CAERUS PICEANCE, LLC
Piceance Basin, Colorado

Drill Cuttings Waste Management and Beneficial Reuse Plan

This Waste Management Plan (WMP) outlines the operational requirements to be followed by Caerus Piceance, LLC (Caerus) when hauling surface hole drill cuttings produced at the O04-696 pad location (COGCC Location ID 414231) (Drill Pad) to the UNOCAL-ENCANA-66S96W 4NESW well pad location (COGCC Location ID 335618) (Unocal 5) to be beneficially reused as fill material during Interim Reclamation of this pad. A map of the general area (Figure 1) and a Route Map (Figure 2) have been included in order to detail the haul route that will be followed. The property that both the Drill Pad, the Unocal 5, and haul road connecting them is owned by Caerus.

Management of Cuttings at the O04-696 Pad

Caerus plans to drill 16 wells on the Drill Pad. During the drilling process, the cuttings will be brought to the surface and stabilized by dehydrating them via shaker tables and centrifuges. Once the cuttings are dewatered, they will be temporarily staged on the Drill Pad's pad surface within secondary containment berms to prevent them from contacting stormwater runoff. Prior to leaving the Drill Pad, the cuttings will be further dehydrated with amendments designed to dry out the cuttings to prevent accumulation of liquids greater than de minimis amounts.

Cuttings will be segregated between surface and production based on what depth they are produced from. Cuttings produced during the drilling of the surface casing hole (usually from 100 feet below ground surface (bgs) to 1,500 feet bgs) will be placed in one pile and cuttings produced during the drilling of the production casing hole (usually from 1,500 feet bgs to total depth) in another. Samples collected from cuttings produced during the drilling of the surface casing hole typically do not exhibit exceedances of the total petroleum hydrocarbons, benzene, toluene, ethylbenzene, or total xylenes Concentration Levels listed in COGCC Table 910-1 while samples collected from cuttings produced during the production casing hole occasionally do. Using this approach will allow us to reduce the amount of cuttings deemed to have exceedances of COGCC Table 910-1 Concentration Levels.

Once approximately 500 cubic yards of surface hole cuttings have accumulated, a five-point composite sample will be collected from the stockpile and analyzed for constituents listed in COGCC Table 910-1. In order to collect samples that are representative of the cuttings stockpile per COGCC Rule 910.b.(2).B, 910.b.(3).B, and 910.b.(3).C, each of the five aliquots representing the composite samples will be collected at random depts at least one foot below the surface of the pile. Once the above-mentioned sample has been collected, all further cuttings produced on the drill pad will be diverted to the production hole cuttings stockpile until sample results are reported and all cuttings represented by the sampling described above have been transported to the Unocal 5. This will prevent the accidental re-impacting of a stockpile of potentially compliant surface hole cuttings.

If analytical results indicate that the soil sample collected from the surface hole cuttings

stockpile complies with all COGCC Table 910-1 Concentration Levels (minus EC, SAR, and pH), all 500 cubic yards of these cuttings will be transported to the Unocal 5 pad location as described below in the section of this plan titled "Transportation Operations to Unocal 5." Arsenic results will be compared to results of background samples collected at the N04-696 pad location (COGCC Location ID 335598). These background results are presented in Appendix 2. Please see the section of this plan titled "Reclamation of Unocal 5" for details on how Caerus plans to address EC, SAR, and pH exceedances.

If cuttings exhibit exceedances of Concentration Levels other than those listed for arsenic, EC, SAR, and pH, they will be integrated into the production casing hole cuttings piles and remediated per Caerus' normal cuttings remediation procedures following the completion of drilling and completion activities.

Transportation Operations to Unocal 5

Caerus intends on hauling all surface hole cuttings (approximately 2,000 cubic yards) from the Drill Pad to the Unocal 5. No production hole cuttings will be moved from the Drill Pad to the Unocal 5. The Unocal 5 is located approximately 0.6 miles from the Drill Pad. The cuttings will be transported to the Unocal 5 by contractors hired by Caerus. Personnel designated to handle these cuttings will be trained and informed of the nature and risks posed by this type of waste. In addition, these individuals shall be required to wear appropriate personal protective equipment while handling the cuttings. All employees involved with the handling of the cuttings will be trained to understand and implement the WMP components that are relevant to their responsibilities.

