Uranerz
ENERGY CORPORATION

February 13, 2014

Attn: Document Control Desk
Director
Office of Federal and State Materials and
Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Protection
Mail Stop T-8F5
11545 Rockville Pike
Two White Flint North
Rockville, MD 20852-2738

Re: Semi-Annual and Annual Report Uranerz Energy Corporation Nichols Ranch ISR Project SUA-1597

Dear Director and Deputy Director,

This letter and attachments serve as the Semi-Annual and Annual Report for the Uranerz Energy Corporation Nichols Ranch ISR Project that is required by License Conditions 9.4E, 10.11, 11.1, 11.2, 11.7, and 12.10 in SUA-1597.

Revised pages to the license application are enclosed in accordance with SUA-1597 License Condition 9.4E. An index of change has been included to guide insertion into the license application.

If you have any questions regarding the provided information, please contact me at 307-265-8900 or by email at mthomas@uranerz.com.

Sincerely,

Michael P. Thomas
Vice President Regulatory and Public Affairs
Uranerz Energy Corporation

MT/dk

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Attachments

July-December 2013 Semi-Annual and 2013 Annual Report
Annual Revised Pages to License Application

cc: Ron Linton, NRC Project Manager (via email)
Linda Gersey, NRC Region IV (via email)
Mark Rogaczewski, WDEQ-LQD District III Supervisor

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Uranerz
ENERGY CORPORATION

Nichols Ranch ISR Project
License Number SUA-1597
Docket No.40-9067

Semi-Annual Report

July - December 2013

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Table of Appendices

1.0 INTRODUCTION

Uranerz received Source Material License SUA-1597 on July 19, 2011. In accordance with 10CFR40.65 and Source Material License SUA-1597 Uranerz Energy Corporation submits the 2013 Semi-Annual Effluent and Monitoring Report and Annual report summarizing the operational and environmental activities monitored for the Nichols Ranch and Hank Units. Semi-Annual reporting is performed according to SUA-1597 License Condition 11.1 and 12.10 and includes information for the period of July 1, 2013 through December 31, 2013. Annual Reporting is submitted per License Conditions 9.4E, 10.11, 11.2, 11.7, and 12.10 accounting for January 1, 2013 through December 31, 2013.

2.0 OPERATIONAL MONITORING

2.1 Activities Summary

Uranerz continued construction of the Nichols Ranch Unit Central Processing Plant (CPP) and Production Area #1 (PA#1) during the report period as summarized in Quarterly Reports submitted to the NRC on October 10, 2013 for third quarter and January 9, 2014 for fourth quarter.

The NRC approved the PA#1 Wellfield Package on September 12, 2013. Wyoming Department of Environmental Quality, Land Quality Division (WDEQ/LQD) approved the PA#1 wellfield package on June 4, 2013.

Production start-up pends approval from the NRC. The NRC performed the pre-operational inspection, for production approval, on November 18, 2013 through November 21, 2013.

Two deep disposal wells, NICH DW 1 (completed August, 2013) and NICH DW 4 (completed October 2013) were approved to operate during the report period (December 5 and 20, 2013 respectively). Deep disposal wells are permitted through the Wyoming Department of Environmental Quality Water Quality Division with water aquifer exemption granted by the EPA.

No operational activities occurred at the Hank Unit during the report period. The Environmental Assessment (EA) is pending with the Bureau of Land Management (BLM) for the 280 acres that the BLM manages.

2.2 Excursion Well Status

No wells were on excursion status during the reporting process. Excursion monitoring will commence following lixiviant circulation.

2.3 Disposal Well Volumes

Along with flow rates, License Condition 10.11 requires the volume disposed in each disposal well to be reported annually. During the reporting period no production activities occurred and did not dispose into the disposal wells during the period.

During the reporting period no production areas were operational. As stated above, construction of the facilities and PA#1 continued at the Nichols Ranch Unit.

2.4 Flow Rates and Manifold Pressures

Per License Condition 11.1C Uranerz is required to record flow rates and manifold pressures daily. These records are compiled and available to inspectors on site upon their request.

2.5 Summary of Mechanical Integrity Testing (MIT) Data

The number of wells installed and mechanical integrity test (MIT) status (License Condition 11.1B) is reported in Quarterly Reports to the NRC to reduce reporting redundancy between agencies requiring the same information.

2.6 Restoration

No production areas are in restoration for the reporting period.

3.0 ENVIRONMENTAL MONITORING

3.1 Ground Water Monitoring

As no production took place during the period no groundwater monitoring, as described in License Condition 11.7 was performed. Ground water monitoring was done preoperatively, in accordance with License Condition 12.10

Pursuant to License Condition 12.10 pre-operational water samples were collected from domestic and livestock wells located within 2 kilometers of the proposed production area. The samples were analyzed at an offsite laboratory for natural uranium, radium-226, and those constituents, chloride, conductivity, and alkalinity, as listed in Section 5.7.8.9 of the license application. The analysis results are provided in Appendix A.

A review of groundwater wells, per License Condition 12.4, within 2 kilometers of any production area identified two new groundwater wells. One is a groundwater well for Samson Resources and the second is the Uranerz domestic well. Water samples were collected and analyzed for each well. A report detailing the specifics was submitted to the NRC on October 16, 2013 and December 27, 2013 respectively.

A surficial aquifer well, URNZG-15, was identified in Production Area #1 during the report period. In accordance with License Condition 11.3C the surficial well will be analyzed for parameters listed in Table D6-6a of the license application. Sampling was attempted; however, no water was available to sample during the report period. The sampling dates for the surficial wells are as follows.

Date	Waterlevel Results
9/17/2013	dry
10/1/2013	dry
11/19/2013	dry
12/17/2013	dry

3.2 Surface Water Monitoring

In accordance with Section 5.7.7.3.1 of the license application surface water will be collected and analyzed for total uranium, Th-230, Ra-226, and Pb-210. Given the prevailing dry conditions; grab samples from locations of surface water were not able to be collected. There are three surface water self-samplers on site with two located at the Nichols Ranch Unit and one at the Hank Unit. Uranerz collected no samples during the period, as there was no water present to sample. Results are provided in Appendix B.

3.3 Summary of Spills

There were no spills as the result of production fluid during the reporting period.

3.4 Sediments and Soil Sampling

In accordance with Section 5.7.7.5 of the license application sediment samples will be collected annually and analyzed for uranium, radium-226, lead-210 and thorium. Samples were collected in areas where surface water is sampled. Results are provided in Appendix C.

Soils are also collected annually in the vicinity of where radon is monitored. There are six radon sampling locations and soil was sampled at each of the locations. Soil samples were analyzed for uranium, radium-226, lead-210 and thorium. Results are provided in Appendix D

3.5 Air Particulate, Radon, and Gamma Radiation Monitoring

Uranerz maintains an air monitoring program at six locations around the licensed Nichols Ranch facility. These stations are used to monitor air particulates, radon, and passive gamma measurements and are averaged and compared to background for use in calculating annual dose to the public.

The air station locations are as follow:

- NA-1 monitors the nearest full time resident at Dry Fork Ranch
- NA-2 is the southern boundary and monitors the down wind conditions of the north west winds for the control processing facility
- NA-3 is at the northern boundary and monitors the downwind conditions of south west winds for the wellfield and the CPP
- NA-4 is at our easterly boundary and is considered our background being upwind from the wellfield and the central processing plant.

- NA-5 is located west of the plant and monitors the down wind conditions of our easterly winds at night.
- NA-6 is located north east of the plant and monitors the man camp our maximally exposed member of the public.

Air Particulate samples are collected weekly and then composited quarterly for analysis by an outside laboratory. Review of the data shows that the concentration of the parameters are less than the 10CFR 20 Appendix B, Effluent Concentration Limits. Table 1 of Appendix E shows the air particulate data collected for the third and fourth quarter.

Radon gas is monitored continuously at the six air particulate stations and at seven other locations. The added locations are additional data points and are intended for internal use. These additional points are available upon inspection, but will not be included in the semi-annual report. Passive outdoor radon detectors are exchanged quarterly and sent to Landauer for analysis. The data is shown in Table 2 of Appendix E. Data is given as raw data without subtracting the background location. Since the site is not in operations the data collected is assumed to be from background sources of radon. Once operations commence these values will be compared to radon daughter effluent releases found in 10CFR 20 Appendix B values to assess dose to the public.

Passive gamma radiation is monitored continuously at the six air particulate stations and at the other seven radon stations. The added locations are additional data points and are intended for internal use. These additional points are available upon inspection, but will not be included in the semi-annual report. The monitoring is performed using Optically Stimulated Luminescence (OSL) dosimeters that are exchanged and analyzed by Landauer quarterly. The passive gamma radiation monitoring data is shown in Table 3 of Appendix E.

4.0 SUMMARY OF EMPLOYEE URINALYSIS RESULTS

No bio-assays exceeded the action level of 15 µg/L uranium during the report period. Samples are collected on all employees at initial hiring. Monthly samples are collected from plant operators. Analysis is performed by an outside laboratory.

5.0 PUBLIC DOSE

10 CFR 20.1301 requires that each NRC licensee conduct their operations in a manner that the total effective dose equivalent (TEDE) to members of the public does not exceed 100 mrem in a year, and that the dose from external sources in any unrestricted area does not exceed 2 mrem in any hour.

Additionally, 10CFR 20.1302 requires licensees to show compliance to these dose limits by demonstrating one of the following:

1. Show by actual measurement or calculation that the TEDE to the public does not exceed 100 mrem; or
2. Show that the annual average concentration of radioactive effluent released at the restricted boundary do not exceed the values in Table 2 of Appendix B in 10 CFR 20. Also that the external dose to an individual continuously present in an unrestricted area would not exceed 2 mrem in an hour.

Since Uranerz is awaiting permission to process licensed material, compliance these dose limits are not required.

6.0 SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) EVAULATIONS

Per License Condition 9.4E, Uranerz shall furnish, in an annual report to the NRC, a description of such changes, tests, or experiments, including a summary of the evaluations made by the safety and environmental evaluation panel (SERP). Uranerz completed a total of eleven (11) SERPs during the year. A summary of the SERPs findings for each evaluation can be found in Appendix G Table 1. In addition the licensee shall annually submit changed pages, which shall include both a change indicator and a page change identification. Page changes to the operation and reclamation plan are being submitted separate of this report.

7.0 ALARA REVIEW

As required by License condition 11.2, the licensee shall submit the results of the annual review of the radiation protection program content and implementation performed in accordance with 10CFR20.1101(c). These results shall include doses to individual members of the public. This submittal will occur once the Nichols Ranch facility is allowed to process licensed material and has done so for a calendar year. After the year, an ALARA audit will occur and will be submitted with the semi-annual effluent report in July. This allows all data from the fourth quarter to arrive before issuing doses to the public.

8.0 SURETY

All activities that have been conducted to date at the Nichols Ranch ISR Project are covered in the original surety estimate that was submitted when SUA-1597 was issued. No revisions are necessary at this time.

The WDEQ-LQD also requires an annual surety review and therefore Uranerz will review the surety annually in December (during the NRC second half semi-annual report period) thus aligning the NRC and LQD surety reviews for consistency, standardization and reduced redundancy. Uranerz submitted the update to the NRC under cover letter dated December 9, 2013.

