original relative position and reclaimed in accordance with 1000 Series Rules, includign the establishment of vegetative cover on non-cropland and successful crop growth on cropland.

APPENDIX A
SURFACE OWNER AGREEMENT

July 15, 2014

Marian D. Warren
Warren Farms
601 South Date
Yuma, Colorado 80759
C/O Jim Walker
Petron Development
1899 Littleton Boulevard
Littleton, CO 80120

RE: Surface Owner Approval to Land Treat Exploration and Production Waste
SW ¼ NW ¼ Section 11, Township 2 North, Range 49 West, 6th Principal Meridian
County Road YY, Washington County, Colorado

Dear Mr. Walker,

CM Production, LLC (CM Production) acquired the Oliver Warren #1 crude oil well and associated production facilities in 2010. Two former skim pits used to skim crude oil off of the produced water were present to the north of the tank battery. Delta Petroleum Corporation, the previous operator, installed a skim tank to replace the unlined skim pits and the skim pits were closed.

CM recently discovered that the skim pits contain soil with total petroleum hydrocarbon concentrations above Colorado Oil and Gas Conservation Commission (COGCC) regulations as stated in Table 910-1 (attached). Under the supervision of the COGCC, CM Production seeks permission from Warren Farms to land treat these wastes on location. A general site location map, proposed treatment area map and approval signature page are attached.

Background

CM Production retained Olsson Associates (Olsson) to conduct a subsurface investigation of former skim pits at the Oliver Warren #1 on March 27, 2014. Oily soils were encountered in the pits and laboratory analytical results show that the concentrations of total petroleum hydrocarbons are above the Table 910-1 soil parameter concentration level of 500 milligrams per kilogram, and that petroleum hydrocarbon compounds were above their respective concentration levels. Details of the investigation and testing are discussed in a Skim Pit Assessment Report filed with the COGCC under Remediation #8209. CM Production will gladly provide you a copy of the report if you desire one.

Proposed Land Treatment of Exploration and Production Wastes

CM Production proposes to excavate and land treat the E&P wastes and impacted soils on location in order to meet the Table 910-1 concentrations. The land treatment will consist of using a hydrogen peroxide solution used to oxidize and break down petroleum hydrocarbons in the impacted soil pile. This process may be repeated a few times to reduce the petroleum hydrocarbon concentrations, or alternatively CM Production may add nutrients, fertilizer, soil amendments such as straw and manure, and microbes to bio-remediate the E&P waste and impacted soil to meet the Table 910-1 requirements.

CM Production, LLC | 390 Union Boulevard Suite 620 Lakewood, CO 80228 | Main: 303.534.0199 | Fax: 720.207.6128 |

To accomplish the remediation, CM Production expects approximately one acre of land surface area to the south of the Oliver Warren #1 tank battery will be required to thinly-spread the soils and treat them to reduce the petroleum hydrocarbon concentrations. CM Production will ensure that the impacted soils will be properly managed to prevent adverse environmental impacts to air, water, soil or biological resources.

Secondary containment, consisting of a compacted earthen berm, will be placed around the perimeter of the treatment area to prevent impacted storm water from transporting the wastes offsite. Best management practices will be in place to divert storm water away from the treatment area.

Soil samples will be collected from the treated soils and submitted for laboratory analysis throughout the remediation progress. Once analytical results show that the petroleum hydrocarbon contaminates meet COGCC Regulations, the soil may be reused onsite.

Treatment Schedule

CM Production would like to begin the remediation of the impacted soils as soon as possible in July 2014.

Agreement Time Period

CM Production believes soil treatment could take as little as a few months to several years and requests the time period of this letter agreement is for a period of three years from the execution date of this letter.

Surface Owner Approval to Land Treat E&P Wastes and Impacted Soils

By signing below, I signify that I am the surface owner, or an authorized representative of the surface land owner for the parcel upon which the Oliver Warren #1 tank battery is located. I authorize CM Production to land treat these soils on approximately one acre of land adjacent to the tank battery.

Marian D Warren

Surface Owner/Representative

Owner

Title:

7-24-14

Date:

John Teff

John TEFF - MNGR

Business Manager – CM Production, LLC

7/15/14

Date:

CM Production, LLC | 390 Union Boulevard Suite 620 Lakewood, CO 80228 | Main: 303.534.0199 | Fax: 720.207.6128 |

FIGURES

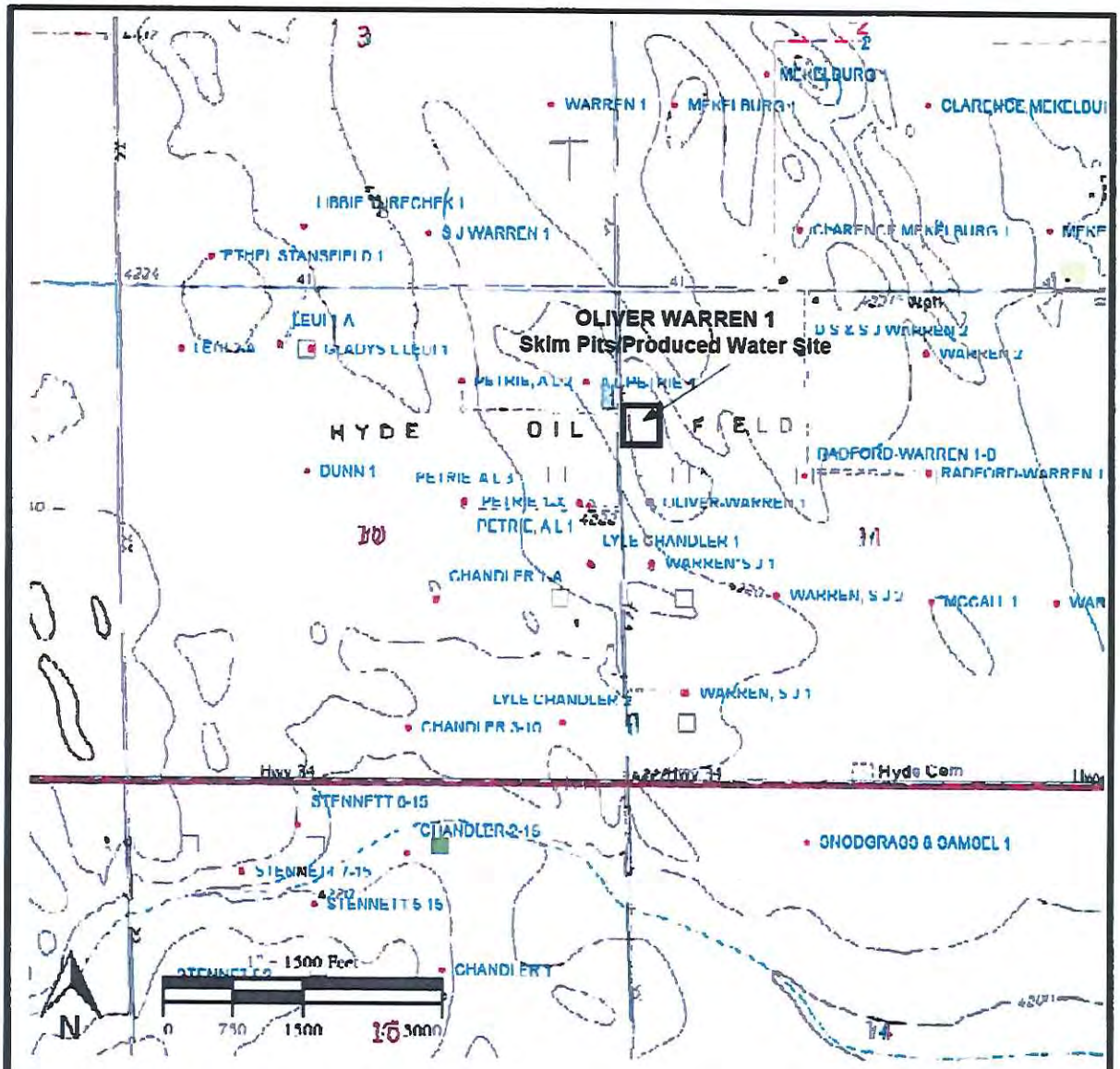

FIGURE 1
GENERAL SITE LOCATION
Oliver Warren #1 Tank Battery – Former Skim Pits
SW ¼ NW ¼ Section 11 T2N R49W 6 P.M.
Washington County, Colorado

