

05

ENTERED



Environmental Protection Division
Environmental Compliance Programs (ENV-CP)
PO Box 1663, K490
Los Alamos, New Mexico 87545
(505) 667-0666

Date: NOV 19 2013
Symbol: ENV-DO-13-0271
LAUR: 13-28355

Mr. Jerry Schoeppner, Chief
Ground Water Quality Bureau
New Mexico Environment Department
Harold Runnels Building, Room N2250
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502

Dear Mr. Schoeppner:

SUBJECT: FINAL PROJECT REPORT, LAND APPLICATION OF TREATED
GROUNDWATER FROM MONITORING WELL R-42, DP-1793

On May 2, 2013, the New Mexico Environment Department (NMED) granted the U.S. Department of
Energy and Los Alamos National Security, LLC (DOE/LANS) temporary permission to discharge
treated groundwater from monitoring well R-42 (Enclosure 1). One condition of approval was the
submittal of a final project report:

- 19. A final project report shall be submitted to NMED within 30 days of the final cessation of
discharge. The report shall provide the total volume of treated water discharged and the
analytical results of the nitrate-nitrogen and chromium analyses for the project, and identify
the locations that received treated water.

Between June 26 and October 22, 2013, DOE/LANS pumped, treated, and discharged approximately
703,000 gallons of groundwater from monitoring well R-42. All produced groundwater was treated
with ion exchange (IX) prior to land application. Samples of treated groundwater were analyzed daily
for total chromium and nitrate-nitrogen; all analytical results were below the New Mexico Water
Quality Control Commission standards for chromium (50 µg/L) and nitrate-nitrogen (10 mg/L).



The following enclosures provide the specific information requested by NMED.

- **Enclosure 2** contains data collected from the pumping test at R-42.
  - ✓ Land application batch number
  - ✓ Date of land application,
  - ✓ Volume of each truck load of land applied water
  - ✓ Location of land application sites
  - ✓ Sample ID for each sample of treated water analyzed for chromium and nitrate-nitrogen
  - ✓ Total chromium results
  - ✓ Nitrate-nitrogen results
  
- **Enclosure 3** is a map showing the land application sites receiving treated groundwater.

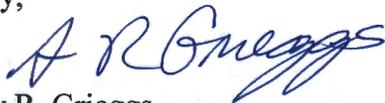
Condition No. 18 of the previously-referenced approval letter requires DOE/LANS to provide the following information:

*18. Following final cessation of discharge, the treatment system and synthetically lined storage lagoons shall be properly disposed of in accordance with all local, state, and federal laws and regulations. A summary describing final disposition of treatment units and temporary lined lagoons shall be submitted to NMED in the final project report.*

It is the expectation of DOE/LANS that additional pumping tests at monitoring well R-42 will be conducted in 2014 under the Chromium Project. Accordingly, the R-42 treatment system infrastructure—frac tanks, IX vessels, and lined lagoons—has been placed in inactive status for the winter season: frac tanks have been drained, IX vessels stored in a heated warehouse to prevent freezing, and lined lagoons emptied to provide headspace for winter precipitation. Any future pumping tests at R-42 will be conducted with prior written approval from the NMED.

Please contact Robert S. Beers by telephone at (505) 667-7969 or by email at [bbeers@lanl.gov](mailto:bbeers@lanl.gov) if you have questions regarding this project report.

Sincerely,



Anthony R. Grieggs  
Group Leader  
Environmental Compliance Programs (ENV-CP)  
Los Alamos National Security, LLC

ARG:RSB/lm

Enclosures:

1. May 2, 2013, letter from NMED granting DOE/LANS temporary permission to discharge treated groundwater from monitoring well R-42
2. Table containing data from the R-42 pumping test
3. Map of the R-42 pumping test land application sites

Cy: James Hogan, NMED/SWQB, Santa Fe, NM  
John E. Kieling, NMED/HWB, Santa Fe, NM  
Steven M. Yanicak, NMED/DOE/OB, (E-File)  
Hai Shen, NA-OO-LA, (E-File)  
Gene E. Turner, NA-OO-LA, (E-File)  
Eric L. Trujillo, NA-OO-LA, (E-File)  
Carl A. Beard, PADOPS, (E-File)  
Michael T. Brandt, ADESH, (E-File)  
Jeffrey D. Mousseau, ADEP, (E-File)  
Alison M. Dorries, ENV-DO, (E-File)  
Victoria A. George, REG-DO, (E-File)  
David J. McInroy, CAP, (E-File)  
Craig R. Douglass, CAP, (E-File)  
Danny Katzman, ET-EI, (E-File)  
Michael R. Alexander, CAP-FS, (E-File)  
Bennie A. Martinez, EES-14, (E-File)  
Charles J. English, REG-SP, (E-File)  
Michael T. Saladen, ENV-CP, (E-File)  
Robert S. Beers, ENV-CP, (E-File)  
[LASOmailbox@nnsa.doe.gov](mailto:LASOmailbox@nnsa.doe.gov), (E-File)  
[locatesteam@lanl.gov](mailto:locatesteam@lanl.gov), (U1301153), (E-File)  
ENV-CP Correspondence File, K490

# **ENCLOSURE 1**

May 2, 2013, letter from NMED granting DOE/LANS  
temporary permission to discharge treated groundwater  
from monitoring well R-42

ENV-DO-13-0271

LAUR-13-28355

U1301153

Date: NOV 19 2013



NEW MEXICO  
ENVIRONMENT DEPARTMENT



*Ground Water Quality Bureau*

SUSANA MARTINEZ  
Governor

JOHN A. SANCHEZ  
Lieutenant Governor

Harold Runnels Building  
1190 St. Francis Drive  
P.O. Box 5469, Santa Fe, NM 87502-5469  
Phone (505) 827-2918 Fax (505) 827-2965  
www.nmenv.state.nm.us

RYAN FLYNN  
Cabinet Secretary-Designate  
BUTCH TONGATE  
Deputy Secretary

**CERTIFIED MAIL – RETURN RECEIPT REQUESTED**

May 2, 2013

Ms. Alison Dorries, LANS-EP-RS  
Los Alamos National Security, LLC  
P.O. Box 1663 MS K404  
Los Alamos, NM 87545

Mr. Gene Turner, DOE/AIP/POC  
U.S. Department of Energy  
Los Alamos Site Office, MS A316  
528 35th Street  
Los Alamos, NM 87545