Any spills or releases occurring during transport will be reported to Caerus environmental staff immediately. Contractors hired to transport the cuttings to the Drill Pad will not be responsible for reporting spills or releases to the COGCC. This will be the responsibility of Caerus environmental staff.

Documentation of Transportation

All loads of cuttings transported between the Drill Pad and Unocal 5 will be documented using the Waste Origin Log found in Appendix 1. Per COGCC Rule 907.b.(2), the following information will be kept on file for at least five years and will be made available upon request:

1. The date of the transport;
2. The identity of the waste generator;
3. The identity of the waste transporter;
4. The location waste pickup site;
5. The type and volume of waste; and
6. The name and location of the treatment or disposal site.

Storage of Cuttings at Unocal 5

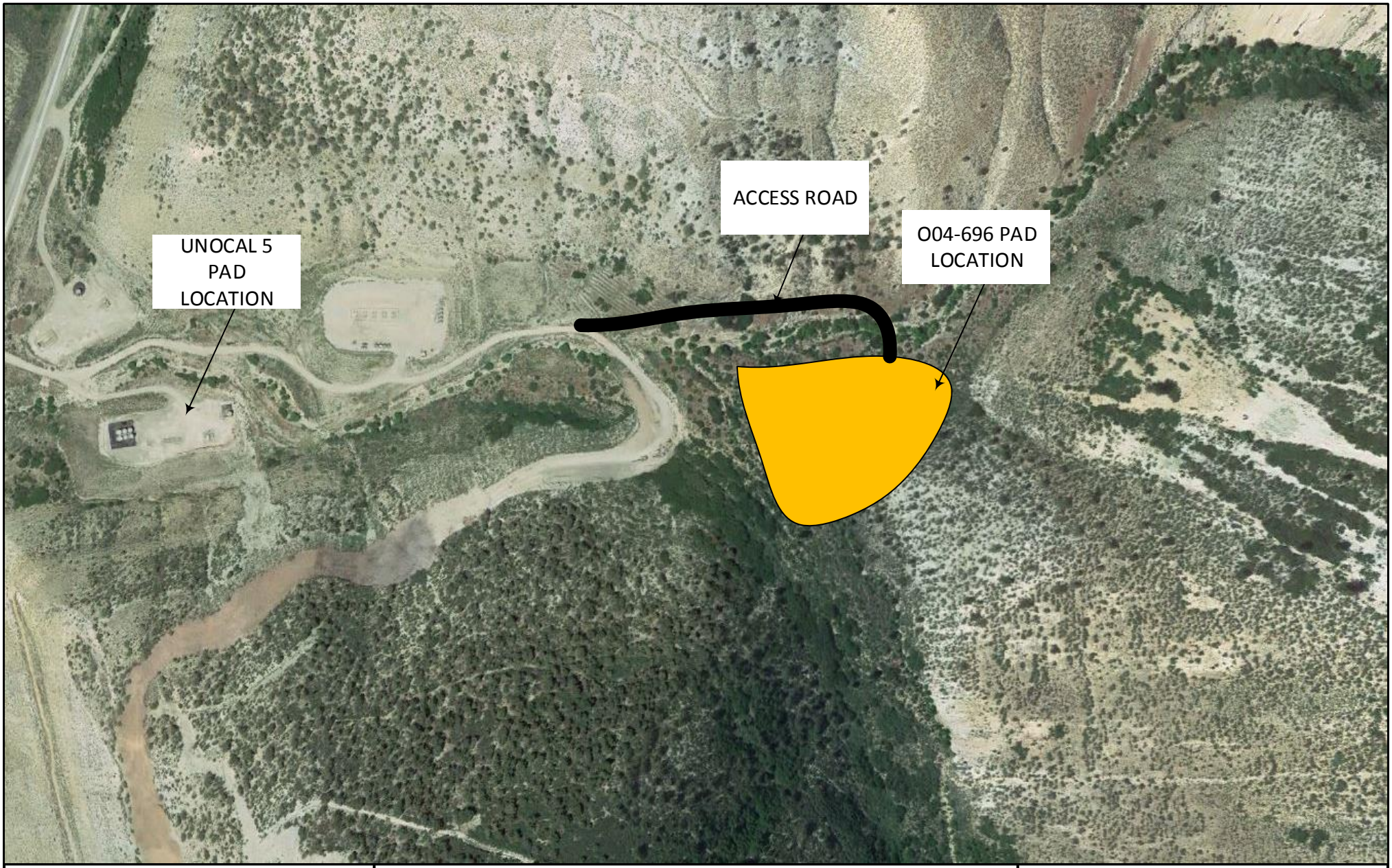
All cuttings approved to be transported to the Unocal 5 via procedures listed above will be placed in the southwestern portion of the pad disturbance (Figure 3) within a containment berm. This berm will serve as a stormwater BMP that will prevent stormwater runoff from

conveying potential pollutants from the cuttings pile off location.