Revision Date	07/02/2014
Revision Number	
Revised by:	JWH
Approved by:	
Project Number	013-1681
Scale	As Shown

OLSSON ASSOCIATES

CM Production LLC | 390 UNION BOULEVARD SUITE 620 LAKEWOOD, CO 80228 | MAIN: 303.534.0199 | FAX: 720.207.6128 |

LEGEND:

- Oil / Gas Well Location
- Permitted Water Well Location
- COGCC Permitted Pit Location
- Area of Proposed Land Treatment Cell

FIGURE 2
Proposed Land Treatment Cell
Oliver Warren #1 Tank Battery – Former Skim Pits
SW ¼ NW ¼ Section 11 T2N R49W 6 P.M.
Washington County, Colorado

Revision Date:	07/02/2014
Revision Number:	
Revised by:	JWH
Approved by:	
Project Number:	013-1681
Scale:	As Shown

OLSSON ASSOCIATES

CM Production LLC | 390 Union Boulevard Suite 620 Lakewood, CO 80228 | Main: 303.534.0199 | Fax: 720.207.6128 |

ATTACHMENTS

Table 910-1
Concentration Levels

Contaminant of Concern	Concentrations
Organic Compounds in Soil	
TPH (total petroleum hydrocarbons) GRO or DRO	500 mg/kg
Benzene	0.17 mg/kg
Toluene	85 mg/kg
Ethylbenzene	100 mg/kg
Xylenes	175 mg/kg
Acenaphthene	1000 mg/kg
Anthracene	1000 mg/kg
Benzo(A)anthracene	0.22 mg/kg
Benzo(B)fluoranthene	0.22 mg/kg
Benzo(K)fluoranthene	2.2 mg/kg
Benzo(A)pyrene	0.022 mg/kg
Chrysene	22 mg/kg
Dibenzo(A,H)anthracene	0.022 mg/kg
Fluoranthene	1000 mg/kg
Fluorene	1000 mg/kg
Indeno(1,2,3,C,D)pyrene	0.22 mg/kg
Naphthalene	23 mg/kg
Pyrene	1000 mg/kg
Inorganic Compounds in Soil	
Electrical Conductivity (EC)	< 4 mmhos/cm or 2x background
Sodium Adsorption Ratio (SAR)	< 12
pH	6 to 9 standard units
Metals in Soil	
Arsenic	0.39 mg/kg
Barium	15,000 mg/kg
Cadmium	70 mg/kg
Chromium (III)	120,000 mg/kg
Chromium (VI)	23 mg/kg
Copper	3,100 mg/kg
Lead (inorganic)	400 mg/kg
Mercury	23 mg/kg
Nickel (soluble salts)	1,600 mg/kg
Selenium	390 mg/kg
Silver	390 mg/kg
Zinc	23,000 mg/kg

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APPENDIX B
CONFIRMATION SOIL SAMPLE ANALYTICAL RESULTS

Mountain States ACCUTEST LABORATORIES

09/10/14

Technical Report for

Olsson Associates - Denver

CM Production-Oliver Warren #1

013-1681

Accutest Job Number: D61777

Sampling Date: 09/03/14

Report to:

Olsson Associates
4690 Table Mountain Drive #200 Suite 200
Golden, CO 80403
jhix@olssonassociates.com

ATTN: James Hix

Total number of pages in report: **79**

NELAP ACCREDITED TNI LABORATORY

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Scott Heideman
Laboratory Director

Client Service contact: Renea Jackson 303-425-6021

Certifications: CO (CO00049), ID, NE (CO00049), ND (R-027), NJ (CO 0007), OK (D9942), UT (NELAP CO00049), TX (T104704511)

Sections: 1 2 3 4 5 6 7 8 9 10

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Sample Summary

Olsson Associates - Denver

Job No: D61777

CM Production-Oliver Warren #1
Project No: 013-1681

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
D61777-1	09/03/14	10:00	JED	09/03/14	SO	Soil	CMOW-PC-11 N/E 1/2
D61777-1A	09/03/14	10:00	JED	09/03/14	SO	Soil	CMOW-PC-11 N/E 1/2
D61777-2	09/03/14	11:00	JED	09/03/14	SO	Soil	CMOW-PC-7 N/W 1/2
D61777-2A	09/03/14	11:00	JED	09/03/14	SO	Soil	CMOW-PC-7 N/W 1/2
D61777-3	09/03/14	10:05	JED	09/03/14	SO	Soil	CMOW-PC-12 S/S WC
D61777-3A	09/03/14	10:05	JED	09/03/14	SO	Soil	CMOW-PC-12 S/S WC
D61777-4	09/03/14	10:10	JED	09/03/14	SO	Soil	CMOW-PC-16BW
D61777-4A	09/03/14	10:10	JED	09/03/14	SO	Soil	CMOW-PC-16BW
D61777-5	09/03/14	10:15	JED	09/03/14	SO	Soil	CMOW-PC-14 B/CTR
D61777-5A	09/03/14	10:15	JED	09/03/14	SO	Soil	CMOW-PC-14 B/CTR
D61777-6	09/03/14	10:25	JED	09/03/14	SO	Soil	CMOW-PC-9.5 E/SEC
D61777-6A	09/03/14	10:25	JED	09/03/14	SO	Soil	CMOW-PC-9.5 E/SEC
D61777-7	09/03/14	10:45	JED	09/03/14	SO	Soil	CMOW-PC-11 S/CTR

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

Sample Summary
(continued)

Olsson Associates - Denver

Job No: D61777

CM Production-Oliver Warren #1
Project No: 013-1681

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
D61777-7A	09/03/14	10:45	JED	09/03/14	SO	Soil	CMOW-PC-11 S/CTR

Soil samples reported on a dry weight basis unless otherwise indicated on result page.

CASE NARRATIVE / CONFORMANCE SUMMARY

Client:	Olsson Associates - Denver	**Job No**	D61777
Site:	CM Production-Oliver Warren #1	**Report Date**	9/10/2014 3:04:04 PM

On 09/03/2014, 7 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 20.2 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D61777 was assigned to the project. The lab sample ID, client sample ID, and date of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Extractables by GCMS By Method SW846 8270C

Matrix: SO **Batch ID:** OP10566

- All samples were extracted and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D61777-6MS, D61777-6MSD were used as the QC samples indicated.
- Sample(s) D61777-2 have surrogates outside control limits. Probable cause due to matrix interference.
- D61777-2: Dilution required due to matrix interference; extract was viscous.
- D61777-2 for Terphenyl-d14: Outside control limits due to matrix interference.

Volatiles by GC By Method SW846 8015B

Matrix: AQ **Batch ID:** GGB1435

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

Matrix: SO **Batch ID:** GGB1435

- Sample(s) D61724-1MS, D61724-1MSD were used as the QC samples indicated.
- Sample(s) D61777-2 have surrogates outside control limits. Probable cause due to matrix interference.
- D61777-2 for 1,2,4 Trichlorobenzene: Outside control limits due to possible matrix interference.

Extractables by GC By Method SW846-8015B

Matrix: SO **Batch ID:** OP10556

- All samples were extracted and analyzed within the recommended method holding time.
- Sample(s) D61777-1MS, D61777-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Metals By Method SW846 6010C

Matrix: AQ **Batch ID:** MP13935

- All samples were digested and analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D61777-3AMS, D61777-3AMSD, D61777-3ASDL were used as the QC samples for the metals analysis.
- The serial dilution RPD(s) for Magnesium are outside control limits for sample MP13935-SD1. Probable cause due to sample homogeneity.
- MP13935-SD1 for Magnesium: Serial dilution indicates possible matrix interference.