RE: Temporary Permission to Discharge, Treated Well Development and Pump Test Ground Water Discharge at Regional Monitoring Well R-42, DP-1793 (AI:856, PRD20130003)

Dear Mr. Turner and Ms. Dorries:

The New Mexico Environment Department (NMED) has reviewed your request for temporary permission, dated February 28, 2013 (copy enclosed) to discharge no more than 4,800,000 gallons of treated industrial wastewater generated from a proposed regional monitoring well R-42 pump test and dye tracer study. Ground water in the area of R-42 has been determined to contain chromium at levels that exceed the Water Quality Control Commissions (WQCCs) standard. The water generated during the pump test is to be stored in above ground tanks (frac tanks) and treated to remove chromium using an ion exchange treatment system. Treated water will be temporarily stored in two 160,000 gallon synthetically lined lagoons and then land applied on approximately 77 acres of roadways and six acres of open areas in the vicinity of regional monitoring well R-42. The proposed discharge is located in Mortandad Canyon, approximately three miles southeast of Los Alamos in Section 24, Township 19N, Range 06E, within the boundaries of Los Alamos National Laboratory, Los Alamos County.

Temporary permission to discharge is hereby granted, for a duration not to exceed 120 days from the date discharge commences, pursuant to Subsection B of 20.6.2.3106 NMAC of the New Mexico WQCC Regulations. This approval is contingent on your discharging and reporting as described in your February 28, 2013 request and upon the following conditions:

U1301153

Mr. Turner and Ms. Dorries, DP-1793 (AI:856, PRD20130003)

May 2, 2013

Page 2

1. NMED shall be notified within 5 business days of the date discharge commences.
2. The two 160,000 gallon synthetically lined treated water storage lagoons shall be constructed in accordance with the plans and specifications submitted by LANL to NMED on March 15, 2013.
3. LANL shall implement measures to restrict access of unauthorized personnel and wildlife to the two 160,000 gallon synthetically lined lagoons.
4. Both synthetically lined lagoons shall maintain no less than two-foot freeboard at all times.
5. Water generated from the pump testing of monitoring well R-42 shall be contained and treated to a chromium concentration equal to or less than 0.05 mg/L prior to discharge.
6. Land application of water derived from monitoring well R-42 shall not exceed a nitrate-nitrogen concentration greater than 10 mg/L.
7. The total volume of treated water discharged shall be recorded and submitted to NMED with the final project report.
8. Land application of the treated water shall not occur in a watercourse or result in run-off to a watercourse.
9. Land application of the treated water shall not result in ponding.
10. Land application shall be conducted in a manner that minimizes potential impacts to ground water quality and maximizes evaporation.
11. Treatment of contaminated water and land application of the treated water is restricted to daylight hours and a maximum of 10 hours per day.
12. Land application of the treated water must be supervised at all times.
13. Land application of the treated water is prohibited while precipitation is occurring or during times when the ground is saturated or frozen to the extent that land applied water cannot be absorbed.
14. During treatment, LANL shall collect a daily grab sample of the treated water at a point prior to being discharged to the synthetically lined lagoons and analyze the sample for nitrate-nitrogen (NO<sub>3</sub>-N). All sample collection, preservation and analysis shall conform to the methods identified in Subsection B of 20.6.2.3107 NMAC of the WQCC Regulations. All analytical results shall be submitted to NMED with the final project report.
15. During treatment, LANL shall collect successive composite samples of the treated water and analyze the samples for chromium. Each composite sample shall consist of aliquot samples taken at a point prior to being discharged to the synthetically lined lagoons. Aliquots shall be taken in intervals approximately three hours apart until the storage lagoon is full (while still maintaining the required two-foot of freeboard). All sample collection, preservation and analysis shall conform to the methods identified in Subsection B of 20.6.2.3107 NMAC of the WQCC Regulations. All analytical results shall be submitted to NMED with the final project report.
16. Discharges from the lagoons to the land application areas shall only commence following confirmation that the treated water analytical results for nitrate-nitrogen and chromium concentrations do not exceed 9.0 mg/L and 0.045 mg/L respectively (90% of the applicable WQCC Standards for ground water).
17. Should the analytical results for a sample indicate nitrate-nitrogen or chromium at a concentration greater than 9.0 mg/L or 0.045 mg/L respectively, treated water shall not be land applied. LANL shall notify NMED of analytical results which exceed 9.0 mg/l Nitrate-nitrogen and 0.045 mg/L chromium and shall propose corrective actions to NMED to remedy

U1301153

Mr. Turner and Ms. Dorries, DP-1793 (AI:856, PRD20130003)

May 2, 2013

Page 3

the situation. Following NMED's approval for the implementation of corrective actions discharge may resume.

18. Following final cessation of discharge, the treatment system and synthetically lined storage lagoons shall be properly disposed of in accordance with all local, state and federal laws and regulations. A summary describing final disposition of treatment units and temporary lined lagoons shall be submitted to NMED in the final project report.
19. A final project report shall be submitted to NMED within 30 days of the final cessation of discharge. The report shall provide the total volume of treated water discharged and the analytical results of the nitrate-nitrogen and chromium analyses for the project, and identify the locations that received the treated water.

This temporary permission does not relieve you of the responsibility to comply with any other applicable federal, state, and/or local laws and regulations, such as zoning requirements and nuisance ordinances. Also, this approval does not relieve you of liability should your operation result in actual pollution of surface or ground waters.

If you have any questions, please contact Jennifer Fullam of the Ground Water Pollution Prevention Section at 505-827-2909.

Sincerely,



*FOR*  
Jerry Schoeppner, Chief  
Ground Water Quality Bureau

JS:JF

Enc: Request for Temporary Permission dated February 28, 2013

cc: Robert Italiano, District Manager, NMED District II  
NMED Santa Fe Field Office  
County File  
James Hogan, NMED SWQB  
Erin Trujillo, NMED SWQB  
John Kieling, NMED HWB  
Dave Cobrain, NMED HWB  
Steven Yanicak, NMED-DOE-Oversight Bureau  
Hai Shen, LASO-EO, Los Alamos National Laboratory, A316, Los Alamos, NM 87545  
Pete Maggiore, NA-OO-LA, Los Alamos National Laboratory, A316, Los Alamos, NM 87545  
Carl Beard, PADOPS, Los Alamos National Laboratory, A102, Los Alamos, NM 87545  
Michael T. Brandt, ADESH, Los Alamos National Laboratory, K491, Los Alamos, NM 87545