Reclamation of Unocal 5

Once all cuttings have been staged on the Unocal 5, Interim Reclamation of the western portion of the Unocal 5 will occur in order to reduce the footprint of this disturbance. This reclamation will occur within one year of the conclusion of well completion work of the wells on the Drill Pad. Cuttings will be integrated into the southwestern cut slope in varying thicknesses based on where in the reclaim they are placed. Thickness could vary from five feet to 20 feet. They will then be covered with top soil and non-top soil deposits taken from locations around the pad which are depicted on Figure 3. Covering the remediated cuttings with native soil will serve to stabilize the cuttings until interim reclamation is achieved. All interim reclamation activities will be conducted in accordance with COGCC Rule 1003 and Guidelines listed under FAQ 32. Caerus anticipates that the cuttings transported to the Unocal 5 will exhibit exceedances of the Concentration Levels listed for EC, SAR, and pH. In order to address these exceedances, Caerus is requesting consideration for COGCC Table 910-1 Concentration Levels for EC, pH, and SAR under guidelines set forth under FAQ 32 as all cuttings will be buried a minimum of three feet beneath the reclaimed soil surface. Caerus believes the request for FAQ 32 consideration is acceptable as there are minimal potential receptors in the area and environmental impacts to these receptors are unlikely. The entire pad surface is contained by a perimeter berm to reduce the chance for overland flow from exiting the pad surface. The nearest surface water is 240 feet to the north and groundwater at the site is estimated to be greater than 50 feet below the pad surface based on previous assessments completed at the site.

FIGURES



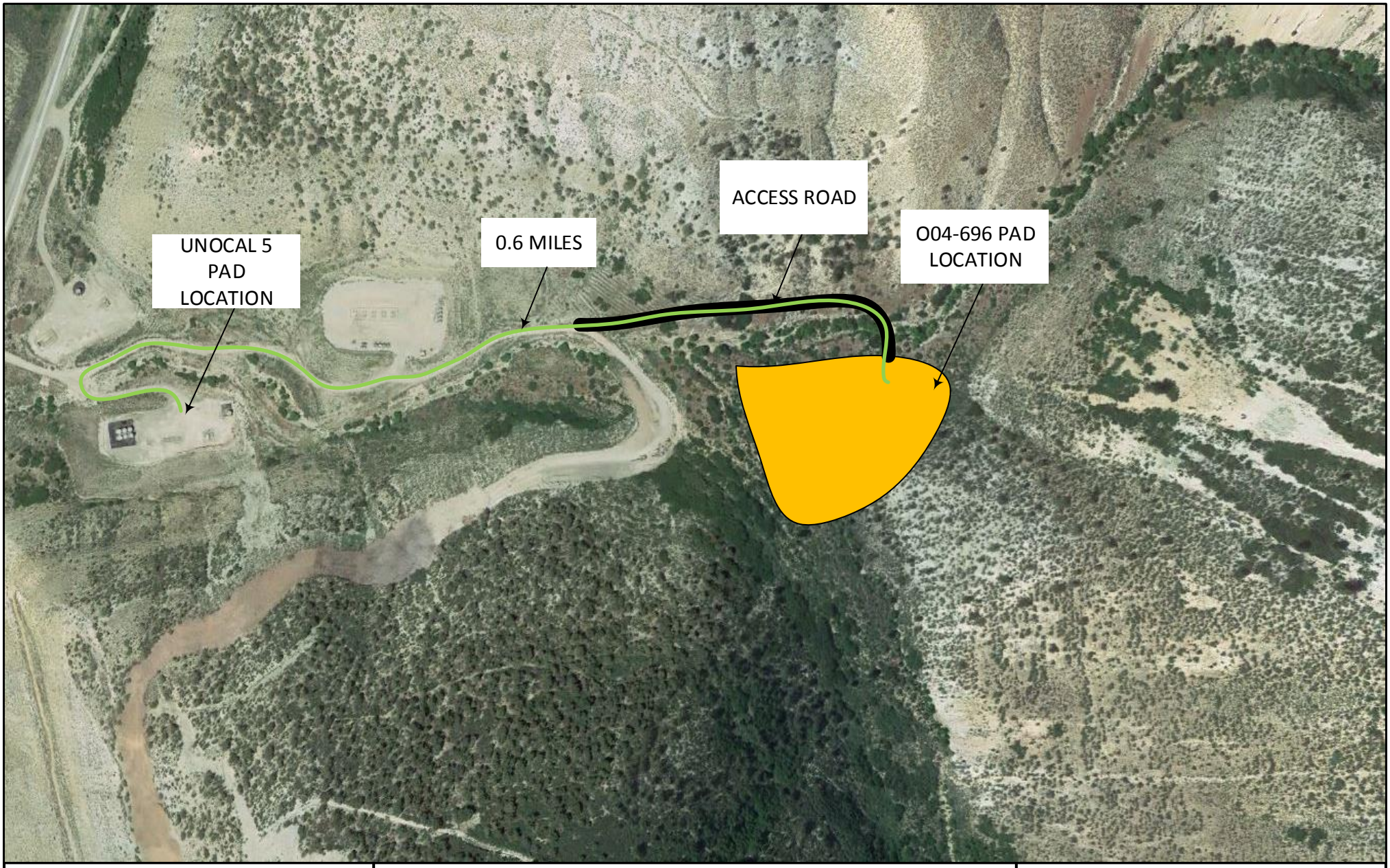
CAERUS OIL AND GAS LLC
143 Diamond Ave
Parachute, CO 81635
PHONE: 970-285-2600