Wet Chemistry By Method SM2540G-2011 M

Matrix: SO **Batch ID:** GN26286

- The data for SM2540G-2011 M meets quality control requirements.

Wet Chemistry By Method USDA HANDBOOK 60

Matrix: SO **Batch ID:** MP13935

- D61777-1A through -7A for Sodium Adsorption Ratio: Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+(Mg meq/L)/2]

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.

Summary of Hits

Job Number: D61777
Account: Olsson Associates - Denver
Project: CM Production-Oliver Warren #1
Collected: 09/03/14

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
D61777-1	**CMOW-PC-11 N/E 1/2**					
Specific Conductivity		863	1.0		umhos/cm	SM 2510B-2011 MOD
pH		9.64			su	SW846 9045D
D61777-1A	**CMOW-PC-11 N/E 1/2**					
Calcium		9.11	2.0		mg/l	SW846 6010C
Magnesium		5.53	1.0		mg/l	SW846 6010C
Sodium		175	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [a]		11.3			ratio	USDA HANDBOOK 60
D61777-2	**CMOW-PC-7 N/W 1/2**					
Benzo(b)fluoranthene [b]		872	570	140	ug/kg	SW846 8270C
Benzo(g,h,i)perylene [b]		726	570	140	ug/kg	SW846 8270C
Benzo(a)pyrene [b]		441 J	570	140	ug/kg	SW846 8270C
Chrysene [b]		3610	570	140	ug/kg	SW846 8270C
Fluoranthene [b]		859	570	140	ug/kg	SW846 8270C
Fluorene [b]		3800	570	140	ug/kg	SW846 8270C
1-Methylnaphthalene [b]		7260	570	140	ug/kg	SW846 8270C
2-Methylnaphthalene [b]		7500	570	290	ug/kg	SW846 8270C
Naphthalene [b]		1410	570	140	ug/kg	SW846 8270C
Phenanthrene [b]		8110	570	140	ug/kg	SW846 8270C
Pyrene [b]		1500	570	140	ug/kg	SW846 8270C
TPH-GRO (C6-C10)		111	13	6.4	mg/kg	SW846 8015B
TPH-DRO (C10-C28)		7940	76	57	mg/kg	SW846-8015B
Specific Conductivity		967	1.0		umhos/cm	SM 2510B-2011 MOD
pH		9.73			su	SW846 9045D
D61777-2A	**CMOW-PC-7 N/W 1/2**					
Calcium		4.65	2.0		mg/l	SW846 6010C
Sodium		224	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [a]		25.4			ratio	USDA HANDBOOK 60
D61777-3	**CMOW-PC-12 S/S WC**					
Specific Conductivity		1470	1.0		umhos/cm	SM 2510B-2011 MOD
pH		9.84			su	SW846 9045D
D61777-3A	**CMOW-PC-12 S/S WC**					
Calcium		8.28	2.0		mg/l	SW846 6010C
Magnesium		2.21	1.0		mg/l	SW846 6010C

Summary of Hits

Job Number: D61777
Account: Olsson Associates - Denver
Project: CM Production-Oliver Warren #1
Collected: 09/03/14

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
Sodium		271	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [a]		21.6			ratio	USDA HANDBOOK 60
D61777-4	**CMOW-PC-16BW**					
Specific Conductivity		676	1.0		umhos/cm	SM 2510B-2011 MOD
pH		10.30			su	SW846 9045D
D61777-4A	**CMOW-PC-16BW**					
Calcium		17.0	2.0		mg/l	SW846 6010C
Magnesium		3.85	1.0		mg/l	SW846 6010C
Sodium		145	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [a]		8.26			ratio	USDA HANDBOOK 60
D61777-5	**CMOW-PC-14 B/CTR**					
TPH-DRO (C10-C28)		15.1	7.8	5.8	mg/kg	SW846-8015B
Specific Conductivity		693	1.0		umhos/cm	SM 2510B-2011 MOD
pH		10.10			su	SW846 9045D
D61777-5A	**CMOW-PC-14 B/CTR**					
Calcium		41.7	2.0		mg/l	SW846 6010C
Magnesium		3.61	1.0		mg/l	SW846 6010C
Sodium		136	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [a]		5.42			ratio	USDA HANDBOOK 60
D61777-6	**CMOW-PC-9.5 E/SEC**					
Specific Conductivity		1530	1.0		umhos/cm	SM 2510B-2011 MOD
pH		10.16			su	SW846 9045D
D61777-6A	**CMOW-PC-9.5 E/SEC**					
Calcium		10.8	2.0		mg/l	SW846 6010C
Magnesium		2.26	1.0		mg/l	SW846 6010C
Sodium		250	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [a]		18.1			ratio	USDA HANDBOOK 60
D61777-7	**CMOW-PC-11 S/CTR**					
Specific Conductivity		996	1.0		umhos/cm	SM 2510B-2011 MOD
pH		10.12			su	SW846 9045D

Summary of Hits

Job Number: D61777
Account: Olsson Associates - Denver
Project: CM Production-Oliver Warren #1
Collected: 09/03/14

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	RL	MDL	Units	Method
D61777-7A	**CMOW-PC-11 S/CTR**					
Calcium		17.1	2.0		mg/l	SW846 6010C
Magnesium		4.62	1.0		mg/l	SW846 6010C
Sodium		192	2.0		mg/l	SW846 6010C
Sodium Adsorption Ratio [a]		10.6			ratio	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]
(b) Dilution required due to matrix interference; extract was viscous.

Mountain States ACCUTEST LABORATORIES

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID: CMOW-PC-11 N/E 1/2
Lab Sample ID: D61777-1
Matrix: SO - Soil
Method: SW846 8270C SW846 3546
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 88.8

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G21253.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	75	19	ug/kg	
208-96-8	Acenaphthylene	ND	75	19	ug/kg	
120-12-7	Anthracene	ND	75	19	ug/kg	
56-55-3	Benzo(a)anthracene	ND	75	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	75	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	75	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	75	19	ug/kg	
50-32-8	Benzo(a)pyrene	ND	75	19	ug/kg	
218-01-9	Chrysene	ND	75	19	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	75	19	ug/kg	
206-44-0	Fluoranthene	ND	75	19	ug/kg	
86-73-7	Fluorene	ND	75	19	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	75	19	ug/kg	
90-12-0	1-Methylnaphthalene	ND	75	19	ug/kg	
91-57-6	2-Methylnaphthalene	ND	75	37	ug/kg	
91-20-3	Naphthalene	ND	75	19	ug/kg	
85-01-8	Phenanthrene	ND	75	19	ug/kg	
129-00-0	Pyrene	ND	75	19	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	108%		30-130%
4165-60-0	Nitrobenzene-d5	97%		19-130%
1718-51-0	Terphenyl-d14	99%		40-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-11 N/E 1/2		
Lab Sample ID:	D61777-1	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8015B	**Percent Solids:**	88.8
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB26399.D	1	09/04/14	EP	n/a	n/a	GGB1435
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	12	6.2	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	98%		60-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: CMOW-PC-11 N/E 1/2
Lab Sample ID: D61777-1
Matrix: SO - Soil
Method: SW846-8015B SW846 3546
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 88.8

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH025452.D	1	09/05/14	JS	09/04/14	OP10556	GFH1140
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	7.5	5.6	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	58%		20-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: CMOW-PC-11 N/E 1/2
Lab Sample ID: D61777-1
Matrix: SO - Soil
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 88.8

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	88.8		%	1	09/04/14	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	863	1.0	umhos/cm	1	09/08/14	JD	SM 2510B-2011 MOD
pH	9.64		su	1	09/04/14 14:15	SK	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: CMOW-PC-11 N/E 1/2
Lab Sample ID: D61777-1A
Matrix: SO - Soil
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 88.8

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	9.11	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Magnesium	5.53	1.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Sodium	175	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5209
(2) Prep QC Batch: MP13935