U1301153

**Mr. Turner and Ms. Dorries, DP-1793 (AI:856, PRD20130003)**

**May 2, 2013**

**Page 4**

**David J. McInroy, CAP, Los Alamos National Laboratory, M996, Los Alamos, NM  
87545**

**Victoria George, REG-DO, Los Alamos National Laboratory, M991, Los Alamos, NM  
87545**

**Danny Katzman, ET-EI, Los Alamos National Laboratory, M992, Los Alamos, NM  
87545**

**Michael Saladen ENV-RCRA, Los Alamos National Laboratory, K490, Los Alamos, NM  
87545**

**Bob Beers, ENV-RCRA, Los Alamos National Laboratory, K490, Los Alamos NM,  
87545**

U1301153

## **ENCLOSURE 2**

Table containing data from the R-42 pumping test

ENV-DO-13-0271

LAUR-13-28355

U1301153

Date: NOV 19 2013

Tracking Number <sup>1</sup> -Well name -Pit A/B & batch# -load #	Date of Land Application	Volume Applied (gal)	Location of Application Mortandad Canyon Land Application Location Number(s)	Sample ID Number	Total Chromium (ug/L)	Nitrate (as Nitrogen) (mg/L)
42-A1-1	6/26/2013	10,000	Zones 4 and 5	VS-R42-4-36536	3.0	
42-A1-1				VS-R42-4-36537	4.0	
42-A1-1				VS-R42-4-36539	3.0	
42-A1-1				VS-R42-4-36597		<0.002
42-A1-1				VS-R42-4-36599		<0.002
42-A1-1				VS-R42-4-36601		<0.002
42-A1-2	6/26/2013	5,000	Zones 5 and 6	VS-R42-4-36536	3.0	
42-A1-2				VS-R42-4-36537	4.0	
42-A1-2				VS-R42-4-36539	3.0	
42-A1-2				VS-R42-4-36597		<0.002
42-A1-2				VS-R42-4-36599		<0.002
42-A1-2				VS-R42-4-36601		<0.002
42-A1-3	6/26/2013	10,000	Zones 5 and 6	VS-R42-4-36536	3.0	
42-A1-3				VS-R42-4-36537	4.0	
42-A1-3				VS-R42-4-36539	3.0	
42-A1-3				VS-R42-4-36597		<0.002
42-A1-3				VS-R42-4-36599		<0.002
42-A1-3				VS-R42-4-36601		<0.002
42-A1-4	6/26/2013	5,000	Zones 2 and 3	VS-R42-4-36536	3.0	
42-A1-4				VS-R42-4-36537	4.0	
42-A1-4				VS-R42-4-36539	3.0	
42-A1-4				VS-R42-4-36597		<0.002
42-A1-4				VS-R42-4-36599		<0.002
42-A1-4				VS-R42-4-36601		<0.002
42-A1-5	6/26/2013	10,000	Zones 4 and 5	VS-R42-4-36536	3.0	
42-A1-5				VS-R42-4-36537	4.0	
42-A1-5				VS-R42-4-36539	3.0	
42-A1-5				VS-R42-4-36597		<0.002
42-A1-5				VS-R42-4-36599		<0.002
42-A1-5				VS-R42-4-36601		<0.002
42-A1-6	6/26/2013	5,000	Zones 5 and 6	VS-R42-4-36536	3.0	
42-A1-6				VS-R42-4-36537	4.0	
42-A1-6				VS-R42-4-36539	3.0	
42-A1-6				VS-R42-4-36597		<0.002
42-A1-6				VS-R42-4-36599		<0.002
42-A1-6				VS-R42-4-36601		<0.002
42-A1-7	6/26/2013	10,000	Zones 4 and 5	VS-R42-4-36536	3.0	
42-A1-7				VS-R42-4-36537	4.0	
42-A1-7				VS-R42-4-36539	3.0	
42-A1-7				VS-R42-4-36597		<0.002
42-A1-7				VS-R42-4-36599		<0.002
42-A1-7				VS-R42-4-36601		<0.002
42-A1-8	6/26/2013	5,000	Zones 2 and 3	VS-R42-4-36536	3.0	
42-A1-8				VS-R42-4-36537	4.0	
42-A1-8				VS-R42-4-36539	3.0	
42-A1-8				VS-R42-4-36597		<0.002
42-A1-8				VS-R42-4-36599		<0.002
42-A1-8				VS-R42-4-36601		<0.002
<b>A1 Total</b>		<b>60,000</b>				
42-B1-1	7/2/2013	4,000	Zones 4, 5 and 6	VS-R42-4-36603		<0.002
42-B1-1				VS-R42-4-36543	6.0	
42-B1-2	7/2/2013	4,000	Zones 4, 5 and 6	VS-R42-4-36603		<0.002
42-B1-2				VS-R42-4-36543	6.0	
42-B1-3	7/2/2013	4,000	Zones 4, 5 and 6	VS-R42-4-36603		<0.002
42-B1-3				VS-R42-4-36543	6.0	
42-B1-4	7/2/2013	4,000	Zones 4, 5 and 6	VS-R42-4-36603		<0.002