Figure 1
Site Location Map

Diagram Created By: Jake Janicek (EHS Specialist)
Date: 5/16/2019

Not to Scale

Site Location:
Parachute Creek Area
Garfield County, Colorado
Caerus Oil and Gas LLC



CAERUS OIL AND GAS LLC
143 Diamond Ave
Parachute, CO 81635
PHONE: 970-285-2600

LEGEND

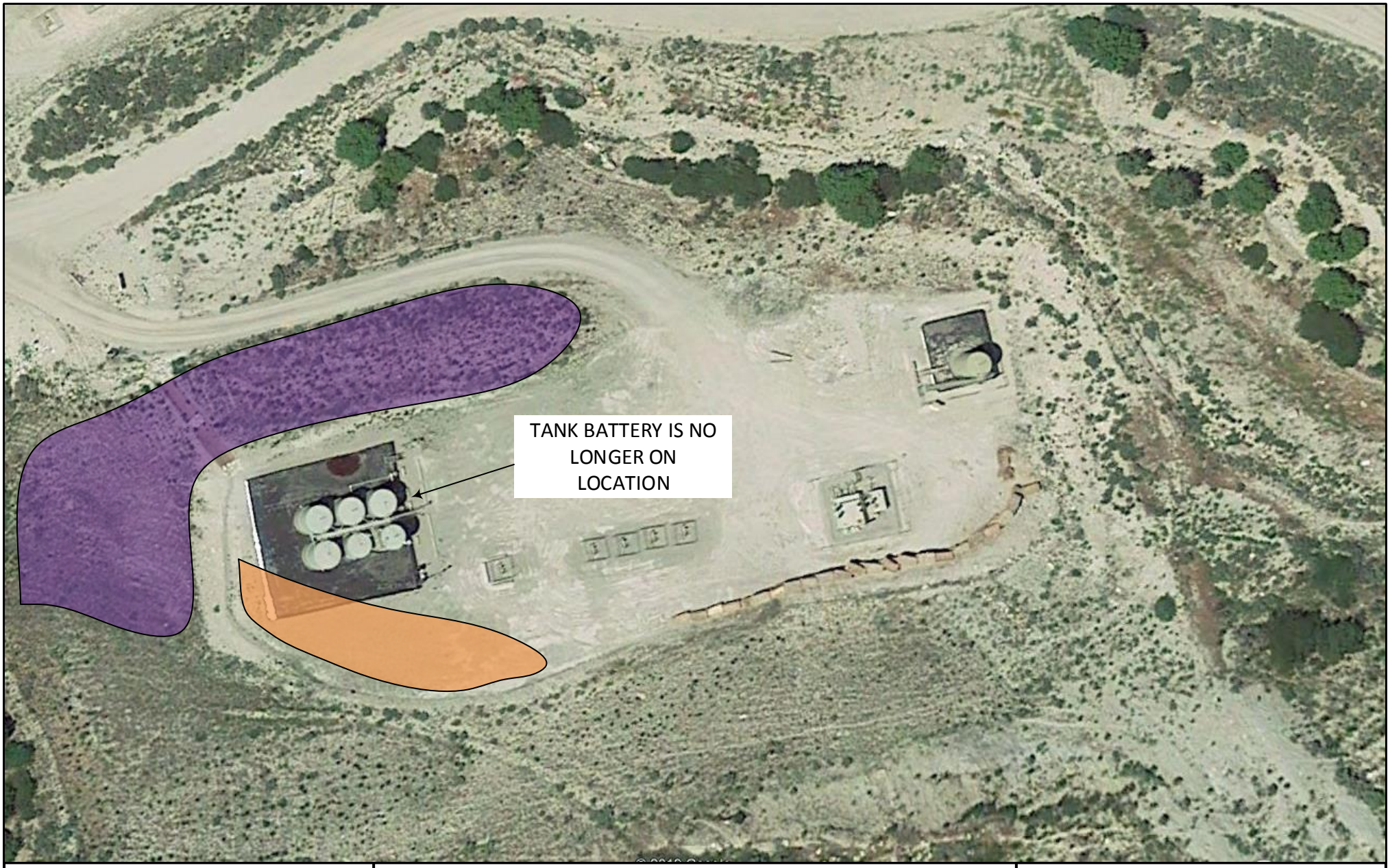
PROPOSED HAUL ROUTE

Figure 2
Proposed Haul Route

Diagram Created By: Jake Janicek (EHS Specialist)
Date: 1/20/2020

Not to Scale

Site Location:
Parachute Creek Area
Garfield County, Colorado
Caerus Oil and Gas LLC



CAERUS OIL AND GAS LLC
143 Diamond Ave
Parachute, CO 81635
PHONE: 970-285-2600

Diagram Created By: Jake Janicek (EHS Specialist)
Date: 1/20/2020

LEGEND

PROPOSED CUTTINGS STOCKPILE WITH CONTAINMENT BERM

PROPOSED FILL MATERIAL DEPOSITS

Figure 3
Proposed Cuttings Placement Diagram

Not to Scale

Site Location:
Parachute Creek Area
Garfield County, Colorado
Caerus Oil and Gas LLC

APPENDIX 1
WASTE ORIGIN LOG

CAERUS OIL AND GAS LLC	# WASTE ORIGIN LOG (For Transport ONLY) O04-696 CUTTINGS LOG	**Document No:** **Revised By - Date:** Middleton– 11/26/18 **Reviewed By - Date:** Middleton – 11/26/18

	For all **SPILLS** notify Gas Control and or EHS On-Call For questions regarding load inspection procedures, manifests, this form or othe Issues related to this facility please call EHS On-Call
	GENERAL PROCEDURES (PLEASE READ)
	1. **DO NOT** transport if cuttings contain more the de minimis amounts of liquids 2. Make sure all cuttings are segregated between Surface and Production 3. **Completely fill out the information below to insure that loads tracked per Caerus Drill Cuttings Management Plan**

DATE	WASTE GENERATOR	TRANSPORT COMPANY	LOAD ORIGIN	TYPE OF WASTE	ESTIMATED QUANTITY (Yrds)	TREATMENT/DISPOSAL SITE
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**
	Caerus Oil and Gas		O04-696	**Drill Cuttings**		**Unocal 5**

APPENDIX 2
NO4-696 BACKGROUND ARSENIC DATA

CAERUS OIL AND GAS LLC

143 Diamond Ave
Parachute, CO 81635
PHONE: 970-285-2600

LEGEND

- Background Soil Sample
- Confirmation Soil Sample
- Excavation Extents
- Stockpile of Removed Soil