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-11 N/E 1/2		
Lab Sample ID:	D61777-1A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	88.8
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	11.3		ratio	1	09/05/14 19:37	KV	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID: CMOW-PC-7 N/W 1/2
Lab Sample ID: D61777-2
Matrix: SO - Soil
Method: SW846 8270C SW846 3546
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 87.4

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	3G21266.D	5	09/09/14	DC	09/05/14	OP10566	E3G1053
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.5 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	570	140	ug/kg	
208-96-8	Acenaphthylene	ND	570	140	ug/kg	
120-12-7	Anthracene	ND	570	140	ug/kg	
56-55-3	Benzo(a)anthracene	ND	570	140	ug/kg	
205-99-2	Benzo(b)fluoranthene	872	570	140	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	570	140	ug/kg	
191-24-2	Benzo(g,h,i)perylene	726	570	140	ug/kg	
50-32-8	Benzo(a)pyrene	441	570	140	ug/kg	J
218-01-9	Chrysene	3610	570	140	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	570	140	ug/kg	
206-44-0	Fluoranthene	859	570	140	ug/kg	
86-73-7	Fluorene	3800	570	140	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	570	140	ug/kg	
90-12-0	1-Methylnaphthalene	7260	570	140	ug/kg	
91-57-6	2-Methylnaphthalene	7500	570	290	ug/kg	
91-20-3	Naphthalene	1410	570	140	ug/kg	
85-01-8	Phenanthrene	8110	570	140	ug/kg	
129-00-0	Pyrene	1500	570	140	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	129%		30-130%
4165-60-0	Nitrobenzene-d5	91%		19-130%
1718-51-0	Terphenyl-d14	132% [b]		40-130%

(a) Dilution required due to matrix interference; extract was viscous.
(b) Outside control limits due to matrix interference.

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-7 N/W 1/2		
Lab Sample ID:	D61777-2	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8015B	**Percent Solids:**	87.4
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB26400.D	1	09/04/14	EP	n/a	n/a	GGB1435
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.0 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	111	13	6.4	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	195% [a]		60-140%

(a) Outside control limits due to possible matrix interference.

ND = Not detected MDL = Method Detection Limit J = Indicates an estimated value
RL = Reporting Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: CMOW-PC-7 N/W 1/2
Lab Sample ID: D61777-2
Matrix: SO - Soil
Method: SW846-8015B SW846 3546
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 87.4

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FI16363.D	5	09/05/14	JS	09/04/14	OP10556	GFI944
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	2.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	7940	76	57	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	54%		20-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: CMOW-PC-7 N/W 1/2
Lab Sample ID: D61777-2
Matrix: SO - Soil
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 87.4

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	87.4		%	1	09/04/14	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	967	1.0	umhos/cm	1	09/08/14	JD	SM 2510B-2011 MOD
pH	9.73		su	1	09/04/14 14:15	SK	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-7 N/W 1/2		
Lab Sample ID:	D61777-2A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	87.4
Project:	CM Production-Oliver Warren #1		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	4.65	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Magnesium	< 1.0	1.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Sodium	224	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5209
(2) Prep QC Batch: MP13935

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-7 N/W 1/2		
Lab Sample ID:	D61777-2A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	87.4
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	25.4		ratio	1	09/05/14 19:44	KV	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-12 S/S WC		
Lab Sample ID:	D61777-3	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8270C SW846 3546	**Percent Solids:**	84.6
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G21254.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	78	20	ug/kg	
208-96-8	Acenaphthylene	ND	78	20	ug/kg	
120-12-7	Anthracene	ND	78	20	ug/kg	
56-55-3	Benzo(a)anthracene	ND	78	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	78	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	78	20	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	78	20	ug/kg	
50-32-8	Benzo(a)pyrene	ND	78	20	ug/kg	
218-01-9	Chrysene	ND	78	20	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	78	20	ug/kg	
206-44-0	Fluoranthene	ND	78	20	ug/kg	
86-73-7	Fluorene	ND	78	20	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	78	20	ug/kg	
90-12-0	1-Methylnaphthalene	ND	78	20	ug/kg	
91-57-6	2-Methylnaphthalene	ND	78	39	ug/kg	
91-20-3	Naphthalene	ND	78	20	ug/kg	
85-01-8	Phenanthrene	ND	78	20	ug/kg	
129-00-0	Pyrene	ND	78	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	94%		30-130%
4165-60-0	Nitrobenzene-d5	77%		19-130%
1718-51-0	Terphenyl-d14	97%		40-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-12 S/S WC		
Lab Sample ID:	D61777-3	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8015B	**Percent Solids:**	84.6
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB26401.D	1	09/04/14	EP	n/a	n/a	GGB1435
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	13	6.7	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	96%		60-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: CMOW-PC-12 S/S WC
Lab Sample ID: D61777-3
Matrix: SO - Soil
Method: SW846-8015B SW846 3546
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 84.6

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH025397.D	1	09/05/14	JS	09/04/14	OP10556	GFH1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	7.9	5.9	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	99%		20-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: CMOW-PC-12 S/S WC
Lab Sample ID: D61777-3
Matrix: SO - Soil
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 84.6

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	84.6		%	1	09/04/14	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	1470	1.0	umhos/cm	1	09/08/14	JD	SM 2510B-2011 MOD
pH	9.84		su	1	09/04/14 14:15	SK	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-12 S/S WC		
Lab Sample ID:	D61777-3A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	84.6
Project:	CM Production-Oliver Warren #1		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	8.28	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Magnesium	2.21	1.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Sodium	271	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5209
(2) Prep QC Batch: MP13935

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-12 S/S WC		
Lab Sample ID:	D61777-3A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	84.6
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	21.6		ratio	1	09/05/14 19:01	KV	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID: CMOW-PC-16BW
Lab Sample ID: D61777-4
Matrix: SO - Soil
Method: SW846 8270C SW846 3546
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 87.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G21255.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	76	19	ug/kg	
208-96-8	Acenaphthylene	ND	76	19	ug/kg	
120-12-7	Anthracene	ND	76	19	ug/kg	
56-55-3	Benzo(a)anthracene	ND	76	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	76	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	76	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	76	19	ug/kg	
50-32-8	Benzo(a)pyrene	ND	76	19	ug/kg	
218-01-9	Chrysene	ND	76	19	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	76	19	ug/kg	
206-44-0	Fluoranthene	ND	76	19	ug/kg	
86-73-7	Fluorene	ND	76	19	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	76	19	ug/kg	
90-12-0	1-Methylnaphthalene	ND	76	19	ug/kg	
91-57-6	2-Methylnaphthalene	ND	76	38	ug/kg	
91-20-3	Naphthalene	ND	76	19	ug/kg	
85-01-8	Phenanthrene	ND	76	19	ug/kg	
129-00-0	Pyrene	ND	76	19	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	98%		30-130%
4165-60-0	Nitrobenzene-d5	88%		19-130%
1718-51-0	Terphenyl-d14	92%		40-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-16BW		
Lab Sample ID:	D61777-4	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8015B	**Percent Solids:**	87.5
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB26402.D	1	09/04/14	EP	n/a	n/a	GGB1435
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	13	6.4	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	97%		60-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: CMOW-PC-16BW
Lab Sample ID: D61777-4
Matrix: SO - Soil
Method: SW846-8015B SW846 3546
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 87.5

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH025399.D	1	09/05/14	JS	09/04/14	OP10556	GFH1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	7.6	5.7	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	78%		20-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: CMOW-PC-16BW
Lab Sample ID: D61777-4
Matrix: SO - Soil
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 87.5

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	87.5		%	1	09/04/14	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	676	1.0	umhos/cm	1	09/08/14	JD	SM 2510B-2011 MOD
pH	10.30		su	1	09/04/14 15:00	SK	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-16BW		
Lab Sample ID:	D61777-4A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	87.5
Project:	CM Production-Oliver Warren #1		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	17.0	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Magnesium	3.85	1.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Sodium	145	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5209
(2) Prep QC Batch: MP13935