Tracking Number <sup>1</sup> -Well name -Pit A/B & batch# -load #	Date of Land Application	Volume Applied (gal)	Location of Application Mortandad Canyon Land Application Location Number(s)	Sample ID Number	Total Chromium (ug/L)	Nitrate (as Nitrogen) (mg/L)
42-B1-4				VS-R42-4-36543	6.0	
42-B1-5	7/2/2013	4,000	Zones 4, 5 and 6	VS-R42-4-36603		<0.002
42-B1-5				VS-R42-4-36543	6.0	
42-B1-6	7/2/2013	4,000	Zones 1, 2, 3 and 4	VS-R42-4-36603		<0.002
42-B1-6				VS-R42-4-36543	6.0	
42-B1-7	7/3/2013	10,000	Zones 4 and 5	VS-R42-4-36603		<0.002
42-B1-7				VS-R42-4-36543	6.0	
42-B1-8	7/3/2013	10,000	Zones 4 and 5	VS-R42-4-36603		<0.002
42-B1-8				VS-R42-4-36543	6.0	
42-B1-9	7/3/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36603		<0.002
42-B1-9				VS-R42-4-36543	6.0	
42-B1-10	7/22/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36603		<0.002
42-B1-10				VS-R42-4-36543	6.0	
<b>B1 Total</b>		<b>64,000</b>				
42-A2-1	7/8/2013	4,000	Zones 5 and 6	VS-R42-4-36604		<0.002
42-A2-1				VS-R42-4-36544	6.0	
42-A2-1				VS-R42-4-36538	5.0	
42-A2-1				VS-R42-4-36598		<0.002
42-A2-2	7/8/2013	4,000	Zones 4 and 5	VS-R42-4-36604		<0.002
42-A2-2				VS-R42-4-36544	6.0	
42-A2-2				VS-R42-4-36538	5.0	
42-A2-2				VS-R42-4-36598		<0.002
42-A2-3	7/22/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36604		<0.002
42-A2-3				VS-R42-4-36544	6.0	
42-A2-3				VS-R42-4-36538	5.0	
42-A2-3				VS-R42-4-36598		<0.002
42-A2-4	7/9/2013	10,000	Zones 4 and 5	VS-R42-4-36604		<0.002
42-A2-4				VS-R42-4-36544	6.0	
42-A2-4				VS-R42-4-36538	5.0	
42-A2-4				VS-R42-4-36598		<0.002
42-A2-5	7/10/2013	10,000	Zones 5 and 6	VS-R42-4-36604		<0.002
42-A2-5				VS-R42-4-36544	6.0	
42-A2-5				VS-R42-4-36538	5.0	
42-A2-5				VS-R42-4-36598		<0.002
42-A2-6	7/10/2013	10,000	Zones 4 and 5	VS-R42-4-36604		<0.002
42-A2-6				VS-R42-4-36544	6.0	
42-A2-6				VS-R42-4-36538	5.0	
42-A2-6				VS-R42-4-36598		<0.002
42-A2-7	7/10/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36604		<0.002
42-A2-7				VS-R42-4-36544	6.0	
42-A2-7				VS-R42-4-36538	5.0	
42-A2-7				VS-R42-4-36598		<0.002
<b>A2 Total</b>		<b>58,000</b>				
42-B2-1	7/11/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36545	4.0	
42-B2-1				VS-R42-4-36605		<0.002
42-B2-1				VS-R42-4-36542	5.0	
42-B2-1				VS-R42-4-36602		<0.002
42-B2-2	7/11/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36545	4.0	
42-B2-2				VS-R42-4-36605		<0.002
42-B2-2				VS-R42-4-36542	5.0	
42-B2-2				VS-R42-4-36602		<0.002
42-B2-3	7/11/2013	4,000	Zones 2, 3 and 4	VS-R42-4-36545	4.0	
42-B2-3				VS-R42-4-36605		<0.002
42-B2-3				VS-R42-4-36542	5.0	
42-B2-3				VS-R42-4-36602		<0.002

Tracking Number <sup>1</sup> -Well name -Pit A/B & batch# -load #	Date of Land Application	Volume Applied (gal)	Location of Application Mortandad Canyon Land Application Location Number(s)	Sample ID Number	Total Chromium (ug/L)	Nitrate (as Nitrogen) (mg/L)
42-B2-4	7/12/2013	10,000	Zones 4 and 5	VS-R42-4-36545	4.0	
42-B2-4				VS-R42-4-36605		<0.002
42-B2-4				VS-R42-4-36542	5.0	
42-B2-4				VS-R42-4-36602		<0.002
42-B2-5	7/15/2013	10,000	Zones 2, 3 and 4	VS-R42-4-36545	4.0	
42-B2-5				VS-R42-4-36605		<0.002
42-B2-5				VS-R42-4-36542	5.0	
42-B2-5				VS-R42-4-36602		<0.002
42-B2-6	7/15/2013	10,000	Zones 1 and 2	VS-R42-4-36545	4.0	
42-B2-6				VS-R42-4-36605		<0.002
42-B2-6				VS-R42-4-36542	5.0	
42-B2-6				VS-R42-4-36602		<0.002
42-B2-7	7/15/2013	5,000	Zones 3 and 4	VS-R42-4-36545	4.0	
42-B2-7				VS-R42-4-36605		<0.002
42-B2-7				VS-R42-4-36542	5.0	
42-B2-7				VS-R42-4-36602		<0.002
<b>B2 Total</b>		<b>59,000</b>				
42-A3-1	7/18/2013	10,000	Zones 5 and 6	VS-R42-4-36546	6.0	
42-A3-1				VS-R42-4-36606		0.45
42-A3-1				VS-R42-4-36548	7.0	
42-A3-1				VS-R42-4-36608		7.5
42-A3-2	7/18/2013	10,000	Zones 4, 5 and 6	VS-R42-4-36546	6.0	
42-A3-2				VS-R42-4-36606		0.45
42-A3-2				VS-R42-4-36548	7.0	
42-A3-2				VS-R42-4-36608		7.5
42-A3-3	7/18/2013	10,000	Zones 1, 2 and 3	VS-R42-4-36546	6.0	
42-A3-3				VS-R42-4-36606		0.45
42-A3-3				VS-R42-4-36548	7.0	
42-A3-3				VS-R42-4-36608		7.5
42-A3-4	7/18/2013	4,000	Zones 4 and 5	VS-R42-4-36546	6.0	
42-A3-4				VS-R42-4-36606		0.45
42-A3-4				VS-R42-4-36548	7.0	
42-A3-4				VS-R42-4-36608		7.5
42-A3-5	7/18/2013	10,000	Zones 4, 5 and 6	VS-R42-4-36546	6.0	
42-A3-5				VS-R42-4-36606		0.45
42-A3-5				VS-R42-4-36548	7.0	
42-A3-5				VS-R42-4-36608		7.5
42-A3-6	7/19/2013	10,000	Zones 1, 2 and 3	VS-R42-4-36546	6.0	
42-A3-6				VS-R42-4-36606		0.45
42-A3-6				VS-R42-4-36548	7.0	
42-A3-6				VS-R42-4-36608		7.5
42-A3-7	7/19/2013	9,000	Zones 1, 2 and 3	VS-R42-4-36546	6.0	
42-A3-7				VS-R42-4-36606		0.45
42-A3-7				VS-R42-4-36548	7.0	
42-A3-7				VS-R42-4-36608		7.5
<b>A3 Total</b>		<b>63,000</b>				
<b>B3 Total<sup>2</sup></b>		<b>0</b>				
42-A4-1	7/30/2013	10,000	Zones 5 and 6	VS-R42-4-36552	2.0	
42-A4-1				VS-R42-4-36612		<0.002
42-A4-1				VS-R42-4-36553	1.0	
42-A4-1				VS-R42-4-36613		<0.002
42-A4-2	7/30/2013	10,000	Zones 4 and 5	VS-R42-4-36552	2.0	
42-A4-2				VS-R42-4-36612		<0.002
42-A4-2				VS-R42-4-36553	1.0	
42-A4-2				VS-R42-4-36613		<0.002