Appendix A

Livestock and Domestic Wells Within 2 Kilometers

Water Quality Analysis

July-December 2013 Semi-Annual Report

Sample Location	Sample Date	Uranium-Natural (Total)		Radium 226			Alkalinity (mg/L)	Conductivity (umhos/cm)	Chloride (mg/L)
		Concentration (mg/L)	Reporting Limit (mg/L)	Concentration (pCi/L)	Precision (±) (pCi/l)	MDC or RL (pCi/L)			
Hank Unit									
North Dry Willow	23 Oct 13	0.0763	0.0003	3.1	0.35	0.14	132	2250	9
Dry Willow #1	9 Sep 13	0.0028	0.0003	43	1.2	0.14	125	1170	3
Brown - F	9 Sep 13	0.0003	0.0003	0.77	0.18	0.13	145	464	3
Brown - WS	23 Oct 13	0.0084	0.0003	0.48	0.015	0.14	81	1210	5
Means #1	23 Oct 13	0.0260	0.0003	1.3	0.23	0.14	105	1690	4
Paden #1	19 Jun 13	0.606	0.0003	4.9	0.045	0.17	119	2070	8
Doble Hill Well #1	Not Sampled, Well Disconnected								
Connie #2	Not Sampled, Inoperable								
Nichols Ranch Unit									
DW-4L	23 Jul 13	ND	0.0003	0.04	0.11	0.18	112	611	9
DW-4M	26 Sep 13	ND	0.0003	0.33	0.17	0.19	162	1330	25
DW-4U	4 Sep 13	0.0855	0.0003	0.61	0.20	0.19	132	1440	6
Nichols #1	22 Jul 13	0.0274	0.0003	0.04	0.11	0.199	133	494	5
Pats #1	23 Jul 13	0.0452	0.0003	0.24	0.17	0.22	132	613	6
Pug #2	23 Jul 13	ND	0.0003	0.30	0.17	0.22	250	494	3
Brown 21-6	23 Jul 13	ND	0.0003	-0.03	0.11	0.21	153	416	5
Red Springs Artesian	Not Sampled, Dry Well (Checked September 9, 2013)								
Dry Fork #3	Not Sampled, Dry Well (Checked September 9, 2013)								
Pug #1	Not Sampled, Dry Well (Checked September 9, 2013)								

Notes:

ND =Not Detected at the Reporting Limit

MDC = Minimum Detectable Concentration

RL = Reporting Limit

Appendix B

Uranerz Surface Water Quality Analysis

July - December 2013 Semi-Annual Report

Sample Location	Sample Date	Uranium-Natural (Total)		Radium 226			Lead 210			Thorium 230		
		Concentration (mg/L)	Reporting Limit (mg/L)	Concentration (pCi/L)	Precision (±) (pCi/L)	MDC or RL (pCi/L)	Concentration (pCi/L)	Precision (±) (pCi/L)	MDC or RL (pCi/L)	Concentration (pCi/L)	Precision (±) (pCi/L)	MDC or RL (pCi/L)
NRSSW (Cottonwood D Nichols)	NA	No water present to sample										
NRSSE (Cottonwood U Nichols)	N/A	No water present to sample										
Dry Willow Reservoir	N/A	No water present to sample										
Brown Water Pond	N/A	No water present to sample										
HSS (Dry Willow Creek)	NA	No water present to sample										

Notes:

ND =Not Detected at the Reporting Limit

MDC = Minimum Detectable Concentration

RL = Reporting Limit

Appendix C

Uranerz Sediment Analysis

July-December 2013 Semi-Annual Report

Sample Location	Sample Date	Uranium-Natural (Total)		Radium 226			Lead 210			Thorium 230		
		Concentration (mg/L)	Reporting Limit (mg/L)	Concentration (pCi/L)	Precision (±) (pCi/l)	MDC or RL (pCi/L)	Concentration (pCi/L)	Precision (±) (pCi/l)	MDC or RL (pCi/L)	Concentration (pCi/L)	Precision (±) (pCi/l)	MDC or RL (pCi/L)
NRSSW (Cottonwood D Nichols)	6 Jun 13	3.9	0.1*	3.0	0.1	0.02	2.3	0.2	0.2	0.7	0.2	0.2
NRSSE (Cottonwood U Nichols)	6 Jun 13	6.7	0.1*	1.9	0.09	0.02	1.7	0.2	0.2	0.7	0.2	0.2
Dry Willow Reservoir	23 Jul 13	1.5	1.0	1.4	0.05	0.01	1.8	0.1	0.2	1.1	0.3	0.2
Brown Water Pond	23 Jul 13	1.7	1.0	1.2	0.05	0.01	2.8	0.2	0.2	0.7	0.2	0.1
Cottonwood Creek @ Brown Ranch	22 Jul 13	1.4	1.0	1.0	0.04	0.01	0.9	0.1	0.2	0.6	0.2	0.1
HSS (Dry Willow Creek)	12 Jun 13	1.9	1.0	0.7	0.05	0.02	0.6	0.1	0.2	0.7	0.2	0.1

Notes:

ND =Not Detected at the Reporting Limit

MDC = Minimum Detectable Concentration

RL = Reporting Limit

* Per laboratory the Reporting Limit was increased due to sample matrix and represents the need for a dilution factor.

Appendix D

Uranerz Soil Analysis

July-December 2013 Semi-Annual Report

Sample Location	Sample Date	Uranium-Natural (Dissolved)		Radium 226			Lead 210			Thorium 230		
		Concentration (mg/L)	Reporting Limit (mg/L)	Concentration (pCi/L)	Precision (±) (pCi/l)	MDC or RL (pCi/L)	Concentration (pCi/L)	Precision (±) (pCi/l)	MDC or RL (pCi/L)	Concentration (pCi/L)	Precision (±) (pCi/l)	MDC or RL (pCi/L)
NA-1	10 Jun 13	1.4	1.0	1.2	0.07	0.02	0.8	0.1	0.2	0.5	0.2	0.1
NA-2	10 Jun 13	1.0	1.0	1.0	0.07	0.02	1.5	0.1	0.2	0.3	0.2	0.2
NA-3	10 Jun 13	1.2	1.0	0.9	0.06	0.02	0.5	0.1	0.2	0.6	0.2	0.1
NA-4	10 Jun 13	ND	1.0	0.9	0.07	0.02	0.8	0.1	0.2	0.6	0.2	0.1
NA-5	10 Jun 13	ND	1.0	1.2	0.07	0.02	0.9	0.1	0.2	0.7	0.2	0.2
NA-6	10 Jun 13	ND	1.0	1.2	0.07	0.02	1.4	0.1	0.2	0.7	0.3	0.2

Notes:

ND =Not Detected at the Reporting Limit

MDC = Minimum Detectable Concentration

RL = Reporting Limit

Appendix E
Table 1 Air Particulate Locations
July-December 2013

Sample Location	Sample Period	Radionuclide	Concentration (µCi/ml)	Error ±(µCi/ml)	LLD (µCi/ml)	10CFR 20 APP B Table 2 Values (µCi/ml)	Percent Concentration %
NA-1 Air Station Nearest Resident	3rd Quarter	U-Nat	5.E-17	NA	1E-16	9E-14	0.1
		Th-230	8.E-17	4E-17	1E-16	3E-14	0.3
		Ra-226	-8.E-18	6E-17	1E-16	9E-13	0.0
		Pb210	1.E-15	1E-15	2E-15	6E-13	0.2
	4th Quarter	U-Nat	1.40E-16	N/A	1E-16	9E-14	0.2
		Th-230	1E-16	N/A	1E-16	3E-14	0.3
		Ra-226	1E-16	N/A	1E-16	9E-13	0.0
		Pb-210	1.4E-14	1.7E-15	2E-15	6E-13	2.3
NA-2 Air Station Downwind Southern Boundary	3rd Quarter	U-Nat	6.E-17	NA	1E-16	9E-14	0.1
		Th-230	1.E-16	5E-17	1E-16	3E-14	0.3
		Ra-226	6.E-17	9E-17	1E-16	9E-13	0.0
		Pb210	1.E-14	3E-15	2E-15	6E-13	1.8
	4th Quarter	U-Nat	1.20E-16	N/A	1E-16	9E-14	0.1
		Th-230	1E-16	N/A	1E-16	3E-14	0.3
		Ra-226	1.1E-16	3.7E-17	1E-16	9E-13	0.0
		Pb-210	2.3E-14	2E-15	2E-15	6E-13	3.8
NA-3 Air Station Downwind North Boundary	3rd Quarter	U-Nat	1.E-16	NA	1E-16	9E-14	0.1
		Th-230	1.E-16	8E-17	1E-16	3E-14	0.3
		Ra-226	-1.E-18	1E-16	1E-16	9E-13	0.0
		Pb210	5.E-15	6E-15	2E-15	6E-13	0.8
	4th Quarter	U-Nat	1.30E-16	NA	1E-16	9E-14	0.1
		Th-230	1E-16	NA	1E-16	3E-14	0.3
		Ra-226	1E-16	3.8E-17	1E-16	9E-13	0.0
		Pb-210	2.6E-14	2.3E-15	2E-15	6E-13	4.3
NA-4 Air Station Background Site	3rd Quarter	U-Nat	5.E-17	NA	1E-16	9E-14	0.1
		Th-230	7.E-17	4E-17	1E-16	3E-14	0.2
		Ra-226	-9.E-18	7E-17	1E-16	9E-13	0.0
		Pb210	2.E-15	1E-15	2E-15	6E-13	0.3
	4th Quarter	U-Nat	1.4E-16	NA	1E-16	9E-14	0.2
		Th-230	1E-16	NA	1E-16	3E-14	0.3
		Ra-226	1E-16	NA	1E-16	9E-13	0.0
		Pb-210	2.4E-14	2E-15	2E-15	6E-13	4.0

Appendix E
Table 1 Air Particulate Locations
July-December 2013

Sample Location	Sample Period	Radionuclide	Concentration (µCi/ml)	Error ±(µCi/ml)	LLD (µCi/ml)	10CFR 20 APP B Table 2 Values (µCi/ml)	Percent Concentration %
NA-5 Air Station Downwind West of CPP	3rd Quarter	U-Nat	6.E-17	NA	1E-16	9E-14	0.1
		Th-230	9.E-17	5E-17	1E-16	3E-14	0.3
		Ra-226	8.E-17	1E-16	1E-16	9E-13	0.0
		Pb210	1.E-14	3E-15	2E-15	6E-13	2.2
	4th Quarter	U-Nat	1E-16	NA	1E-16	9E-14	0.1
		Th-230	1E-16	NA	1E-16	3E-14	0.3
		Ra-226	1E-16	NA	1E-16	9E-13	0.0
		Pb-210	2.6E-14	2.E-15	2E-15	6E-13	4.3
NA-6 Air Station Downwind North East of CPP	3rd Quarter	U-Nat	6.E-17	NA	1E-16	9E-14	0.1
		Th-230	8.E-17	4.E-17	1E-16	3E-14	0.3
		Ra-226	9.E-17	1.E-16	1E-16	9E-13	0.0
		Pb210	5.E-15	1.E-15	2E-15	6E-13	0.8
	4th Quarter	U-Nat	1.E-16	NA	1E-16	9E-14	0.1
		Th-230	1E-16	NA	1E-16	3E-14	0.3
		Ra-226	1E-16	NA	1E-16	9E-13	0.0
		Pb-210	2.E-14	2.E-15	2E-15	6E-13	3.7

Appendix E
Table 2 Radon Monitoring
January - December 2013

Location Nichols Ranch Project	1st Quarter (µCi/ml)	Uncertainty (µCi/ml)	2nd Quarter (µCi/ml)	Uncertainty (µCi/ml)	3rd Quarter (µCi/ml)	Uncertainty (µCi/ml)	4th Quarter (µCi/ml)	Uncertainty (µCi/ml)	Location Average (µCi/ml)	10CFR 20 APP B Table 2 Values (µCi/ml)
NR-1 (Nearest Resident)	5.00E-10	4.00E-11	1.60E-09	1.00E-10	9.00E-10	7.00E-11	1.10E-09	9.00E-11	1.03E-09	1.00E-10
NR-2 (Southern Boundary Downwind)	NA	NA	7.00E-10	5.00E-11	1.30E-09	8.00E-11	6.00E-10	6.00E-11	6.50E-10	1.00E-10
NR-3 (North Boundary Downwind)	3.00E-10	3.00E-11	3.00E-10	3.00E-11	9.00E-10	8.00E-11	5.00E-10	6.00E-11	5.00E-10	1.00E-10
NR-5 (Background)	NA	NA	6.00E-10	5.00E-11	1.10E-09	8.00E-11	7.00E-10	6.00E-11	8.00E-10	1.00E-10
NR-6 (West of CPP downwind)	NA	NA	6.00E-10	5.00E-11	1.10E-09	8.00E-11	7.00E-10	6.00E-11	6.00E-10	1.00E-10
NR-7 (North East of CPP Downwind Maximally Exposed Member of the Public)	NA	NA	6.00E-10	5.00E-11	1.20E-09	8.00E-11	8.00E-10	7.00E-11	6.50E-10	1.00E-10

Appendix E
Table 3 Passive Gamma Radiation Monitoring
January-December 2013

Location Nichols Ranch Project	1st Quarter (mrem/quarter)	2nd Quarter (mrem/quarter)	3rd Quarter (mrem/quarter)	4th Quarter (mrem/quarter)	Location Average (µCi/ml)
NR-1(Nearest Resident)	4.9	6.1	10	5.9	6.7
NR-2 (Southern Boundary Downwind)	7.7	5.9	8.4	5.3	6.8
NR-3 (North Boundary Downwind)	3.3	7.3	6.6	4.6	5.5
NR-5 (Background Upwind)	4.5	10.2	10.1	8.3	8.3
NR-6 (West of CPP downwind)	NA	7.4	12.4	1.6	7.1
NR-7 (North East of CPP Downwind, maximally exposed member of the public)	NA	9.1	13.4	6.1	9.5
Quarterly Average	5.1	7.7	10.2	5.3	7.1