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-16BW		
Lab Sample ID:	D61777-4A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	87.5
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	8.26		ratio	1	09/05/14 19:51	KV	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-14 B/CTR		
Lab Sample ID:	D61777-5	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8270C SW846 3546	**Percent Solids:**	85.7
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G21256.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	78	19	ug/kg	
208-96-8	Acenaphthylene	ND	78	19	ug/kg	
120-12-7	Anthracene	ND	78	19	ug/kg	
56-55-3	Benzo(a)anthracene	ND	78	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	78	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	78	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	78	19	ug/kg	
50-32-8	Benzo(a)pyrene	ND	78	19	ug/kg	
218-01-9	Chrysene	ND	78	19	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	78	19	ug/kg	
206-44-0	Fluoranthene	ND	78	19	ug/kg	
86-73-7	Fluorene	ND	78	19	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	78	19	ug/kg	
90-12-0	1-Methylnaphthalene	ND	78	19	ug/kg	
91-57-6	2-Methylnaphthalene	ND	78	39	ug/kg	
91-20-3	Naphthalene	ND	78	19	ug/kg	
85-01-8	Phenanthrene	ND	78	19	ug/kg	
129-00-0	Pyrene	ND	78	19	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	107%		30-130%
4165-60-0	Nitrobenzene-d5	99%		19-130%
1718-51-0	Terphenyl-d14	94%		40-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-14 B/CTR		
Lab Sample ID:	D61777-5	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8015B	**Percent Solids:**	85.7
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB26403.D	1	09/04/14	EP	n/a	n/a	GGB1435
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	13	6.6	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	104%		60-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-14 B/CTR		
Lab Sample ID:	D61777-5	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846-8015B SW846 3546	**Percent Solids:**	85.7
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH025401.D	1	09/05/14	JS	09/04/14	OP10556	GFH1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	15.1	7.8	5.8	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	80%		20-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-14 B/CTR		
Lab Sample ID:	D61777-5	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	85.7
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	85.7		%	1	09/04/14	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	693	1.0	umhos/cm	1	09/08/14	JD	SM 2510B-2011 MOD
pH	10.10		su	1	09/04/14 15:00	SK	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-14 B/CTR		
Lab Sample ID:	D61777-5A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	85.7
Project:	CM Production-Oliver Warren #1		

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	41.7	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Magnesium	3.61	1.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Sodium	136	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5209
(2) Prep QC Batch: MP13935

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-14 B/CTR		
Lab Sample ID:	D61777-5A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	85.7
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	5.42		ratio	1	09/05/14 20:21	KV	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-9.5 E/SEC		
Lab Sample ID:	D61777-6	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8270C SW846 3546	**Percent Solids:**	89.7
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G21250.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	74	19	ug/kg	
208-96-8	Acenaphthylene	ND	74	19	ug/kg	
120-12-7	Anthracene	ND	74	19	ug/kg	
56-55-3	Benzo(a)anthracene	ND	74	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	74	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	74	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	74	19	ug/kg	
50-32-8	Benzo(a)pyrene	ND	74	19	ug/kg	
218-01-9	Chrysene	ND	74	19	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	74	19	ug/kg	
206-44-0	Fluoranthene	ND	74	19	ug/kg	
86-73-7	Fluorene	ND	74	19	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	74	19	ug/kg	
90-12-0	1-Methylnaphthalene	ND	74	19	ug/kg	
91-57-6	2-Methylnaphthalene	ND	74	37	ug/kg	
91-20-3	Naphthalene	ND	74	19	ug/kg	
85-01-8	Phenanthrene	ND	74	19	ug/kg	
129-00-0	Pyrene	ND	74	19	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	93%		30-130%
4165-60-0	Nitrobenzene-d5	83%		19-130%
1718-51-0	Terphenyl-d14	83%		40-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-9.5 E/SEC		
Lab Sample ID:	D61777-6	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8015B	**Percent Solids:**	89.7
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB26404.D	1	09/04/14	EP	n/a	n/a	GGB1435
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.1 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	12	6.1	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	95%		60-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-9.5 E/SEC		
Lab Sample ID:	D61777-6	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846-8015B SW846 3546	**Percent Solids:**	89.7
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH025403.D	1	09/05/14	JS	09/04/14	OP10556	GFH1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	7.4	5.6	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	77%		20-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-9.5 E/SEC		
Lab Sample ID:	D61777-6	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	89.7
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	89.7		%	1	09/04/14	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	1530	1.0	umhos/cm	1	09/08/14	JD	SM 2510B-2011 MOD
pH	10.16		su	1	09/04/14 15:00	SK	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: CMOW-PC-9.5 E/SEC
Lab Sample ID: D61777-6A
Matrix: SO - Soil
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 89.7

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	10.8	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Magnesium	2.26	1.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Sodium	250	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5209
(2) Prep QC Batch: MP13935

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-9.5 E/SEC		
Lab Sample ID:	D61777-6A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	89.7
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	18.1		ratio	1	09/05/14 20:28	KV	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-11 S/CTR		
Lab Sample ID:	D61777-7	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8270C SW846 3546	**Percent Solids:**	83.0
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3G21257.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053
Run #2							

	Initial Weight	Final Volume
Run #1	30.0 g	1.0 ml
Run #2		

BN PAH List

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	80	20	ug/kg	
208-96-8	Acenaphthylene	ND	80	20	ug/kg	
120-12-7	Anthracene	ND	80	20	ug/kg	
56-55-3	Benzo(a)anthracene	ND	80	20	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	80	20	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	80	20	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	80	20	ug/kg	
50-32-8	Benzo(a)pyrene	ND	80	20	ug/kg	
218-01-9	Chrysene	ND	80	20	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	80	20	ug/kg	
206-44-0	Fluoranthene	ND	80	20	ug/kg	
86-73-7	Fluorene	ND	80	20	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	80	20	ug/kg	
90-12-0	1-Methylnaphthalene	ND	80	20	ug/kg	
91-57-6	2-Methylnaphthalene	ND	80	40	ug/kg	
91-20-3	Naphthalene	ND	80	20	ug/kg	
85-01-8	Phenanthrene	ND	80	20	ug/kg	
129-00-0	Pyrene	ND	80	20	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
321-60-8	2-Fluorobiphenyl	97%		30-130%
4165-60-0	Nitrobenzene-d5	86%		19-130%
1718-51-0	Terphenyl-d14	85%		40-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-11 S/CTR		
Lab Sample ID:	D61777-7	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846 8015B	**Percent Solids:**	83.0
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GB26405.D	1	09/04/14	EP	n/a	n/a	GGB1435
Run #2							

	Initial Weight	Final Volume	Methanol Aliquot
Run #1	5.0 g	5.0 ml	100 ul
Run #2			

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	14	7.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
120-82-1	1,2,4-Trichlorobenzene	97%		60-140%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-11 S/CTR		
Lab Sample ID:	D61777-7	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
Method:	SW846-8015B SW846 3546	**Percent Solids:**	83.0
Project:	CM Production-Oliver Warren #1		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FH025405.D	1	09/05/14	JS	09/04/14	OP10556	GFH1137
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	1.0 ml
Run #2		

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	8.0	6.0	mg/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	77%		20-130%

ND = Not detected MDL = Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CMOW-PC-11 S/CTR		
Lab Sample ID:	D61777-7	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	83.0
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
%solids							
Solids, Percent	83		%	1	09/04/14	SWT	SM2540G-2011 M
prep: DEPT.OF AG, BOOK N9							
Specific Conductivity	996	1.0	umhos/cm	1	09/08/14	JD	SM 2510B-2011 MOD
pH	10.12		su	1	09/04/14 15:00	SK	SW846 9045D

RL = Reporting Limit

Report of Analysis

Client Sample ID: CMOW-PC-11 S/CTR
Lab Sample ID: D61777-7A
Matrix: SO - Soil
Project: CM Production-Oliver Warren #1

