13 August 2021
Reference: PQE-DOGM-2021-0813

Ms. Dana Dean – Deputy Director, Mining
Utah Division of Oil, Gas and Mining Minerals Program
1594 West North Temple, Suite 1210
Box 145801
Salt Lake City, UT 84114-5801

RE: **Petroteq Energy Inc. Temple Mountain Mine**
DOGM Permit No. M/047/0089 Amended Notice of Intent

Dear Ms. Dean,

Per your Division Findings regarding Cessation Order MC-2021-60-01, dated May 25, 2021, and subsequent denial dated July 29,2021 consider this an amendment under R647-4-119 to Petroteq Energy Inc.'s (Petroteq) Temple Mountain Mine (TMM) Notice of Intention for permit M/047/0089 approved October 24, 2017 (2017 NOI). This revision is an amendment under R647-4-119 which defines an amendment as an insignificant change to the approved notice of intention that does not require public notice.

Attached please find a complete replacement of the 2017 NOI. I have attached a track change redline strikeout version of the 2017 NOI as well as a clean version for ease of review. Since the 2017 NOI is not paginated, we have left pages and figures that do not require revision with their original approved DOGM stamp dated October 24, 2017. Please note that text and sections have been deleted/removed due to the fact that demolition, removal and reclamation have occurred, related to the Vivakor mobile plant, since 2017. The revised/updated figures and text depict the minor modifications to the Petroteq demonstration plant process equipment and ancillary facilities, including reclaimed areas and removed process equipment.

The physical mine disturbance boundary depicted on Figure 1 and approved in October 2017 has not changed. The limited amount of TMM ore used for the commissioning and demonstration plant runs came from existing stockpiles and within the active pit. A small amount of ore to complete the demonstration plant test was trucked in and a portion of this offsite ore was later removed due to low bitumen content. After accounting for the removed offsite ore, a total of 535 cubic yards of offsite ore has been delivered to the TMM site. The plant underwent minor part replacements and additions during commissioning and start-up. There are currently no additional planned plant modifications.

PETROTEQ ORE PROCESSING ACTIVITY - TEMPLE MOUNTAIN MINE, VERNAL

All Values = Cubic Yards Week Ending	29-May-21	5-Jun-21	12-Jun-21	19-Jun-21	26-Jun-21	3-Jul-21	10-Jul-21	17-Jul-21	24-Jul-21	31-Jul-21	7-Aug-21	TOTALS
Temple Mtn Ore Mined	0	0	0	0	0	0	0	0	0	0	0	0
Temple Mtn Ore Processed	96	61	0	0	0	0	0	0	0	0	0	157
Offsite Ore Delivered to Site	0	633	542	113	0	0	0	0	113	113	0	1514
Offsite Ore Processed	0	150	256	0	208	80	164	0	0	90	0	948
Cleaned Sand Delivered to Storage Area	93	202	226	0	141	58	110	0	0	77	0	907
Cleaned Sand Collected by Sand Processor	(26)	0	0	(224)	(91)	0	0	0	0	0	0	(341)
Net Cleaned Sand Added to Storage Area	67	202	226	(224)	50	58	110	0	0	77	0	566
Offsite Ore Removed From Site	0	0	0	(134)	(113)	0	(156)	(192)	0	(96)	(288)	(979)

Net Offsite Ore Delivered to Site	535	CY
Ore Not Yet Processed	(413)	CY
Net Cleaned Sand Remaining on Site	566	CY

15315 Magnolia Blvd, Suite 120
Sherman Oaks, CA 91403

PETROTEQ®
ENERGY INC.

Per your July 29, 2021 request, we have included post processed sand analysis required by the Utah Division of Environmental Quality/Division of Water Quality protocol. SPLP and dry analyses of the post-processed sand have been performed and the test results have been included in this submission. The Synthetic Precipitation Leaching Procedure (SPLP) method is very similar to TCLP, but its project applicability differs significantly. SPLP is generally specific to soil samples and is performed to determine the potential of contaminants present in soil to leach into groundwater. SPLP is often requested for projects where environmental engineers are concerned with evaluating the risk of potential groundwater contamination from the land application of waste materials to soil. TCLP is used for waste characterization for disposal at a landfill and can be performed on liquid, solid, or multi-phasic samples.

If the Division requires a TCLP analysis, an additional sample of post processed sand will need to be sent for TCLP testing and additional time will be needed to complete this analysis. We are unaware of other types of mined and processed ore sold into the marketplace being required to have a TCLP analysis approved by DOGM. A TCLP analysis was not required by the UDEQ permit.

We have also included a revised reclamation plan per your request.

In the near term Petroteq does not intend to mine additional ore from the existing pit to feed the demonstration plant and will only use the demonstration plant to show potential investors the capabilities of the Petroteq CORT process. Any post processed sand generated as a result of these additional demonstration runs will also likely be sold as frac sand or as a concrete aggregate.

The current approved bond contemplates backfilling of the pit with post processed sand and per DOGM bond calculation protocol is the worst case bond cost due to hauling and grading post processed sand in the pit. The post processed sand sold into the mineral marketplace could materially reduce the reclamation cost.

As can be seen in the approved bond SUR60000383 revision dated July 2015, there is approximately $75,000 in demolition bond that can be applied to the current plant. The current plant demolition is also covered under bond 2149828 approved in December 2017. We will not currently be looking to increase the disturbed area beyond the 22 acres covered by the current bond. It appears the new process will allow for the sale of the post processed sand as frac sand or as a concrete aggregate and not require the elaborate backfilling and monitoring articulated in the previous NOI's. Due to the above, we feel that the current bond reflects a demolition estimate that is higher than the true cost of demolition.

Petroteq requests that these two bonds be reviewed by DOGM and be considered adequate for demolition cost related to the minor changes to the present demonstration plant as depicted on Figures 1b and 1c.

15315 Magnolia Blvd, Suite 120
Sherman Oaks, CA 91403

If you have any questions concerning this request, please contact George Stapleton (713) 206-9010 or John Gefferth (314) 304-8328.

Sincerely yours,

George Stapleton

George Stapleton
Chief Operating Officer

Cc: April Abate

Amendment to Notice of Intention to Commence Large Mining Operations

TMC Capital (TMC) is submitting this Amendment under R647-4-119 to the approved (October 24, 2017) Notice of Intention to Commence Large Mining Operations on NOI-Permit Number M/47/0089 (NOI), to inform DOGM of the following:

1) The operator of the permit remainsTMC Capital, LLC.
2) The oil sands demonstration plant previously located in Maeser and historically receiving ore from Temple Mountain Mine (TMM) has been relocated to the TMM site where it was utilized to demonstrate Petroteq's Clean Oil Recovery Technology process for extracting bitumen from oil sands ore. Now that this process technology has been proven and is third party certified, the plant may be used intermittently to test varying ores or demonstrate the process to potential funding parties for a future 5,000 barrel of oil per day commercial plant. It is anticipated that the existing demonstration plant will process no more than 500 CY of oil sands ore per month between now and year end when a decision will be made regarding the plant's demolition or continued use.
3. To notify UDOGM that Viva RRT, LLC concluded testing their equipment in 2019 and is no longer operating at the mine site. The equipment has been removed from the permit.
4. The permit boundary depicted on Figure 1 has not changed since the approved NOI dated October 24, 2017.
5. To provide DOGM with an updated site map of the layout of the oil sands extraction demonstration facility.
6. To address the Division's April 19, 2021 request for new address and contact information and conditions of the Cessation Order (Citation # MC-2021-60-01) dated May 14, 2021.
7. To notify DOGM that offsite ore will be processed at the demonstration plant and the post process sand will be marketed to offsite firms for use as frac sand or as an aggregate or used in reclamation per the approved permit.
8. To include a revised reclamation plan.

R647-4-104. Operator, Surface and Mineral Owners

1) Mine Name: Temple Mountain Mine (TMM)
2) Operator: TMC Capital
   Type of Business: LLC
   Utah Business Entity No. : 8495484-0160
   Registered Utah Agent: Quick Data Services, Inc. 2005 East 2700 South, Suite 200, Salt Lake City, UT 84109
   801-487-0790
3) Permanent Address: 15315 W Magnolia Blvd.
   Suite 120Sherman Oaks, CA 91403

Contract Operator:
Valkor Oil & Gas
21732 Provincial Blvd.
Suite 160
Houston, TX 77450

4) Contact Person for Permitting, Surety, Notices:

George Stapleton
Chief Operating Officer-Petroteq Energy Inc.
15315 Magnolia Blvd, Suite 120, Sherman Oaks, CA 91403
(phone) 713-206-9010
(e-mail) gstapleton@petroteq.energy

5) Locations of operations:
County(ies) Uintah County, Utah

NE1/4 of SW1/4,	Section 31	Township 5S	Range 22E
SE1/4 of SW1/4,	Section 31	Township 5S	Range 22E
NW1/4 of SW1/4,	Section 31	Township 5S	Range 22E
NW1/4 of SE1/4,	Section 31	Township 5S	Range 22E
SW1/4 of SE1/4	Section 31	Township 5S	Range 22E

Lot 4 (equivalent to SW ¼ of SW ¼) Section 31

6) Ownership of the land surface:
Name: Sam Arentz Address: 6083 Carriage House Way, Reno NV, 89519

7) Owner(s) of record of the minerals to be mined:
Name: Sam Arentz Address: 6083 Carriage House Way, Reno NV, 89519

8) Adjacent land owners:
Name: State of Utah (SITLA) Address: 675 East 500 South, Suite 500, SLC, UT 84102

9) Have the land, mineral, and adjacent owners have been notified in writing?
YES.

10) Does Permitee/Operator have a legal right to enter and conduct mining operations on the land covered by this notice?
YES.
Mining operations and the operation of the Petroteq Oil Recovery (POR) plant have been contracted to Valkor Oil & Gas. Actual mining and transport of ore is subcontracted to Scamp Excavation Inc. of Wellington, UT.

R647-4-105. Maps, Drawings, and Photographs

Figure 1: Lease Location, land ownership, the locations of the POR facility and disturbed area (permit area) within the lease.

Figure 1a: The facility map where POR's extraction facility is located.

Figure 1b: Site map/plan (2018 Aerial Photo) of Petroteq's oil sands extraction facility.

Figure 1c: March 30, 2021 Aerial photo support of Petroteq's oil sands extraction facility modifications completed in 2019-current.

Figure 2: Natural gas condensate MSDS indicating the negligible solubility of natural gas condensate in water.

Figure 3: The moisture content of post processed sands.

R647-4-106: Operation Plan

106.2 – Type of operation to be conducted:

The location of the NOI and lease is on, or about Section 31, Township 5S Range 22E, Uintah County Utah (Fig. 1). Open pit mining operations will be used for both the removal of overburden/interburden and the oil sands ore. Mining activities may consist of blasting and subsequent removal of the overburden/interburden and oil sands ore with both rubber-tired and tracked excavators. Any mining activities will be in the areas already identified as "disturbed areas" which are currently covered by a reclamation bond. Mine reclamation activities will be concurrent with mining activities. The anticipated depth of the mine floor is approximately 200 feet. To better facilitate heavy equipment operation, the floor of the mine will be as flat as possible and not follow the contour of the surface topography. Local variations in the elevation of the current surface topography will mean that, in some areas, the maximum depth of the mine will be either greater, or less than 200 feet. At this time, ore at shallow depth suitable for mining for the demonstration plant has not been identified within the disturbed areas and, as a result, ore is being mined at and transported from an offsite location. No mining is taking place on the lease and it is unlikely that mining will take place on the lease during the demonstration run of the plant.

Mining/Processing methods to be used on-site:

The oil sands ore will be processed on site using a proprietary solvent based technology developed by Petroteq Energy Inc., parent company of TMC Capital LLC and Petroteq Oil Recovery LLC. This technology uses light hydrocarbons as a solvent, but does not use heavy, or chlorinated solvents, or water to extract the oil/bitumen from the oil sands. A more complete description of the extraction's technology can be found in **Appendix 1** (Petroteq Clean Oil Recovery Technology ("CORT") Overview).

The plant currently located on the TMM site was originally constructed as the developmental pilot plant at Maeser, Utah that POR used to optimize its oil extraction technology. The pilot plant was relocated to the TMM lease beginning in February 2017 and construction was completed by April 2018. Upgrades were made to convert the pilot plant into a demonstration plant capable of extracting 400-500 barrels per day. The plant is located in the area between the perennial stream that runs through the lease and Route 45 (Figs. 1 and 1a). This area does not have significant oil sands beneath it and is close to Route 45. The area where the Viva plant was located prior to removal will be used for future storage of processed sand. This site is impermeable due to the fact that the oil sands have compacted under its own weight (Fig. 1). As an added measure of protection to the environment, the perimeter of this flat topped oil sands ore stockpile is surrounded by a two-foot-high berm.

The upgraded plant has the following:

1) Five (5) solvent storage tanks, each with a nominal capacity of 300 barrels, or equivalent.
2) Five (5) sales oil storage tanks, three (3) with a nominal capacity of 300 barrels and one each of 400 barrels and 500 barrels or equivalent
3) Five (5) "pre-oil" storage tanks, each with a nominal capacity of 300 barrels or equivalent.

4) One vertical settling tank with a nominal capacity of 400 barrels and a second settling tank having a nominal capacity of 300 barrels or equivalent.
5) One diesel storage tank (for heavy equipment), with a nominal capacity of 2,300 gallons.

The sales oil storage tanks, the light hydrocarbon solvent storage tanks, the pre-oil tanks and the 300-bbl settling tank will be held within a containment area.The containment area will have the capacity to hold a minimum of 110% of the volume of the largest tank held in the containment area. The volume of the containment area is calculated as the gross volume of the containment area (V=LxWxH) minus the volume of the tanks up to the top of the containment wall ($V=\pi R^2 H$).

Gross volume of 105' x 132' containment structure (2' high wall) – 105' x 132' x 2' = 27,720 ft^3.

Volume of oil in a 500-barrel oil tank, using a conversion of 5.6146 ft^3 per barrel = 2,807 ft^3.

The 2,300-gallon diesel tank will be held in a separate containment area designed to hold more than 110% (2,530 gallons) of the maximum volume of diesel in the tanks.

Deleterious or acid forming materials present or left on site

As noted above, the solvents used for Petroteq's CORT process are light hydrocarbon compounds (LNAPL) sourced from natural gas condensates.. Natural gas condensates have only negligible solvent solubility in water (Fig. 2). It should be noted that no DNAPL compounds are used in the CORT process. DNAPLs are significantly more damaging to the environment, more difficult and much more expensive to clean up if groundwater remediation is required, not only because they sink in the water column and impact deeper and larger volumes of water, but also because they are generally non-petroleum compounds and more likely chlorinated compounds. Most chlorinated compounds are listed as hazardous wastes.

The CORT process was designed to extract up to 99% of the hydrocarbons from the oil sands and recover roughly 95% of the solvents used to extract the hydrocarbons from the oil sands. SPLP and dry analyses of the post processed sands from the original pilot plant indicated only residual levels of hydrocarbon compounds remain in the oil sands after processing. These levels are below Utah's Tier 1 levels for soils surrounding leaking underground storage tanks (Table 1 and 2).