Appendix F
Annual SERP Summary
January-December 2013

SERP No.	Date	SERP Topic	Evaluation Summary
SERP-7-2012	8/29/2013	Steel Header House Basements	The license application describes the use of conrete for headerhouse foundations. The SERP evaluated the use of other materials, such as steel, for the foundation basements. The use of other materials may reduce disposal cost as they may be re-used in future wellfield header houses. Other ISR facilities use different materials in this application. Leak Detection was evaluated as a potential concern and the SERP concluded that there would be no changes to leak detection as Uranerz would still be required to provide the same level as evaluated in the license application. The SERP concluded that using alternative materials would be acceptable.
SERP-1-2013	10/22/2013	Management Title Position Changes in License Application	The SERP evaluated title changes described in Chapter 5.0 of the TR. Changes were made to the President, Executive Vice President, Vice President, Production and Vice President, Environment, Safety and Health and Manager ESH. The President was updated to CEO, the Executive Vice President was removed, the Vice President Production was revised to Vice President Operations, the Vice President ESH was revised to Vice President Regulatory Affairs, and the Manager ESH was reinstated. Responsibilities of each position were evaluated by the SERP to ensure that appropriate management remains in place as described in Regulatory Guide 8.31 and NUREG 1569 . The SERP concluded that the revisions are acceptable and does not change the license application as it was previously evaluated in the NRC SER.
SERP-2-2013	7/30/2013	Revise Volume I, Section 2.4.2 Project Effect on Cultural Resource Sites within the Nichols Rand Unit and Hank Unit	The license application descibes that green snow fence will be used to fence cultural site within the license boundary. However, the snow fence is not a conducive material in harsh local weather conditions, specifically winds. Additionally, surface landowners do not care for the use of the snow fence and have requested it not be used. Therefore it was proposed to remove the specification of using green snow fence from the license application. The Memorandum of Agreement (MOA) with the NRC dictates that those areas stated in the MOA will be 'delineated and fenced'. The MOA however does not specify fencing types which allows Uranerz the availability to use a fencing type on a by case basis. The license application was revised to align with the MOA and ensure compliance as required in License Condition 9.8. The SERP concluded that these changes were acceptable and ensures commitments are met.
SERP-3-2013	7/30/2013	Revise TR Section 7.5.4 for use of gas heaters	The license application provides for the use of electric heaters only. However, the flexibilty to use either electric or gas was proposed and evaluated by the SERP. A review of the NRC SER indicates that the NRC staff evaluated the electric heaters based on dispersion potential in the instance of an explosion. Based on that, the use of gas heaters would only be changing the heater type, not the nature of the material form as evaluated in the SER. Therefore, the SERP concluded to accept the change and revised the license application to include the use of gas heaters.

Appendix F
Annual SERP Summary
January-December 2013

SERP No.	Date	SERP Topic	Evaluation Summary
SERP-4-2013	7/29/2013	Revise Well Diagrams Figures 3-13 and 3-14 in Volume I	Figures 3-13 and 3-14 which are well diagrams, were revised with regard to casing stick up. Well construction is permitted through the WDEQ-LQD regulations which requires that casing sticks up above ground and no height is specified. The intent of well stickup is to prevent entry of foreign materials into the well. These two figures were revised in the DEQ permit and to maintain consistency and therefore compliance the NRC figures were revised. The SERP agreed and concluded that the minor revision to the figures would not change the license application as evaluated as the revisions were in alignment with regulatory requirements.
SERP-5-2013	8/27/2013	11e2 Disposal Site & Methods	The SERP evaluated proposed changes to Section 3.2.6 of Volume I of the license application. The proposal was to change how 11e(2) byproduct material was stored and packaged at Nichols Ranch in order to economically and safely dispose of the material. The changes allow for the use of super sack and lined containers as well as the use of both concrete and or gravel pads in the 11 e 2 disposal areas. The SERP concluded that the changes will not result in increased safety or radiological hazards and will ultimately result in less byproduct material which is in agreement with the ALARA principle. Based on the conclusions the SERP agreed to accept the changes.
SERP-6-2013	10/8/2013	Spill Clean up requirements	The license application required excessively more stringent cleanup criteria than regulatorily required in 10CFR40 Criterion 6(6) Appendix A. It was proposed that the radium benchmark be used instead, because to remediate soil below regulation imposes undue expense and is not scientifically based. The codified regulations outline the radium benchmark standard and the obligations of the licensees to follow this standard. The NRC's criteria is 5 pCi/g (surface) and 15 pCi/g (subsurface) above background. Therefore clarification of remediation efforts for spills was necessary to be included in the license application. The SERP concluded that this change allows for more practical remediation plans while maintaining safety and environmental commitments.
SERP-7-2013	10/15/2013	RST Qualifications	The SERP was presented with employee qualifications for Radiation Safety Technicians. The qualifications were reviewed with Regulatory Guide 8.31. Both employees were found to be well qualified and the SERP concluded that they met requirements to be radiation safety technicians.
SERP-8-2013	11/12/2013	Plant Design Figure Changes	The SERP evaluated various changes to Figure 3-3 of Section 3 Volume I of the license application. There are six changes that would impact Figure 3-3. These changes evolved during construction and involved revising locations of various rooms and equipment. Two changes involved new equipment not shown on Figure 3-3. Based on the evaluation of the items the SERP concluded that Figure 3-3 of the license application requires revision and will be submitted in the second semi-annual report.

Appendix F
Annual SERP Summary
January-December 2013

SERP No.	Date	SERP Topic	Evaluation Summary
SERP-9-2013	12/10/2013	Removal Water Sampling SOP Addendum 5a	The license application contains a Uranerz standard operating procedure for well sampling. This procedure is the only procedure incorporated into the license application and requires a formal Safety and Environmental Review Panel (SERP) to update or change. The NRC was consulted on the need to have the procedure in the application and per discussion concluded that it was not a requirement to have standard operating procedures in the application but to ensure that discussion was provided that they are on site for review. It was therefore proposed to remove the procedure from the application so that it may be maintained as other site procedures are. All procedures may be reviewed by the NRC during site inspections. The SERP agreed that the procedure should be removed.
SERP-10-2013	12/10/2013	RSO Qualifications	The SERP was presented with two employee's qualifications for Radiation Safety Officers. The qualifications were reviewed with Regulatory Guide 8.31. The SERP agreed that both employees qualification meet the requirements of RSO.

Do not make corrections to this form after printing. Forms bearing strikeouts, ink changes, etc will not be accepted.

INDEX SHEET FOR MINE PERMIT AMENDMENTS OR REVISIONS

Date 1/9/2014

MINE COMPANY NAME: Uranerz Energy Corporation
MINE NAME: Nichols Ranch ISR Project

License NO.: SUA-1597

Statement: I, Michael P. Thomas, an authorized representative of Uranerz Energy Corporation declare that only the items listed on this and all consecutively numbered Index Sheets are intended as revisions to the current permit document. In the event that other changes inadvertently occurred due to this revision, those unintentional alterations will not be considered approved. Please initial and date.
MPT 2-13-2014

NOTES:
1) Include all revision or change elements and a brief description of or reason for each revision element.
2) List all revision or change elements in sequence by volume number; number index sheets sequentially as needed.

Volume Number	Page, Map or other Permit Entry to be REMOVED	Page, Map or other Permit Entry to be ADDED	Description of Change
Volume I	Mine Plan Section 2.4.2, Pgs. TR-21 and TR-21a (Revised January 2010)	Mine Plan Section 2.4.2, Pgs. TR-21 and TR-21a (Revised July 2013)	Pages are being replaced for revisions to subsections 'Project Effects of Cultural Resource Sites within the Nichols Ranch Unit' and Project Effects to Cultural Resources within the Hank Unit.
Volume I	Mine Plan Section 2.0, Figure 2-1 (date 10/15/2007)	Mine Plan Section 2.0, Figure 2-1 (Rev Date: 11/13/2013)	Figure 2-1 Access Roads and Resin Transfer Routes is being replaced with a revised figure showing the routes available to truck to Smith Ranch Highland ISR Project
Volume I	Mine Plan Section 3.2.6, Pg. TR-175 (Revised July 2010), Figure 3-1 (date: 10/17/2007)	Mine Plan Section 3.2.6, Pg. TR-175 (Revised August 2013), Figure 3-1 (Revised July 22, 2013)	Page and figure replace those for section 3.2.6 Sources of Plant Liquid Effluents and Disposal Methods
Volume I	Mine Plan Section 3.4.3, Pgs. TR-180 (Revised July 2010)	Mine Plan Section 3.4.3, Pgs. TR-180 and TR-180a (Revised August 2013)	Pages revised for section 3.4.3 Wellfield Injection Patternsto describe organizational structure changes. Figure was revised and is being replaced to illustrate the narrative changes.
Volume I	Mine Plan Section 5.1.1, Pgs. TR-201 (November 2008), TR-202 through TR-206 (Revised July 2012) and Figure 5-1 (12-5-2008)	Mine Plan Section 5.1.1, Pgs. TR-201 through TR-206 and Figure 5-1 (Revised October 2013)	Pages revised for Section 5.1.1 Management, Figure 5-1 revised to reflect narrative changes
Volume I	Mine Plan Section 5.7.8.5.1 Pg. TR-241, Pg TR-5A-I and Operational Groundwater Sampling Procedure (Revised July 2010)	Mine Plan Section 5.7.8.5.1 Pg. TR-241, Pg. TR-5A-I (Revised December 2013)	Page revised for Section 5.7.8.5.1 Data Collection. The Standard Operating Procedure in Addendum 5A was removed; however a place holder remains for any future needs for an Addendum 5A.
Volume I	Mine Plan Section 5.7.8.10.2, Pg. TR-247 (Rev. Feb. 2009)	Mine Plan Section 5.7.8.10.2, Pg. TR-247 (Revised December 2013)	Page revised for Section 5.7.8.10.2 Water Quality Sampling and Analysis Procedures.
Volume I	Mine Plan Section 7.5.1.2, Pg. TR-313 (Rev.Feb.2009)	Mine Plan Section 7.5.1.2, Pg. TR-313(Revision August 2013)	Page revised for Section 7.5.1.2 Shipments of Loaded Resin
Volume I	Mine Plan Section 7.5.3.Pg TR-318 (Revised July 2010)	Mine Plan Section 7.5.3.Pg TR-318 (Revised October 2013)	Page revised for Section 7.5.3.1 Process Pipelines.
Volume I	Mine Plan Section 7.5.4, Pg. TR-320 (November 2007)	Mine Plan Section 7.5.4, Pg. TR-320 (Revised July 2013)	Page revised for Section 7.5.4 Fires and Explosions
Volume I	Mine Plan Section 3.0 , Figure 3-3 (Date: October 18, 2007), Figure 3-3a (2/23/2008), Figure 3-13 (Sept. 25,2007), Figure 3-14 (Sept.25,2007),	Mine Plan Section 3.0 , Figure 3-3 (11/13/2013), Figure 3-13 (7/11/13), Figure 3-14 (7/11/13)	Figures 3-3, 3-13, and 3-14 have been updated and require replacement. Figure 3-3a is being removed as the contents were incorporated into Figure 3-3.

(personal communication, November 21, 2007, with Clint Crago, Archaeologist, BLM Buffalo Field Office). The SENE, NESE, and SESE of Section 31 were inventoried in 2007 for the Uranerz Energy Corporation's Hank In Situ Uranium Project, but it has not been reviewed by BLM. All of Sections 6-8 T43N, R75W, were inventoried at the Class III level in 2006 by Arcadis U.S., Inc. for the Dry Willow Phase 4 POD.

Impact Assessment/Project Effect to Cultural Resources

Of the 54 sites previously identified within and near the Nichols Ranch and Hank Units, 37 of these sites are located within the permit boundary of the Nichols Ranch project area (13 sites are in the Nichols Ranch Unit and 24 sites are in the Hank Unit (see Table 2-6 and Exhibit 2-1). Of these 37 sites within the Nichols Ranch permit area, 11 sites are eligible for the NRHP: three within the Nichols Ranch Unit and 8 within the Hank Unit (see Table 2-6). They include multicomponent Site 48CA268 (Pumpkin Buttes TCP), which occurs within and adjacent to the east side of the Hank Unit (Exhibit 2-1).

Project Effects to Cultural Resource Sites within the Nichols Ranch Unit

There are three NRHP-eligible cultural resource sites within the Nichols Ranch Unit and there will be no adverse effects to any of the three NRHP-eligible cultural resources (Sites 48JO2946, 48CA5390, and 48CA5391). Uranerz will avoid these sites during ground disturbing activities and there will be no adverse effects to any of these sites. To provide further protection to the two eligible sites that are located within or near the projected wellfield (specifically sites 48JO2944 and 48CA5391), Uranerz will delineate ~~these sites~~ and ~~will mark them with green colored plastic snow~~ fence ~~material~~ around these sites. The fencing ~~material will not be highly visible and no signs will be installed but the fencing material~~ will protect these sites from inadvertent disturbance while allowing ~~. Uranerz will also provide small openings (6 to 8 ft) in the fencing to allow~~ livestock and wildlife to move freely in, out, and through the site.