Date Sampled: 09/03/14
Date Received: 09/03/14
Percent Solids: 83.0

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Calcium	17.1	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Magnesium	4.62	1.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]
Sodium	192	2.0	mg/l	1	09/05/14	09/05/14	KV	SW846 6010C [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA5209
(2) Prep QC Batch: MP13935

RL = Reporting Limit

Report of Analysis

Client Sample ID:	CMOW-PC-11 S/CTR		
Lab Sample ID:	D61777-7A	**Date Sampled:**	09/03/14
Matrix:	SO - Soil	**Date Received:**	09/03/14
		Percent Solids:	83.0
Project:	CM Production-Oliver Warren #1		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Sodium Adsorption Ratio [a]	10.6		ratio	1	09/05/14 20:35	KV	USDA HANDBOOK 60

(a) Calculated as: (Na meq/L) / sqrt [(Ca meq/L)+ (Mg meq/L)/2]

RL = Reporting Limit

Mountain States ACCUTEST LABORATORIES

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

CHAIN OF CUSTODY

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ACCUTEST LABORATORIES

Accutest Laboratories Mountain States
4036 Youngfield Street Wheat Ridge, Co 80033
TEL. 303-425-6021 877-737-4521
FAX 303-425-6021

FED-EX Tracking #: | Bottle Order Control #:
Accutest Quote #: | Accutest Job #: D61777

Client / Reporting Information

Company Name: Olsson Associates
Street Address: 4690 Table Mtn. Dr., Ste. 200
City: Golden State: CO Zip: 80403
Project Contact: James Hix E-mail: jhix@olssonassociates.com
Phone #: 303-327-3072 Fax #: 303-327-3659
Sampler(s) Name(s): Jason Davidson Phone #: Same

Project Information

Project Name: Oliver Warren #1 Skim Pits
Street: Wash. County Rd. YY
City: Washington County
Project #: 013-1681
Client PO#: Same
Project Manager: James Hix

Billing Information (if different from Report to)

Company Name: Same
Street Address:
City State Zip:
Attention: PO#:

Requested Analysis (see TEST CODE sheet)

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL- Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB-Field Blank; EB- Equipment Blank; RB- Rinse Blank; TB-Trip Blank

Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCL	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	Encore	DRO	GRO	PAH	SAR	LL	DH	LAB USE ONLY
	CMOW-PC-11 N/E¼	-	9/3/14	10:00	JSD	SO	3					3					X	X	X	X	X	X	01
	CMOW-PC-7 N/W¼	-		11:00																			02
	CMOW-PC-12 S/SWC	-		10:05																			03
	CMOW-PC-16 BW	-		10:10																			04
	CMOW-PC-14 B/CTR	-		10:15																			05
	CMOW-PC-9.5 E/SEC	-		10:35																			06
	CMOW-PC-11 S/CTR	-		10:45																			07

9/3/14

Turnaround Time (Business days)

Approved By (Accutest PM): / Date:

- [ ] Std. 10 Business Days
- [x] Std. 5 Business Days (By Contract only)
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] Commercial "B" +Narrative
- [ ] FULLT1 (Level 3+4)
- [ ] State Forms
- [ ] EDD Format
- [ ] PDF

Commercial "A" = Results Only
Commercial "B" = Results + QC Summary

Comments / Special Instructions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	Jason Davidson	9/3/14 2:42pm	1 9/3/14	2		2
3			3	4		4
5			5			

Custody Seal #: FED | Intact | Not Intact | Preserved where applicable | On Ice | Cooler Temp: 20.2

TMCa

D61777: Chain of Custody
Page 1 of 1

Mountain States ACCUTEST LABORATORIES

GC/MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP10566-MB	3G21248.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053

The QC reported here applies to the following samples: **Method:** SW846 8270C

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	67	17	ug/kg	
208-96-8	Acenaphthylene	ND	67	17	ug/kg	
120-12-7	Anthracene	ND	67	17	ug/kg	
56-55-3	Benzo(a)anthracene	ND	67	17	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	67	17	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	67	17	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	67	17	ug/kg	
50-32-8	Benzo(a)pyrene	ND	67	17	ug/kg	
218-01-9	Chrysene	ND	67	17	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	67	17	ug/kg	
206-44-0	Fluoranthene	ND	67	17	ug/kg	
86-73-7	Fluorene	ND	67	17	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	67	17	ug/kg	
90-12-0	1-Methylnaphthalene	ND	67	17	ug/kg	
91-57-6	2-Methylnaphthalene	ND	67	33	ug/kg	
91-20-3	Naphthalene	ND	67	17	ug/kg	
85-01-8	Phenanthrene	ND	67	17	ug/kg	
129-00-0	Pyrene	ND	67	17	ug/kg	

CAS No.	Surrogate Recoveries		Limits
321-60-8	2-Fluorobiphenyl	120%	30-130%
367-12-4	2-Fluorophenol	110%	16-130%
4165-60-0	Nitrobenzene-d5	107%	19-130%
4165-62-2	Phenol-d5	114%	18-130%
1718-51-0	Terphenyl-d14	104%	40-130%
118-79-6	2,4,6-Tribromophenol	105%	17-130%

Blank Spike Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP10566-BS	3G21249.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053

The QC reported here applies to the following samples: **Method:** SW846 8270C

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	1670	1640	98	58-130
208-96-8	Acenaphthylene	1670	1710	103	58-130
120-12-7	Anthracene	1670	1770	106	67-130
56-55-3	Benzo(a)anthracene	1670	1760	106	63-130
205-99-2	Benzo(b)fluoranthene	1670	1760	106	42-157
207-08-9	Benzo(k)fluoranthene	1670	1970	118	38-175
191-24-2	Benzo(g,h,i)perylene	1670	1590	95	49-152
50-32-8	Benzo(a)pyrene	1670	1850	111	47-155
218-01-9	Chrysene	1670	1780	107	68-130
53-70-3	Dibenzo(a,h)anthracene	1670	1670	100	48-152
206-44-0	Fluoranthene	1670	1780	107	64-130
86-73-7	Fluorene	1670	1740	104	58-130
193-39-5	Indeno(1,2,3-cd)pyrene	1670	1640	98	45-153
90-12-0	1-Methylnaphthalene	1670	1630	98	55-130
91-57-6	2-Methylnaphthalene	1670	1630	98	54-130
91-20-3	Naphthalene	1670	1610	97	53-130
85-01-8	Phenanthrene	1670	1790	107	66-130
129-00-0	Pyrene	1670	1800	108	68-130

CAS No.	Surrogate Recoveries	BSP	Limits
321-60-8	2-Fluorobiphenyl	109%	30-130%
367-12-4	2-Fluorophenol	92%	16-130%
4165-60-0	Nitrobenzene-d5	97%	19-130%
4165-62-2	Phenol-d5	90%	18-130%
1718-51-0	Terphenyl-d14	102%	40-130%
118-79-6	2,4,6-Tribromophenol	102%	17-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP10566-MS	3G21251.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053
OP10566-MSD	3G21252.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053
D61777-6	3G21250.D	1	09/09/14	DC	09/05/14	OP10566	E3G1053