It should be noted that the post processed sands have the capacity to hold a considerable amount of meteoric water due to capillary attraction. This is especially true since the sands will be coming out of the sand dryer in a finely ground state with a moisture content less than 1% (Fig. 3). If a standard water holding capacity chart is used as a measure of the storage capacity of the processed sands (using fine sand as the category of soil that the processed sands are equivalent to) then each vertical foot of processed sands should be able to hold 1.8 inches of rainwater via capillary attraction (Table 5). Twenty feet of processed sands have the capability of holding 36 inches of water due to capillary attraction, this is significantly more than the 100-year 24-hour rain event in this area, 2.3 inches of rain (Western Regional Climate Center, 2015a) and significantly more than the annual average rainfall in this area, 8.87 inches (Table 6).

The combination of high solvent recovery, negligible solvent solubility in water (Fig. 2), low monthly precipitation (Table 6), high pan evaporation (Table 7) and the high water holding capacity of the post processed sands (Table 5) dramatically reduces the chances that LNAPL leachates will form or affect groundwater, or surface water, or that hydrocarbon vapors will affect air quality after processing is completed. For the above reasons, it is anticipated that no deleterious materials will be left at the site after mining and oil sands processing operations are concluded.

Post processed sands testing and temporary storage of the post processed sands prior to use as a mine reclamation material

Should the facility resume operations (now that the short demonstration run has been completed) at the mine site, POR will conduct daily/weekly tests on the post processed sands. Dry analyses will be conducted on the post processed sands on a quarterly basis during the first year of operations and semiannually thereafter. This testing Schedule was proposed to and accepted by the Utah Division of Water Quality as part of MCW's Ground Water Discharge Permit (detailed in Section 1.7 of the Processed Sand Storage and Monitoring Program portion of the Ground Water Discharge Permit application – approved July 28, 2016).

The laboratory parameters for all testing are as follows:

Benzene, toluene, ethylbenzene, xylenes, naphthalene, total petroleum, hydrocarbons (gasoline range organics), total petroleum hydrocarbons (diesel range organics), total recoverable petroleum hydrocarbons.

If laboratory analyses indicate that any of the hydrocarbon levels listed above are in excess of the Utah Division of Environmental Response and Remediation Tier 1 screening levels, facility operations will be modified and or adjusted to bring residual hydrocarbon levels in the post processed sands below the Tier 1 screening levels (Table 8).

During the recently completed demonstration run of the plant and extraction process, the post processed sands have been temporarily stored on the approved 15 to 20-foot-high flat topped stockpile of oil sands ore (outlined in red in Fig. 1 identified as VEF) before being transferred offsite or used for mine reclamation. This oil sands ore storage pile is impermeable due to the fact that the oil sands have compacted under its own weight, so it is an ideal location for temporary post processed sands storage. As an added measure of protection to the environment, the perimeter of this flat topped oil sands ore stockpile is surrounded by a two-foot-high berm. As indicated above, low monthly precipitation (Table 6), high pan evaporation (Table 7) and the high water holding capacity of the post processed sands (Table 5) dramatically reduces the chances that LNAPL leachates will form from the temporarily stored post processed sands. This ore pile will be processed once permanent storage of the processed sands commences. This temporary holding area was proposed to and accepted by the Utah Division of Water Quality as part of the Ground Water Discharge Permit (detailed in Section 2.0 of Processed Sand Storage and Monitoring Program portion of the Ground Water Discharge Permit application – approved July 28,2016).

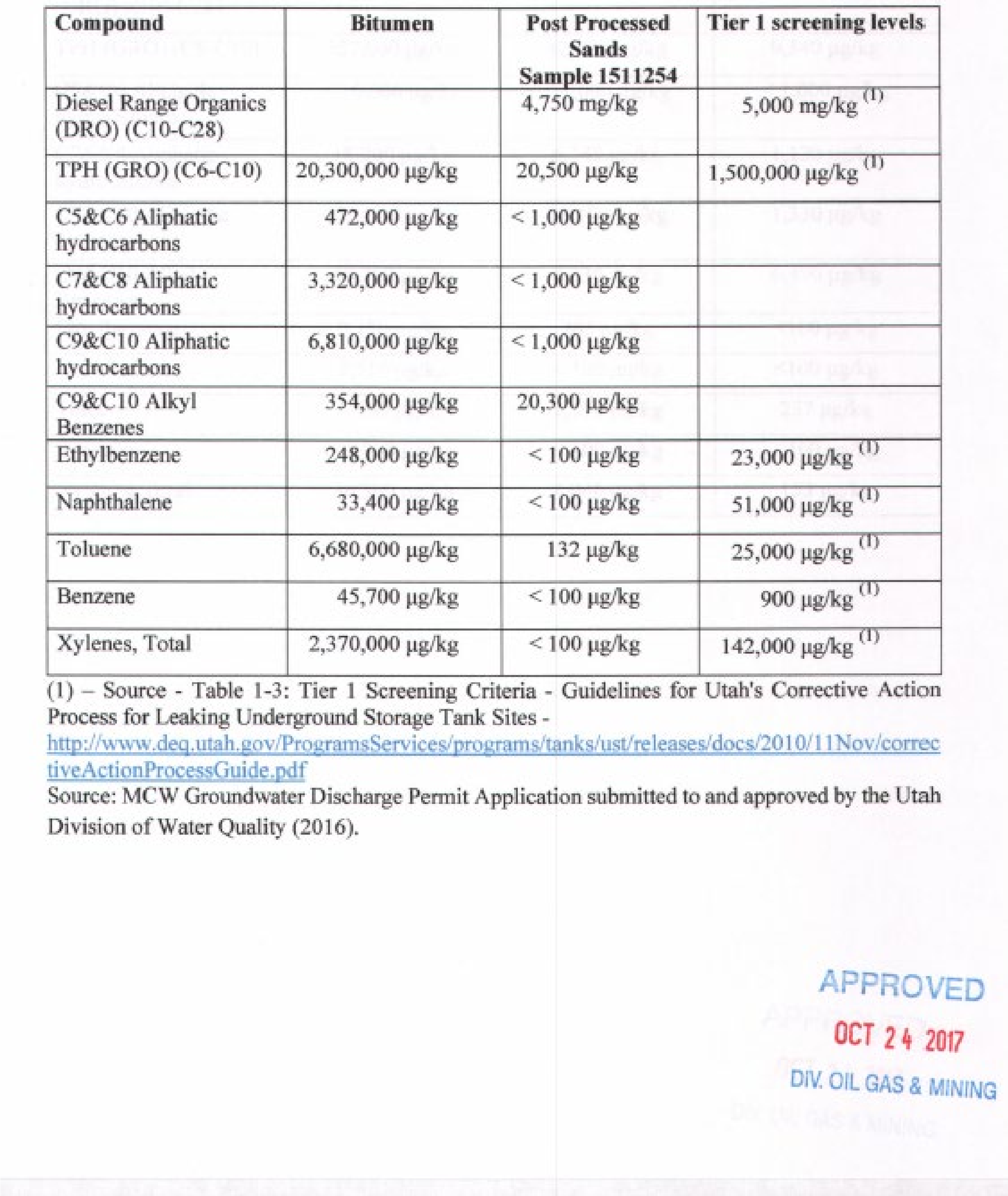
Table 1. SPLP analytical results for overburden and **MCW** post processed sands.

Compound	Native Overburden Analytical Results (mg/L)	MCW Processed Sands Analytical Result (mg/L) Sample 1411196-A	Numeric Standard (mg/L) [1]
Arsenic	<0.050		0.05
Barium	<0.050		2.0
Cadmium	<0.010		0.005
Calcium	90	4.90	
Chromium (total)	<0.010		0.1
Lead	<0.050		0.015
Magnesium	16	<1.00	
Mercury	<0.0010		0.002
Potassium	3.8	<1.00	
Selenium	<0.050		0.05
Silver	<0.010		0.1
Sodium	28	1.94	
Alkalinity (as $CaCO_3$)	68	12.9	
Bicarbonate (as $CaCO_3$)		<10.0	
Chloride	1.5	0.580	
Oil & Grease		<5.00	
Conductivity (µmhos/cm)	1300		
pH @ 25 °C (reported in Standard Units)	7.96	10.0	6.5-8.5
SGT-HEM/Non-Polar Material		<5.00	
Sulfate	280	4.77	
Total Dissolved Solids (TDS)	440	84.0	1200[2]
Total Recoverable Petroleum Hydrocarbon	3.9		10[3]
Total Organic Carbon (TOC)		31.4	
Diesel Range Organics (DRO)		0.898	
Gasoline Range Organics (GRO)		0.149	
SVOA SPLP by GC/MS Method 8270D/1312/3510C (19 compounds reported, all below detection limit)		<0.0100	
Benzene		<0.00100	0.005
C5&C6 Aliphatic hydrocarbons[4]		0.00778	
C7&C8 Aliphatic hydrocarbons[4]		<0.0200	
C9&C10 Aliphatic hydrocarbons[4]		<0.0200	
C9&C10 Alkyl Benzenes		0.0286	
Ethylbenzene		0.00522	0.7
Naphthalene		0.00472	
Toluene		0.0378	1
Xylenes, Total		0.0554	10

Source: [1] R317-6-2, Ground Water Quality Standards, [2] R317-2-14, Numeric Criteria, [3] Utah Tier 1, [4] EPA and Utah do not have standards for Aliphatic hydrocarbons; for comparison, Massachusetts has a maximum contaminant level (MCL) for aliphatic hydrocarbons of 0.3 mg/L

Source: Stantec, 2015

Table 2: Dry analyses of the native bitumen and post processed oil sands from the pilot plant. All hydrocarbon compounds detected in the post processed sands are below Utah's Tier 1 screening levels (maximum contamination levels) for petroleum hydrocarbons from leaking underground storage tanks.



Compound	Bitumen	Post Processed Sands Sample 1511254	Tier 1 screening levels
Diesel Range Organics (DRO) (C10-C28)		4,750 mg/kg	5,000 mg/kg (1)
TPH (GRO) (C6-C10)	20,300,000 µg/kg	20,500 µg/kg	1,500,000 µg/kg (1)
C5&C6 Aliphatic hydrocarbons	472,000 µg/kg	< 1,000 µg/kg	
C7&C8 Aliphatic hydrocarbons	3,320,000 µg/kg	< 1,000 µg/kg	
C9&C10 Aliphatic hydrocarbons	6,810,000 µg/kg	< 1,000 µg/kg	
C9&C10 Alkyl Benzenes	354,000 µg/kg	20,300 µg/kg	
Ethylbenzene	248,000 µg/kg	< 100 µg/kg	23,000 µg/kg (1)
Naphthalene	33,400 µg/kg	< 100 µg/kg	51,000 µg/kg (1)
Toluene	6,680,000 µg/kg	132 µg/kg	25,000 µg/kg (1)
Benzene	45,700 µg/kg	< 100 µg/kg	900 µg/kg (1)
Xylenes, Total	2,370,000 µg/kg	< 100 µg/kg	142,000 µg/kg (1)

(1) – Source - Table 1-3: Tier 1 Screening Criteria - Guidelines for Utah's Corrective Action Process for Leaking Underground Storage Tank Sites - http://www.deq.utah.gov/ProgramsServices/programs/tanks/ust/releases/docs/2010/11Nov/correctiveActionProcessGuide.pdf

Source: MCW Groundwater Discharge Permit Application submitted to and approved by the Utah Division of Water Quality (2016).

Table 3: American West Analytical Laboratories

Removed due to Viva removing their equipement in 2019

Replaced with American West Analytical Laboratories analysis dated August 5, 2021 for post-processed sands from POR demonstration facility.

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

George Stapleton
Petroteq Energy Inc.
15315 W Magnolie Blvd, Suite 120
Sherman Oaks, CA 91403
TEL: (713) 206-9010

RE: POSP Ore/Sand

Dear George Stapleton: Lab Set ID: 2107538

American West Analytical Laboratories received sample(s) on 7/21/2021 for the analyses presented in the following report.

American West Analytical Laboratories (AWAL) is accredited by The National Environmental Laboratory Accreditation Program (NELAP) in Utah and Texas; and is state accredited in Colorado, Idaho, New Mexico, Wyoming, and Missouri.

All analyses were performed in accordance to the NELAP protocols unless noted otherwise. Accreditation scope documents are available upon request. If you have any questions or concerns regarding this report please feel free to call.

The abbreviation "Surr" found in organic reports indicates a surrogate compound that is intentionally added by the laboratory to determine sample injection, extraction, and/or purging efficiency. The "Reporting Limit" found on the report is equivalent to the practical quantitation limit (PQL). This is the minimum concentration that can be reported by the method referenced and the sample matrix. The reporting limit must not be confused with any regulatory limit. Analytical results are reported to three significant figures for quality control and calculation purposes.

Thank You,

Approved by:

Patrick Noteboom

Digitally signed by Patrick Noteboom
DN: cn=Patrick Noteboom, o=American West Analytical Laboratories, ou=UT00031, email=pat@awal-labs.com, c=US
Date: 2021.08.05 15:49:45 -06'00'

Laboratory Director or designee

INORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-001
Client Sample ID: Cleaned Sand #1
Collection Date: 7/20/2021 1000h
Received Date: 7/21/2021 1405h

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

Analytical Results SPLP METALS Method 1312

SPLP Prep Date: 7/26/2021 1645h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	7/28/2021 2130h	7/30/2021 1333h	SW6020B	0.0200	< 0.0200	
Barium	mg/L	7/28/2021 2130h	7/30/2021 1333h	SW6020B	0.300	< 0.300	
Cadmium	mg/L	7/28/2021 2130h	7/30/2021 1333h	SW6020B	0.00350	< 0.00350	
Calcium	mg/L	7/28/2021 2130h	8/2/2021 916h	SW6010D	1.00	**10.6**	
Chromium	mg/L	7/28/2021 2130h	7/30/2021 1333h	SW6020B	0.100	< 0.100	
Lead	mg/L	7/28/2021 2130h	7/30/2021 1333h	SW6020B	0.0100	< 0.0100	
Magnesium	mg/L	7/28/2021 2130h	8/2/2021 916h	SW6010D	1.00	< 1.00	
Mercury	mg/L	7/27/2021 1230h	7/27/2021 1809h	SW7470A	0.0100	< 0.0100	
Potassium	mg/L	7/28/2021 2130h	8/2/2021 916h	SW6010D	1.00	< 1.00	
Selenium	mg/L	7/28/2021 2130h	7/30/2021 1333h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	7/28/2021 2130h	7/30/2021 1333h	SW6020B	0.0100	< 0.0100	
Sodium	mg/L	7/28/2021 2130h	8/2/2021 916h	SW6010D	1.00	**2.98**	

American West
ANALYTICAL LABORATORIES

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

INORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-002
Client Sample ID: Raw Ore
Collection Date: 7/20/2021 1005h
Received Date: 7/21/2021 1405h

