



Department of Environmental Quality



To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Matthew H. Mead, Governor

John Corra, Director

September 16, 2011

Mr. William Kearney
Uranium One USA, Inc.
907 N. Poplar Street, Suite 260
Casper, WY 82601

RE: Willow Creek ISL Operations Spill Investigation Inspection Report, Permit No. 478

Dear Mr. Kearney:

Enclosed is a copy of the report on the August 24, 2011, Spill Investigation Inspection of the Irigaray-Christensen ISL Operations. This inspection was conducted in your presence and that of Tim McCullough and Larry Arbogast, all of Uranium One

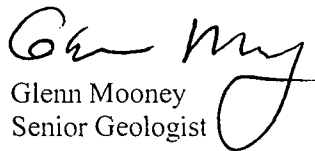
A copy of this report will be placed in the permanent inspection file for the Irigaray-Christensen ISL Operations, as will any written comments you may have.

As noted in the report, no cleanup work is recommended; natural attenuation of the spilled sodium chloride should be adequate. However, since topsoil was damaged by the spill, and because of the delay in reporting the spill, a Notice of Violation will be issued.

Your cooperation and assistance, as well of that of Messrs. McCullough and Arbogast are greatly appreciated

Please feel free to call if you have any questions.

Sincerely,


Glenn Mooney
Senior Geologist

\gm

Attachment

cc: Cheyenne file w/attach.
✓ Mr. Keith McConnell, US Nuclear Regulatory Commission, Mail Stop T-7J8,
Washington, DC 20555-0001 w/attach.

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MTK
9/16/11

SPILL INSPECTION REPORT

SUBJECT: Uranium One's Willow Creek In Situ Uranium Mine

PERMIT NO.: 478

INSPECTOR: Glenn Mooney *GM*

PERSONS CONTACTED: Bill Kearney, Tim McCullough, Larry Arbogast, Uranium One

DATE of INSPECTION: August 24, 2011

Introduction

On Friday, August 19, 2011, Bill Kearney of Uranium One sent an email to Joe Hunter and me reporting a spill at the Irigaray Plant. An estimated 7000 to 10,000 gallons of sodium chloride brine had overflowed a tank and flowed down an adjacent drainage. No water was affected. It was thought the spill occurred around August 4 or 5, 2011.

A written report on the spill was received by the District III Office on September 7, 2011, in a letter from Mr. Tim McCullough of Uranium One dated August 31, 2011, notifying the Nuclear Regulatory Commission of the spill and the events surrounding the spill. Glenn Mooney and Joe Hunter of the Cheyenne DEQ Office were copied on this letter.

Inspection

I arrived at the Irigaray site about 9:30 AM, August 24, 2011. I was shown the tank inside the plant annex building which holds the brine that spilled. It had overflowed through a vent near the top which ran outside through the adjacent wall (Photo No. 1). On the ground below the vent was a culvert opening built to convey water from roof runoff away from the building (Photo No. 2). The culvert runs southwestward under a graveled pad to link up with another culvert running southeast that carries run-off to a drainage that runs northeastward along the south-eastern side of the plant building (Photo No. 3). The spilled brine went through these culverts and down the drainage for a distance of about 110 yards. The maximum width of the affected area was about five feet (Photos Nos. 4 and 5).

Larry Arbogast said the apparent cause of the spill was a valve that had been left partially open when the tank was filled. The tank is periodically filled with dry sodium chloride which is converted to brine by the addition of water to the tank. There are no figures available on the number of pounds of salt lost. Since the water is introduced to the salt tank at the bottom and the vent which overflowed is at the top of the tank, the fluid which overflowed could be expected to be the least dense and contained the least salt of the fluid in the tank.

A repeat of this problem will be prevented by rerouting the vent so any overflows will remain inside the building where they will flow to the building sumps. Any fluids in the building sumps are routed to an evaporation pond.

The visual effects of the spill are limited to the grass in the affected channel turning brown and presumably dead and a thin salt crust (Photos Nos. 5 and 6).

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Following the spill, the drainage culvert leading to the channel (Photo No. 3) was replaced, resulting in equipment track over and alongside the spill area (Photo No. 4). No cleanup work had been attempted by the day of the inspection.

Four samples of soil were collected, three from the affected channel bottom and one from away from the channel to serve as a control (Photos Nos. 7-10). The samples were taken as representative from 0 to 4 inches in depth. The samples were delivered to InterMountain Labs (IML) on August 25, 2011, with instructions to have them analyzed for the LQD Guideline 1 suite for topsoil. The results of the lab analyses were received on September 13, 2011 (Attachment No. 1).