The QC reported here applies to the following samples: **Method:** SW846 8270C

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	D61777-6 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	Spike ug/kg	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		1850	1570	85	1860	1550	83	1	36-130/30
208-96-8	Acenaphthylene	ND		1850	1620	87	1860	1570	84	3	10-150/30
120-12-7	Anthracene	ND		1850	1650	89	1860	1560	84	6	50-130/30
56-55-3	Benzo(a)anthracene	ND		1850	1650	89	1860	1580	85	4	41-130/30
205-99-2	Benzo(b)fluoranthene	ND		1850	1690	91	1860	1610	87	5	29-152/30
207-08-9	Benzo(k)fluoranthene	ND		1850	1720	93	1860	1650	89	4	14-175/30
191-24-2	Benzo(g,h,i)perylene	ND		1850	1480	80	1860	1440	78	3	15-164/30
50-32-8	Benzo(a)pyrene	ND		1850	1720	93	1860	1670	90	3	27-151/30
218-01-9	Chrysene	ND		1850	1700	92	1860	1640	88	4	46-130/30
53-70-3	Dibenzo(a,h)anthracene	ND		1850	1550	84	1860	1500	81	3	31-152/30
206-44-0	Fluoranthene	ND		1850	1660	90	1860	1590	86	4	53-130/30
86-73-7	Fluorene	ND		1850	1680	91	1860	1590	86	6	24-134/30
193-39-5	Indeno(1,2,3-cd)pyrene	ND		1850	1520	82	1860	1470	79	3	26-153/30
90-12-0	1-Methylnaphthalene	ND		1850	1530	83	1860	1500	81	2	21-130/30
91-57-6	2-Methylnaphthalene	ND		1850	1500	81	1860	1510	81	1	10-148/30
91-20-3	Naphthalene	ND		1850	1510	82	1860	1490	80	1	27-130/30
85-01-8	Phenanthrene	ND		1850	1640	89	1860	1600	86	2	38-130/30
129-00-0	Pyrene	ND		1850	1700	92	1860	1610	87	5	53-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D61777-6	Limits
321-60-8	2-Fluorobiphenyl	89%	87%	93%	30-130%
367-12-4	2-Fluorophenol	71%	71%		16-130%
4165-60-0	Nitrobenzene-d5	78%	79%	83%	19-130%
4165-62-2	Phenol-d5	73%	71%		18-130%
1718-51-0	Terphenyl-d14	83%	80%	83%	40-130%
118-79-6	2,4,6-Tribromophenol	82%	78%		17-130%

* = Outside of Control Limits.

Mountain States ACCUTEST LABORATORIES

GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB1435-MB	GB26394.D	1	09/04/14	EP	n/a	n/a	GGB1435

The QC reported here applies to the following samples: **Method:** SW846 8015B

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-GRO (C6-C10)	ND	0.050	0.050	mg/l	

CAS No.	Surrogate Recoveries		Limits
120-82-1	1,2,4-Trichlorobenzene	97%	60-140%

Blank Spike Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGB1435-BS	GB26395.D	1	09/04/14	EP	n/a	n/a	GGB1435

The QC reported here applies to the following samples: **Method:** SW846 8015B

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	Spike mg/l	BSP mg/l	BSP %	Limits
	TPH-GRO (C6-C10)	2.2	2.29	104	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
120-82-1	1,2,4-Trichlorobenzene	104%	60-140%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D61724-1MS	GB26397.D	1	09/04/14	EP	n/a	n/a	GGB1435
D61724-1MSD	GB26398.D	1	09/04/14	EP	n/a	n/a	GGB1435
D61724-1	GB26396.D	1	09/04/14	EP	n/a	n/a	GGB1435

The QC reported here applies to the following samples: **Method:** SW846 8015B

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	D61724-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	Spike mg/kg	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-GRO (C6-C10)	66.4		304	386	105	304	378	102	2	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D61724-1	Limits
120-82-1	1,2,4-Trichlorobenzene	140%	133%	132%	60-140%

* = Outside of Control Limits.

Mountain States ACCUTEST LABORATORIES

GC Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP10556-MB	FH025434.D	1	09/05/14	JS	09/04/14	OP10556	GFH1140

The QC reported here applies to the following samples: **Method:** SW846-8015B

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	Result	RL	MDL	Units	Q
	TPH-DRO (C10-C28)	ND	6.7	5.0	mg/kg	

CAS No.	Surrogate Recoveries		Limits
84-15-1	o-Terphenyl	76%	20-130%

Blank Spike Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP10556-BS	FH025436.D	1	09/05/14	JS	09/04/14	OP10556	GFH1140

The QC reported here applies to the following samples: **Method:** SW846-8015B

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	Spike mg/kg	BSP mg/kg	BSP %	Limits
	TPH-DRO (C10-C28)	167	92.2	55	42-130

CAS No.	Surrogate Recoveries	BSP	Limits
84-15-1	o-Terphenyl	77%	20-130%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: D61777
Account: COCSCOG Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP10556-MS	FH025438.D	1	09/05/14	JS	09/04/14	OP10556	GFH1140
OP10556-MSD	FH025440.D	1	09/05/14	JS	09/04/14	OP10556	GFH1140
D61777-1	FH025452.D	1	09/05/14	JS	09/04/14	OP10556	GFH1140

The QC reported here applies to the following samples: **Method:** SW846-8015B

D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7

CAS No.	Compound	D61777-1 mg/kg	Q	Spike mg/kg	MS mg/kg	MS %	Spike mg/kg	MSD mg/kg	MSD %	RPD	Limits Rec/RPD
	TPH-DRO (C10-C28)	ND		187	93.1	50	186	102	55	9	20-150/30

CAS No.	Surrogate Recoveries	MS	MSD	D61777-1	Limits
84-15-1	o-Terphenyl	66%	74%	58%	20-130%

* = Outside of Control Limits.

Mountain States ACCUTEST LABORATORIES

Metals Analysis

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	55	210		
Antimony	150	11	95		
Arsenic	130	19	28		
Barium	50	1	7		
Beryllium	50	4.5	6		
Boron	250	4	33		
Cadmium	50	1	1.8		
Calcium	2000	12	210	-24	<2000
Chromium	50	1.5	2		
Cobalt	25	2.5	2.9		
Copper	50	4	9.5		
Iron	350	7.5	48		
Lead	250	11	110		
Lithium	25	2	14		
Magnesium	1000	34	95	67.5	<1000
Manganese	25	2.5	2.3		
Molybdenum	50	2	4.2		
Nickel	150	2.5	4.4		
Phosphorus	500	75	100		
Potassium	5000	500	1400		
Selenium	250	36	55		
Silicon	250	24	26		
Silver	150	1.5	3		
Sodium	2000	37	850	203	<2000
Strontium	25	.05	.6		
Thallium	50	9	20		
Tin	250	60	80		
Titanium	50	.5	11		
Uranium	250	15	28		
Vanadium	50	2	2		
Zinc	150	2	16		

Associated samples MP13935: D61777-1A, D61777-2A, D61777-3A, D61777-4A, D61777-5A, D61777-6A, D61777-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	RL	IDL	MDL	MB raw	final

(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	D61777-3A Original	MS	Spikelot ICPALL2	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	8280	141000	125000	106.2	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	2210	132000	125000	103.8	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	271000	399000	125000	102.4	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP13935: D61777-1A, D61777-2A, D61777-3A, D61777-4A, D61777-5A, D61777-6A, D61777-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	D61777-3A Original MS	Spikelot ICPALL2	% Rec	QC Limits

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	D61777-3A Original	MSD	Spikelot ICPALL2	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron						
Cadmium						
Calcium	8280	139000	125000	104.6	1.4	20
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium						
Magnesium	2210	132000	125000	103.8	0.0	20
Manganese						
Molybdenum						
Nickel						
Phosphorus						
Potassium						
Selenium						
Silicon						
Silver						
Sodium	271000	397000	125000	100.8	0.5	20
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc						

Associated samples MP13935: D61777-1A, D61777-2A, D61777-3A, D61777-4A, D61777-5A, D61777-6A, D61777-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	D61777-3A Original MSD	Spikelot ICPALL2	% Rec	MSD RPD	QC Limit

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	133000	125000	106.4	80-120
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	132000	125000	105.6	80-120
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	129000	125000	103.2	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP13935: D61777-1A, D61777-2A, D61777-3A, D61777-4A, D61777-5A, D61777-6A, D61777-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	BSP Result	Spikelot ICPALL2	% Rec	QC Limits

(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

Metal	D61777-3A Original	SDL 1:5	%DIF	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron				
Cadmium				
Calcium	1660	1540	6.9	0-10
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium				
Magnesium	441	506	14.7*(a)	0-10
Manganese				
Molybdenum				
Nickel				
Phosphorus				
Potassium				
Selenium				
Silicon				
Silver				
Sodium	54200	52000	4.2	0-10
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc				

Associated samples MP13935: D61777-1A, D61777-2A, D61777-3A, D61777-4A, D61777-5A, D61777-6A, D61777-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SERIAL DILUTION RESULTS SUMMARY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

QC Batch ID: MP13935
Matrix Type: AQUEOUS

Methods: SW846 6010C, USDA HANDBOOK 60
Units: ug/l

Prep Date: 09/05/14

	D61777-3A		QC
Metal	Original SDL 1:5	%DIF	Limits

(anr) Analyte not requested
(a) Serial dilution indicates possible matrix interference.