Tracking Number <sup>1</sup> -Well name -Pit A/B & batch# -load #	Date of Land Application	Volume Applied (gal)	Location of Application Mortandad Canyon Land Application Location Number(s)	Sample ID Number	Total Chromium (ug/L)	Nitrate (as Nitrogen) (mg/L)
42-A4-3	7/30/2013	4,000	Zones 5 and 6	VS-R42-4-36552	2.0	
42-A4-3				VS-R42-4-36612		<0.002
42-A4-3				VS-R42-4-36553	1.0	
42-A4-3				VS-R42-4-36613		<0.002
42-A4-4	7/30/2013	10,000	Zones 5 and 6	VS-R42-4-36552	2.0	
42-A4-4				VS-R42-4-36612		<0.002
42-A4-4				VS-R42-4-36553	1.0	
42-A4-4				VS-R42-4-36613		<0.002
42-A4-5	7/30/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36552	2.0	
42-A4-5				VS-R42-4-36612		<0.002
42-A4-5				VS-R42-4-36553	1.0	
42-A4-5				VS-R42-4-36613		<0.002
42-A4-6	7/30/2013	4,000	Zones 4 and 5	VS-R42-4-36552	2.0	
42-A4-6				VS-R42-4-36612		<0.002
42-A4-6				VS-R42-4-36553	1.0	
42-A4-6				VS-R42-4-36613		<0.002
42-A4-7	7/30/2013	4,000	Zones 1, 2 and 3	VS-R42-4-36552	2.0	
42-A4-7				VS-R42-4-36612		<0.002
42-A4-7				VS-R42-4-36553	1.0	
42-A4-7				VS-R42-4-36613		<0.002
42-A4-8	7/30/2013	10,000	Zones 4, 5 and 6	VS-R42-4-36552	2.0	
42-A4-8				VS-R42-4-36612		<0.002
42-A4-8				VS-R42-4-36553	1.0	
42-A4-8				VS-R42-4-36613		<0.002
42-A4-9	7/31/2013	4,000	Zones 2, 3 and 4	VS-R42-4-36552	2.0	
42-A4-9				VS-R42-4-36612		<0.002
42-A4-9				VS-R42-4-36553	1.0	
42-A4-9				VS-R42-4-36613		<0.002
<b>A4 Total</b>		<b>66,000</b>				
42-B4-1	8/1/2013	5,000	Zones 5 and 6	VS-R42-4-36550	3.0	
42-B4-1				VS-R42-4-36610		<0.002
42-B4-1				VS-R42-4-36555	3.0	
42-B4-1				VS-R42-4-36615		<0.002
42-B4-1				VS-R42-4-36554	4.0	
42-B4-1				VS-R42-4-36614		<0.002
42-B4-2	8/1/2013	10,000	Zones 4, 5 and 6	VS-R42-4-36550	3.0	
42-B4-2				VS-R42-4-36610		<0.002
42-B4-2				VS-R42-4-36555	3.0	
42-B4-2				VS-R42-4-36615		<0.002
42-B4-2				VS-R42-4-36554	4.0	
42-B4-2				VS-R42-4-36614		<0.002
42-B4-3	8/1/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36550	3.0	
42-B4-3				VS-R42-4-36610		<0.002
42-B4-3				VS-R42-4-36555	3.0	
42-B4-3				VS-R42-4-36615		<0.002
42-B4-3				VS-R42-4-36554	4.0	
42-B4-3				VS-R42-4-36614		<0.002
42-B4-4	8/1/2013	10,000	Zones 5 and 6	VS-R42-4-36550	3.0	
42-B4-4				VS-R42-4-36610		<0.002
42-B4-4				VS-R42-4-36555	3.0	
42-B4-4				VS-R42-4-36615		<0.002
42-B4-4				VS-R42-4-36554	4.0	
42-B4-4				VS-R42-4-36614		<0.002
42-B4-5	8/2/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36550	3.0	
42-B4-5				VS-R42-4-36610		<0.002
42-B4-5				VS-R42-4-36555	3.0	

Tracking Number <sup>1</sup> -Well name -Pit A/B & batch# -load #	Date of Land Application	Volume Applied (gal)	Location of Application Mortandad Canyon Land Application Location Number(s)	Sample ID Number	Total Chromium (ug/L)	Nitrate (as Nitrogen) (mg/L)
42-B4-5				VS-R42-4-36615		<0.002
42-B4-5				VS-R42-4-36554	4.0	
42-B4-5				VS-R42-4-36614		<0.002
42-B4-6	8/2/2013	10,000	Zones 5 and 6	VS-R42-4-36550	3.0	
42-B4-6				VS-R42-4-36610		<0.002
42-B4-6				VS-R42-4-36555	3.0	
42-B4-6				VS-R42-4-36615		<0.002
42-B4-6				VS-R42-4-36554	4.0	
42-B4-6				VS-R42-4-36614		<0.002
42-B4-7	8/2/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36550	3.0	
42-B4-7				VS-R42-4-36610		<0.002
42-B4-7				VS-R42-4-36555	3.0	
42-B4-7				VS-R42-4-36615		<0.002
42-B4-7				VS-R42-4-36554	4.0	
42-B4-7				VS-R42-4-36614		<0.002
<b>B4 Total</b>		<b>65,000</b>				
42-A5-1	8/7/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36552	4.0	
42-A5-1				VS-R42-4-36612		<0.002
42-A5-1				VS-R42-4-36551	4.0	
42-A5-1				VS-R42-4-36611		<0.002
42-A5-2	8/7/2013	4,000	Zones 1, 2, 3 and 4	VS-R42-4-36552	4.0	
42-A5-2				VS-R42-4-36612		<0.002
42-A5-2				VS-R42-4-36551	4.0	
42-A5-2				VS-R42-4-36611		<0.002
42-A5-3	8/8/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-36552	4.0	
42-A5-3				VS-R42-4-36612		<0.002
42-A5-3				VS-R42-4-36551	4.0	
42-A5-3				VS-R42-4-36611		<0.002
42-A5-4	8/8/2013	10,000	Zones 5 and 6	VS-R42-4-36552	4.0	
42-A5-4				VS-R42-4-36612		<0.002
42-A5-4				VS-R42-4-36552	4.0	
42-A5-4				VS-R42-4-36612		<0.002
42-A5-5	8/8/2013	10,000	Zones 1, 2, 3, 4 and 5	VS-R42-4-36552	4.0	
42-A5-5				VS-R42-4-36612		<0.002
42-A5-5				VS-R42-4-36551	4.0	
42-A5-5				VS-R42-4-36611		<0.002
42-A5-6	8/8/2013	4,000	Zones 4 and 5	VS-R42-4-36552	4.0	
42-A5-6				VS-R42-4-36612		<0.002
42-A5-6				VS-R42-4-36551	4.0	
42-A5-6				VS-R42-4-36611		<0.002
42-A5-7	8/8/2013	10,000	Zones 1, 2, 3, 4 and 5	VS-R42-4-36552	4.0	
42-A5-7				VS-R42-4-36612		<0.002
42-A5-7				VS-R42-4-36551	4.0	
42-A5-7				VS-R42-4-36611		<0.002
42-A5-8	8/8/2013	4,000	Zones 4 and 5	VS-R42-4-36552	4.0	
42-A5-8				VS-R42-4-36612		<0.002
42-A5-8				VS-R42-4-36551	4.0	
42-A5-8				VS-R42-4-36611		<0.002
42-A5-9	8/9/2013	5,000	Zones 5 and 6	VS-R42-4-36552	4.0	
42-A5-9				VS-R42-4-36612		<0.002
42-A5-9				VS-R42-4-36551	4.0	
42-A5-9				VS-R42-4-36611		<0.002
<b>A5 Total</b>		<b>67,000</b>				
42-B5-1	8/14/2013	4,000	Zones 5 and 6	VS-R42-4-40200		<0.002
42-B5-1				VS-R42-4-40400	2.0	