In addition, the Nichols Unit will not adversely affect the setting, feeling, and association of Site 48CA268 because it occurs almost 5.0 mi west of the Pumpkin Buttes TCP (see

Exhibit 2-1). The Programmatic Agreement prepared for this site has determined that only ground disturbing activities within 2.0 mi of the appropriate base elevations of Site 48CA268 will have an adverse effect to the contributing setting surrounding the TCP. Therefore, project-related activities in the Nichols Ranch Unit will not have an adverse effect to Site 48CA268.

Project Effects to Cultural Resources within the Hank Unit

There are eight NRHP-eligible cultural resource sites within the Nichols Ranch Unit and there will be no adverse effects to any of the eight NRHP-eligible cultural resources (Sites 48CA268, 48CA6475, 48CA6490, 48CA6748, 48CA6751, 48CA6753, 48CA6754, and 48CA6927). Uranerz will avoid these sites during ground disturbing activities and there will be no adverse effects to any of these sites. To provide further protection to the two eligible sites that are located within the projected wellfield (specifically sites 48CA6754 and 48CA6727), Uranerz will delineate and fence around these sites in consultation with the Secretary of Interior's Standard for Archaeology and History.. The fencing will protect these sites from inadvertent disturbance while allowing ~~these sites and will mark them with green colored plastic snow fence material. The fencing material will not be highly visible and no signs will be installed but the fencing material will protect these sites from inadvertent disturbance. Uranerz will also provide small openings (6 to 8 ft) in the fencing to allow~~ livestock and wildlife to move freely in, out, and through the site.

Additionally, Uranerz will comply with the mitigation measures stipulated in the 2009 Programmatic Agreement for in-situ uranium operations for the Pumpkin Butte TCP. Detailed information concerning specific mitigation measures is presented in Section MP 3.16. Therefore, there will be no adverse effect to the Pumpkin Butte TCP (Site 48CA268) from project-related activities in the Hank Unit. Table 2-6a summarizes the NRHP eligibility and project effect to the eight NRHP-eligible sites.

2.4.3 Paleontological Resources

A paleontological survey was conducted for the Nichols Ranch ISR Project. From the survey performed, the Nichols Ranch ISR Project was concluded to have no major impact to significant

(personal communication, November 21, 2007, with Clint Crago, Archaeologist, BLM Buffalo Field Office). The SENE, NESE, and SESE of Section 31 were inventoried in 2007 for the Uranerz Energy Corporation's Hank In Situ Uranium Project, but it has not been reviewed by BLM. All of Sections 6-8 T43N, R75W, were inventoried at the Class III level in 2006 by Arcadis U.S., Inc. for the Dry Willow Phase 4 POD.

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There are eight NRHP-eligible cultural resource sites within the Nichols Ranch Unit and there will be no adverse effects to any of the eight NRHP-eligible cultural resources (Sites 48CA268, 48CA6475, 48CA6490, 48CA6748, 48CA6751, 48CA6753, 48CA6754, and 48CA6927). Uranerz will avoid these sites during ground disturbing activities and there will be no adverse effects to any of these sites. To provide further protection to the two eligible sites that are located within the projected wellfield (specifically sites 48CA6754 and 48CA6727), Uranerz will delineate and fence around these sites in consultation with the Secretary of Interior's Standard for Archaeology and History.. The fencing will protect these sites from inadvertent disturbance while allowing livestock and wildlife to move freely in, out, and through the site.

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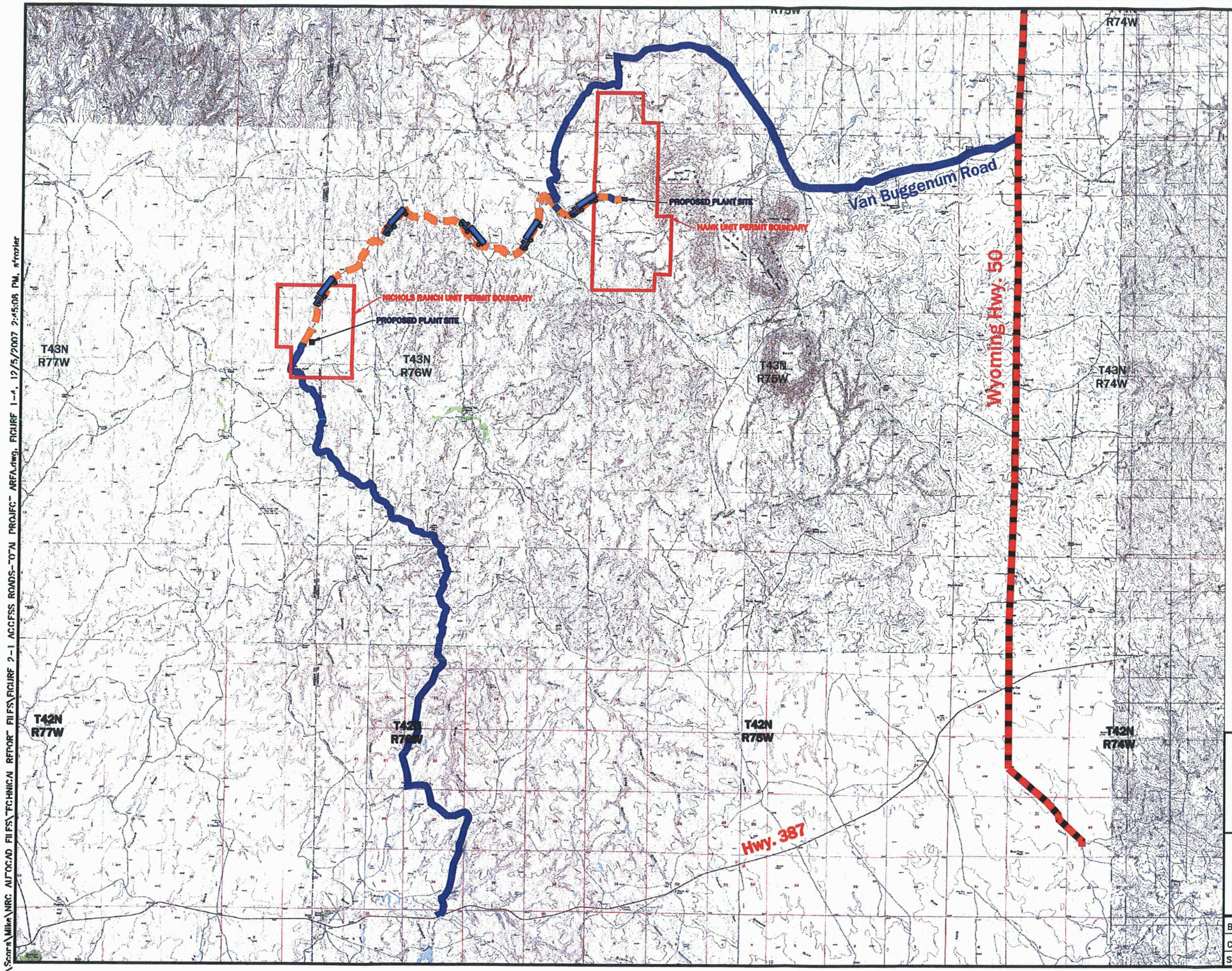

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LEGEND

- ACCESS ROAD
- HIGHWAYS
- RESIN TRANSFER ROUTE

Uranerz ENERGY CORPORATION
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Casper, Wyoming
USA 82605-0850

NICHOLS RANCH ISR PROJECT

FIGURE 2-1
ACCESS ROADS AND RESIN TRANSFER ROUTE

By: S.M.F.	Date: 10/15/2007
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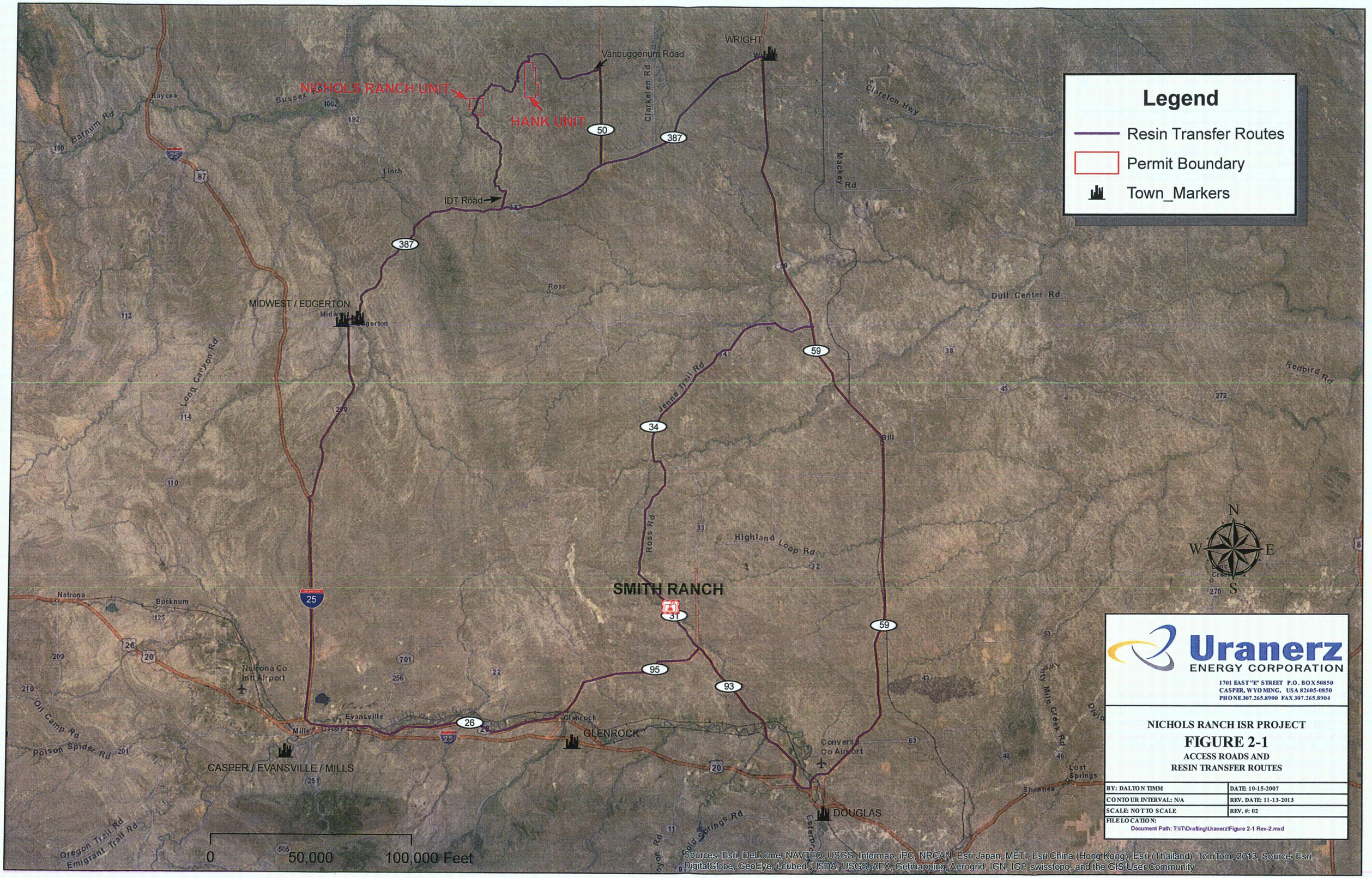
U:\Sara\Mike\NRC AUTOCAD FILES\TECHNICAL REPORT FILES\FIGURE 2-1 ACCESS ROADS-TOWN PROJECT AREA.dwg, FIGURE 2-1, 12/5/2007 2:45:08 PM, sfrazier