Mountain States ACCUTEST LABORATORIES

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D61777
Account: COCSCOG - Olsson Associates - Denver
Project: CM Production-Oliver Warren #1

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Specific Conductivity	GP13477/GN26349			umhos/cm	9988	10000	100.3	90-110%
pH	GN26300			su	8.00	8.00	100.0	99.1-100.9%
pH	GN26301			su	8.00	8.00	100.0	99.1-100.9%

Associated Samples:
Batch GN26300: D61777-1, D61777-2, D61777-3
Batch GN26301: D61777-4, D61777-5, D61777-6, D61777-7
Batch GP13477: D61777-1, D61777-2, D61777-3, D61777-4, D61777-5, D61777-6, D61777-7
(*) Outside of QC limits

APPENDIX C
EXCAVATION PHOTOGRAPHS

Subject: Excavation of the skim pits on the south side of the produced water tank and produced water pit. The excavator is located on the east side of the former east skim pit.

Date: August 14, 2014

View: East

Subject: Ridgeline Excavation began excavating the former skim pits starting on the east side of the site and to the south of the produced water tank and produced water pit.

Date: August 14, 2014

View: North

Subject: Impacted soils were stockpiled on a lined containment cell located to the southeast of the former skim pits near the propane vessel and berm for the vertical separator.

Date: August 14, 2014

View: Southeast

	**Subject:** Ridgeline Excavating began the excavation on the east side of the former skim pits. The photograph shows the power pole and the guywire in the background in the upper right-hand side of the photo which limited the excavation. **Date:** August 14, 2014 **View:** West
	**Subject:** The photograph shows the northeast corner of the skim pit excavation looking to the south toward the vertical separator. **Date:** August 14, 2014 **View:** Southwest
	**Subject:** The excavation of the former skim pit began along the south earthen berm for the skim tank. **Date:** August 14, 2014 **View:** South-Southwest

Subject: Ridgeline benched down and removed unimpacted overburden from the former skim pit. Soils consisted primarily of silty clay and clay.

Date: August 14, 2014

View: South

Subject: The shovel marks the location of the buried produced water flowline that separated the east and west skim pits.

Date: August 14, 2014

View: South

Subject: The flowline connects from the skim tank to the vertical separator to the south. Produced water is discharged to a produced water pit to the north of the skim tank.

Date: August 14, 2014

View: North

Subject: Photograph shows the bottom of the excavation of the east skim pit.

Date: August 14, 2014

View: South

Subject: A white clay layer marked the vertical extent of the impacted soils on the northwest side of the east skim pit excavation. This layer is shown in the bottom center of the photograph.

Date: August 14, 2014

View: Northwest

Subject: Photograph shows the west wall of the east skim pit and the location of the buried produced water flowline marked by the shovel.

Date: August 14, 2014

View: Southwest

	**Subject:** Photograph shows the impacted soil stockpile excavated from the former skim pits. **Date:** August 22, 2014 **View:** East
	**Subject:** The impacted soil stock pile was located to the south of the former skim pits. **Date:** August 22, 2014 **View:** South
	**Subject:**. Photograph shows the north side wall and bottom of the excavation of the skim pits. The produced water flowline was supported by placing a pipe across the excavation. **Date:** August 22, 2014 **View:** North

Subject:. Photograph shows the bottom and the north and east side walls of the excavation of the former skim pits.

Date: August 22, 2014

View: East

Subject: Photograph shows the north and the west side wall and bottom of the excavation of the former skim pits and the produced water flowline from the vertical separator to the skim tank. The flowline was supported by a pipe segment spanning the excavation.

Date: August 22, 2014

View: West

Subject: Photograph shows the south side wall and bottom of the excavation of the former skim pits**.**

Date: August 22, 2014

View: West

Subject: Photograph shows the east and south side walls of the former skim pits excavation. Deadman anchors and guywires for a series of power poles prevented further excavation to the west and northwest**.**

Date: August 22, 2014

View: Southeast

	**Subject:** Overview of the excavation from the northwest corner of the former skim pits excavation showing the east and south side walls and excavation of the west skim pit. **Date:** August 22, 2014 **View:** East
	**Subject:**. Photograph shows the power pole, guywires, and deadmen anchors supporting a series of power poles along the east side of County Road YY. The skim tank and the produced water pit were located further to the north of the former pits. **Date:** August 22, 2014 **View:** Northeast
	**Subject:** Photograph shows the impacted soil stockpile for landfarming. **Date:** August 22, 2014 **View:** North

	**Subject:** Photograph shows the north and east side walls of the former skim pits excavation and storm water in the bottom following rains in late August. **Date:** September 3, 2014 **View:** East
	**Subject:** Photograph shows the location of the north side wall soil sample, CMOW-PC-7', from the west half of the excavation**.** **Date:** September 3, 2014 **View:** North
	**Subject:** Photograph shows the South wall of the former skim pits excavation and the location of soil sample CMOW-PC-11' from the center of the south wall, and the location of the bottom center sample CMOW-PC-14'. Storm water collected in the excavation following late August rainstorms. **Date:** September 3, 2014 **View:** Southwest

Subject: Photograph shows the location of sidewall soil sample CMOW-PC-12' from the eastern half of the north side wall of the excavation.

Date: September 3, 2014

View: Northeast

Subject: Photograph shows an overview of the former skim pits excavation and storm water in the bottom of the pit following rains in late August.

Date: September 3, 2014

View: East

Subject:: Photograph shows the location of side wall soil sample CMOW-PC-12' from the south wall and the location of bottom soil sample CMOW-PC-16' from the western part of the excavation.

Date: September 3, 2014

View: South

Subject: Photograph shows the location of the east side wall soil sample CMOW-PC-9.5', and the southeast corner of the excavation. Standing stormwater was present in the bottom of the excavation following heavy rainstorms in late August.

Date: September 3, 2014

View: East

Subject: Photograph shows the west part of the former skim pits excavation from near the ladder to the skim tank.

Date: September 3, 2014

View: Southwest

Subject: Photograph shows the extent of the excavation to the west which was limited by a power line pole guywires and deadmen anchors.

Date: September 3, 2014

View: West

APPENDIX D
FIELD FORM

SITE FIELD FORM

Site Name: _____ Date: _____

Weather Conditions: _____

Temperature at time of Inspection: _____

Evidence of recent precipitation? ☐ Yes ☐ No (If Yes – Indicate amount in inches if known) _____

1. Storm Water Best Management Practices (BMPs) installed and functioning properly?

☐ Yes ☐ No (If No, please describe BMP installation needed or corrective action below)

_____

_____

_____

2. Is there evidence of exploration and production (E&P) waste or impacted soils leaving the surface impoundment in stormwater runoff?

☐ Yes ☐ No (If Yes, please indicate the location of the spill/release)

_____

_____

3. When was the last time the impacted soil/E&P wastes were treated and tilled or turned?

_____

4. Were any soil samples collected and submitted for laboratory analysis of the Colorado Oil and Gas Conservation Commission (COGCC) Table 910-1 soil parameters?

☐ Yes ☐ No (If Yes, please include laboratory results)

5. If a spill or release occurred were any agencies/individuals required to be notified?

☐ Yes ☐ No (If Yes, please indicate which agencies were notified below)

☐ COGCC ☐ Local Emergency Planning Committee ☐ County Sheriff

☐ CDPHE ☐ Emergency Services ☐ Surface Owner ☐ Property Owners