



Great Western
c/o Mr. James Bernal
Integrity Trucking
414 1st Street
Kersey, Co.

July 10, 2013

Facility ID: 444442

RE: Airport - Drilling Mud Beneficial Re-Use Application Site, Sampling, June 2013,
MEC # 2013.INT/Bays2

Attached please find the results of the June 2013 sampling at the Great Western, Drilling Mud Beneficial Re-Use Airport site, Weld County, Co. The sampling was performed on June 16, 2013.

For the purpose of the site sampling, MEC Inc. divided the site into PODs based on application history. Based on site observations, the status of the delineated PODs appear to be at various stages of use: no mud application at this time, mud placement in progress, and mud application completed (such areas may be at various stages of ripping/tilling).

The June 2013 sampling included the collection five (composite) soil samples from areas designated POD-C north & south, POD-D north & south, and a perimeter background sample.

Composite samples were collected from each designated POD and were analyzed for BTEX, TPH-GRO; TPH-DRO, pH, EC, Calcium, Magnesium, Sodium, and SAR.

POD Description, Status, and Sampling Results

PODs C / D / E: Located in NE corner of site. Application of drilling muds has been completed and tilled in, additional tilling and ripping may be necessary. Background sample for this area was collected in June 2013, sample # POD-C/D Bkg.

Lab Sampling Results summary:

No BTEX or TPH compounds were detected in the laboratory analysis. pH results within acceptable range. The EC soil sample results were slightly above the respective COGCC guideline limits EC: 3.08 (2x bkg). POD-C: EC 4.0; POB-D: EC 4.67. The SAR results for PODs C (10.6) ; POD D (10.3) were slightly above the recommended COGCC <12 guideline. However, the measured SAR levels are above the 1.62 level measured in the POD C & D background sample.

The EC and SAR results indicate a slight increase in values as compared to background levels. This is likely associated with residues from drilling mud.

FINDINGS & RECOMMENDATIONS

The EC and SAR results for the soil samples indicate a slight impact from salt residues from the brine water present in the drilling muds. The levels measured are not likely to cause an adverse environmental impact. Common methods of addressing such impacts include adjusting the concentration of the salt compounds residues. These methods include the introduction of amendments such as calcium or magnesium to counterbalance the concentration of sodium from the salt residue. Also, the exposure or addition of water to the site over time will assist in adjusting the EC and SAR measurement levels.

The SAR readings are slightly above the regulatory guidelines.
The pH measurements were within the acceptable state guideline parameters.

The EC measurements were slightly above the respective regulatory background limits.

Based on the results, it is recommended that manure be placed and mixed into the PODs in which drilling muds have been applied. The manure will improve the organic material content of the soil, improve moisture retention, and improve the physical breakdown of the clay content.

Metal or PAH analysis were not included in this sampling suite. The current lab results with no TPH detections suggest that PAH may not be necessary. Metal analysis may be included upon further review if deemed necessary.

Following the application of manure and mixing in the pods the pods should be re-sampled. MEC Inc. appreciates the opportunity to provide you with these environmental consulting services. Such sampling will be limited to the laboratory analysis to be determined. If you have any further questions, please contact me, 970-381-5951.

Thank you

John Mahoney

John Mahoney

Professional Geologist

Site Great Western - Airport Site
Mud RE-USE site,

,TABLE 1 - SUMMARY LABORATORY ANALYTICAL RESULTS
GreatWestern, Drilling Mud Beneficial Re-Use Site, Airport Location, JUNE 2013

Sample Location I.D.	Date	Sample Depth (feet BGL)	PID Reading	BTEX Ug/L	TVPH (GRO)	TEPH (DRO)	SAR	EC	pH	Location rationale
POD-C north	6/19/2013	0-12 inch	ND	ND	ND	ND	10.6	4.0	7.59	Northern Portion of Pod C, includes 4 randomly selected aliquot samples to compile composite sample. No odor/ stain observed.
POD-C South	6/19/2013	0-12 inch	ND	ND	ND	ND	10.3	4.67	7.48	Southern Portion of Pod C, includes 4 randomly selected aliquot samples to compile composite sample. No odor/ stain observed.
POD-D north	6/19/2013	0-12 inch	ND	ND	ND	ND	29.8	6.49	7.41	Northern Portion of Pod D, includes 4 randomly selected aliquot samples to compile composite sample. No odor/ stain observed.
POD-D South	6/19/2013	0-12 inch	ND	ND	ND	ND	10.6	4.54	7.36	Southern Portion of Pod D, includes 4 randomly selected aliquot samples to compile composite sample. No odor/ stain observed.
POD-C/D Bkg	6/19/2013	0-12 inch	ND	ND	ND	ND	1.62	1.54	7.06	Background samples includes 6 randomly selected aliquot samples from the perimeter of areas C & D. No odor/ stain observed.
				B:0.17 T:85.0 E:100.0 X: 175.0	500	500	<12	<4 mmhos/sqcm Or 2x BKG (3.08)	6-9	REGULATORY GUIDELINE S



See figure 2 for the approximate location of the 4 aliquot sample locations for each pod that were mixed to form the composite sample from each pod.

DELINEATION OF POD SAMPLE AREAS - JUNE 2013

GREAT WESTERN - AIRPORT AREA
DRILLING MUD BENEFICIAL RE-USE SITE
WELD, CO.