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NICHOLS RANCH ISR PROJECT

FIGURE 2-1

ACCESS ROADS AND RESIN TRANSFER ROUTES

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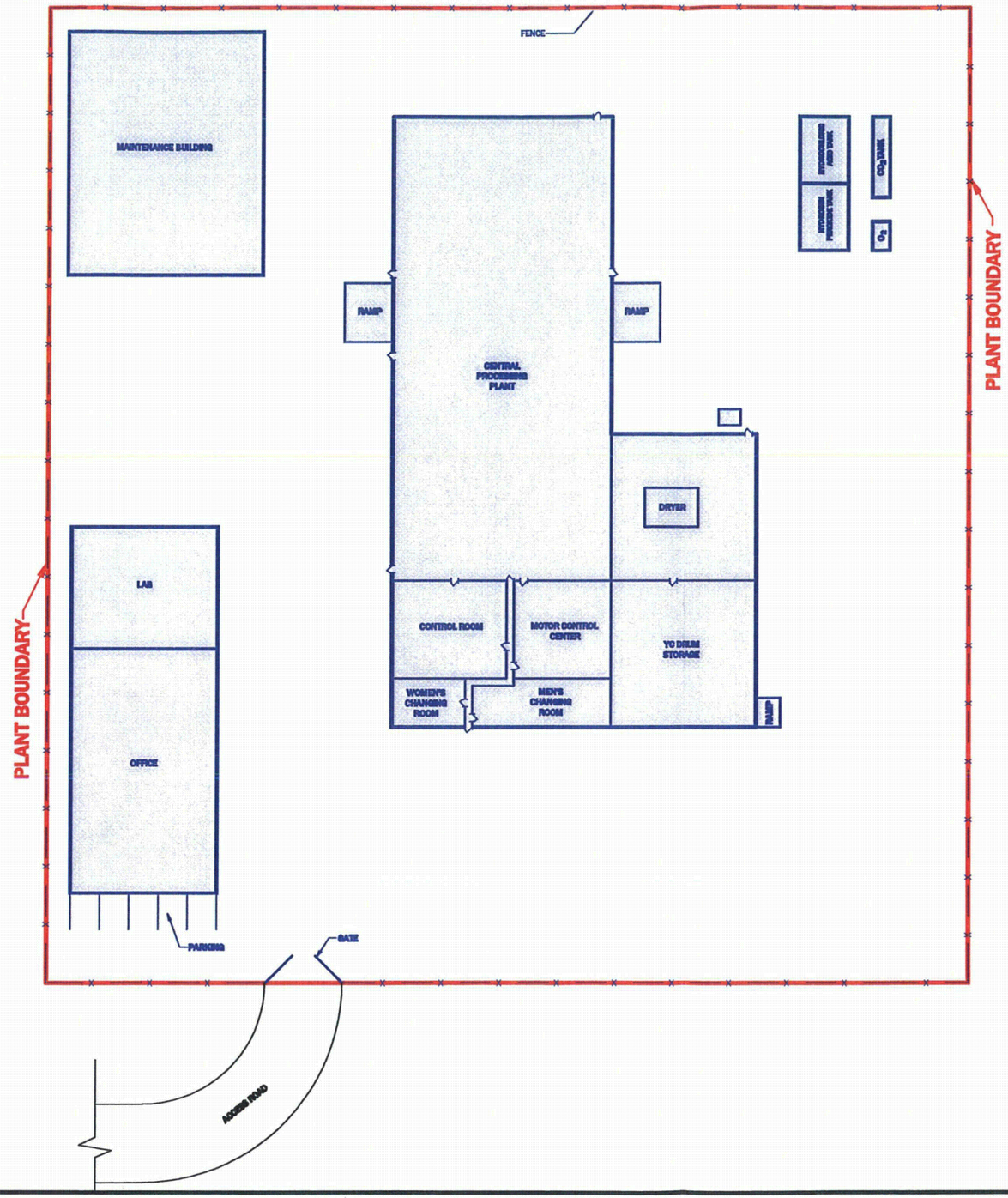
from the plants will be placed into drums such as 55-gallon drums with drum liners, or placed in watertight packages such as super sacks. The ~~drums~~ packages will be located in ~~designated signed~~ restricted areas until placed inside an 11e(2) disposal container.~~the plants.~~ After a ~~drum~~ package is full it will be moved to the plant's 11e(2) byproduct storage area, and the contents placed in a strong tight ~~roll-off~~ container such as a roll-off container. If material such as pipe is too large to fit in the ~~drum~~package, the large material will be placed in ~~the specific plant's byproduct storage area~~a lined container inside the 11e(2) disposal area. The storage areas are shown on the revised diagrams: Figure 3-1 Site Facility Diagram Nichols Ranch Unit and Figure 3-2 Site Facility Diagram Hank Unit. The areas will have concrete and or gravel pads and appropriate signage. The strong tight containers will follow DOT regulations, and typically be covered ~~roll-off~~ containers with an estimated capacity of 20 cubic yards. After a ~~roll-off~~ container is filled, it will be transported to an approved 11e(2) byproduct storage facility.

In the wellfields outside the plant areas there will be some temporary storage of equipment and supplies that are needed for wellfield construction. Equipment and materials that are not releasable for unrestricted use and are not amenable to placement in a container will be stored to prevent dispersion and migration of contamination; e.g. decontamination of removable or covering to prevent weathering. The wellfield sites will be minimized, have appropriate signage, and will be within the wellfield fenced boundary.

3.3 CHEMICAL STORAGE FACILITIES

Uranerz plans to use chemicals to extract uranium, process waste water, and restore groundwater. The Nichols Ranch Unit and the Hank Unit will store chemicals that are both hazardous and non hazardous. The different types of chemicals will be stored in separate locations. Any bulk hazardous materials that could impact the radiological safety of the facility will be isolated and stored in accordance with regulatory agency requirements. Chemicals that are considered nonhazardous and will not affect radiological safety can be stored inside the main buildings. A list of possible chemicals to be used at the facilities include: hydrochloric acid, hydrogen peroxide, sodium chloride, sodium hydroxide, sodium hypochlorite, ammonia, oxygen, carbon dioxide, sodium carbonate, and sodium bicarbonate. Material Safety Data Sheets (MSDS) for each of the chemicals will be reviewed for facility safety and for radiological effects and the



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LEGEND

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NICHOLS RANCH ISR PROJECT

FIGURE 3-1
NICHOLS RANCH UNIT
SITE FACILITY DIAGRAM

By: S.M.F.	Date: OCTOBER 17, 2007
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DWG #: FIGURE 3-1

U:\Scans\Mike\NRC AUTOCAD FILES\TECHNICAL REPORT FILES\FIGURE 3-1 NICHOLS RANCH UNIT SITE FACILITY DIAGRAM.dwg, FIGURE 3-1, 12/5/2007 3:40:34 PM, stroyler

from the plants will be placed into drums such as 55-gallon drums with drum liners, or placed in watertight packages such as super sacks. The packages will be located in restricted areas until placed inside an 11e(2) disposal container. After a package is full it will be moved to the plant's 11e(2) byproduct storage area, and the contents placed in a strong tight container such as a roll-off container. If material such as pipe is too large to fit in the package, the large material will be placed in a lined container inside the 11e(2) disposal area. The storage areas are shown on the revised diagrams: Figure 3-1 Site Facility Diagram Nichols Ranch Unit and Figure 3-2 Site Facility Diagram Hank Unit. The areas will have concrete and or gravel pads and appropriate signage. The strong tight containers will follow DOT regulations, and typically be covered containers with an estimated capacity of 20 cubic yards. After a container is filled, it will be transported to an approved 11e(2) byproduct storage facility.

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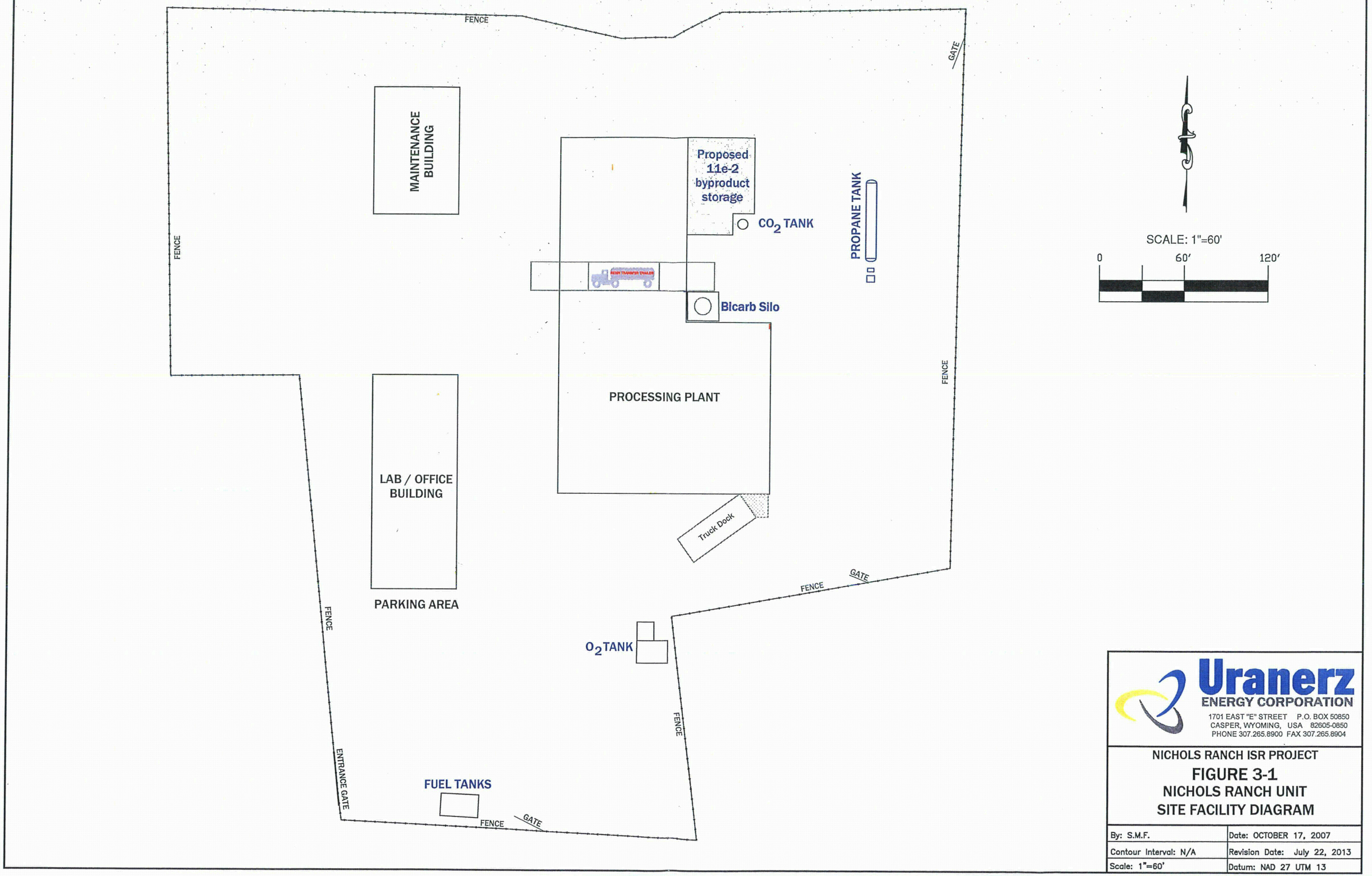

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NICHOLS RANCH ISR PROJECT

FIGURE 3-1
NICHOLS RANCH UNIT
SITE FACILITY DIAGRAM

By: S.M.F.	Date: OCTOBER 17, 2007
Contour Interval: N/A	Revision Date: July 22, 2013
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bleed will be disposed of in a Class I deep disposal well. With the cone of depression being created, the natural groundwater movement from the surrounding areas is toward the wellfield providing an additional control of the leaching solution.

Wellfield bleed is defined as the difference between the amount of solution injected and produced. The bleed rate is anticipated to average 1% of the total production rate for the Nichols Ranch Unit and up to 3% for the Hank Unit. Over- production can be adjusted to guarantee the horizontal ore zone monitor wells are influenced by the cone of depression from the wellfield bleed.

Depending on the oxidation requirement of the formation, the injection wells may be equipped with down-hole oxygen spargers with oxygen being metered through individual rotometers so that each well can be controlled as to the amount of oxygen concentration it receives, or a header house oxygen manifold distributor will be installed. Header houses are small buildings that contain the manifolds with valves, piping, and instrumentation for ~~that connect to the individual~~ injection and recovery wells. ~~The header houses will contain the electrical closures, flow metering, possible oxygen rotometers, and/or sock injection filtration.~~Each header house will contain up to 60 well accommodations. There are two possible designs for a typical header house, and they are shown in Figures 3-9A Header House Details (see map pocket) and 3-9B Header House Details Ground Level (see map pocket), and the details of the piping and instrumentation for the header house is shown in Figure 3-9C Header House Piping and Instrumentation (see map pocket).

The header houses will be metal buildings. There are two possible designs for the buildings and foundations. Depending on the terrain and logistics in the wellfield, one of the two designs will be used. Design A will have the metal building set on top of a foundation built of materials such as concrete or steel. The foundation will have grating which will allow access to the sub floor containing valves and hose runs. The maximum dimensions for the header houses will be up to 40 feet by 20 feet with a six inch concrete pad floor. The floor will slope to a sump with an automatic level control pump. The sump will pipe to the recovery line and will include check valves. Design B will have the

metal building set on a pad. The inside of the building will be designed so that the main connection valves and hose runs are behind one of two walls that run the length of the header house. The walls will be three to four feet from the building edges, and thus allow for maintenance and operators to conduct their inspections and work on the ground level, and not in the sub floor area.