At the time of the inspection, the topsoil appeared to be composed primarily of fine sand or silt, but the lab results identified the textures of all four samples as clay loam. As expected, the three samples from the channel bottom visibly affected by the spill tested high in sodium and sodium adsorption ratio with milliequivalent levels of 749, 1020 and 789 and SARs of 77.8, 141, and 139 respectively for Samples Nos. 1, 3 and 4. Sample No. 2, taken away from the affected channel had a sodium level of 0.75 milliequivalents and an SAR level of 0.63.

Jon Sweet, District III soil scientist, stated that based on the organic matter content of all four samples (1.1% to 1.3%), the material involved was topsoil.

As noted above, no surface water was affected by the spill. The area of the side channel in which the spill occurred is located roughly one-half mile of channel length from Willow Creek, an ephemeral stream. Approximately two straight-line miles from where the side channel enters Willow Creek, the Willow Creek channel joins the Powder River which is a perennial stream in this area.

Cleanup

The amount of affected topsoil is small. At an estimated length of 330 feet, a width of five feet and a depth of four inches, this would amount to less than 21 cubic yards of topsoil.

During the inspection, several options for cleanup of the affected soil were discussed. Several inches of the affected soil could be scraped up and either stockpiled in one of the pond enclosures or placed in the burn pit where pallets, paper drilling mud and cement bags are routinely burned.

Removal of the involved topsoil carries the risk of erosion of the cleaned channel. Unaffected and living grass would inevitably be removed during the cleanup process along with the contaminated topsoil and dead grass. This would expose the underlying topsoil in the channel bottom to erosion.

Another option would be to allow the area to heal through natural attenuation. The highly soluble salt would likely leach out the soil in just a few years. This is my recommended option.

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Conclusions

A spill of sodium chloride brine at the Irigaray plant was investigated. Soil samples were taken which, following laboratory analysis, showed that the material in the channel bottom was heavily contaminated with sodium chloride as expected and the soil material was in fact topsoil.

Contamination of topsoil is a violation of the Wyoming Environmental Quality Act, W.S. § 35-11-415(b)(iii) which required that the operator is required to protect topsoil from toxic materials and “preserve it a usable condition for sustaining vegetation.”

The failure to verbally notify the Land Quality Division of the spill within 24 hours is a violation of Land Quality Division Non-Coal Rules and Regulations Chapter 11, Sections 12(a)(i).

The failure to provide written notice of the spill within five days is a violation of Land Quality Division Non-Coal Rules and Regulations Chapter 11, Sections 12(a)(ii).

A Notice of Violation will be issued for these violations.

\gm

Attachments: Photo pages
Attachment No. 1 – IML analyses

cc: Cheyenne File



Photo No. 1
Looking northwest at southwest plant door with brine tank partially visible at center. The brine tank's outside vent is indicated by arrow.



Photo No. 2
Looking northwest at area outside southwest plant door with route of buried culvert shown approximately by line and arrow. The leaking brine flowed through this culvert.

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Photo No. 3

Looking northeast from top of slope above culvert (No. 1) which discharges runoff from southern plant area and plant roof to drainage east of plant area. Disturbance from work replacing the drainage culvert can be seen in the foreground.

The grass killed by the brine can be seen in the area indicated by Arrow No. 2



Photo No. 4

Close up view of area where sodium, chloride brine has killed the grass and impacted the soil.

The equipment tracks were caused by equipment replacing the drainage culvert seen in Photo No. 3 above.

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Photo No. 5

Looking northeast down drainage affected by brine spill. The brown grass has been killed by the salt. Some white salt crust is visible at center. The plant building is located at the top of the slope at left. This slope was heavily impacted by a yellowcake spill and cleanup in 1994.



Photo No. 6

Close-up of sodium chloride salt crust remaining in channel bottom.

Photos taken August 24, 2011, by Glenn Mooney



Photo No. 7
Sample No. 1 being taken
from location near lower
(northern) end of channel area
affected.



Photo No. 8
Location of Sample No. 2
taken in location away from
spill area as a control sample.



Photo No. 9

Location of Sample No. 3 which was taken in the bottom of the channel where the salt crust is present. Location is about midpart of affected channel.



Photo No. 10

Sample no. 4 being taken from near upper part of spill area in channel.