Analytical Results SPLP METALS Method 1312

SPLP Prep Date: 7/26/2021 1645h

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Arsenic	mg/L	7/28/2021 2130h	7/30/2021 1337h	SW6020B	0.0200	< 0.0200	
Barium	mg/L	7/28/2021 2130h	7/30/2021 1337h	SW6020B	0.300	< 0.300	
Cadmium	mg/L	7/28/2021 2130h	7/30/2021 1337h	SW6020B	0.00350	< 0.00350	
Calcium	mg/L	7/28/2021 2130h	8/2/2021 918h	SW6010D	1.00	**19.9**	
Chromium	mg/L	7/28/2021 2130h	7/30/2021 1337h	SW6020B	0.100	< 0.100	
Lead	mg/L	7/28/2021 2130h	7/30/2021 1337h	SW6020B	0.0100	< 0.0100	
Magnesium	mg/L	7/28/2021 2130h	8/2/2021 918h	SW6010D	1.00	**1.32**	
Mercury	mg/L	7/27/2021 1230h	7/27/2021 1830h	SW7470A	0.0100	< 0.0100	
Potassium	mg/L	7/28/2021 2130h	8/2/2021 918h	SW6010D	1.00	< 1.00	
Selenium	mg/L	7/28/2021 2130h	7/30/2021 1337h	SW6020B	0.0100	< 0.0100	
Silver	mg/L	7/28/2021 2130h	7/30/2021 1337h	SW6020B	0.0100	< 0.0100	
Sodium	mg/L	7/28/2021 2130h	8/2/2021 918h	SW6010D	1.00	**5.81**	

INORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-001
Client Sample ID: Cleaned Sand #1
Collection Date: 7/20/2021 1000h
Received Date: 7/21/2021 1405h

Analytical Results

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Alkalinity (as CaCO3)	mg/L		7/28/2021 954h	SM2320B	10.0	**23.0**	
Bicarbonate (as CaCO3)	mg/L		7/28/2021 954h	SM2320B	10.0	**17.0**	
Chloride	mg/L		8/3/2021 344h	E300.0	0.500	**5.10**	B@
Conductivity	µmhos/cm		7/28/2021 600h	SM2510B	2.00	**98.3**	
Oil & Grease	mg/L		7/30/2021 1549h	E1664B	5.00	**5.54**	
pH @ 25° C	pH Units		7/27/2021 1740h	SM4500-H+B	1.00	**7.58**	H
SGT-HEM/Non-Polar Material	mg/L		7/31/2021 2015h	E1664B-SGT	5.00	< 5.00	
Sulfate	mg/L		8/3/2021 344h	E300.0	2.50	**14.8**	
Total Dissolved Solids	mg/L		7/27/2021 1300h	SM2540C	20.0	**92.0**	B
Total Organic Carbon	mg/L		8/2/2021 2251h	SM5310B	1.00	**8.45**	

Analysis performed on the SPLP Leachate of the sample.
B - This analyte was also detected in the SPLP blank at a concentration of 16 mg/L.
B@ - This analyte was also detected in the SPLP method blank above the PQL at 4.74 mg/L.
H - Sample was received outside of the holding time.

American West
ANALYTICAL LABORATORIES

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

INORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-002
Client Sample ID: Raw Ore
Collection Date: 7/20/2021 1005h
Received Date: 7/21/2021 1405h

Analytical Results

Compound	Units	Date Prepared	Date Analyzed	Method Used	Reporting Limit	Analytical Result	Qual
Alkalinity (as CaCO3)	mg/L		7/28/2021 954h	SM2320B	10.0	**26.0**	
Bicarbonate (as CaCO3)	mg/L		7/28/2021 954h	SM2320B	10.0	< 10.0	
Chloride	mg/L		8/3/2021 407h	E300.0	0.500	**10.4**	B@
Conductivity	µmhos/cm		7/28/2021 600h	SM2510B	2.00	**149**	
Oil & Grease	mg/L		7/30/2021 1549h	E1664B	5.00	**13.1**	
pH @ 25° C	pH Units		7/27/2021 1740h	SM4500-H+B	1.00	**7.33**	H
SGT-HEM/Non-Polar Material	mg/L		7/31/2021 2015h	E1664B-SGT	5.00	**5.72**	
Sulfate	mg/L		8/3/2021 407h	E300.0	2.50	**36.0**	
Total Dissolved Solids	mg/L		7/27/2021 1300h	SM2540C	20.0	**136**	B
Total Organic Carbon	mg/L		8/2/2021 2306h	SM5310B	1.00	**9.49**	

Analysis performed on the SPLP Leachate of the sample.
B - This analyte was also detected in the SPLP blank at a concentration of 16 mg/L.
B@ - This analyte was also detected in the SPLP method blank above the PQL at 4.74 mg/L.
H - Sample was received outside of the holding time.

American West
ANALYTICAL LABORATORIES

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

ORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-001A
Client Sample ID: Cleaned Sand #1
Collection Date: 7/20/2021 1000h
Received Date: 7/21/2021 1405h

Analytical Results SPLP TPH-DRO by GC/FID Method 8015D/3511/1312

Analyzed: 7/28/2021 1137h **Extracted:** 7/27/2021 1349h **SPLP Prep Date:** 7/26/2021 1645h
Units: mg/L **Dilution Factor:** 1 **Method:** SW8015D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Diesel Range Organics (DRO) (C10-C28)	68476-34-6	0.497	**1.45**	@

Surrogate	Units: mg/L	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 4-Bromofluorobenzene		460-00-4	0.924	1.137	81.3	10-182	

@ - High RPD due to suspected sample non-homogeneity or matrix interference.

ORGANIC ANALYTICAL REPORT

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-001C
Client Sample ID: Cleaned Sand #1
Collection Date: 7/20/2021 1000h
Received Date: 7/21/2021 1405h

Analytical Results TPH-DRO (C10-C28) by Method 8015D/3546

Analyzed: 7/26/2021 2054h **Extracted:** 7/26/2021 1131h
Units: mg/kg-dry **Dilution Factor:** 50 **Method:** SW8015D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Diesel Range Organics (DRO) (C10-C28)	68476-34-6	1,000	**1,860**	

Surrogate	Units: mg/kg-dry	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 4-Bromofluorobenzene		460-00-4	58.3	33.38	175	10-160	S

S - Sample dilution required due to sample matrix. Surrogate recoveries are outside of the control limits as expected due to being diluted out.

The reporting limits were raised due to high analyte concentrations.

ORGANIC ANALYTICAL REPORT

Client:	Petroteq Energy Inc.	**Contact:**	George Stapleton
Project:	POSP Ore/Sand		
Lab Sample ID:	2107538-002A		
Client Sample ID:	Raw Ore		
Collection Date:	7/20/2021 1005h		
Received Date:	7/21/2021 1405h		

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

Analytical Results SPLP TPH-DRO by GC/FID Method 8015D/3511/1312

Analyzed: 7/28/2021 1233h **Extracted:** 7/27/2021 1349h **SPLP Prep Date:** 7/26/2021 1645h
Units: mg/L **Dilution Factor:** 1 **Method:** SW8015D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Diesel Range Organics (DRO) (C10-C28)	68476-34-6	0.497	**3.24**	

Surrogate	Units: mg/L	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 4-Bromofluorobenzene		460-00-4	0.881	1.135	77.6	10-182	

American West
ANALYTICAL LABORATORIES

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

ORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-002C
Client Sample ID: Raw Ore
Collection Date: 7/20/2021 1005h
Received Date: 7/21/2021 1405h

Analytical Results TPH-DRO (C10-C28) by Method 8015D/3546

Analyzed: 7/27/2021 921h **Extracted:** 7/26/2021 1131h
Units: mg/kg-dry **Dilution Factor:** 100 **Method:** SW8015D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Diesel Range Organics (DRO) (C10-C28)	68476-34-6	1,990	**13,300**	

Surrogate	Units: mg/kg-dry	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 4-Bromofluorobenzene		460-00-4	52.6	33.20	158	10-160	

The reporting limits were raised due to high analyte concentrations.

ORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-001A
Client Sample ID: Cleaned Sand #1
Collection Date: 7/20/2021 1000h
Received Date: 7/21/2021 1405h

Analytical Results SVOA SPLP by GC/MS Method 8270E/1312/3511

Analyzed: 7/29/2021 1700h **Extracted:** 7/29/2021 1235h **SPLP Prep Date:** 7/26/2021 1645h
Units: mg/L **Dilution Factor:** 1 **Method:** SW8270E

Compound	CAS Number	MDL	Reporting Limit	Analytical Result	Qual
1-Methylnaphthalene	90-12-0	0.00135	0.0481	< 0.0481	U
Acenaphthene	83-32-9	0.000936	0.0481	< 0.0481	U
Acenaphthylene	208-96-8	0.000792	0.0481	< 0.0481	U
Anthracene	120-12-7	0.000862	0.0481	< 0.0481	U
Benz(a)anthracene	56-55-3	0.000671	0.0481	< 0.0481	U
Benzo(a)pyrene	50-32-8	0.00234	0.0481	< 0.0481	U
Benzo(b)fluoranthene	205-99-2	0.00196	0.0481	< 0.0481	U
Benzo(g,h,i)perylene	191-24-2	0.000932	0.0481	< 0.0481	U
Benzo(k)fluoranthene	207-08-9	0.00134	0.0481	< 0.0481	U
Chrysene	218-01-9	0.000756	0.0481	< 0.0481	U$
Dibenz(a,h)anthracene	53-70-3	0.00179	0.0481	< 0.0481	U
Fluoranthene	206-44-0	0.00114	0.0481	< 0.0481	U
Fluorene	86-73-7	0.00105	0.0481	< 0.0481	U
Indene	95-13-6	0.000850	0.0481	< 0.0481	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.00163	0.0481	< 0.0481	U
Naphthalene	91-20-3	0.00135	0.0481	0.00443	J
Phenanthrene	85-01-8	0.000848	0.0481	< 0.0481	U
Pyrene	129-00-0	0.00116	0.0481	< 0.0481	U

Surrogate Units: mg/L	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 2,4,6-Tribromophenol	118-79-6	0.0175	0.04808	36.4	10-177	
Surr: 2-Fluorobiphenyl	321-60-8	0.0205	0.02404	85.3	25-146	
Surr: 2-Fluorophenol	367-12-4	0.0128	0.04808	26.6	10-125	
Surr: Nitrobenzene-d5	4165-60-0	0.0253	0.02404	105	42-134	
Surr: Phenol-d6	13127-88-3	0.0116	0.04808	24.0	10-100	
Surr: Terphenyl-d14	1718-51-0	0.0211	0.02404	87.9	40-164	

U - This flag indicates the compound was analyzed for but not detected above the MDL.
J - Estimated value between the MDL and the reporting limit (PQL).
$ - This compound exceeded (low) the control limit for the CCV. The compound concentration is estimated and may be biased low.

ORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-002A
Client Sample ID: Raw Ore
Collection Date: 7/20/2021 1005h
Received Date: 7/21/2021 1405h

Analytical Results SVOA SPLP by GC/MS Method 8270E/1312/3511

Analyzed: 7/29/2021 1724h **Extracted:** 7/29/2021 1235h **SPLP Prep Date:** 7/26/2021 1645h
Units: mg/L **Dilution Factor:** 1 **Method:** SW8270E

Compound	CAS Number	MDL	Reporting Limit	Analytical Result	Qual
1-Methylnaphthalene	90-12-0	0.00134	0.0480	< 0.0480	U
Acenaphthene	83-32-9	0.000934	0.0480	< 0.0480	U
Acenaphthylene	208-96-8	0.000791	0.0480	< 0.0480	U
Anthracene	120-12-7	0.000860	0.0480	< 0.0480	U
Benz(a)anthracene	56-55-3	0.000670	0.0480	< 0.0480	U
Benzo(a)pyrene	50-32-8	0.00233	0.0480	< 0.0480	U
Benzo(b)fluoranthene	205-99-2	0.00196	0.0480	< 0.0480	U
Benzo(g,h,i)perylene	191-24-2	0.000930	0.0480	< 0.0480	U
Benzo(k)fluoranthene	207-08-9	0.00133	0.0480	< 0.0480	U
Chrysene	218-01-9	0.000754	0.0480	< 0.0480	U$
Dibenz(a,h)anthracene	53-70-3	0.00179	0.0480	< 0.0480	U
Fluoranthene	206-44-0	0.00114	0.0480	< 0.0480	U
Fluorene	86-73-7	0.00105	0.0480	< 0.0480	U
Indene	95-13-6	0.000848	0.0480	< 0.0480	U
Indeno(1,2,3-cd)pyrene	193-39-5	0.00163	0.0480	< 0.0480	U
Naphthalene	91-20-3	0.00134	0.0480	< 0.0480	U
Phenanthrene	85-01-8	0.000846	0.0480	< 0.0480	U
Pyrene	129-00-0	0.00116	0.0480	< 0.0480	U

Surrogate Units: mg/L	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 2,4,6-Tribromophenol	118-79-6	0.0501	0.04798	104	10-177	
Surr: 2-Fluorobiphenyl	321-60-8	0.0300	0.02399	125	25-146	
Surr: 2-Fluorophenol	367-12-4	0.0360	0.04798	75.1	10-125	
Surr: Nitrobenzene-d5	4165-60-0	0.0357	0.02399	149	42-134	S
Surr: Phenol-d6	13127-88-3	0.0278	0.04798	58.0	10-100	
Surr: Terphenyl-d14	1718-51-0	0.0307	0.02399	128	40-164	

U - This flag indicates the compound was analyzed for but not detected above the MDL.

S - High surrogate recoveries indicate possible bias high. Data deemed acceptable as no analytes associated with this surrogate were observed in the field sample.

$ - This compound exceeded (low) the control limit for the CCV. The compound concentration is estimated and may be biased low.

ORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-001C
Client Sample ID: Cleaned Sand #1
Collection Date: 7/20/2021 1000h
Received Date: 7/21/2021 1405h

Analytical Results VOAs Fractionation by GC/MS Method 8260D

Analyzed: 7/22/2021 1854h **Extracted:**
Units: µg/kg-dry **Dilution Factor:** 10.87 **Method:** SW8260D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Benzene	71-43-2	21.8	< 21.8	
C5&C6 Aliphatic hydrocarbons		218	< 218	
C7&C8 Aliphatic hydrocarbons		218	**2,350**	
C9&C10 Aliphatic hydrocarbons		218	**25,200**	
C9&C10 Alkyl Benzenes		218	**4,690**	
Ethylbenzene	100-41-4	21.8	**360**	
Naphthalene	91-20-3	21.8	**254**	
Toluene	108-88-3	21.8	**90.3**	
TPH C6-C10 (GRO)		218	**35,100**	
Xylenes, Total	1330-20-7	21.8	**2,190**	

Surrogate Units: µg/kg-dry	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 1,2-Dichloroethane-d4	17060-07-0	520	544.6	95.5	70-145	
Surr: 4-Bromofluorobenzene	460-00-4	515	544.6	94.6	70-128	
Surr: Dibromofluoromethane	1868-53-7	495	544.6	90.8	70-133	
Surr: Toluene-d8	2037-26-5	532	544.6	97.7	70-123	

The sample was received with headspace.
The reporting limits were raised due to high analyte concentrations.
Sampling and analytical preparation performed by method 5030A modified for analysis of soil samples collected in 2 or 4 oz jars.