There are two separate solution trunk lines connecting the header houses. One of the trunk lines will take the recovery solutions from the header houses back to the processing plants, and the other trunk line will take injection fluid from the plants out to the header houses for injection into the wellfields. The actual number of header houses will depend on field placement of wells.

At each header house the individual injection and recovery flow and pressure readings can be monitored. Individual well flow readings will be recorded on a shift basis, and the overall wellfield flowrates will be balanced at least once per day. Alternately, flow and totallizer data will be transferred to the main or satellite plant and checked automatically. The recovery and injection trunk lines will have electronic pressure gauges and the information will be monitored from the Unit's control room. The control system will have high and low alarms for pressure and flow. If the pressure and/or flow is out of range the alarms will alert personnel to make adjustments, and certain ranges will signal automatic shutoffs or shutdowns.

The pipelines transport the wellfield solutions to and from the ion exchange columns. The flow rates and pressures are monitored to the individual lines. Automatic valves are installed for control of the flow. High density polyethylene (HDPE), Polyvinyl chloride (PVC), and/or stainless steel piping are used in the wellfield. The piping will be designed for operating pressure of 150 psig. However, the equipment will be operated at pressures less than or equal to the designed piping and other equipment ratings. If higher operating pressures are needed, the overall system will be evaluated and materials of construction with appropriate pressure ratings will be used.

Some of the lines from the ion exchanges facilities, header houses, and individual well lines may be buried to prevent freezing. Other ISR sites in Wyoming have successfully buried pipelines to protect them from freezing.

bleed will be disposed of in a Class I deep disposal well. With the cone of depression being created, the natural groundwater movement from the surrounding areas is toward the wellfield providing an additional control of the leaching solution.

Wellfield bleed is defined as the difference between the amount of solution injected and produced. The bleed rate is anticipated to average 1% of the total production rate for the Nichols Ranch Unit and up to 3% for the Hank Unit. Over- production can be adjusted to guarantee the horizontal ore zone monitor wells are influenced by the cone of depression from the wellfield bleed.

Depending on the oxidation requirement of the formation, the injection wells may be equipped with down-hole oxygen spargers with oxygen being metered through individual rotometers so that each well can be controlled as to the amount of oxygen concentration it receives, or a header house oxygen manifold distributor will be installed. Header houses are small buildings that contain the manifolds with valves, piping, and instrumentation for injection and recovery wells. Each header house will contain up to 60 well accommodations. There are two possible designs for a typical header house, and they are shown in Figures 3-9A Header House Details (see map pocket) and 3-9B Header House Details Ground Level (see map pocket), and the details of the piping and instrumentation for the header house is shown in Figure 3-9C Header House Piping and Instrumentation (see map pocket).

The header houses will be metal buildings. There are two possible designs for the buildings and foundations. Depending on the terrain and logistics in the wellfield, one of the two designs will be used. Design A will have the metal building set on top of a foundation built of materials such as concrete or steel. The foundation will have grating which will allow access to the sub floor containing valves and hose runs. The maximum dimensions for the header houses will be up to 40 feet by 20 feet with a six inch concrete pad floor. The floor will slope to a sump with an automatic level control pump. The sump will pipe to the recovery line and will include check valves. Design B will have the metal building set on a pad. The inside of the building will be designed so that the main connection valves and hose runs are behind one of two walls that run

the length of the header house. The walls will be three to four feet from the building edges, and thus allow for maintenance and operators to conduct their inspections and work on the ground level, and not in the sub floor area.

There are two separate solution trunk lines connecting the header houses. One of the trunk lines will take the recovery solutions from the header houses back to the processing plants, and the other trunk line will take injection fluid from the plants out to the header houses for injection into the wellfields. The actual number of header houses will depend on field placement of wells.

At each header house the individual injection and recovery flow and pressure readings can be monitored. Individual well flow readings will be recorded on a shift basis, and the overall wellfield flowrates will be balanced at least once per day. Alternately, flow and totallizer data will be transferred to the main or satellite plant and checked automatically. The recovery and injection trunk lines will have electronic pressure gauges and the information will be monitored from the Unit's control room. The control system will have high and low alarms for pressure and flow. If the pressure and/or flow is out of range the alarms will alert personnel to make adjustments, and certain ranges will signal automatic shutoffs or shutdowns.

The pipelines transport the wellfield solutions to and from the ion exchange columns. The flow rates and pressures are monitored to the individual lines. Automatic valves are installed for control of the flow. High density polyethylene (HDPE), Polyvinyl chloride (PVC), and/or stainless steel piping are used in the wellfield. The piping will be designed for operating pressure of 150 psig. However, the equipment will be operated at pressures less than or equal to the designed piping and other equipment ratings. If higher operating pressures are needed, the overall system will be evaluated and materials of construction with appropriate pressure ratings will be used.

Some of the lines from the ion exchanges facilities, header houses, and individual well lines may be buried to prevent freezing. Other ISR sites in Wyoming have successfully buried pipelines to protect them from freezing.

The ~~President~~ Chief Executive Officer (CEO) has the overall responsibility and authority for the radiation safety and environmental compliance programs. ~~He~~ The CEO is responsible for ensuring that operations are

compliant with applicable regulations and permit/license conditions. The ~~President~~ CEO is also responsible for maintenance of the license. The CEO has the responsibility and authority to terminate immediately any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations. The CEO directly supervises the other Vice Presidents.

~~The President provides for direct supervision of the Executive Vice President in this capacity.~~

~~Executive Vice President~~

~~The Executive Vice President reports to the President and is directly responsible for ensuring that operations personnel comply with radiation safety and environmental protection programs. The Executive Vice President is also responsible for compliance with all federal and state regulations, license conditions, and reporting requirements. The Executive Vice President has the responsibility and authority to terminate immediately any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations. The Executive Vice President directly supervises the functional area managers.~~

~~Production Manager~~

~~The Production Manager reports directly to the Executive Vice President. The Production Manager is responsible for all production activity at the site. In addition to production activities, the Production Manager is also responsible for implementation of industrial and radiation safety, and environmental protection programs associated with operations. All site operations, maintenance, construction, environmental health and safety, and support groups report to the Production Manager. The Production Manager is authorized to implement immediately any action to correct or prevent hazards. The Production Manager has the responsibility and the authority to suspend, postpone, or modify, immediately if necessary, any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations. The Production Manager cannot unilaterally override a decision for suspension, postponement, or modification if that decision is made by senior management, the Environmental, Safety, and Health Manager, or the Radiation Safety Officer. The Production Manager directly supervises the Mine Superintendent.~~

~~compliant with applicable regulations and permit/license conditions. The President is also responsible for maintenance of the license. The President provides for direct supervision of the Executive Vice President in this capacity.~~

~~Executive Vice President~~

~~The Executive Vice President reports to the President and is directly responsible for ensuring that operations personnel comply with radiation safety and environmental protection programs. The Executive Vice President is also responsible for compliance with all federal and state regulations, license conditions, and reporting requirements. The Executive Vice President has the responsibility and authority to terminate immediately any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations. The Executive Vice President directly supervises the functional area managers.~~

Senior Vice President, ~~Production~~ Operations

The Senior Vice President, ~~Production~~ Operations reports directly to the ~~Executive Vice President~~CEO. The Senior Vice President, ~~Production~~ Operations is responsible for all production activity at the site. In addition to production activities, the Senior Vice President, ~~Production~~ Operations is also responsible for implementation of industrial and radiation safety, and environmental protection programs associated with operations. The ~~Production~~ Senior Vice President, Operations directly supervises the Mine ~~Superintendent~~Manager.

Mine ~~Superintendent~~Manager

The Mine ~~Superintendent~~ Manager reports directly to the Senior Vice President, ~~Production~~Operations. All site operations, maintenance, construction, environmental health and safety, and support groups report to the Mine ~~Superintendent~~Manager. The Mine ~~Superintendent~~ Manager is authorized to implement immediately any action to correct or prevent hazards. The Mine ~~Superintendent~~ Manager has the responsibility and the authority to suspend, postpone, or modify, immediately if necessary, any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations.

Line Management

Line management reports directly to the Mine ~~Superintendent~~Manager. Line management is responsible for management oversight and direct supervision of activities including construction, operations, maintenance, and support for the respective functional area. Line management is responsible for line implementation of industrial and radiation safety, and environmental protection program requirements associated with the respective functional area. Line management is responsible for line conduct and enforcing compliance with management controls (e.g. operating procedures, radiation work permits, and ALARA requirements within the respective functional area). Line management has the authority to stop any activity, immediately if necessary, that is determined to be a threat to employee or public health, the environment, or a potential violation of state or federal regulations. Line management oversees all wellfield, production, and lab personnel.

Vice President~~, Environment, Safety, and Health~~Regulatory Affairs

The Vice President ~~Environment Safety, and Health (ESH)~~Regulatory Affairs reports directly to the ~~Executive Vice President~~CEO. The Vice President ~~ESH~~ Regulatory Affairs is responsible to oversee the~~for~~ preparation and submittal of permit and license applications to pertinent regulatory agencies. This position supports the Manager Environment, Safety, and Health (ESH) as a resource and ensures permit conditions, agency responses, and regulatory notifications are met.~~all radiation protection, health and safety, and environmental programs, and for ensuring compliance with all applicable regulatory requirements.~~ The Vice President ~~ESH~~ Regulatory Affairs also has the responsibility to advise senior management on matters involving radiation safety and to implement changes and/or corrective actions involving radiation safety authorized by senior management. The Vice President ~~ESH~~ Regulatory Affairs is tasked to ensure that the environmental and radiation safety ~~and environmental monitoring and protection~~ programs are conducted in a manner consistent with regulatory requirements. ~~This position assists in the development and review of radiological and environmental sampling and analysis procedures and is responsible for routine auditing of the programs.~~ The Vice President ~~ESH~~ Regulatory Affairs has no production-related

responsibilities. ~~The Vice President, ESH supervises the Radiation Safety Officer.~~

Manager Environment, Safety, and Health

The Manager Environment, Safety, and Health (ESH) reports directly to the Mine Manager and indirectly to the Vice President Regulatory Affairs. This position has the responsibility and authority for, environmental, occupational safety and radiation safety programs, ensuring compliance with all applicable regulatory requirements. This position assists in the development and review of radiological and environmental sampling and analysis procedures and is responsible for routine auditing of the programs. The Manager ESH has no production related responsibilities. As such, the Manager ESH has the responsibility and authority to suspend, postpone, or modify any activity that is determined to be a threat to employees, public health, the environment or potentially a violation of state or federal regulations. Additionally, this position could fulfill the duties of the RSO on an interim basis. If required to fulfill RSO duties, the position will meet the requirements of the NRC Regulatory Guide 8.31 for the RSO.

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Radiation Safety Officer

The Radiation Safety Officer (RSO) reports directly to the ~~Vice President, ESH~~Manager ESH. The RSO is responsible for conducting the radiation safety program and for providing assistance in ensuring compliance with NRC regulations and license conditions applicable to worker health protection. The RSO is responsible for overseeing the day-to-day operation of the radiation safety program and for ensuring that records required by NRC are maintained. The RSO has the responsibility and the authority to suspend, postpone, or modify, immediately if necessary, any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations, including the ALARA program. The RSO has no production-related responsibilities. As such, the RSO has an indirect line to the Vice President, Regulatory Affairs. The RSO supervises the Radiation Safety Technician(s).

Environmental Supervisor and Environmental and Radiation Safety Technicians

The Environmental ~~Technicians~~ Supervisor reports directly to the ~~Vice President, ESH~~Manager ESH. The Environmental Technicians report to the Environmental Supervisor. ~~and the Radiation~~

~~Safety Technicians report directly to the RSO.~~ The ~~Environmental and~~ Radiation Safety Technicians report to the RSO. The Environmental Supervisor, Environmental Technicians and Radiation Safety Technicians assist the ~~Vice President, ESH~~ Manager ESH and the RSO with the implementation of the environmental monitoring and radiation safety programs. The Environmental Supervisor and Environmental and Radiation Safety Technicians are responsible for the orderly collection and recording of all data from environmental and radiological safety programs. The Environmental Supervisor and Environmental and Radiation Safety Technicians have no production-related responsibilities.

5.1.2 ALARA

The radiation safety and environmental programs at the Nichols Ranch ISR Project site will be implemented in the context of keeping personnel and environmental exposure to radiation and radioactive material as low as is reasonably achievable (ALARA).