Tracking Number <sup>1</sup> -Well name -Pit A/B & batch# -load #	Date of Land Application	Volume Applied (gal)	Location of Application Mortandad Canyon Land Application Location Number(s)	Sample ID Number	Total Chromium (ug/L)	Nitrate (as Nitrogen) (mg/L)
42-B5-1				VS-R42-4-40739	5.0	
42-B5-1				VS-R42-4-39266	6.0	
42-B5-1				VS-R42-4-39266		0.40
42-B5-2	8/14/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-40200		<0.002
42-B5-2				VS-R42-4-40400	2.0	
42-B5-2				VS-R42-4-40739	5.0	
42-B5-2				VS-R42-4-39266	6.0	
42-B5-2				VS-R42-4-39266		0.40
42-B5-3	8/14/2013	4,000	Zones 3, 4 and 5	VS-R42-4-40200		<0.002
42-B5-3				VS-R42-4-40400	2.0	
42-B5-3				VS-R42-4-40739	5.0	
42-B5-3				VS-R42-4-39266	6.0	
42-B5-3				VS-R42-4-39266		0.40
42-B5-4	8/15/2013	10,000	Zones 5 and 6	VS-R42-4-40200		<0.002
42-B5-4				VS-R42-4-40400	2.0	
42-B5-4				VS-R42-4-40739	5.0	
42-B5-4				VS-R42-4-39266	6.0	
42-B5-4				VS-R42-4-39266		0.40
42-B5-5	8/15/2013	10,000	Zones 4 and 5	VS-R42-4-40200		<0.002
42-B5-5				VS-R42-4-40400	2.0	
42-B5-5				VS-R42-4-40739	5.0	
42-B5-5				VS-R42-4-39266	6.0	
42-B5-5				VS-R42-4-39266		0.40
42-B5-6	8/15/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-40200		<0.002
42-B5-6				VS-R42-4-40400	2.0	
42-B5-6				VS-R42-4-40739	5.0	
42-B5-6				VS-R42-4-39266	6.0	
42-B5-6				VS-R42-4-39266		0.40
42-B5-7	8/16/2013	5,000	Zones 1, 2 and 3	VS-R42-4-40200		<0.002
42-B5-7				VS-R42-4-40400	2.0	
42-B5-7				VS-R42-4-40739	5.0	
42-B5-7				VS-R42-4-39266	6.0	
42-B5-7				VS-R42-4-39266		0.40
42-B5-8	8/16/2013	4,000	Zones 1, 2 and 3	VS-R42-4-40200		<0.002
42-B5-8				VS-R42-4-40400	2.0	
42-B5-8				VS-R42-4-40739	5.0	
42-B5-8				VS-R42-4-39266	6.0	
42-B5-8				VS-R42-4-39266		0.40
42-B5-9	8/16/2013	5,000	Zones 5 and 6	VS-R42-4-40200		<0.002
42-B5-9				VS-R42-4-40400	2.0	
42-B5-9				VS-R42-4-40739	5.0	
42-B5-9				VS-R42-4-39266	6.0	
42-B5-9				VS-R42-4-39266		0.40
<b>B5 Total</b>		<b>62,000</b>				
42-A6-1	8/21/2013	10,000	Zones 4 and 5	VS-R42-4-40399	6.0	
42-A6-1				VS-R42-4-40199		1.5
42-A6-1				VS-R42-4-40402	3.0	
42-A6-1				VS-R42-4-40202		1.1
42-A6-1				VS-R42-4-40403	4.0	
42-A6-1				VS-R42-4-40203		1.1
42-A6-2	8/21/2013	10,000	Zones 4, 5 and 6	VS-R42-4-40399	6.0	
42-A6-2				VS-R42-4-40199		1.5
42-A6-2				VS-R42-4-40402	3.0	
42-A6-2				VS-R42-4-40202		1.1
42-A6-2				VS-R42-4-40403	4.0	
42-A6-2				VS-R42-4-40203		1.1