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

ORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-002C
Client Sample ID: Raw Ore
Collection Date: 7/20/2021 1005h
Received Date: 7/21/2021 1405h

Analytical Results VOAs Fractionation by GC/MS Method 8260D

Analyzed: 7/26/2021 1447h **Extracted:**
Units: µg/kg-dry **Dilution Factor:** 1 **Method:** SW8260D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Benzene	71-43-2	2.01	< 2.01	
C5&C6 Aliphatic hydrocarbons		20.1	< 20.1	
C7&C8 Aliphatic hydrocarbons		20.1	< 20.1	
C9&C10 Aliphatic hydrocarbons		20.1	< 20.1	
C9&C10 Alkyl Benzenes		20.1	**53.5**	
Ethylbenzene	100-41-4	2.01	< 2.01	
Naphthalene	91-20-3	2.01	< 2.01	
Toluene	108-88-3	2.01	< 2.01	
TPH C6-C10 (GRO)		20.1	**53.5**	
Xylenes, Total	1330-20-7	2.01	< 2.01	

Surrogate Units: µg/kg-dry	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 1,2-Dichloroethane-d4	17060-07-0	50.2	50.17	100	70-145	
Surr: 4-Bromofluorobenzene	460-00-4	52.6	50.17	105	70-128	
Surr: Dibromofluoromethane	1868-53-7	47.8	50.17	95.2	70-133	
Surr: Toluene-d8	2037-26-5	52.2	50.17	104	70-123	

The sample was received with headspace.
Sampling and analytical preparation performed by method 5030A modified for analysis of soil samples collected in 2 or 4 oz jars.

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

ORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-001B
Client Sample ID: Cleaned Sand #1
Collection Date: 7/20/2021 1000h
Received Date: 7/21/2021 1405h

Analytical Results VOAs SPLP 1312 List by GC/MS Method 8260D/5030C

Analyzed: 7/27/2021 1340h **Extracted:** **SPLP Prep Date:** 7/26/2021 1645h
Units: mg/L **Dilution Factor:** 1 **Method:** SW8260D

Compound	**CAS Number**	**Reporting Limit**	**Analytical Result**	**Qual**
Benzene	71-43-2	0.00100	< 0.00100	
C5&C6 Aliphatic hydrocarbons		0.0200	< 0.0200	
C7&C8 Aliphatic hydrocarbons		0.0200	**0.0276**	
C9&C10 Aliphatic hydrocarbons		0.0200	**0.0432**	
C9&C10 Alkyl Benzenes		0.0200	**0.0336**	
Ethylbenzene	100-41-4	0.00200	**0.0102**	
Naphthalene	91-20-3	0.00200	**0.00484**	
Toluene	108-88-3	0.00200	**0.00450**	
TPH C6-C10 (GRO)		0.0200	**0.185**	
Xylenes, Total	1330-20-7	0.00200	**0.0610**	

Surrogate **Units:** mg/L	**CAS**	**Result**	**Amount Spiked**	**% REC**	**Limits**	**Qual**
Surr: 1,2-Dichloroethane-d4	17060-07-0	0.0488	0.05000	97.6	80-136	
Surr: 4-Bromofluorobenzene	460-00-4	0.0506	0.05000	101	85-121	
Surr: Dibromofluoromethane	1868-53-7	0.0463	0.05000	92.7	78-132	
Surr: Toluene-d8	2037-26-5	0.0498	0.05000	99.5	81-123	

ORGANIC ANALYTICAL REPORT

Client: Petroteq Energy Inc. **Contact:** George Stapleton
Project: POSP Ore/Sand
Lab Sample ID: 2107538-002B
Client Sample ID: Raw Ore
Collection Date: 7/20/2021 1005h
Received Date: 7/21/2021 1405h

American West
ANALYTICAL LABORATORIES

3440 South 700 West
Salt Lake City, UT 84119

Phone: (801) 263-8686
Toll Free: (888) 263-8686
Fax: (801) 263-8687
e-mail: awal@awal-labs.com

web: www.awal-labs.com

Jennifer Osborn
Laboratory Director

Jose Rocha
QA Officer

Analytical Results VOAs SPLP 1312 List by GC/MS Method 8260D/5030C

Analyzed: 7/27/2021 1400h **Extracted:** **SPLP Prep Date:** 7/26/2021 1645h
Units: mg/L **Dilution Factor:** 1 **Method:** SW8260D

Compound	CAS Number	Reporting Limit	Analytical Result	Qual
Benzene	71-43-2	0.00100	< 0.00100	
C5&C6 Aliphatic hydrocarbons		0.0200	< 0.0200	
C7&C8 Aliphatic hydrocarbons		0.0200	< 0.0200	
C9&C10 Aliphatic hydrocarbons		0.0200	< 0.0200	
C9&C10 Alkyl Benzenes		0.0200	< 0.0200	
Ethylbenzene	100-41-4	0.00200	< 0.00200	
Naphthalene	91-20-3	0.00200	< 0.00200	
Toluene	108-88-3	0.00200	< 0.00200	
TPH C6-C10 (GRO)		0.0200	< 0.0200	
Xylenes, Total	1330-20-7	0.00200	< 0.00200	

Surrogate Units: mg/L	CAS	Result	Amount Spiked	% REC	Limits	Qual
Surr: 1,2-Dichloroethane-d4	17060-07-0	0.0489	0.05000	97.9	80-136	
Surr: 4-Bromofluorobenzene	460-00-4	0.0505	0.05000	101	85-121	
Surr: Dibromofluoromethane	1868-53-7	0.0460	0.05000	92.1	78-132	
Surr: Toluene-d8	2037-26-5	0.0500	0.05000	99.9	81-123	

American West Analytical Laboratories

Rpt Emailed: D

WORK ORDER Summary

Work Order: **2107538** Page 1 of 2

Client: Petroteq Energy Inc.

Due Date: 8/5/2021

Client ID: WALKIN

Contact: George Stapleton

Project: **POSP Ore/Sand**

QC Level: I

WO Type: Standard

Comments: Do not release w/o Financial Arrangements. All tests on fraction A must be run on SPLP Leachate. SPLP SVOAs to be reported to the MDL.;

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
2107538-001A	**Cleaned Sand #1**	7/20/2021 1000h	7/21/2021 1405h	**1312LM-PR**	Leachate		SPLP - wc	3
				1312LO-PR			SPLP - wc	
				300.0-W *2 SEL Analytes: CL SO4*			SPLP - wc	
				3005A-SPLP-PR			SPLP - wc	
				3511-SVOA-SPLP-PR			SPLP - wc	
				3511-TPH-SPLP-PR			SPLP - wc	
				6010D-SPLP *4 SEL Analytes: CA MG K NA*			SPLP - wc	
				6020B-SPLP *7 SEL Analytes: AS BA CD CR PB SE AG*			SPLP - wc	
				8015-W-TPH-3511-SPLP			SPLP - wc	
				8270E-W-SPLP-3511 *Test Group: 8270E-W-3511-SPLP; # of Analytes: 18 / # of Surr: 6*			SPLP - wc	
				ALK-W-2320B *2 SEL Analytes: ALK ALKB*			SPLP - wc	
				COND-W-2510B			SPLP - wc	
				HG-SPLP-7470A			SPLP - wc	
				HG-SPLP-PR			SPLP - wc	
				OGB-W-1664B			SPLP - wc	
				OGF-W-1664B-SGT			SPLP - wc	
				PH-4500H+B			SPLP - wc	
				TDS-W-2540C			SPLP - wc	
				TOC-W-5310B			SPLP - wc	
2107538-001B				**1312ZHE-PR**			splp - voc	1
				8260D-W-SPLP *Test Group: 8260D-W-SPLP; # of Analytes: 9 / # of Surr: 4*			splp - voc	
2107538-001C				**3546-TPH-PR**			VOCFridge	
				8015-S-TPH-3546 *Test Group: 8015-S-TPH-3546; # of Analytes: 1 / # of Surr: 1*			VOCFridge	
				8260D-S *Test Group: 8260D-S-Frac; # of Analytes: 10 / # of Surr: 4*			VOCFridge	

Printed: 07/30/21 17:26

LABORATORY CHECK: %M ☐ RT ☐ CN ☐ TAT ☐ QC ☐ LUO ☐ HOK______ HOK______ HOK______ COC Emailed__________

WORK ORDER Summary

Work Order: **2107538** Page 2 of 2

Client: Petroteq Energy Inc.

Due Date: 8/5/2021

Sample ID	Client Sample ID	Collected Date	Received Date	Test Code	Matrix	Sel	Storage	
2107538-001C	**Cleaned Sand #1**	7/20/2021 1000h	7/21/2021 1405h	**PMOIST**	Leachate		VOCFridge	1
2107538-002A	**Raw Ore**	7/20/2021 1005h	7/21/2021 1405h	**1312LM-PR**	Soil		SPLP - wc	3
				1312LO-PR			SPLP - wc	
				300.0-W *2 SEL Analytes: CL SO4*			SPLP - wc	
				3005A-SPLP-PR			SPLP - wc	
				3511-SVOA-SPLP-PR			SPLP - wc	
				3511-TPH-SPLP-PR			SPLP - wc	
				6010D-SPLP *4 SEL Analytes: CA MG K NA*			SPLP - wc	
				6020B-SPLP *7 SEL Analytes: AS BA CD CR PB SE AG*			SPLP - wc	
				8015-W-TPH-3511-SPLP			SPLP - wc	
				8270E-W-SPLP-3511 *Test Group: 8270E-W-3511-SPLP; # of Analytes: 18 / # of Surr: 6*			SPLP - wc	
				ALK-W-2320B *2 SEL Analytes: ALK ALKB*			SPLP - wc	
				COND-W-2510B			SPLP - wc	
				HG-SPLP-7470A			SPLP - wc	
				HG-SPLP-PR			SPLP - wc	
				OGB-W-1664B			SPLP - wc	
				OGF-W-1664B-SGT			SPLP - wc	
				PH-4500H+B			SPLP - wc	
				TDS-W-2540C			SPLP - wc	
				TOC-W-5310B			SPLP - wc	
2107538-002B				**1312ZHE-PR**			splp - voc	1
				8260D-W-SPLP *Test Group: 8260D-W-SPLP; # of Analytes: 9 / # of Surr: 4*			splp - voc	
2107538-002C				**3546-TPH-PR**			VOCFridge	
				8015-S-TPH-3546 *Test Group: 8015-S-TPH-3546; # of Analytes: 1 / # of Surr: 1*			VOCFridge	
				8260D-S *Test Group: 8260D-S-Frac; # of Analytes: 10 / # of Surr: 4*			VOCFridge	
				PMOIST			VOCFridge	

AWAL Use Only - One or more samples expired upon receipt:

Test Code
PH-4500H+B

Printed: 07/30/21 17:26 LABORATORY CHECK: %M ☐ RT ☐ CN ☐ TAT ☐ QC ☐ LUO ☐ HOK______ HOK______ HOK______ COC Emailed__________

American West Analytical Laboratories

3440 S. 700 W. Salt Lake City, UT 84119
Phone # (801) 263-8686 Toll Free # (888) 263-8686
Fax # (801) 263-8687 Email awal@awal-labs.com
www.awal-labs.com

CHAIN OF CUSTODY

2107538
AWAL Lab Sample Set #
Page ____ of ____

All analysis will be conducted using NELAP accredited methods and all data will be reported using AWAL's standard analyte lists and reporting limits (PQL) unless specifically requested otherwise on this Chain of Custody and/or attached documentation.

QC Level: 1 2 2+ 3 3+

Turn Around Time: 1 2 3 4 5 [✓ Stnd]

Unless other arrangements have been made, signed reports will be emailed by **5:00 pm** on the day they are due.

Due Date: 8/5/21

Client: PETROTEQ ENERGY INC.
Address: 15315 W. MAGNOLIA BLVD, STE 120
SHERMAN OAKS, CA 91403
Contact: GEORGE STAPLETON
Phone #: Cell: (713) 206-9010
Email: gstapleton@petroteq.energy
Project Name: POSP ORE/SAND
Project #:
PO #:
Sampler Name: GEORGE STAPLETON

☐ Report down to the MDL
☐ Include EDD:
☐ Lab Filter for:

☐ Field Filtered For:

For Compliance With:
☐ NELAP
☐ RCRA
☐ CWA
☐ SDWA
☐ ELAP / A2LA
☐ NLLAP
☐ Non-Compliance
☐ Other:

Sample ID:	Date Sampled	Time Sampled	# of Containers	Sample Matrix	See Attached	Known Hazards & Sample Comments
CLEANED SAND #1	7/20/21	1000				
CLEANED SAND #2		1000				
CLEANED SAND #3		1000				
CLEANED SAND #4		1000				
CLEANED SAND #5		1000				
RAW ORE #1	7/20/21	10:05				
RAW ORE #2		10:05				
RAW ORE #3		10:05				
RAW ORE #4		10:05				
RAW ORE #5		10:05				
DB 7/30/21	7/21/21				7/21/21	DB 7/30/21

Laboratory Use Only

Samples Were:
1 Shipped or [✓ hand delivered]
2 Ambient or [✓ Chilled]
3 Temperature 1.9 °C
4 Received Broken/Leaking (Improperly Sealed) Y [✓ N]
5 Properly Preserved [✓ Y] N Checked at bench
6 Received Within Holding Times [✓ Y] N

COC Tape Was:
1 Present on Outer Package Y N [✓ NA]
2 Unbroken on Outer Package Y N [✓ NA]
3 Present on Sample Y N [✓ NA]
4 Unbroken on Sample Y N [✓ NA]

Discrepancies Between Sample Labels and COC Record? Y [✓ N]

elinquished by: gnature George Stapleton
int Name: GEORGE STAPLETON
Date: ~~7/20/21~~ Time: 14:05
Received by: Signature Denise Bruun
Print Name: Denise Bruun
Date: ~~7/20/21~~ Time: 14:05

elinquished by: gnature
int Name:
Date: Time:
Received by: Signature
Print Name:
Date: Time:

elinquished by: gnature
int Name:
Date: Time:
Received by: Signature
Print Name:
Date: Time:

elinquished by: gnature
int Name:
Date: Time:
Received by: Signature
Print Name:
Date: Time:

Special Instructions:
PLEASE CONTACT PAT NOTEBOOM FOR TESTS TO BE PERFORMED ON EACH SET OF SAMPLES

All work performed on SPLP Fluid # –

AWAL2021 Fees

Table 1. SPLP analytical results for overburden and **MCW** post processed sands.

$155	SPLP Vol (& Non Vol) **Compound**	**Native Overburden Analytical Results (mg/L)**	**MCW Processed Sands Analytical Result (mg/L) Sample 1411196-A**	**Numeric Standard (mg/L)** [1]
$171	Arsenic	<0.050		0.05
	Barium	<0.050		2.0
	Cadmium	<0.010		0.005
	Calcium	90	4.90	
	Chromium (total)	<0.010		0.1
	Lead	<0.050		0.015
	Magnesium	16	<1.00	
	Mercury	<0.0010		0.002
	Potassium	3.8	<1.00	
	Selenium	<0.050		0.05
	Silver	<0.010		0.1
	Sodium	28	1.94	
$20	Alkalinity (as $CaCO_3$)	68	12.9	
	Bicarbonate (as $CaCO_3$)		<10.0	
$14	Chloride	1.5	0.580	
$50	Oil & Grease		<5.00	
$14	Conductivity (µmhos/cm)	1300		
$14	pH @ 25 °C (reported in Standard Units)	7.96	10.0	6.5-8.5
then paired w/ O&G $20	SGT-HEM/Non-Polar Material		<5.00	
$15	Sulfate	280	4.77	
$16	Total Dissolved Solids (TDS)	440	84.0	1200[2]
SGT HEM =	Total Recoverable Petroleum Hydrocarbon	3.9		10[3]
$35	Total Organic Carbon (TOC)		31.4	
$50	Diesel Range Organics (DRO)		0.898	
$165	Gasoline Range Organics (GRO)		0.149	
	SVOA SPLP by GC/MS Method 8270D/1312/3510C (19 compounds reported, all below detection limit) (PNA)	R 7-28-21	<0.0100	
includes GRO $60	Benzene		<0.00100	0.005
	C5&C6 Aliphatic hydrocarbons[4]		0.00778	
	C7&C8 Aliphatic hydrocarbons[4]		<0.0200	
	C9&C10 Aliphatic hydrocarbons[4]		<0.0200	
	C9&C10 Alkyl Benzenes		0.0286	
	Ethylbenzene		0.00522	0.7
	Naphthalene		0.00472	
	Toluene		0.0378	1
	Xylenes, Total		0.0554	10

TOTAL this page $799.00

Source: [1] R317-6-2, Ground Water Quality Standards, [2] R317-2-14, Numeric Criteria, [3] Utah Tier 1, [4] EPA and Utah do not have standards for Aliphatic hydrocarbons; for comparison, Massachusetts has a maximum contaminant level (MCL) for aliphatic hydrocarbons of 0.3 mg/L

Source: Stantec, 2015

APPROVED

OCT 24 2017

DIV. OIL GAS & MINING

Totals

Table 2. Dry analyses of the native bitumen and post processed oil sands from **MCW's** pilot plant. All hydrocarbon compounds detected in the post processed sands are below Utah's Tier 1 screening levels (maximum contamination levels) for petroleum hydrocarbons from leaking underground storage tanks. This is particularly important for the BTEX compounds (benzene, toluene, ethyl benzene and xylene) due to possible negative health implications from ingesting or breathing in these compounds.