5.1.2.1 Philosophy

The considered purpose of the radiation safety and environmental protection programs at the Nichols Ranch ISR Project site are to maintain exposure to radiation and radioactive materials ALARA for all employees, contractors, visitors, and the environment. The implementation and effectiveness of a successful ALARA program is the responsibility of everyone involved in conducting operations at the site.

5.1.2.2 Responsibilities

Responsibilities for implementation of the ALARA philosophy are shared by management, the RSO, and all workers at the Nichols Ranch ISR Project site.

Management

Management is responsible for developing, implementing, and enforcing the policies and procedures necessary for effective radiation safety, environmental protection, and ALARA programs to ensure the health and safety of workers and visitors, and protection of the environment.

Management will provide the following:

1. A strong commitment to and continuing support for the development and implementation of the radiation safety, environmental protection, and ALARA programs;
2. Information and policy statements to employees, contractors, and visitors.
3. Periodic management review of operational and procedural efforts to maintain ALARA;
4. Continuing management evaluation of the radiation safety and environmental protection programs including staffing, and allocations of space and funding; and
5. Appropriate briefings and training in radiation safety, environmental protection, and ALARA concepts for all employees, and, when appropriate, for contractors and visitors.

~~Vice President, ESH~~ Manager ESH and RSO

The ~~Vice President, ESH~~ Manager ESH and the RSO have primary responsibility for the technical adequacy and correctness of an ALARA application for the environmental protection and radiation safety programs. Each has continuing responsibility for surveillance and supervisory action in the enforcement of the ALARA program.

The ~~Vice President, ESH~~ Manager ESH and the RSO will be assigned the following:

1. Major responsibility for the development and administration of the environmental protection, radiation safety, and ALARA programs;
2. Sufficient authority to enforce regulations and administrative policies that affect any aspect of the environmental protection and radiation safety;
3. Responsibility to review and approve plans for new equipment, process changes, or changes in operating procedures to ensure that the plans do not adversely affect the environmental protection and radiation safety programs; and
4. Adequate equipment and facilities to monitor relative attainment of the ALARA objective.

Workers

Environmental protection, radiation safety, and ALARA programs are only as effective as the workers' adherence to the program. All workers at the Nichols Ranch ISR Project site will be responsible for the following:

1. Adhering to all policies, operating procedures, and instruction for environmental protection and radiation safety as established by management;
2. Reporting promptly to management equipment malfunctions or violations of standard practices or procedures that could result in increased radiological hazard;
3. Suggesting improvements for the environmental protection, radiation safety, and ALARA programs.

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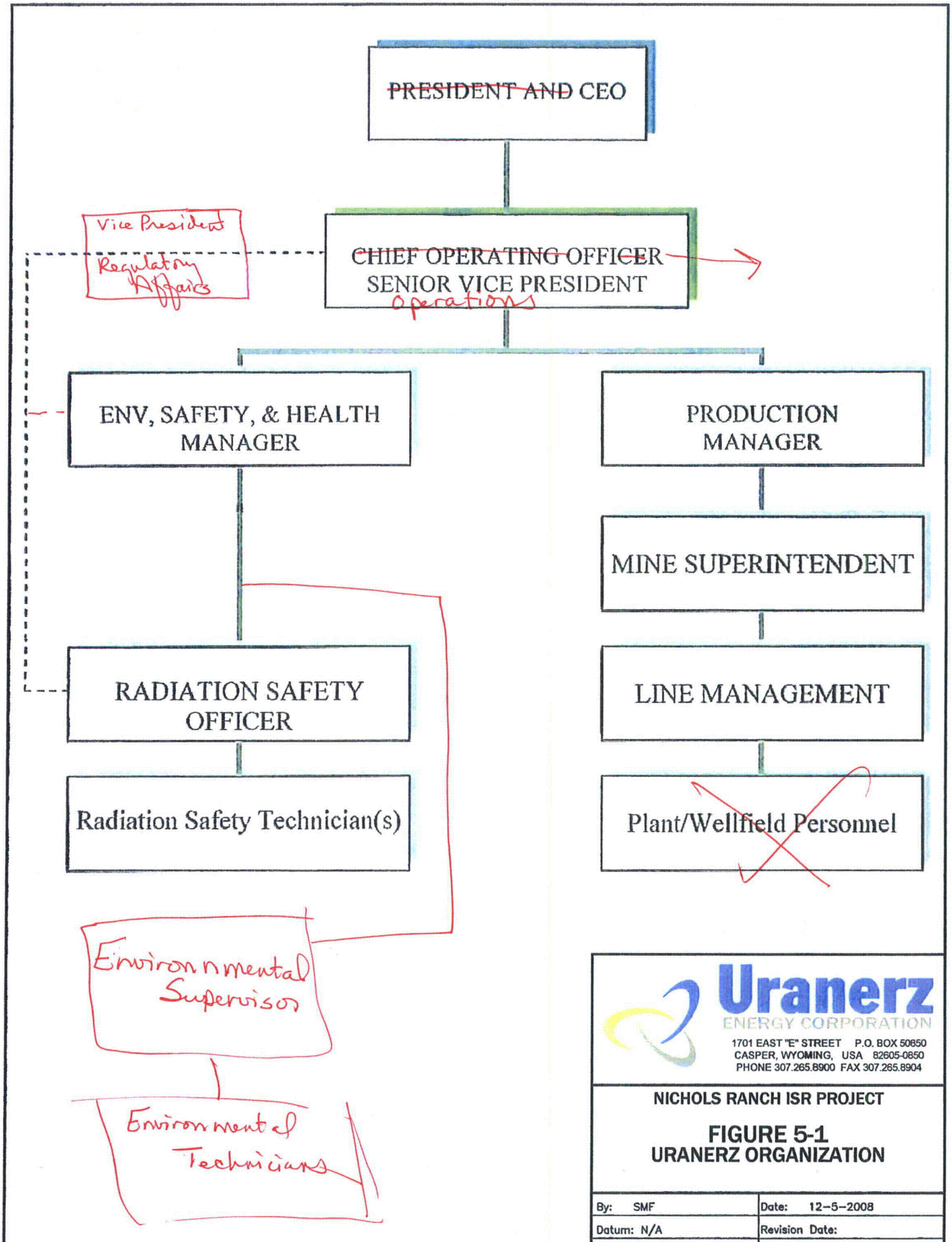

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NICHOLS RANCH ISR PROJECT

FIGURE 5-1
URANERZ ORGANIZATION

By: SMF	Date: 12-5-2008
Datum: N/A	Revision Date:
Scale: N/A	Contour Interval: N/A

5.0 OPERATIONS

Operations at the Nichols Ranch ISR Project site and facilities are conducted in conformance with applicable laws, regulations and requirements of the various Federal and State regulatory agencies. The organization and management controls described below are established to ensure compliance and further implement the company's policy for providing a safe working environment including the philosophy of maintaining radiation exposures as low as is reasonably achievable (ALARA).

5.1 ORGANIZATION

The management structure and responsibilities of the Uranerz Energy Corporation (Uranerz) organization are described in the following section. The organization function is to provide for development, review, approval, implementation, and adherence to operating procedures, radiation safety programs, environmental and groundwater monitoring programs, quality assurance programs, routine and non-routine maintenance activities, and changes to any of these programs or activities.

5.1.1 Management

The Uranerz organization management structure is shown in Figure 5-1 (see map pocket). The structure is applicable to site construction and site management. The structure is applicable to the central processing facility and the satellite facility. The responsibilities and authorities are described below for these management positions.

A Safety and Environmental Review Panel (SERP) will be established, in whole or part, from these management positions. The SERP is described in Section 5.2.

Chief Executive Officer

The Chief Executive Officer (CEO) has the overall responsibility and authority for the radiation safety and environmental compliance programs. The CEO is responsible for ensuring that operations are compliant with applicable regulations and permit/license conditions. The CEO is also responsible for maintenance of the license. The CEO has the responsibility and authority to terminate immediately any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations. The CEO directly supervises the other Vice Presidents.

Senior Vice President, Operations

The Senior Vice President, Operations reports directly to the CEO. The Senior Vice President, Operations is responsible for all production activity at the site. In addition to production activities, the Senior Vice President, Operations is also responsible for implementation of industrial and radiation safety, and environmental protection programs associated with operations. The Senior Vice President, Operations directly supervises the Mine Manager.

Mine Manager

The Mine Manager reports directly to the Senior Vice President, Operations. All site operations, maintenance, construction, environmental health and safety, and support groups report to the Mine Manager. The Mine Manager is authorized to implement immediately any action to correct or prevent hazards. The Mine Manager has the responsibility and the authority to suspend, postpone, or modify, immediately if necessary, any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations.

Line Management

Line management reports directly to the Mine Manager. Line management is responsible for management oversight and direct supervision of activities including construction, operations, maintenance, and support for the respective functional area. Line management is responsible for line implementation of industrial and radiation safety, and environmental protection program requirements associated with the respective functional area. Line management is responsible for line conduct and enforcing compliance with management controls (e.g. operating procedures, radiation work permits, and ALARA requirements within the respective functional area). Line management has the authority to stop any activity, immediately if necessary, that is determined to be a threat to employee or public health, the environment, or a potential violation of state or federal regulations. Line management oversees all wellfield, production, and lab personnel.

Vice President Regulatory Affairs

The Vice President Regulatory Affairs reports directly to the CEO. The Vice President Regulatory Affairs is responsible to oversee the preparation and submittal of permit and license applications to pertinent regulatory agencies. This position supports the Manager Environment, Safety, and Health (ESH) as a resource and ensures permit conditions, agency responses, and regulatory notifications are met. The Vice President Regulatory Affairs also has the responsibility to advise senior management on matters involving radiation safety and to implement changes and/or corrective actions involving radiation safety authorized by senior management. The Vice President Regulatory Affairs is tasked to ensure that the environmental and radiation safety programs are conducted in a manner consistent with regulatory requirements. The Vice President Regulatory Affairs has no production-related responsibilities.

Manager Environment, Safety, and Health

The Manager Environment, Safety, and Health (ESH) reports directly to the Mine Manager, and indirectly to the Vice President Regulatory Affairs. This position has the responsibility and authority for, environmental, occupational safety and radiation safety programs, ensuring compliance with all applicable regulatory requirements. This position assists in the development and review of radiological and environmental sampling and analysis procedures and is responsible for routine auditing of the programs. The Manager ESH has no production related responsibilities. As such, the Manager ESH has the responsibility and authority to suspend, postpone, or modify any activity that is determined to be a threat to employees, public health, the environment or potentially a violation of state or federal regulations. Additionally, this position could fulfill the duties of the RSO on an interim basis. If required to fulfill RSO duties, the position will meet the requirements of the NRC Regulatory Guide 8.31 for the RSO.

Radiation Safety Officer

The Radiation Safety Officer (RSO) reports directly to the Manager ESH. The RSO is responsible for conducting the radiation safety program and for providing assistance in ensuring compliance with NRC regulations and license conditions applicable to worker health protection. The RSO is responsible for overseeing the day-to-day operation of the radiation safety program and for ensuring that records required by NRC are maintained. The RSO has the responsibility and the authority to suspend, postpone, or modify, immediately if necessary, any activity that is determined to be a threat to employee or public health, the environment, or potentially a violation of state or federal regulations, including the ALARA program. The RSO has no production-related responsibilities. As such, the RSO has an indirect line to the Vice President, Regulatory Affairs. The RSO supervises the Radiation Safety Technician(s).

Environmental Supervisor and Environmental and Radiation Safety Technicians

The Environmental Supervisor reports directly to the Manager ESH. The Environmental Technicians report to the Environmental Supervisor. The Radiation Safety Technicians report to the RSO. The Environmental Supervisor, Environmental Technicians and Radiation Safety Technicians assist the Manager ESH and the RSO with the implementation of the environmental monitoring and radiation safety programs. The Environmental Supervisor and Environmental and Radiation Safety Technicians are responsible for the orderly collection and recording of all data from environmental and radiological safety programs. The Environmental Supervisor and Environmental and Radiation Safety Technicians have no production-related responsibilities.

5.1.2 ALARA

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2. Information and policy statements to employees, contractors, and visitors.
3. Periodic management review of operational and procedural efforts to maintain ALARA;
4. Continuing management evaluation of the radiation safety and environmental protection programs including staffing, and allocations of space and funding; and
5. Appropriate briefings and training in radiation safety, environmental protection, and ALARA concepts for all employees, and, when appropriate, for contractors and visitors.

Manager ESH and RSO

The Manager ESH and the RSO have primary responsibility for the technical adequacy and correctness of an ALARA application for the environmental protection and radiation safety programs. Each has continuing responsibility for surveillance and supervisory action in the enforcement of the ALARA program.