Tracking Number <sup>1</sup> -Well name -Pit A/B & batch# -load #	Date of Land Application	Volume Applied (gal)	Location of Application Mortandad Canyon Land Application Location Number(s)	Sample ID Number	Total Chromium (ug/L)	Nitrate (as Nitrogen) (mg/L)
42-A6-3	8/21/2013	4,000	Zones 1, 2 and 3	VS-R42-4-40399	6.0	
42-A6-3				VS-R42-4-40199		1.5
42-A6-3				VS-R42-4-40402	3.0	
42-A6-3				VS-R42-4-40202		1.1
42-A6-3				VS-R42-4-40403	4.0	
42-A6-3				VS-R42-4-40203		1.1
42-A6-4	8/21/2013	10,000	Zones 4, 5 and 6	VS-R42-4-40399	6.0	
42-A6-4				VS-R42-4-40199		1.5
42-A6-4				VS-R42-4-40402	3.0	
42-A6-4				VS-R42-4-40202		1.1
42-A6-4				VS-R42-4-40403	4.0	
42-A6-4				VS-R42-4-40203		1.1
42-A6-5	8/21/2013	4,000	Zones 1, 2 and 3	VS-R42-4-40399	6.0	
42-A6-5				VS-R42-4-40199		1.5
42-A6-5				VS-R42-4-40402	3.0	
42-A6-5				VS-R42-4-40202		1.1
42-A6-5				VS-R42-4-40403	4.0	
42-A6-5				VS-R42-4-40203		1.1
42-A6-6	8/22/2013	10,000	Zones 1, 2, 3 and 4	VS-R42-4-40399	6.0	
42-A6-6				VS-R42-4-40199		1.5
42-A6-6				VS-R42-4-40402	3.0	
42-A6-6				VS-R42-4-40202		1.1
42-A6-6				VS-R42-4-40403	4.0	
42-A6-6				VS-R42-4-40203		1.1
42-A6-7	8/22/2013	10,000	Zones 5 and 6	VS-R42-4-40399	6.0	
42-A6-7				VS-R42-4-40199		1.5
42-A6-7				VS-R42-4-40402	3.0	
42-A6-7				VS-R42-4-40202		1.1
42-A6-7				VS-R42-4-40403	4.0	
42-A6-7				VS-R42-4-40203		1.1
42-A6-8	8/22/2013	7,000	Zone 4	VS-R42-4-40399	6.0	
42-A6-8				VS-R42-4-40199		1.5
42-A6-8				VS-R42-4-40402	3.0	
42-A6-8				VS-R42-4-40202		1.1
42-A6-8				VS-R42-4-40403	4.0	
42-A6-8				VS-R42-4-40203		1.1
<b>A6 Total</b>		<b>65,000</b>				
42-B6-1	8/27/2013	10,000	Zone 4	VS-R42-4-40201		<0.002
42-B6-1				VS-R42-4-40401	2.0	
42-B6-1				VS-R42-4-40404	4.0	
42-B6-1				VS-R42-4-40404		<0.002
42-B6-2	8/27/2013	10,000	Zones 1, 2 and 3	VS-R42-4-40201		<0.002
42-B6-2				VS-R42-4-40401	2.0	
42-B6-2				VS-R42-4-40404	4.0	
42-B6-2				VS-R42-4-40404		<0.002
42-B6-3	8/27/2013	10,000	Zone 5 and 6	VS-R42-4-40201		<0.002
42-B6-3				VS-R42-4-40401	2.0	
42-B6-3				VS-R42-4-40404	4.0	
42-B6-3				VS-R42-4-40404		<0.002
42-B6-4	8/28/2013	10,000	Zones 1, 2 and 3	VS-R42-4-40201		<0.002
42-B6-4				VS-R42-4-40401	2.0	
42-B6-4				VS-R42-4-40404	4.0	
42-B6-4				VS-R42-4-40404		<0.002
42-B6-5	8/28/2013	4,000	Zone 5 and 6	VS-R42-4-40201		<0.002
42-B6-5				VS-R42-4-40401	2.0	
42-B6-5				VS-R42-4-40404	4.0	

Tracking Number <sup>1</sup> -Well name -Pit A/B & batch# -load #	Date of Land Application	Volume Applied (gal)	Location of Application Mortandad Canyon Land Application Location Number(s)	Sample ID Number	Total Chromium (ug/L)	Nitrate (as Nitrogen) (mg/L)
42-B6-5				VS-R42-4-40404		<0.002
<b>B6 Total</b>		<b>44,000</b>				
42-A7-1	10/22/2013	10,000	Zones 4 and 5	VS-R42-4-40405	7.0	
42-A7-1				VS-R42-4-40205		0.002
42-A7-2	10/22/2013	10,000	Zones 4 and 5	VS-R42-4-40405	7.0	
42-A7-2				VS-R42-4-40205		0.002
42-A7-3	10/22/2013	5,000	Zones 1, 2 and 3	VS-R42-4-40405	7.0	
42-A7-3				VS-R42-4-40205		0.002
42-A7-4	10/22/2013	5,000	Zones 4 and 5	VS-R42-4-40405	7.0	
42-A7-4				VS-R42-4-40205		0.002
<b>A7 Total</b>		<b>30,000</b>				
<b>Project Total</b>		<b>703,000</b>				

<sup>1</sup>The Tracking Number consists of the following three identifying terms: Well Name (eg, 42), Pit A or B and the batch number (eg, A1), and the

<sup>2</sup>The 42-B3 water was not land applied and there is no data for it. This water had elevated Nitrate-Nitrogen and was pumped out of pit B and back into the frac tanks for retreatment on 7/27 and 7/28/2013 through the new ion exchange vessel.