Compound	**Bitumen**	**Post Processed Sands Sample 1511254**	**Tier 1 screening levels**
Diesel Range Organics (DRO) (C10-C28)		4,750 mg/kg	5,000 mg/kg (1)
TPH (GRO) (C6-C10)	20,300,000 µg/kg	20,500 µg/kg	1,500,000 µg/kg (1)
C5&C6 Aliphatic hydrocarbons	472,000 µg/kg	< 1,000 µg/kg	
C7&C8 Aliphatic hydrocarbons	3,320,000 µg/kg	< 1,000 µg/kg	
C9&C10 Aliphatic hydrocarbons	6,810,000 µg/kg	< 1,000 µg/kg	
C9&C10 Alkyl Benzenes	354,000 µg/kg	20,300 µg/kg	
Ethylbenzene	248,000 µg/kg	< 100 µg/kg	23,000 µg/kg (1)
Naphthalene	33,400 µg/kg	< 100 µg/kg	51,000 µg/kg (1)
Toluene	6,680,000 µg/kg	132 µg/kg	25,000 µg/kg (1)
Benzene	45,700 µg/kg	< 100 µg/kg	900 µg/kg (1)
Xylenes, Total	2,370,000 µg/kg	< 100 µg/kg	142,000 µg/kg (1)

#50

#60

(1) – Source - Table 1-3: Tier 1 Screening Criteria - Guidelines for Utah's Corrective Action Process for Leaking Underground Storage Tank Sites - http://www.deq.utah.gov/ProgramsServices/programs/tanks/ust/releases/docs/2010/11Nov/correctiveActionProcessGuide.pdf

Source: MCW Groundwater Discharge Permit Application submitted to and approved by the Utah Division of Water Quality (2016).

Total this page #110.00

Table 4:

Removed due to Viva removing their equipment in 2019

Table 5. Water holding capacity measured in inches of water per foot of soil.

Soil Type	Total Available Water, in/ft.
coarse sand	0.6
fine sand	1.8
loamy sand	2.0
sandy loam	2.4
sandy clay loam	1.9
loam	3.8
silt loam	4.2
silty clay loam	2.4
clay loam	2.2
silty clay	2.6
clay	2.4

Source: Cornell University, 2015 - http://nrcca.cals.cornell.edu/soil/CA2/CA0212.1-3.php

Table 6: Average monthly precipitation (inches) for Vernal, Utah.

Month	**January**	**February**	**March**	**April**	**May**	**June**
Avg. Precipitation	0.43	0.51	0.67	0.87	1.06	0.67
Month	**July**	**August**	**September**	**October**	**November**	**December**
Avg. Precipitation	0.63	0.75	0.91	1.26	0.55	0.47

Average annual precipitation (rainfall): 8.78

Source: US Climate Data, 2015

Table 7. Pan evaporation for Vernal Utah, average values from 1928-2005 (in inches).

Month	**January**	**February**	**March**	**April**	**May**	**June**
Pan Evaporation	0.00	0.00	0.00	5.07	6.41	7.48
Month	**July**	**August**	**September**	**October**	**November**	**December**
Pan Evaporation	6.64	6.34	4.89	2.92	0.00	0.00

Annual average pan evaporation: 39.75 inches

Source: Western Region Climate Center, 2015b

Table 8. Utah Division of Environmental Response and Remediation Tier 1 screening levels for soils surrounding leaking underground storage tanks.

Tier 1 Screening Levels are applicable only when the following site conditions are met:

1.) No buildings, property boundaries or utility lines within 30 feet of the highest measured concentration of any contaminant that is greater than the initial screening levels but less than or equal to the Tier 1 screening levels AND,

2.) No water wells or surface water within 500 feet of highest measured concentration of any contaminant that is greater than the initial screening levels but less than or equal to the Tier 1 screening levels.

Contaminants *	**Groundwater** *(mg/L)*	**Soil** *(mg/kg)*
Benzene	0.3	0.9
Toluene	3	25
Ethylbenzene	4	23
Xylenes	10	142
Naphthalene	0.7	51
Methyl t-butyl ether (MTBE)	0.2	0.3
Total Petroleum Hydrocarbons (TPH) as gasoline	10	1500
Total Petroleum Hydrocarbons (TPH) as diesel	10	5000
Oil and Grease or Total Recoverable Petroleum Hydrocarbons (TRPH)	10	10000

*Environmental samples which have been collected to determine levels of contamination from underground storage tanks shall be analyzed using appropriate laboratory analytical methods as referenced in Utah Admin. Code R311-205-2(d)(1).

R647-4-110. Reclamation Plan (Revised 8/2021) A narrative description of the plan to complete this reclamation is found below.

1. The current land use for the area consists of mining and contiguous wildlife habitat. The applicant has designed the reclamation plan for this large mining operation with be a post-mining land use of wildlife habitat.

2. The current status of the operation is that the demonstration plant has proved that the redesigned process is capable of producing oil in saleable quantities and that the majority of the post processed sand can be sold for various uses. In the near term, Petroteq does not intend to mine additional ore from the existing pit to feed the demonstration plant and will only use the demonstration plant to test other oil sands ores and/or show potential investors the plant capabilities. Licensing of this technology is currently being analyzed by several firms that may require a live demonstration. This reclamation plan and approved bond calculations contemplate backfilling the pit with post processed sand (largest cost contributor to the reclamation bond) and is a worst-case reclamation cost. Petroteq intends to keep backfilling of the final pit as an option as approved. If it is determined at a later date to not backfill the pit and reclaim the highwalls by grading, a revised reclamation plan will be submitted. Grading the highwalls will be many times less costly that backfilling the pit. The approved bond for demolition of the demonstration plant was based on dismantling, transporting, and re-erecting the plant form Maeser Utah to its current location (14 miles). This approved bond amount is more than sufficient to cover straight demolition of the demonstration plant.

3. The following narrative descriptions depict the general manner and anticipated extent to which roads, high-walls, slopes, impoundments, drainages, pits and ponds, piles, shafts and adits, drill holes, and similar structures will be reclaimed:

Pit reclamation

- The pit excavation will be concurrently backfilled during mining, contoured, and left in a free-draining condition (see highwall reclamation below)
- The drainage course left within the pit basin shall include check dams, curves and stilling pools to control flow velocities and enhance infiltration. The sandy soils will have a high infiltration rate thereby resulting in little runoff except during intense rain events
- Following reclamation, the slopes will have surface soil placement (or suitable material placement) to a nominal depth of 6 inches, roughening, pitting, and re-seeding

Road reclamation

- Roads will be reclaimed through re-grading and slope reduction
- Reclaimed road surfaces will be ripped to a depth of 18-24 inches and readied for surface soil placement (or suitable alternative) to a nominal depth of 6 inches, roughening, pitting, and re-seeding
- Road cut and fill areas will be sloped to achieve an overall slope angle of 3:1 (3h:1v) or less at closure
- Water bars, berms, or other erosion control measures will be designed pursuant to the following references:
    - *Designing for Effective Sediment and Erosion Control on Construction Sites. Fifield, 2001*
    -
    - *Field Manual on Sediment and Erosion Control Best Management Practices for Contractors and Inspectors, Fifield, J.S.2002*

Highwall reclamation

- Concurrent pit backfilling will achieve the contours depicted on ***Drawing 6, Drawing 7, Drawing 8, and Drawing 12***, anticipated to be at a slope of 3h:1v or less
- The ultimate contours will result in no pit high-walls remaining at closure

Slope reclamation

- Overburden slopes are anticipated to be left at an overall slope angle of 3h:1v or less and reclaimed when mining ceases
- Process area cut slopes and fills are anticipated to be left at an overall slope angle of 3h:1v or less and reclaimed through slope reduction or backfilling against the cut wall
- Following reclamation, the slopes will have surface soil placement (or suitable material placement) to a nominal depth of 6 inches, roughening, pitting, and re-seeding

Impoundment reclamation

- No impoundment will be present at closure

Drainages and natural drainage patterns reclamation

- Design features identified in ***Appendix 2*** (PSOMAS) will remain as permanent post-closure features and have been designed as such
- Stable internal drainage corridors for the mining and process areas will be re-established to provide controlled drainages similar to the pre-existing parameters
- Armoring of internal drainage conveyances is anticipated to be accomplished with imported well graded nominal 4" rock and/or snaked alignments with step pools to minimize excessive erosion
- Sedimentation will be controlled via accepted construction practices *(Fifield, 2001 & 2002)*
- The perennial stream shall have nominal 2 foot re-vegetated berm barrier installed to minimize sediment from entering the stream

Ponds reclamation

There are no ponds to be reclaimed.Overburden disposal area reclamation

The overburden disposal area created during the initial years of mining will be fully reclaimed when mining ceases. Reclamation will include shaping and grading to achieve an anticipated overall slope angle of 3h:1v, placement of drainage features such as well graded rock drainage or slope velocity break v-ditches, placement of surface soils to a nominal depth of 6 inches (or alternately direct seeding dependent upon reclamation test results), roughening of surface soil surface, pitting and reseeding.

Shafts

- Shafts will not be present.

Adits

- Adits will not be present

Drill holes reclamation

There are no production drill holes within the permit boundary.

Exploration drill holes are not anticipated outside of the permit boundary under the scope of this NOI.

Stockpiled materials

Stockpiles of ore will be completely processed and will not exist into the post-closure phase. Stockpiles of process-generated silica sand will either be completely sold as a secondary product or completely utilized during reclamation as pit backfill or other reclamation fill.

Stockpiled surface soils will be completely utilized during reclamation and will not exist into the post-closure phase. All areas underlying previous stockpile areas will be shaped with dozers, graded and reclaimed per ***Drawing 12.*** Procedures for this reclamation include ripping previous stockpile areas to a nominal depth of 18-24 inches, placement of surface soils or approved alternate, roughening, pitting and seeding.

Leach pads

Leach pads will not be present.

Tailing areas

Tailing areas will not be present.

3. The applicant commits to the complete removal of surface facilities at the completion of operations. Surface facilities are anticipated to include those identified on ***Table 2***. No surface facilities are to be left onsite as part of the post-mining land use, including but not limited to buildings, utilities, roads, pads, pits and surface equipment.

In general facilities will be dismantled utilizing equipment onsite during the course of operations prior to removal from the lease. Specialized equipment such as cranes, transports, or other non-operational phase equipment will be utilized as necessary to complete the decommissioning and dismantling work.

A narrative description of the manner and the extent to which surface, process, and ancillary facilities will be reclaimed is as follows:

Demonstration Process Facilitie

Materials remaining at the time of facility dismantling will be salvaged for recycle and/or reuse to the greatest extent practicable. All tanks, stationary equipment and facilities will be removed from the site. Tanks, piping, pumps, sumps, process vessels and other equipment that contained process solutions and/or chemicals will be removed from service and treated as appropriate to decontaminate and clean them prior to transport off site for re-use or proper disposal.

Mobile equipment will be returned (if rented) or sold. When no longer needed for decommissioning and closure activities, office and other ancillary facilities will also be removed from the site.

The removal of the process and ancillary facilities is scheduled to be completed within 1 calendar year of the end of processing.

Ancillary Facilities

Any process reagents, chemicals, and chemical products will be inventoried and either returned, recycled or disposed of off-site. Mining explosive components, if any, will be inventoried and removed under ATF requirements.

Sub-surface structure foundations are not anticipated for this NOI.
Buried or partially-buried sumps, vaults, and other features that are below grade will be removed, cleaned and the material properly disposed. There are no underground storage tanks.

All fuels or petroleum products (grease, oil, fluids, etc.) will be inventoried and either returned, recycled or disposed of off-site. The rented fuel storage tank facility will be returned to its owner.

Communication Facilities

The applicant commits to decommission all towers or other communication infrastructure that may exist at the time of final closure.

Water Supply

The applicant commits to decommission, dismantle and reclaim all facilities associated with the operation phase water supply system including but not limited to onsite pipelines, onsite distribution pumps, etc. Plant fresh water tanks existing at the time of closure will be decommissioned and either transported offsite for re-use or dismantled for salvage or disposal.

Power Lines

The applicant commits to coordinate the de-energizing and decommissioning of all distribution power lines, transformer stations, switchgear, etc. with the local power supplier(s). All power supply and distribution features will be removed. Any required temporary power for final closure activities after these permanent features are required to be removed will be provided by mobile generators.

Landfill

The applicant commits to the proper closure of the onsite Class III landfill cells within the pit limits after disposal of all closure phase debris. Closure will comply with both UDOGM and UDS&HW guidelines including the placement and compression of cover fill material with mine equipment such as dozers, graders, haulage trucks, and water trucks to a minimum depth of three feet over any cell. Grading over closed cells will be integrated with the overall grading plan for the pit phases.

4. The applicant presents that no deleterious or acid-forming materials have been identified and no deleterious or acid-forming materials are anticipated to remain onsite after closure of the large mining operation is complete.

5. The applicant commits to a planting program as best calculated to revegetate the disturbed area. All proposed broadcast seeding will be coordinated to be completed as soon as practicable after preparation of the seedbed. Contemporaneous reclamation in planned to occur throughout the operation life.

The applicant will achieve final reclamation and revegetation success by:

- surface configuration
- grading
- surface soil management and handling
- seeding
- land management and monitoring
- abandonment
- bond release

5.11. Regrading and shaping of the disturbed area within the permit boundary is intended to leave the site in a stable condition where reclamation success will ensure surety release and achievement of the designated post-mining land use.

The applicant understands that engineered drainage will be a critical component to this success and commits to the measures identified in ***Appendix 2***. These details present surface structures that will remain after closure to assure drainage is engineered for proper management. The applicant commits to an ongoing management program of drainage, erosion, and sedimentation control over the life of the mining operations. Such measures will include, but not be limited to, regular monitoring for stability and erosion and implementation of design fixes in the unlikely event such measures are necessary to reestablish proper drainage. In addition to ***Appendix 2***, final regrading and reclamation treatments can be found on ***Drawing 6***, ***Drawing 7***, ***Drawing 8***, and ***Drawing 12***.