Soil Analysis Report
Wyoming DEQ Land Quality Division

2100 W 5th
Sheridan, WY 82801

Report ID: S1108519001

Project: Non-Coal
Date Received: 8/25/2011

Date Reported: 9/13/2011
Work Order: S1108519

Lab ID	Sample ID	Depths Inches	pH s.u.	Saturation %	Electrical	Organic	PE	PE	PE	SAR
					Conductivity dS/m	Matter %	Calcium meq/L	Magnesium meq/L	Sodium meq/L	
S1108519-001	IR#1	0-4	7.1	46.2	61.3	1.2	126	59.3	749	77.8
S1108519-002	IR#2	0-4	7.9	42.7	0.46	1.1	2.49	0.39	0.75	0.63
S1108519-003	IR#3	0-4	7.3	46.7	74.0	1.3	67.1	37.4	1020	141
S1108519-004	IR#4	0-4	7.4	45.3	62.0	1.2	47.4	16.9	789	139

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H2OSol= water soluble, AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor



Soil Analysis Report

Uranium One

907 N. Poplar St. Ste 260
Casper, WY 82601

Report ID: S1108517001

Project: Willow Creek IR

Date Reported: 9/13/2011

Date Received: 8/25/2011

Work Order: S1108517

Lab ID	Sample ID	Depths Inches	pH s.u.	Electrical	Sodium	Chloride	Sand %	Silt %	Clay %	Texture
				Conductivity dS/m	PE ppm	PE ppm				
S1108517-001	IR #1	0-4	7.3	75.7	21500	44800	38.0	34.0	28.0	Clay Loam
S1108517-002	IR #2 Background	0-4	8.0	0.60	90.2	105	38.0	31.0	31.0	Clay Loam
S1108517-003	IR #3	0-4	7.2	105	35400	95100	37.0	33.0	30.0	Clay Loam
S1108517-004	IR #4	0-4	7.4	50.1	13800	38500	40.0	31.0	29.0	Clay Loam

These results apply only to the samples tested.

Abbreviations for extractants: PE= Saturated Paste Extract, H2SO4= water soluble, AB-DTPA= Ammonium Bicarbonate-DTPA, AAO= Acid Ammonium Oxalate

Abbreviations used in acid base accounting: T.S.= Total Sulfur, AB= Acid Base, ABP= Acid Base Potential, PyrS= Pyritic Sulfur, Pyr+Org= Pyritic Sulfur + Organic Sulfur, Neutral. Pot.= Neutralization Potential

Miscellaneous Abbreviations: SAR= Sodium Adsorption Ratio, CEC= Cation Exchange Capacity, ESP= Exchangeable Sodium Percentage

Reviewed by: Karen A Secor
Karen Secor, Soil Lab Supervisor



Inter-Mountain Labs
 Sheridan, WY and Gillette, WY

- CHAIN OF CUSTODY RECORD -

Page of

All shaded fields must be completed.
 This is a legal document: any misrepresentation may be construed as fraud.

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Client Name <i>Tranna 4</i>	Project Identification <i>Willow Creek - IR</i>	Sampler (Signature/Attestation of Authenticity)	Telephone #
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Report Address	Contact Name <i>Bill Kearney</i>	ANALYSES / PARAMETERS		
Invoice Address	Email <i>bill.kearney@intermountainlabs.com</i>			
	Phone <i>307-277-2618</i>			
	Purchase Order #	Quote #		

ITEM	LAB ID <i>(Lab Use Only)</i>	DATE SAMPLED	TIME	SAMPLE IDENTIFICATION	Matrix	# of Containers	Texture	C/	NA	EC	PH	REMARKS
2		<i>4</i>	<i>1005</i>	<i>IR # 2 0-4" Backyard</i>			<i>✓</i>					
3		<i>1017</i>	<i>1017</i>	<i>IR # 3 0-4"</i>			<i>✓</i>					
4		<i>1020</i>	<i>1020</i>	<i>IR # 4 0-4"</i>			<i>✓</i>					
5												
6												
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10												
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14												

LAB COMMENTS	Relinquished By (Signature/Printed)	DATE	TIME	Received By (Signature/Printed)	DATE	TIME
	<i>[Signature]</i>	<i>8/25/11</i>	<i>1330</i>	<i>[Signature]</i>	<i>8-25-11</i>	<i>1330</i>

SHIPPING INFO	MATRIX CODES	TURNAROUND TIMES	COMPLIANCE INFORMATION	ADDITIONAL REMARKS
<input type="checkbox"/> UPS <input type="checkbox"/> Fed Express <input type="checkbox"/> US Mail <input type="checkbox"/> Hand Carried <input type="checkbox"/> Other _____	Water WT Soil SL Solid SD Filter FT Other OT	<input type="checkbox"/> Check desired service <input type="checkbox"/> Standard turnaround <input type="checkbox"/> RUSH - 5 Working Days <input type="checkbox"/> URGENT - < 2 Working Days <i>Rush & Urgent Surcharges will be applied</i>	Compliance Monitoring? Y/N Program (SDWA, NPDES,...) PWSID/ Permit # Chlorinated? Y/N Sample Disposal: Lab Client	