Figure 4
N04-696 BACKGROUND SAMPLING SITE MAP

Diagram Created By: Jake Janicek (EHS Specialist)
Date: 5/16/2019

Not to Scale

Site Location:
Grass Mesa
Garfield County, Colorado
Caerus Oil and Gas LLC

TABLE 1
O04-696 TO UNOCAL 5 BENEFICIAL REUSE PLAN
N04-696 BACKGROUND SOIL ANALYTICAL RESULTS
CAERUS OIL AND GAS LLC
PICEANCE BASIN, COLORADO

PARAMETER	COGCC CONCENTRATION LEVELS	UNITS	NO4-NEB-051311	NO4-NB-051311	NO4-NWB-051311	NO4-WB-051311
Sample Date			5/13/2011	5/13/2011	5/13/2011	5/13/2011
Sample Matix			Background	Background	Background	Background
Arsenic	0.39	mg/kg	6.6	7.8	22	3.8
Barium	15,000	mg/kg	NA	NA	NA	NA
Cadmium	70	mg/kg	NA	NA	NA	NA
Chromium (III)	120,000	mg/kg	NA	NA	NA	NA
Chromium (VI)	23	mg/kg	NA	NA	NA	NA
Copper	3,100	mg/kg	NA	NA	NA	NA
Lead	400	mg/kg	NA	NA	NA	NA
Mercury	23	mg/kg	NA	NA	NA	NA
Nickel	1,600	mg/kg	NA	NA	NA	NA
Selenium	390	mg/kg	NA	NA	NA	NA
Silver	390	mg/kg	NA	NA	NA	NA
Zinc	23,000	mg/kg	NA	NA	NA	NA
EC	4 or 2x background	mmhos/cm	NA	NA	NA	NA
pH	6-9	SU	NA	NA	NA	NA
SAR	12	unitless	NA	NA	NA	NA
TPH-DRO			NA	NA	NA	NA
TPH-GRO			NA	NA	NA	NA
TPH	500	mg/kg	NA	NA	NA	NA
Benzene	0.17	mg/kg	NA	NA	NA	NA
Toluene	85	mg/kg	NA	NA	NA	NA
Ethylbenzene	100	mg/kg	NA	NA	NA	NA
Total Xylenes	175	mg/kg	NA	NA	NA	NA
Acenaphthene	1,000	mg/kg	NA	NA	NA	NA
Anthracene	1,000	mg/kg	NA	NA	NA	NA
Benz(a)anthracene	0.22	mg/kg	NA	NA	NA	NA
Benzo(b)fluoranthene	0.22	mg/kg	NA	NA	NA	NA
Benzo(k)fluoranthene	2.2	mg/kg	NA	NA	NA	NA
Benzo(a)pyrene	0.022	mg/kg	NA	NA	NA	NA
Chrysene	22	mg/kg	NA	NA	NA	NA
Dibenzo(a,h)anthracene	0.022	mg/kg	NA	NA	NA	NA
Fluoranthene	1,000	mg/kg	NA	NA	NA	NA
Fluorene	1,000	mg/kg	NA	NA	NA	NA
Indeno(1,2,3,c,d)pyrene	0.22	mg/kg	NA	NA	NA	NA
Naphthalene	23	mg/kg	NA	NA	NA	NA
Pyrene	1,000	mg/kg	NA	NA	NA	NA

Notes:
< - less than the stated reporting limit
Highlight - indicates result exceeds the COGCC concentration level
COGCC - Colorado Oil and Gas Conservation Commission
EC - electrical conductivity
mg/kg - milligrams per kilogram
mmhos/cm - millimhos per centimeter
NA - not analyzed
ND - non detect
SAR - sodium adsorption ratio
SU - standard unit
TPH-GRO - total petroleum hydrocarbons-gasoline range organics
TPH-DRO - total petroleum hydrocarbons-diesel range organics
TPH - combination of TPH-GRO and TPH-DRO

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Chris Hines
EnCana Oil & Gas Inc. - CO
2717 County Road 215, Suite 100
Parachute, CO 81635

Report Summary

Tuesday May 24, 2011

Report Number: L516387
Samples Received: 05/17/11
Client Project:

Description: NO4

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By: Jarred Willis

Jarred Willis , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - I-2327, CT - PH-0197, FL - E87487
GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704, ND - R-140
NJ - TN002,NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 00109, WV - 233
AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032008A,
TX - T104704245, OK-9915