The following narrative describes the applicant's plan to complete reclamation through, at a minimum, grading and/or stabilization procedures, surface soil replacement, seed bed preparation, seed mixture(s) and rate(s), and timing of seeding.

Erosion Control

The applicant commits to appropriate erosion control measures *(**Appendix 2 and Fifield, 2001 & 2002**)* to achieve surety release and a stable post-mining land use while realizing no adverse impact to adjacent landowners. It is understood that disturbance of the proposed NOI will result in temporary disruption of the existing distribution, quality, and quantity of water runoff. It is also anticipated that improvements over existing conditions are possible with implementation of Best Management Practices (BMPs) coupled with surface run-on measures depicted in ***Appendix 2*** and stormwater measures to be implemented through the stormwater pollution prevention plan (SWPPP).

The applicant understands that the erosion control technologies proposed will reduce, but not eliminate, soil erosion associated with the project. The applicant further understands that the erosion control measures anticipated will be modified during or after installation and that the proposed erosion control measures discussed hereafter permit maximum flexibility and allow for design and installation modifications.

The general narrative for the applicant's erosion control plan is presented in the following discussion:

Soils

- Salvage of surface soils, known to be thin to non-existent (see ***Appendix 3***), will occur to a nominal depth of 6 inches
- Salvaged surface soils will be stockpiled in the surface soil stockpile, ripped, roughened, and seeded with a temporary cover crop within one planting season or as surface soil salvage progresses
- Erosion will be minimized through the close coordination of surface soil salvage to achieve a "just-in-time" result, approximately 60-90 days, thus keeping the disturbed acreage a any given time to a minimum
- Coordination of surface soil placement and seeding will be managed to minimize the duration of time valuable soil will be left exposed but not seeded, during the initial clearing phase, intermediate grading phase, and final reclamation phase. This coordination will include, but not be limited to:
  - Installation of run-on and run-off controls, specifically those identified in ***Appendix 2***.
  - Installation of temporary erosion controls, including but not limited to silt fences, wattle, or gravel check dams, as construction progresses in conjunction with the SWPPP
- For all roads, fills, or stockpile, slope lengths or gradients will be minimized to the greatest extent practicable to minimize erosion potential

Roads

- Existing access roads will be utilized initially and phased out as mining and site preparation evolves.
- All access and haulage roads will be sited and designed to provide for safety, stability, and drainage
- No importation of road building material is anticipated
- Grades for any road on the project shall not exceed 10%
- Roads will be paved at a nominal thickness of 2-4 inches with native asphaltic material whenever possible
- Design cross culverts and ditches to complement natural drainage.
- Run-on controls such as berms, slope drains, and water bars (*Fifield, 2001 & 2002*) will be designed and installed as necessary
- Road drainage features will be engineered and installed at the time of road construction to ensure maximum erosion control
- Road drainage features, such as out-slope design, in-slope design, or road surface crowning to complement the surrounding drainage, will be engineered and installed at the time of road construction to ensure maximum erosion control.
- Drain water conveyances from access or haulage roads will be engineered to achieve a low-energy, un-concentrated flow and installed at the time of road construction to ensure maximum erosion control
- Culverts will be engineered and installed at the time of road construction to ensure maximum erosion control typically at an angle of fifteen to thirty degrees toward the inflow of the ditch and have a minimum one percent slope
- Rock armor, drop inlets, and catch basins will be engineered and installed at the time of road construction to ensure maximum erosion control typically at the culvert inlet to reduce plugging
- Culverts will be engineered and installed at the time of road construction to ensure maximum erosion control typically along the natural slope under the fill in areas
- Rocks or other energy-dissipating materials will be engineered and installed at the time of road construction to ensure maximum erosion control typically placed below the culvert outlet

Road Maintenance

- Asphaltic material-paved roads will be re-surfaced as necessary to maintain drainage and safety
- Dirt roads will be graded as needed
- All drainage features will be checked for debris or failure that limit or remove their effectiveness
- Road surfacing, water, well graded rock or gravel, or other treatments will be evaluated for use on dirt road surfaces in compliance with the developed Fugitive Dust Control Plan
- All culverts or other physical drainage conveyance features will be marked with large painted stakes, flags, or signs

Road Reclamation

- During the operation phase, cut and fill slopes will be ripped, surface soil applied, roughened, and seeded (temporary cover crop seed) within one planting season
- Once final reclamation configuration is achieved, cut and fill slopes will be ripped, surface soil applied, roughened, and seeded (temporary cover crop seed)
- All roads will be reclaimed at the time of closure
- Roads will not be left during the post-closure phase

Drainage

- Erosion will be minimized within the existing drainage pattern through engineered structures (***Appendix 2)***
- Principal surface structures will be installed at the onset of large mining operations anticipated in 2008 and will remain post mining. The temporary sediment control ponds will be breached once permanent channels reach self maintaining conditions
- The perennial stream channel will be protected, secured, and remain unaltered
- A wetland revegetation plan will be developed in the event a new disturbance occurs within a designated wetland area or if the existing culvert and road is removed and revegetation of the wetland is necessary. In general, willows will be cut and transplanted at 2' centers within the defined wetland limits
- Install engineered sedimentation structures upstream of the perennial stream (***Appendix 2***)
- Install and seed soil berms along the course of the perennial stream within the project site for run-on control before construction begins
- Install sedimentation control BMPs (wattle and/or silt fence, see *Fifield, 2001 or 2002*) along the course of the perennial stream within the project site before construction begins
- Monitor annually the perennial stream for erosion and water quality and repair or replace BMPs as appropriate

Groundwater

- Minimize erosion that could potentially impact or compromise groundwater resources although, as previously indicated in the NOI, groundwater is not known to exist in the area nor is groundwater anticipated to exist in the mining area

Seed Mixture

The selected seed mix reflects the Division's recommendations for species composition observed within the project area prior to mining and the surrounding landscape and/or species not observed, but typically associated with the landscape, soil type, elevation, and precipitation of the project area. The project area naturally consists of a high amount of bare round cover, between 50 and 88.6 percent (see ***Appendix 3***). Native and non-native species for establishing vegetative cover will be utilized. Variances for substitution to the designated seed mix will be applied for by the applicant at the time of re-vegetation should a specific species be unavailable.

The following seed mixture will be utilized for all re-vegetated areas:

Common name	Scientific name	Pounds pure live seed per acre
Fourwing Saltbush	Atriplex canescens	2.0
Siberian wheatgrass	Agropyron sibericum	2.0
Crested wheatgrass	Agropyron desertorum X cristatum	1.0
Indian ricegrass	Oryzopsis hymenoides	2.0
Kochia	Kochia prostrata	0.5
Palmer penstemon	Penstemon palmeri	0.5
Russian wild rye	Elymus junceus	5.0
	TOTAL	**13.0**

Seed Ordering

Seed ordering will utilize a "just-in-time" approach coordinated with the seed supplier and seeding operator.

Seed Quality and Certified Seed

The applicant commits to utilize only reputable seed suppliers that can provide certified weed-free seed and, to the greatest extent practical, seed with local origination.

Seed Storage

Seed will be brought onsite utilizing a "just-in-time" approach coordinated with the seed supplier and seeding operator. Long-term onsite storage will be minimized.

Seeding Schedule

Final seeding is anticipated to be performed in late October and early November.

Site Preparation

All seedbeds will be prepared by ripping to a nominal depth of 12 inches followed by the placement of surface soils to a nominal depth of 6 inches. Scarifying of the placed surface soils will also be completed to leave a roughened condition to enhance water harvesting, erosion control and re-vegetation success. Compacted surfaces such as roads and pads will be dozer-ripped a minimum of 18 inches prior to surface soil placement.

Seeding Method

Broadcast seeding will be utilized to limit the amount of soil disturbance and to allow soil roughness to be maintained. Broadcast seeding is anticipated to be completed with an equipment mounted cyclone (whirl bird) type seeder. Seeding as soon as practicable after roughening will be scheduled to get seed cover prior to surface crusting. Seedbed covering to achieve a 2" seed depth and/or other seeding techniques may be employed if deemed appropriate at the time of re-vegetation.

Reclamation Monitoring Controls

The applicant commits to control and monitoring on an annual basis of re-vegetation efforts designed to enhance ultimate success and surety release. This effort includes securing access to testing and/or reclaimed areas and utilization of third-party consultants and/or local government or academic reclamation specialists to accurately and appropriately measure the success of any re-vegetative efforts, including re-vegetation of the overburden disposal, the soil supplement test areas on the overburden disposal area, the concurrent pit backfill area, or any other area subject to re-vegetation during the mining operations. The results of these monitoring efforts shall be utilized to make recommendations for improvements in the large scale reclamation and re-vegetation effort to be initiated during the closure phase of the operation.

Weed Prevention and Control

Seeding of the surface soil stockpile will utilize certified weed-free seed. Surface soil stockpiles will be monitored for noxious weed populations on an annual basis and treated as necessary for noxious weed control prior to placement for re-vegetation. Grading and placement of surface soils will be coordinated with seeding so as to minimize the potential for weed infestation. Seeding of re-vegetated area will be performed with cleaned equipment. Re-vegetated areas will be monitored during the establishment phase for noxious weed populations and treated accordingly.

Irrigation

Irrigation will not be utilized.

Re-vegetation with Live Plants
Re-vegetation with live plants is not anticipated.

Fertilization
Fertilization is not proposed.

Grazing Protection
Protection of re-seeded areas will be monitored to ensure success of the re-vegetation. Seeded areas will be monitored for the presence of unmanaged livestock grazing. Fencing is not anticipated to protect the seeding from trespass livestock but will be considered if livestock owner obligations and actions fail. The Utah Division of Wildlife Resources will be contacted if wildlife becomes a problem on the reclaimed site during the early years.

5.12. The applicant willevaluate the utilization of overburden, overburden/sand mixtures, and surface soil / sand mixtures as a supplemental growth medium to surface soil if required. This program will be designed and carried out utilizing reclamation test plots on the overburden disposal area as overburden disposal is shifted from this stockpile disposal area to a concurrent pit backfilling. This approach will attempt to ensure that where there is no original protective cover, an alternate practical procedure will be completed to develop an alternate source of reclamation cover to minimize or control erosion or siltation during the post-closure phase of the operation.

6. The applicant commits to completing reclamation of the large mining operation pursuant to **R647-4-110.**

R647-4-111. Reclamation Practices

The applicant commits to operate in a manner consistent with the intent and language of R647-4-111. During reclamation, the applicant agrees to conform to the following practices unless the Division grants a variance in writing:

1. Public Safety and Welfare – The applicant will minimize hazards to the public safety and welfare following completion of operations. Methods to minimize hazards shall include but not be limited to:

1.11. The permanent sealing of shafts and tunnels in the unlikely event such surface features are discovered

1.12. The proper onsite or offsite disposal of trash, scrap metal and wood, buildings, extraneous debris, and other materials incident to mining

1.13. The plugging of drill, core, or other exploratory holes, if any, as set forth in Rule R647-4-108

1.14. The posting of appropriate warning signs in locations where public access to operations is directed or readily available

1.15. The construction of berms, fences and/or barriers above high-walls or other excavations when required by the Division and determined to be consistent with MSHA

2. Drainages – The applicant commits that natural channels will have erosion control and reclamation performed and will be left in a stable condition with respect to actual and reasonably expected water flow so as to avoid or minimize future damage to the hydrologic system.

3. Erosion Control – The applicant commits to the performance of reclamation such that sediment from disturbed areas is adequately controlled during the post-closure phase and that the degree of erosion control is appropriate for the site and regional conditions of post mining land-use, topography, soil, drainage, water quality or other characteristics.

4. Deleterious Materials – The applicant commits, in the unlikely event deleterious materials are present, to the safe offsite removal or onsite management of deleterious or potentially deleterious material to the extent that adverse environmental effects are eliminated or controlled.

5. Land Use – The applicant commits to leave the on-site area suitable of the designated wildlife habitat post-mining land use.

6. Slopes – The applicant commits to leave overburden disposal, mine pit backfill, process plant benches, access and haulage road cuts and fills, or other cuts or fills in a stable configuration, minimizing safety hazards and erosion while providing for successful re-vegetation.

7. Highwalls – The applicant commits to reclaim and stabilize pit walls and cuts for pads or roadways by backfilling against them and/or by cutting these features back to achieve a slope angle of 3h:1v or less.

8. Roads and Pads – The applicant commits to reclaim on-site roads and pads when they are no longer needed for operations or for future exploration activity (contiguous to the mining operations). The applicant commits to ensure the property will have adequate surface drainage structures and in be in a condition suitable for the designated post-mining land use of wildlife habitat.

9. Dams and Impoundments – The applicant commits that the process water pond will be backfilled and shaped to prevent impounding of water. Surface drainage controls (*see **Drawing 12***) remaining at the conclusion of the mining operation and into the closure and post-closure phases will be reclaimed so as to be:

- self-draining
- mechanically stable
- of sound hydrologic design
- beneficial to the post-mining land use

10. Trenches and Pits – The applicant commits to backfilling and reclamation of any remaining trenches and/or small pits.

11. Structures and Equipment – The applicant commits to completely remove all structures, rail lines, utility connections, equipment, and debris and dispose of or salvage said materials.

12. Topsoil Redistribution – After final grading, the applicant commits that soil materials will be re-distributed on a stable surface is such a manner as to minimize erosion, prevent undue compaction and promote re-vegetation.

13. Re-vegetation – The applicant commits to utilize Division-approved species for re-vegetation seeding and will include adaptable perennial species that will grow on the site, provide basic soil and watershed protection, and support the post-mining land use. The applicant agrees that re-vegetation will be considered accomplished when:

13.11. Re-vegetation has:

- achieved 70 percent of the pre-mining vegetative ground cover, estimated at 19 percent for the proposed mining operation
- survived three growing seasons following the last seeding of a defined area

13.12. The Division determines that the re-vegetation work has been satisfactorily completed within practical limits.

R647-4-112. Variance

R647-4-113. Surety

A reclamation plan and cost estimate based upon RS MEANS or third-party costs has been developed and approved several times. Surety is posted per Phase 1 below.
Phase 1 will include the existing demonstration plant demolition, site surface disturbance area including the pit, and , access roads, the 2.5 year mining plan with overburden pile and the two permanent drainage diversions. The surety will be modified, if required, to incorporate additional phases, 5 and 10 year mining plan and plant or process units prior to their construction. The areas to be phased bonded are depicted on ***Drawings 9-11**.* The following reclamation components will be included in the surety estimate:

- Clean-up and removal of structures
- Backfilling, grading and contouring
- Soil material redistribution and stabilization
- Re-vegetation (preparation, seeding, mulching)
- Safety gates, berms, barriers, signs, etc.
- Demolition, removal or burial of facilities/structures, re-grading / ripping of facilities areas
- Re-grading, ripping of waste dump tops and slopes
- Re-grading / ripping stockpiles, pads and other compacted areas
- Ripping access roads
- Drainage reconstruction
- General site clean up and removal of trash and debris
- Removal / disposal of hazardous materials
- Mobilization/de-mobilization
- Supervision during reclamation
- Profit/overhead
- Escalation factor/contingency
- Post mine monitoring for surety bond release

The areas and treatments included in the reclamation treatments map (***Drawing 9***) correspond with items included in the reclamation cost estimate. Surety calculations can be found in ***Appendix 5***. The calculations are set up in an excel format with tabs for each key element to be reclaimed. Each tab details the elements to be reclaimed with assumptions and reference for costing from a base cost table.