From Aerial Photograph
Mapcard Internet Website

MAHONEY ENVIRONMENTAL CONSULTING, INC.
1601 10th AVENUE, GREELEY, CO 80631
(970) 352-2644 (TEL) (888)-219-5357 (FAX)

Project No: 2013.INT-GW1

Boundaries are approximate,
Scale 1:12,500



Note lab samples consisted of upto 4 composite aliquot samples. The approximate location of the respective aliquot samples are illustrated for each POD.

Composite Sample #,	Aliquots ID for each POD	Composite Sample #,	Aliquots ID for each POD
POD -D north	D: -1N, 2N, 3N, 4N	POD-D South	D: 1S, 2S, 3S, 4S
POD-C/D BKG	BKG: 1, 2, 3, 4		

COMPOSITE SURFACE SOIL SAMPLE LOCATIONS - JUNE 2013

GREAT WESTERN - AIRPORT AREA
DRILLING MUD BENEFICIAL RE-USE SITE
WELD, CO.

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www.weldlabs.com

July 1, 2013

Mahoney Environmental Consulting, Inc.

1601 10th Ave.

Greeley, CO 80631

Laboratory No. E13171-2(page 1 of 4)

Sample ID	pH (SI)	EC (mmhos/cm)	Calcium (ppm)	Magnesium (ppm)	Sodium (ppm)	SAR
POD-C North	7.59	4	223	84.5	735	10.6
POD-C South	7.48	4.67	260	120	798	10.3
POD-D North	7.41	6.49	396	127	2665	29.8
POD-D South	7.36	4.54	258	108	803	10.6
POD-C/D Bkg	7.06	1.54	110	69.5	88.1	1.62



Project Manager

7/1/13
Date

Sampling procedures can affect the value of analytical results – customers are advised to use appropriate sampling protocol to insure samples are truly representative of the bulk sample.

July 1, 2013

Mahoney Environmental
1601 10th Ave.
Greeley, CO 80631

Project: Airport

Laboratory No.: E13171-2

(page 2 of 4)

Method EPA 602/SW8020 A, EPA 624/SW8015 and SW8260

Sample ID	Date Sampled	Date Analyzed	Benzene	Toluene	Ethyl-benzene	o,p-Xylene	m-Xylene	TVPH	Surrogate Recovery
			ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	%
POD-C North	06/19/13	06/24/13	U	U	U	U	U	U	72.5
POD-C South	06/19/13	06/25/13	U	U	U	U	U	U	104
POD-D North	06/19/13	06/25/13	U	U	U	U	U	U	100
POD-D South	06/19/13	06/25/13	U	U	U	U	U	U	90.6
POD-C/D Bkg	06/19/13	06/27/13	U	U	U	U	U	U	102

Reporting Limit:

50

50

50

50

50

1

QC Limits: 41-160

U=Compound analyzed for but not detected

J=Compound detected at a level below reporting limit.

Project Manager

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July 1, 2013

Diesel Fuel (No. 2)
Total Extractable Hydrocarbons (Diesel C:11-C28)

Method No. SW8015M

Laboratory No. E13171-2

(page 3 of 4)

Date Sampled: 6/19/2013

Date Received: 6/20/2013

Date Prepared: 6/24/2013

Sample ID	Analysis Date	Moisture (%)	Dilution Factor	Surr. % Recov.	Sample Result	RL	Units
POD-C North	6/26/2013	3.4	1.03	118	U	20.7	mg/kg
POD-C South	6/27/2013	3.3	1.03	114	U	20.7	mg/kg
POD-D North	6/27/2013	5.7	1.06	101	U	21.2	mg/kg
POD-D South	6/27/2013	4.5	1.05	90.3	U	20.9	ma/ka
POD-C/D Bkg	6/28/2013	2.1	1.02	105	U	20.4	mg/kg

Surrogate QC Limits: 46-141 (1,2,4-Trichlorobenzene Surrogate)

Qualifiers:

U=Compound analyzed for but not detected

S=Spike Recovery outside accepted recovery limits

J=Indicates an estimated value when compound is detected

Definitions:

RL=Reporting Limit

TVH=Total Volatile Hydrocarbons

TEH=Total Extractable Hydrocarbons

Project Manager

Date

7/1/13

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July 1, 2013

Total Oil Range Hydrocarbons (C29-C40)

Method No. SW8015M

Laboratory No. E13171-2

Date Sampled: 6/19/2013

Date Received: 6/20/2013

Date Prepared: 6/24/2013

(page 4 of 4)

Sample ID	Analysis Date	Moisture (%)	Dilution Factor	Surr. % Recov.	Sample Result	RL	Units
POD-C North	6/26/2013	3.4	1.03	118	U	20.7	mg/kg
POD-C South	6/27/2013	3.3	1.03	114	U	20.7	mg/kg
POD-D North	6/27/2013	5.7	1.06	101	U	21.2	mg/kg
POD-D South	6/27/2013	4.5	1.05	90.3	U	20.9	mg/kg
POD-C/D Bkg	6/28/2013	2.1	1.02	105	U	20.4	mg/kg

Surrogate QC Limits: 46-141 (1,2,4-Trichlorobenzene Surrogate)

Qualifiers:

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