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Chris Hines
EnCana Oil & Gas Inc. - CO
2717 County Road 215, Suite 100
Parachute, CO 81635

May 24, 2011

ESC Sample # : L516387-01

Date Received : May 17, 2011
Description : NO4

Site ID :

Sample ID : NO4-NEB-051311 6-10IN

Project # :

Collected By : Jake Harris
Collection Date : 05/13/11 10:30

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	6.6	1.0	mg/kg	6010B	05/19/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 05/24/11 09:29 Printed: 05/24/11 10:34

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Chris Hines
EnCana Oil & Gas Inc. - CO
2717 County Road 215, Suite 100
Parachute, CO 81635

May 24, 2011

ESC Sample # : L516387-02

Date Received : May 17, 2011
Description : NO4

Site ID :

Sample ID : NO4-NB-051311 6-10IN

Project # :

Collected By : Jake Harris
Collection Date : 05/13/11 10:35

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	7.8	1.0	mg/kg	6010B	05/19/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 05/24/11 09:29 Printed: 05/24/11 10:34

ESC LAB SCIENCES
YOUR LAB OF CHOICE

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Chris Hines
EnCana Oil & Gas Inc. - CO
2717 County Road 215, Suite 100
Parachute, CO 81635

May 24, 2011

ESC Sample # : L516387-03

Date Received : May 17, 2011
Description : NO4

Site ID :

Sample ID : NO4-NWB-051311 6-10IN

Project # :

Collected By : Jake Harris
Collection Date : 05/13/11 10:40

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	22.	1.0	mg/kg	6010B	05/19/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 05/24/11 09:29 Printed: 05/24/11 10:34

ESC
L·A·B S·C·I·E·N·C·E·S
YOUR LAB OF CHOICE

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

REPORT OF ANALYSIS

Chris Hines
EnCana Oil & Gas Inc. - CO
2717 County Road 215, Suite 100
Parachute, CO 81635

May 24, 2011

ESC Sample # : L516387-04

Date Received : May 17, 2011
Description : NO4

Site ID :

Sample ID : NO4-WB-051311 6-10IN

Project # :

Collected By : Jake Harris
Collection Date : 05/13/11 10:45

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Arsenic	3.8	1.0	mg/kg	6010B	05/19/11	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 05/24/11 09:29 Printed: 05/24/11 10:34

Summary of Remarks For Samples Printed
05/24/11 at 10:34:04

TSR Signing Reports: 358
R5 - Desired TAT

Sample: L516387-01 Account: ENCANACO Received: 05/17/11 09:00 Due Date: 05/24/11 00:00 RPT Date: 05/24/11 09:29

Sample: L516387-02 Account: ENCANACO Received: 05/17/11 09:00 Due Date: 05/24/11 00:00 RPT Date: 05/24/11 09:29

Sample: L516387-03 Account: ENCANACO Received: 05/17/11 09:00 Due Date: 05/24/11 00:00 RPT Date: 05/24/11 09:29

Sample: L516387-04 Account: ENCANACO Received: 05/17/11 09:00 Due Date: 05/24/11 00:00 RPT Date: 05/24/11 09:29

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

YOUR LAB OF CHOICE

EnCana Oil & Gas Inc. - CO
Chris Hines
2717 County Road 215, Suite 100

Parachute, CO 81635

Quality Assurance Report
Level II

L516387

May 24, 2011

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Arsenic	< 1	mg/kg			WG536127	05/19/11 12:12

Duplicate

Analyte	Units	Result	Duplicate	RPD	Limit	Ref Samp	Batch
Arsenic	mg/kg	5.50	6.30	13.9	20	L516426-03	WG536127

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Arsenic	mg/kg	192	162.	84.4	78.6-120.8	WG536127

Matrix Spike

Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Arsenic	mg/kg	47.3	6.30	50	82.0	75-125	L516426-03	WG536127

Matrix Spike Duplicate

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Arsenic	mg/kg	47.1	47.3	81.6	75-125	0.424	20	L516426-03	WG536127

Batch number /Run number / Sample number cross reference

WG536127: R1693371: L516387-01 02 03 04

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

YOUR LAB OF CHOICE

EnCana Oil & Gas Inc. - CO
Chris Hines
2717 County Road 215, Suite 100

Parachute, CO 81635

Quality Assurance Report
Level II

L516387

May 24, 2011

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.