References

Blackett, Robert E. 1996. Tar-Sand Resources of the Uinta Basin, Utah, A Catalog of Deposits. Open-File Report 335, Utah Geological Survey. May 1996.

Bowders, John., et al., 2000. Asphalt Barriers for Waste Isolation. GeoEng2000, Melbourne Australia, 19-24, November, 2000.

Clark, Donald, 2015. Temple Mountain Mine, Asphalt Ridge, Uintah County, Utah – Seep and Spring Survey.

Cornell University, 2015 – http://nrcca.cals.cornell.edu/soil/CA2/CA0212.1-3.php

Fifield, J.S.,2001. Designing for Effective Sediment and Erosion Control on Construction Sites.

Fifield, J.S.,2002. Field Manual on Sediment and Erosion Control Best Management Practices for Contractors and Inspectors.

Geosphere, Inc., 2006. Hydrocarbon Characterization for Use in the Hydrocarbon Risk Calculator and Example Characterizations of Selected Alaskan Fuels Technical Background Document and Recommendations. Prepared for Alaska Statement of Cooperation Working Group

Guidelines for Utah's Corrective Action Process for Leaking Underground Storage Tank Sites – http://www.dequtah.gov/ProgramsServices/programs/tanks/ust/releases/docs/2012/11Nov/correctiveActionProcessGuide.pdf

Hyatt and Budd, 2003, Extreme paleoceanographic conditions in a Paleozoic oceanic upwelling system: Orangic productivity and widespread phosphogenesis in the Permian Phosphoria Sea. Geological Society of America Special Paper 370.

JT Boyd Company, 2015. Report for MCW oil sand mine plan, Uintah County, Utah.

Kohler, James,2011. Draft technical report on North West Asphalt Ridge tar sand deposit, Uintah County, Utah prepared for MCW by James Kohler, Utah Geosystems.

Oblad, et al., 1975. Recovery of Bitumen from Oil-impregnated Sandstone Deposits of Utah. 68th Annual Meeting of AIChE, Los Angeles, California, November 16-20,1975

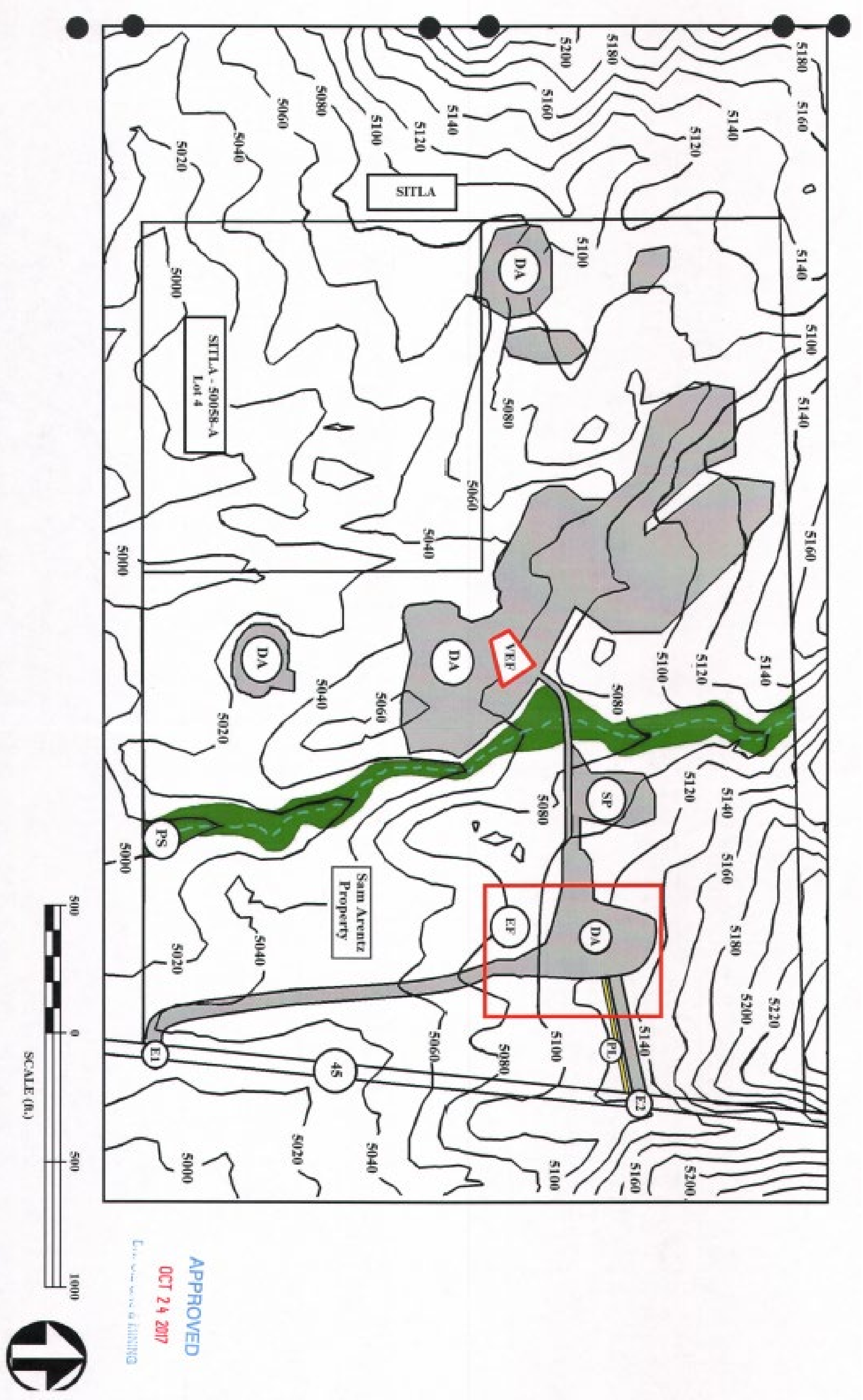
Sprinkel, Douglas A. 2006. Interim Geologic Map of the Vernal 30' x 60' Quadgrangle, Uintah and Duchesne Counties, Utah, and Moffat and Rio Blanco Counties, Colorado. Utah Geological Survey Open-File Report 470.

RSMeans: https://www.rsmeansonline.com/References/CREW/2-Year%202013%20Crews/Crew%20Standard%20Union.PDF

Figures

Figure 1: The location of the lease (M0470089) on, or about Section 31, Township 5S Range 22E, Uintah County, Utah, disturbed area/permit boundary, current conditions, land ownership, and adjacent land ownership information.

Key:
DA = Current Disturbed Areas/Permit Area (shaded areas).
EF = The location of the oil sands extraction facility.
VEF = The original location of Viva's mobile oil sands extraction facility. This facility has been removed and the area is currently being used for post processed sand storage
PS = The location of the perennial stream that flows through the property.
E1 = Current location of the entrance to the lease.
E2 = The location of the proposed second entrance to the lease.
PL = The proposed location where a power line will come into the property.
45 = Route 45.
SP = Existing oil sands ore stock pile.



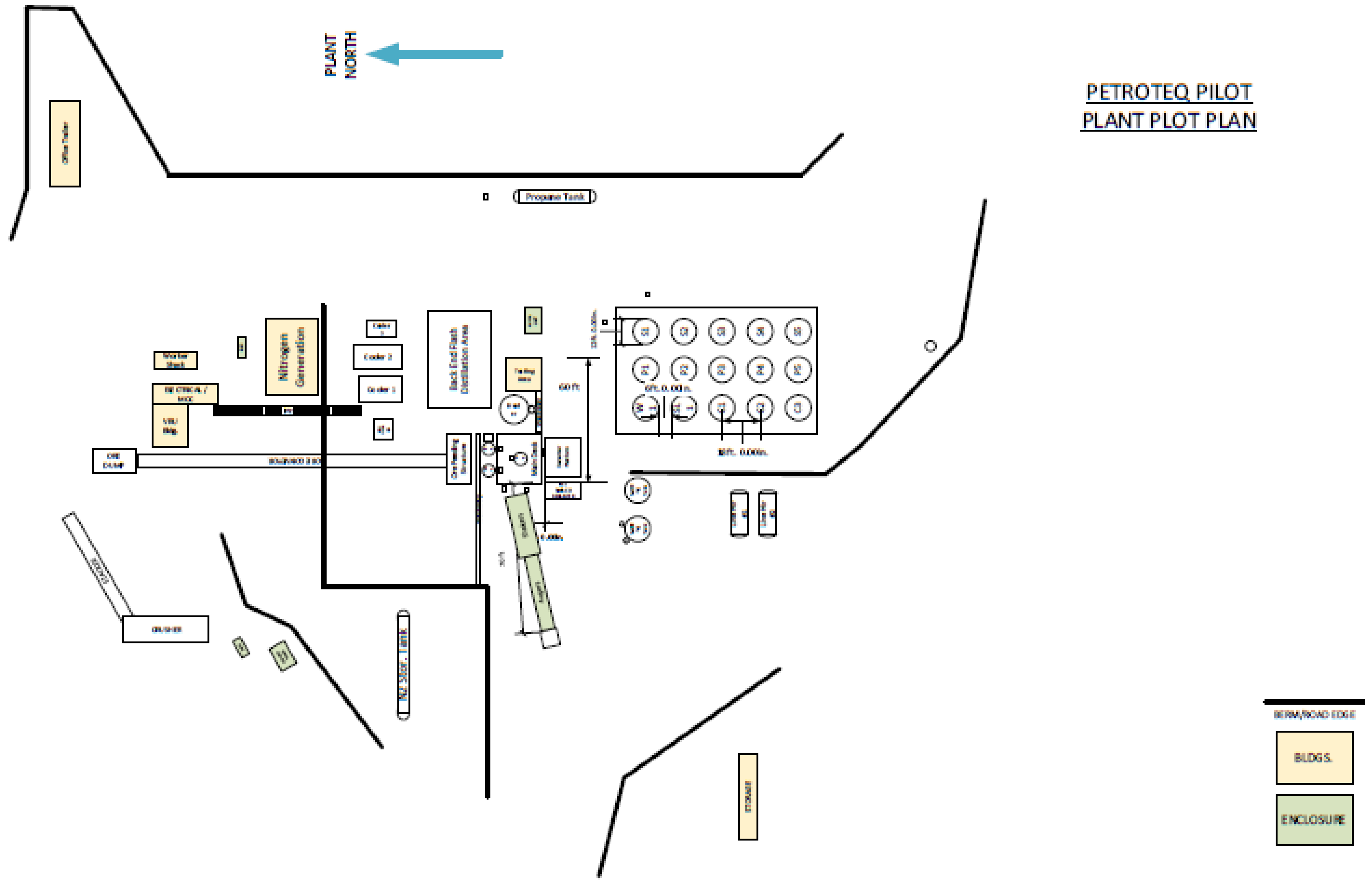
APPROVED
OCT 24 2017
[illegible] MINING

Approved 10/2017

Figure 1a: Site map for Petroteq's 4-500 barrel per day oil sands extraction facility identified on Figure 1 as EF.

Revised 8/2021

PETROTEQ PILOT PLANT PLOT PLAN



NOTES:

REFERENCE DRAWINGS	
DWG #	DESCRIPTION

REVISIONS					
REV.	DESCRIPTION	DRWN	CHK'D	APPD.	DATE
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NOTICE: THIS DOCUMENT IS THE PROPERTY OF CROSSTRAILS AND MAY NOT BE DISCLOSED, COPIED OR DUPLICATED WHOLLY OR PARTLY WITHOUT PRIOR WRITTEN CONSENT OF THE OWNER.

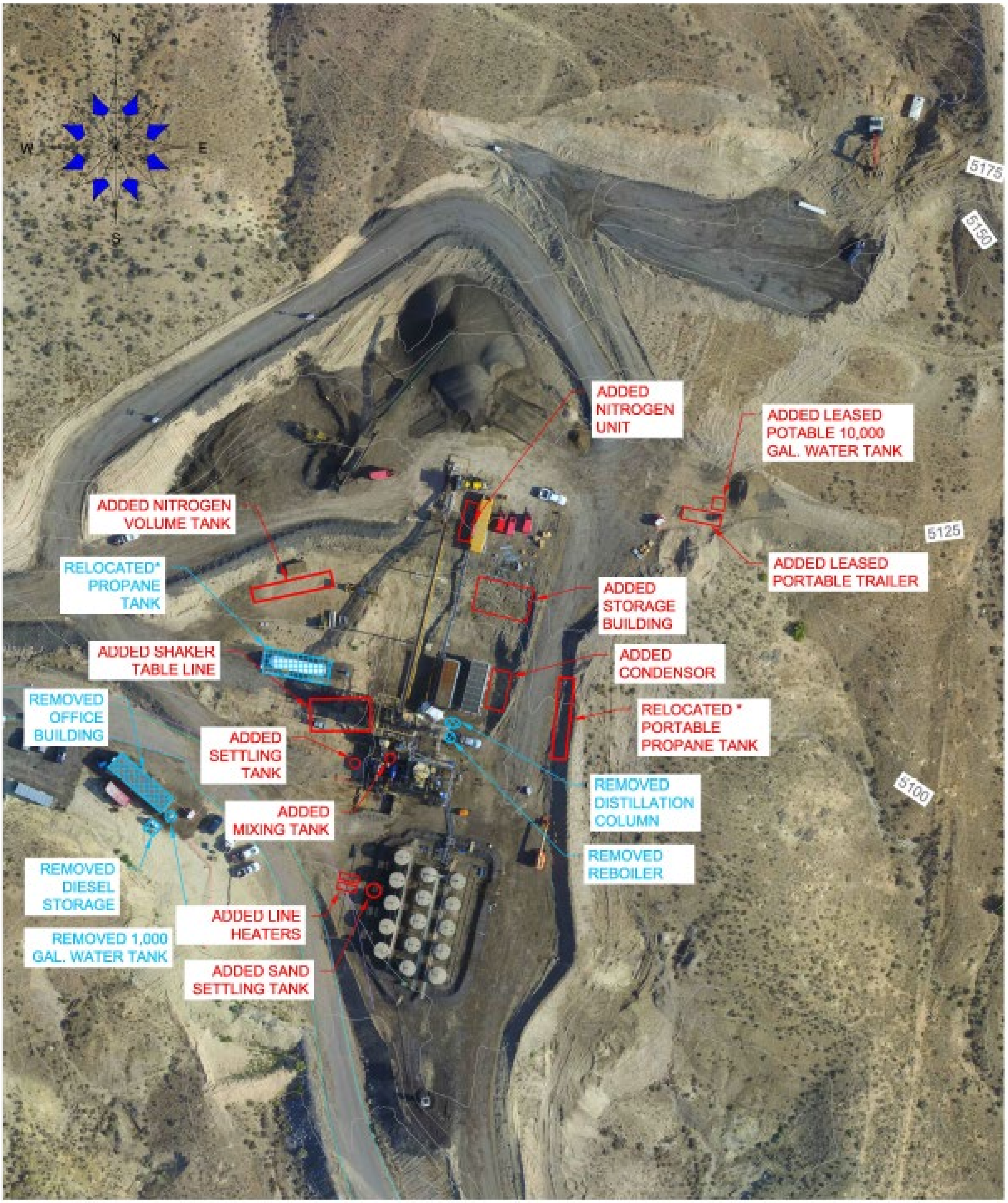
DRAWN BY:	DATE:	Petroteq Energy Oil Sands Facility
[illegible] P.O. NO.		
CT. PROJECT NO.	[illegible]	
CLIENT FILE NO.		
SCALE	1" = 40'	SHEET NO. OF
		[illegible]
REV.		