# **ENCLOSURE 3**

Map of the R-42 pumping test land application sites

ENV-DO-13-0271

LAUR-13-28355

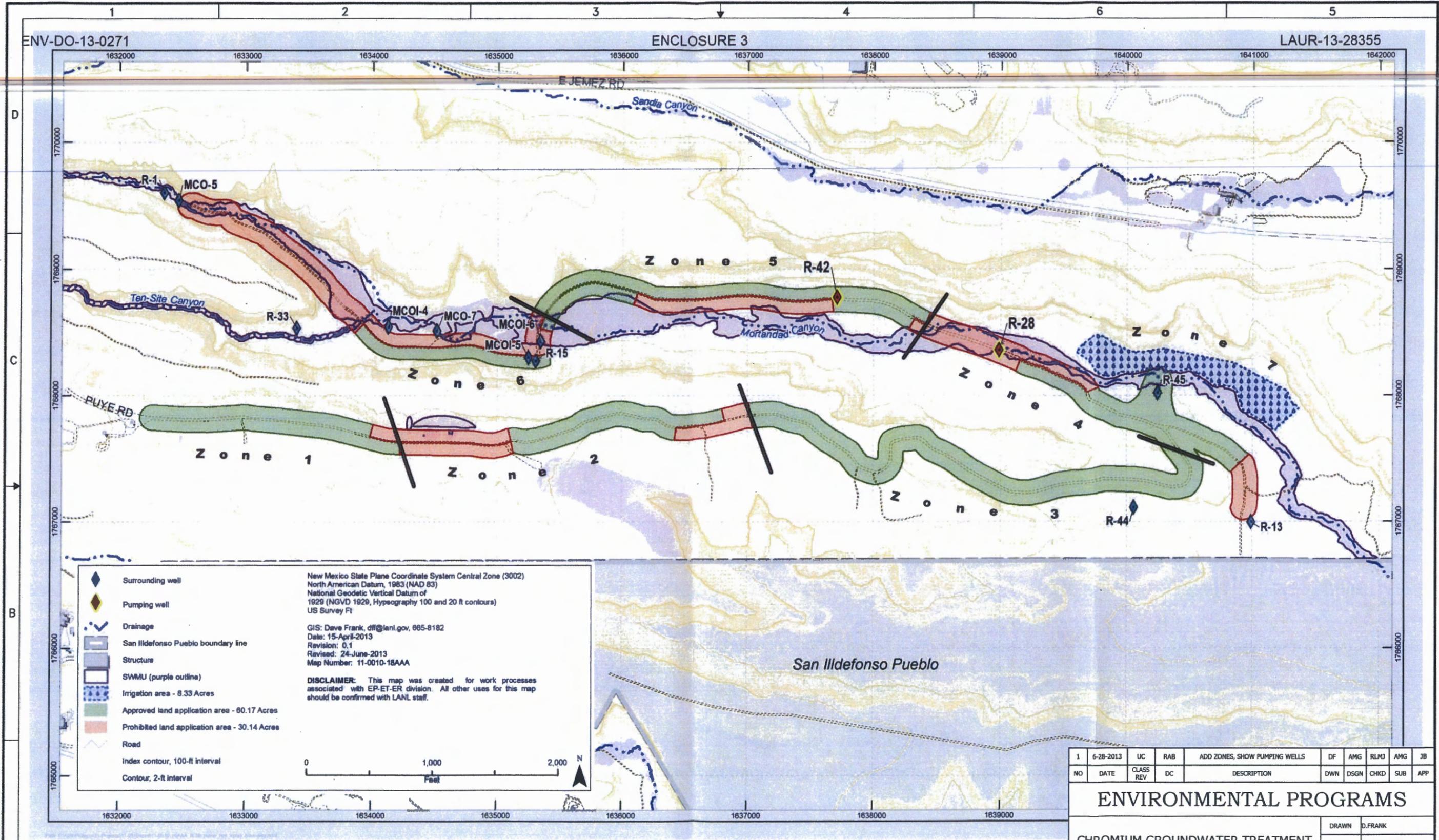
U1301153

Date: NOV 19 2013

ENV-DO-13-0271

ENCLOSURE 3

LAUR-13-28355



	Surrounding well	<p>New Mexico State Plane Coordinate System Central Zone (3002)          North American Datum, 1983 (NAD 83)          National Geodetic Vertical Datum of 1929 (NGVD 1929, Hypsography 100 and 20 ft contours)          US Survey Ft</p> <p>GIS: Dave Frank, dff@lanl.gov, 865-8182          Date: 15-April-2013          Revision: 0.1          Revised: 24-June-2013          Map Number: 11-0010-18AAA</p> <p><b>DISCLAIMER:</b> This map was created for work processes associated with EP-ET-ER division. All other uses for this map should be confirmed with LANL staff.</p>
	Pumping well	
	Drainage	
	San Ildefonso Pueblo boundary line	
	Structure	
	SWMU (purple outline)	
	Irrigation area - 8.33 Acres	
	Approved land application area - 60.17 Acres	
	Prohibited land application area - 30.14 Acres	
	Road	
	Index contour, 100-ft interval	
	Contour, 2-ft interval	



NO	DATE	CLASS REV	UC	RAB	DC	DESCRIPTION	DF	AMG	RLMD	AMG	JB
1	6-28-2013	UC		RAB		ADD ZONES, SHOW PUMPING WELLS	DF	AMG	RLMD	AMG	JB

<b>ENVIRONMENTAL PROGRAMS</b>			
<b>CHROMIUM GROUNDWATER TREATMENT LAND IRRIGATION AREAS</b>			
DRAWN	D.FRANK		
DESIGN	A.MACGREGOR		
CHECKED	R.MCCLLENAHAN		
DATE	05-28-13		
TA- 05	BLDG 0000		
SUBMITTED: A. MACGREGOR	APPROVED FOR RELEASE: J. BENNETT		
SHEET			
PO BOX 1663 LOS ALAMOS, NEW MEXICO 87545			
D.C.: UNCLASSIFIED REVIEWER: W B HARDESTY BASIS: ENVPRO DUSA DATE: 05-24-2013			
PROJECT ID	DRAWING NO	ESR NO	REV
103006	SK-11166	NA	1



COPY

GROUND WATER  
NOV 19 2013  
BUREAU

***Environmental Protection Division***  
Environmental Compliance Programs (ENV-CP)  
PO Box 1663, K490  
Los Alamos, New Mexico 87545  
(505) 667-0666

Date: NOV 19 2013  
Symbol: ENV-DO-13-0271  
LAUR: 13-28355

Mr. Jerry Schoeppner, Chief  
Ground Water Quality Bureau  
New Mexico Environment Department  
Harold Runnels Building, Room N2250  
1190 St. Francis Drive  
P.O. Box 26110  
Santa Fe, NM 87502

Dear Mr. Schoeppner:

**SUBJECT: FINAL PROJECT REPORT, LAND APPLICATION OF TREATED  
GROUNDWATER FROM MONITORING WELL R-42, DP-1793**

On May 2, 2013, the New Mexico Environment Department (NMED) granted the U.S. Department of Energy and Los Alamos National Security, LLC (DOE/LANS) temporary permission to discharge treated groundwater from monitoring well R-42 (Enclosure 1). One condition of approval was the submittal of a final project report:

*19. A final project report shall be submitted to NMED within 30 days of the final cessation of discharge. The report shall provide the total volume of treated water discharged and the analytical results of the nitrate-nitrogen and chromium analyses for the project, and identify the locations that received treated water.*

Between June 26 and October 22, 2013, DOE/LANS pumped, treated, and discharged approximately 703,000 gallons of groundwater from monitoring well R-42. All produced groundwater was treated with ion exchange (IX) prior to land application. Samples of treated groundwater were analyzed daily for total chromium and nitrate-nitrogen; all analytical results were below the New Mexico Water Quality Control Commission standards for chromium (50 µg/L) and nitrate-nitrogen (10 mg/L).