Revised 8/2021

Figure 1b: Site map/plan (2018 Aerial Photo) of Petroteq's oil sands extraction facility. The east-west and north-south cross sections of the stormwater basin are found in Figures 1e and 1f, respectively. Compare to aerial photograph, Figure 1d (2021 Aerial Photos).
New Aerial Orthophotographs and topography will be incorporated into the July 21, 2021 revision for all figures.

Facilities in blue depict removed/reclaimed.
Facilities in red depict facilities added or relocated since 2017.

Inserted 8/2021



BARR

Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
170 S MAIN ST SUITE 500
SALT LAKE CITY, UT 84101
Ph: 801-333-8400
Fax: 801-333-8401
www.barr.com

Scale	NTS
Date	3/30/21
Drawn	KLK2
Checked	JAG2
Designed	.
Approved	.

TEMPLE MOUNTAIN MINE
SITE MAP/PLAN (2018)

TMC Capitol LLC
15315 W Magnolia Blvd, Ste, 120
Sherman Oaks, CA 91403

BARR PROJECT No.
45241004

CLIENT PROJECT No.

SHEET No.
FIGURE 1b

REV. No.
0

Inserted 8/2021

Figure 1c: March 30, 2021 Aerial photo support of Petroteq's oil sands extraction facility modifications completed in 2019-current.

New Aerial Orthophotographs and topography will be incorporated into the July 21, 2021 revision for all figures.

Facilities in red depict facilities added or relocated since 2017.

Inserted 8/2021

BARR

Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
170 S MAIN ST SUITE 500
SALT LAKE CITY, UT 84101
Ph: 801-333-8400
Fax: 801-333-8401
www.barr.com

Scale	NTS
Date	3/30/21
Drawn	KLK2
Checked	JAG2
Designed	.
Approved	.

TEMPLE MOUNTAIN MINE AERIAL PHOTOS (2021)

TMC Capitol LLC
15315 W Magnolia Blvd, Ste, 120
Sherman Oaks, CA 91403

BARR PROJECT No.
45241004

CLIENT PROJECT No.

SHEET No.	REV. No.
FIGURE 1c	0

Inserted 8/2021

Appendix 1

Petroteq Energy Clean Oil Recovery Technology (“CORT”)

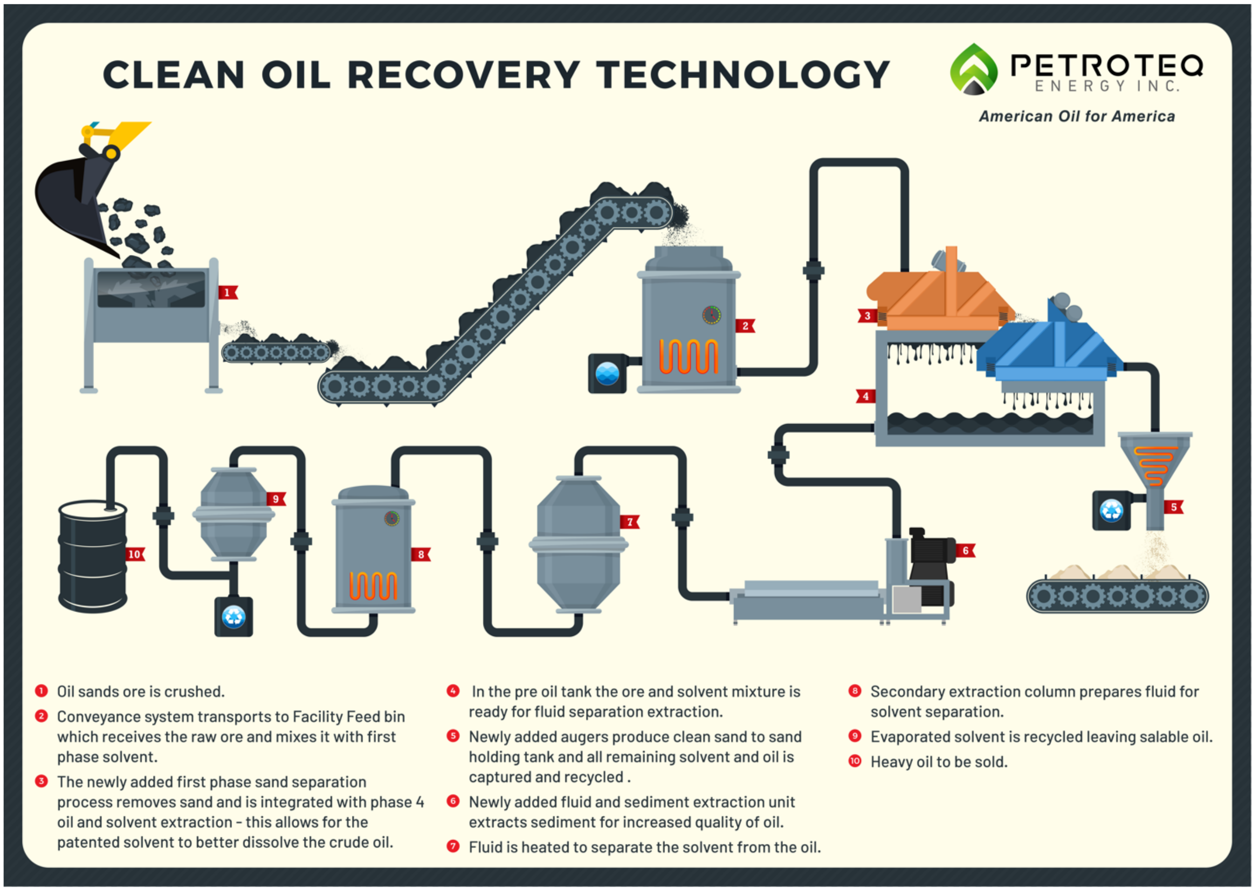
Revised 8/2021

Introduction: As a non-conventional hydrocarbon resource, oil sands hold billions of barrels of oil all over the world. The world's largest oil sands deposits are found in western Canada, where over 170 billion barrels are found close to the surface. The oil sands of western Canada are being developed using hot water for mined ore (Clark hot water extraction process) and steam for reservoirs too deep to mine (Steam Assisted Gravity Drainage – SAGD). Both of these processes consume tremendous amounts of water and energy (natural gas for heating water and producing steam), emit excessive amounts of greenhouse gases, and, in the case of hot water extraction, produce huge tailings ponds that are polluted with the oil that is not fully extracted from the sands. In addition to various environmental issues, the shortcomings and inefficiencies of these two processes result in high capital expenditures and poor economics on a per barrel production basis.

Petroteq recognized the inherent shortcomings of the hot water based oil extraction process and developed a different extraction process to overcome these shortcomings that uses solvents within a closed loop system, instead of water, to recover the oil from mined oil sands.

1.1 Clean Oil Recovery Technology (CORT) Overview: Petroteq's proprietary CORT process uses a chemical solvent, instead of water, to extract the oil from oil sands. CORT's solvent is composed of multiple individual components (multiple light hydrocarbons sourced from naturally occurring natural gas condensates) which, when combined in proper proportions, are capable of dissolving and recovering up to 99% of the bitumen, heavy oil and other lighter hydrocarbons that are found in oil sands. This solvent contains no chlorinated compounds, or dense non-aqueous phase liquids (DNAPL). The CORT process is able to extract the oil from oil sands at much lower operating temperatures (120° - 140°F) than the Clark hot water extraction method without the use of caustic chemicals. The components of CORT's unique solvent form an azeotropic mixture that boils at a relatively low temperature (155° - 165° F). This provides for a high level of energy efficiency during the oil extraction process. This energy efficiency makes the CORT process very economical to operate.

The CORT process takes place in a completely closed loop system that continuously recirculates the solvent after it has separated the bitumen and heavy oils from the oil sands. As mentioned previously, the closed loop system is capable of recovering up to 99% of the bitumen and oil from the oil sands, in effect, remediating the oil sands. Unlike the tailings pond sands and produced water from the Clark hot water extraction process, the processed sands from the CORT process are virtually solvent and hydrocarbon free, which allows for the sands to be used for mine reclamation or sold for use as a frac sand or as a construction aggregate.



CLEAN OIL RECOVERY TECHNOLOGY

PETROTEQ ENERGY INC.

American Oil for America

① Oil sands ore is crushed.
② Conveyance system transports to Facility Feed bin which receives the raw ore and mixes it with first phase solvent.
③ The newly added first phase sand separation process removes sand and is integrated with phase 4 oil and solvent extraction - this allows for the patented solvent to better dissolve the crude oil.
④ In the pre oil tank the ore and solvent mixture is ready for fluid separation extraction.
⑤ Newly added augers produce clean sand to sand holding tank and all remaining solvent and oil is captured and recycled .
⑥ Newly added fluid and sediment extraction unit extracts sediment for increased quality of oil.
⑦ Fluid is heated to separate the solvent from the oil.
⑧ Secondary extraction column prepares fluid for solvent separation.
⑨ Evaporated solvent is recycled leaving salable oil.
⑩ Heavy oil to be sold.

1.2 How the CORT Process Works. During the first stage of the CORT process mined oil sands are crushed to no larger than ¼" size and then delivered to mixing tanks where the ore is mixed with solvent. The resulting solvent/bitumen/sand slurry is then run across a series of shaker tables where the sand is carried onwards and the solvent/bitumen slurry passes through the shaker screens. From the shakers the sand is carried through a series of heated augers where any solvent remaining on the sand is flashed off and recovered for reuse. Up to 95% of the solvent is recovered and recycled from the processed sand. The resulting clean, dry sand can then be used for mine reclamation or sold as a frac sand or as a construction aggregate.

The solvent/bitumen slurry is pumped to a large volume settling tank. After settling, the slurry is run through a solids control system to strip any remaining sand and clay fines from the solvent/bitumen mixture. This mixture is then pumped to "pre-oil" storage tanks. The pre-oil mixture is pumped to the distillation column where the solvent/oil mixture is heated under relatively low heat conditions and the light hydrocarbon solvent is recovered from the pre-oil by distillation. By varying the distillation temperature, all the solvent can be recovered for recycling, or some solvent can be left in the solvent/oil mixture to provide the end customer an oil with the specific API gravity to meet their requirements. After separating the solvent from the pre-oil, the oil is pumped to onsite storage tanks for subsequent shipment to the customer. All the solvent vapors produced by the distillation process are collected and retained within the closed loop system. The solvent vapors are condensed in a chiller and then reused to extract more oil and bitumen from incoming oil sands ore.

Inserted 8/2021

It is important to note that Petroteq has tested the CORT process on oil sands from different locations around the world that have very different hydrocarbon chemical compositions. The efficiency and consistency of the CORT process is not impacted by differences in the chemical composition of the oil/bitumen in the oil sands. Despite dramatic differences in oil/bitumen chemistry, results of extensive testing on oil sands samples sourced from both Utah and China (Table 1) demonstrate the efficiency and consistency of the CORT process. In both cases recovery efficiency of the CORT process exceeded 99%.

Table 1. Chemical comparison between Oil sands samples sourced from Utah and China

Location	**Saturated Hydrocarbons**	**Aromatic Hydrocarbons**
Utah (Asphalt Ridge)[1]	29.3%	28.4%
China[2]	61.06%	5.34%
China[3]	78.87%	4.43%

1 – Oblad, et al (1975)
2 – Zhi-Nong Gao, Li-Bo Zeng and Fei Niu (2005) – 5 sample average
3 – Petroteq testing – 3 sample average

2.0 CORT Extraction Costs: Recent FEED studies indicate that a 5,000 BPD plant employing Petroteq's CORT process can be constructed for $19,000. - $22,000 per daily barrel of capacity. Production costs, including subcontract mining, are estimated to average $22-$25 per barrel delivering netback margins on the order of $26 - $29 per barrel (net of transport and 8% royalty) at $70.00/barrel WTI. Capital expenditures and operating costs compare very favorably to oil sands projects in northern Alberta, Canada.

3.0 Summary and Conclusion. By developing CORT, a new, proprietary solvent based technology for oil sands extraction, Petroteq has addressed the environmental problems (excessive water use, water pollution from tailings ponds, high energy consumption and excessive greenhouse gas emissions) and poor economics associated with the Clark hot water extraction process currently in use in the Canadian oil sands. CORT may be the key needed to unlock the immense value contained within Utah's shallow, mineable oil sands.

Appendix 2

Viva’s Oil Sands Extraction Technology

Removed due to Viva removing their equipment in 2019

Appendix 3

Surety Calculations
Inserted in pdf

Bond Amount

The Total Cost of the following bond calculations are to be added to the $275,000 bond that is currently in place for the reclamation of the mine site. The above-mentioned bond SUR60000383/NAIC 23647 was approved by DOGM in July 2015 and including the reclamation plan for the 22 acres including the reclamation of the current process area as well as demolition of the Vivakor plant and storage tanks. The additional bond 2159828/NAIC 16691 of $110,672 was approved by DOGM in December 2017 and includes reclamation in addition to demolition that was accounted for in bond SUR60000383. The revised table below only addresses demolition of the demonstration plant currently on site. The Vivakor process plant has been demolished and removed from the site.

Cost Estimates for demolition and removal of extraction facility components from mine site

Unit Weight (1)	**Total Wt.**	**Item to be removed**			**Details**
517,500	**517,500**	**MCW oil sands extraction facility**			**Iron structure, tanks, all equipment**
		Extraction Facility Demolition costs		**$60,000**	
			Subtotal	**$60,000**	**Montgomery Recycling Inc. (1)**
Total	**517,500**	**lbs**			
	260	**tons**			
Transportation to Montgomery Recycling			**Subtotal**	**$40,000**	**Montgomery Recycling Inc. (1)**
			Subtotal	**$100,000**	
Direct Costs			**Tota;l**	**$100,000**	
Indirect Costs					
Mob/demob	**0.1**		**Subtotal**	**$10,000**	
Contingency	**0.08**		**Subtotal**	**$8,000**	
Engineering	**0.025**		**Subtotal**	**$2,500**	
Main Office	**0.068**		**Subtotal**	**$6,800**	
Proj. Mgmt.	**0.025**		**Subtotal**	**$2,500**	
Total	**0.298**		**Total**	**$29,800**	
Total Direct and Indirect Costs				**$129,800**	
Escalation Costs		1	2018	$129,800	
0% annually			2019	$129,800	
			2020	$129,800	
			2021	$129,800	
			2022	$129,800	

Notes:

(1) Montgomery Recycling bid attached and includes demolition and resale of above structures and below grade foundations.

Revised 8/2021

MONTGOMERY RECYCLING, INC.
Scrap Metals ▪ Pipe & Steel ▪ Container Service
Industrial Demolition ▪ Industrial Salvage ▪ Tank Decommission

1120 South 1500 East ▪ Vernal, Utah 84078

George,

Montgomery Recycling, Inc. proposes to conduct plant demolition from Temple Mountain site to include all metal/equipment including tanks, vessels, conveyors, piping, structures, etc. The estimated cost of removal would be $100,000 or less. Remember, this is only an estimate due to many unknowns.

Thank you,

TWade Montgomery
Montgomery Recycling, Inc.