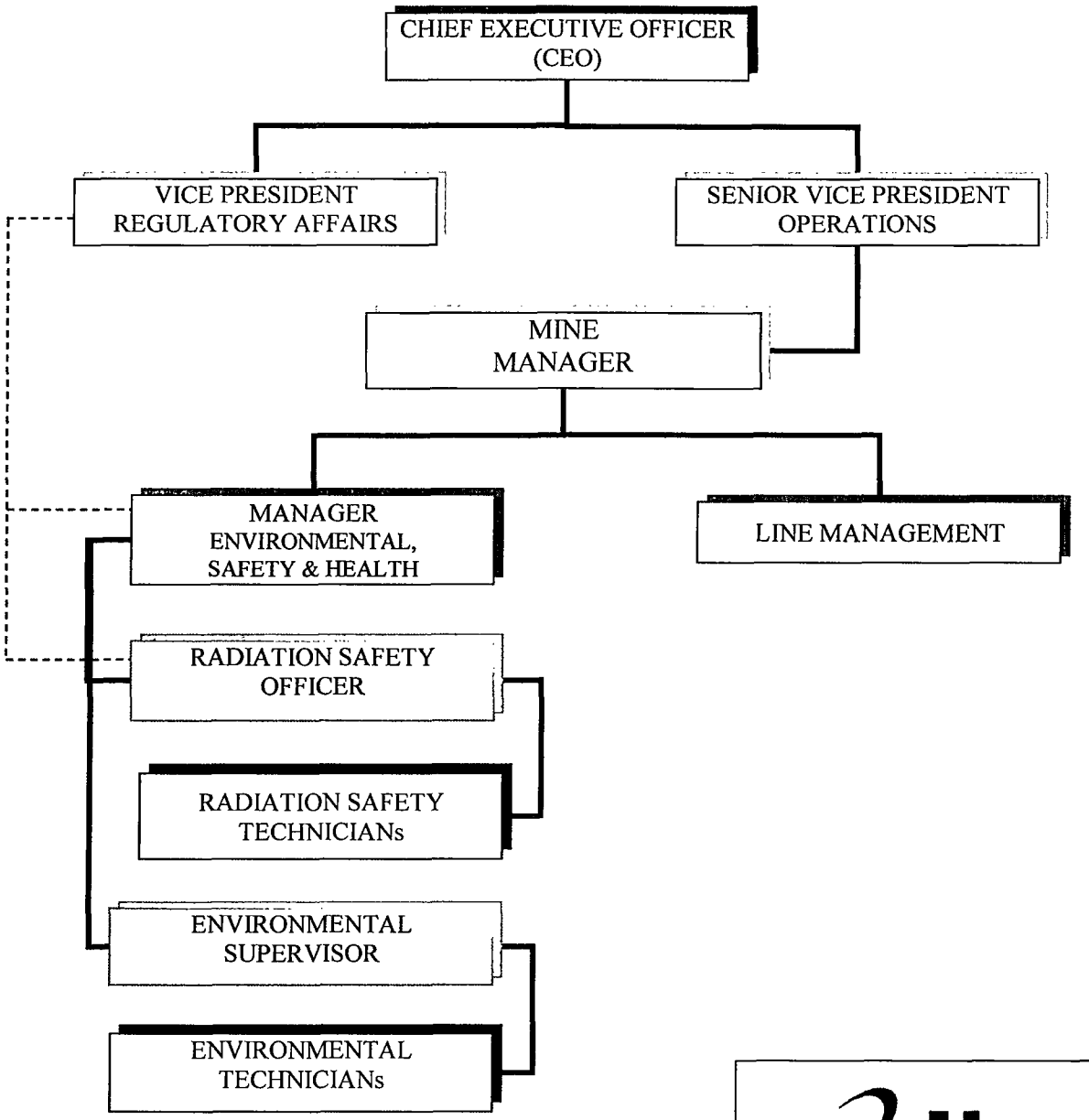
The Manager ESH and the RSO will be assigned the following:

1. Major responsibility for the development and administration of the environmental protection, radiation safety, and ALARA programs;
2. Sufficient authority to enforce regulations and administrative policies that affect any aspect of the environmental protection and radiation safety;
3. Responsibility to review and approve plans for new equipment, process changes, or changes in operating procedures to ensure that the plans do not adversely affect the environmental protection and radiation safety programs; and
4. Adequate equipment and facilities to monitor relative attainment of the ALARA objective.

Workers

Environmental protection, radiation safety, and ALARA programs are only as effective as the workers' adherence to the program. All workers at the Nichols Ranch ISR Project site will be responsible for the following:

1. Adhering to all policies, operating procedures, and instruction for environmental protection and radiation safety as established by management;
2. Reporting promptly to management equipment malfunctions or violations of standard practices or procedures that could result in increased radiological hazard;
3. Suggesting improvements for the environmental protection, radiation safety, and ALARA programs:



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NICHOLS RANCH ISR PROJECT

FIGURE 5-1

URANERZ ORGANIZATION

BY: Dalton Timm	DATE: OCTOBER 29, 2007
CONTOUR INTERVAL: N/A	REV. DATE: OCTOBER 22, 2013
SCALE: N/A	REV. #: 1
FILE LOCATION: I:\it\drafting\nichols ranch\permitting-licensing\figure 5-1 REV-1.doc	

1. Discussion of the results and conclusions of the production area pump test including pumping data, drawdown match curves, potentiometric surface maps, water level graphs, drawdown map, and directional transmissivity data and graphs.
2. Data showing that the monitor well ring and the ore zone are in communication with the production patterns.
3. Any other information that is pertinent to the production area being tested.

5.7.8.5 Baseline Water Quality Determination

The importance of properly defining the baseline groundwater quality for individual production areas cannot be overemphasized as the data collected will be used to establish the Upper Control Limits (UCL's) and the restoration target values that will be used in groundwater restoration. Standard Operating Procedures (SOP) will be developed that will detail acceptable water quality sampling and handling procedures, as well as the statistical assessment of the groundwater data.

5.7.8.5.1 Data Collection

Water quality samples will be collected and analyzed from all monitor wells to establish baseline groundwater quality for the ore zone, ore zone aquifer, underlying aquifer, and the overlying aquifer. Table D6-6a in Volume VI of Appendix D6 details the parameters that will be analyzed during the sampling of baseline water quality. The sampling of the monitor wells will be in accordance to all sampling, preservation, and analysis procedures. ~~Addendum 5A details the standard operating procedure that is and will be utilized by Uranerz Energy Corporation personnel while conducting baselining and operational sampling.~~ Sampling procedures are based on WDEQ-LQD Guideline 4 guidance and are available onsite to all employees. The number of samples collected and the parameters that the samples will be tested for are as follows:

1. Ore Zone (Production Pattern) Wells (MP Wells) – All ore zone monitoring wells in a production area will be sampled four times, with a minimum of two weeks between sampling, during baseline groundwater quality determination. All sampling events shall

ADDENDUM 5A:

~~**OPERATIONAL GROUNDWATER SAMPLING PROCEDURE**~~**Intentionally Left Blank**

~~**October 2008**~~

1. Discussion of the results and conclusions of the production area pump test including pumping data, drawdown match curves, potentiometric surface maps, water level graphs, drawdown map, and directional transmissivity data and graphs.
2. Data showing that the monitor well ring and the ore zone are in communication with the production patterns.
3. Any other information that is pertinent to the production area being tested.

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5.7.8.5.1 Data Collection

Water quality samples will be collected and analyzed from all monitor wells to establish baseline groundwater quality for the ore zone, ore zone aquifer, underlying aquifer, and the overlying aquifer. Table D6-6a in Volume VI of Appendix D6 details the parameters that will be analyzed during the sampling of baseline water quality. The sampling of the monitor wells will be in accordance to all sampling, preservation, and analysis procedures. Sampling procedures are based on WDEQ-LQD Guideline 4 guidance and are available onsite to all employees. The number of samples collected and the parameters that the samples will be tested for are as follows:

1. Ore Zone (Production Pattern) Wells (MP Wells) – All ore zone monitoring wells in a production area will be sampled four times, with a minimum of two weeks between sampling, during baseline groundwater quality determination. All sampling events shall

ADDENDUM 5A:

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All water quality samples from the monitor wells will be analyzed at the Nichols Ranch Unit laboratory for chlorides, total alkalinity, and conductivity within 48 hours of the sample being collected. All samples will be analyzed in accordance with accepted methods based on WDEQ-LQD Guideline 4 guidance. Standard Operating Procedures (SOP's) will be developed that will detail all water sampling and laboratory analysis procedures. The detailed SOP ~~that Uranerz will utilize for sampling of monitor wells can be found in Addendum 5A.~~for water sampling and laboratory analysis is available onsite for employee's use.

5.7.8.10.3 Excursions

If any two of the three UCL excursion parameters (chloride, total alkalinity, or conductivity) are exceeded, an excursion is suspected to have occurred. Within 24 hours of the first analysis, a second verification sample will be taken and analyzed to determine that two of the three excursion parameters have been exceeded. The verification sample is then split and analyzed in duplicate to assess any analytical error. If two of the three UCL's are exceeded, an excursion is then verified. During an excursion event, all monitoring wells that are placed on excursion status will be sampled at least every seven days for the UCL parameters.

If an excursion is verified, the WDEQ-LQD and NRC Project Manager will be verbally notified within 24 hours. The WDEQ-LQD and NRC Project Manager will also be notified in writing within seven days of a verified excursion. Corrective actions such as changes in the injection and recovery flow rates in the affected area will be implemented as soon as practical. The corrective actions will continue until the excursion is mitigated. A written report describing the excursion event, corrective actions, and the corrective action results must also be submitted to the NRC Project Manager within 60 days of the excursion confirmation.

In the event that the concentration of the UCL parameters that were detected in the monitor well(s) do not begin to decline within 60 days after the verification of an excursion, all injection into the ore zone (production zone) adjacent to the excursion will be suspended to further increase the amount of net water withdrawal from the excursion area. Injection will be

suspended until such time that a declining trend in the UCL parameters concentration is

All water quality samples from the monitor wells will be analyzed at the Nichols Ranch Unit laboratory for chlorides, total alkalinity, and conductivity within 48 hours of the sample being collected. All samples will be analyzed in accordance with accepted methods based on WDEQ-LQD Guideline 4 guidance. Standard Operating Procedures (SOP's) will be developed that will detail all water sampling and laboratory analysis procedures. The detailed SOP for water sampling and laboratory analysis is available onsite for employee's use.

5.7.8.10.3 Excursions

If any two of the three UCL excursion parameters (chloride, total alkalinity, or conductivity) are exceeded, an excursion is suspected to have occurred. Within 24 hours of the first analysis, a second verification sample will be taken and analyzed to determine that two of the three excursion parameters have been exceeded. The verification sample is then split and analyzed in duplicate to assess any analytical error. If two of the three UCL's are exceeded, an excursion is then verified. During an excursion event, all monitoring wells that are placed on excursion status will be sampled at least every seven days for the UCL parameters.

If an excursion is verified, the WDEQ-LQD and NRC Project Manager will be verbally notified within 24 hours. The WDEQ-LQD and NRC Project Manager will also be notified in writing within seven days of a verified excursion. Corrective actions such as changes in the injection and recovery flow rates in the affected area will be implemented as soon as practical. The corrective actions will continue until the excursion is mitigated. A written report describing the excursion event, corrective actions, and the corrective action results must also be submitted to the NRC Project Manager within 60 days of the excursion confirmation.

In the event that the concentration of the UCL parameters that were detected in the monitor well(s) do not begin to decline within 60 days after the verification of an excursion, all injection into the ore zone (production zone) adjacent to the excursion will be suspended to further increase the amount of net water withdrawal from the excursion area. Injection will be suspended until such time that a declining trend in the UCL parameters concentration is

will then be processed, dried, and packaged at the Nichols Ranch CPP. The route for moving the resin from the Hank Unit to the Nichols Ranch Unit is shown on Figure D1-2 of Appendix D1. No public roadways will be utilized during the shipping of resin for the Hank Unit to the Nichols Ranch CPP.

At the startup of operations the Nichols Ranch ISR Project will operate as a satellite IX facility. This IX satellite operation will require the shipping of resin loaded with uranium to a licensed processing facility. Verification of license will be obtained before shipments will be allowed. In the case a licensed processing facility is used the transportation routes will be pre-determined and conveyed to the truck driver(s) prior to departure. These routes can take place over public roads and Department of Transportation (DOT) regulations will apply.

The uranium that is loaded onto the resin will remain attached to the resin until it is removed by a strong brine solution. When the loaded resin is transferred to a truck, it is moved using barren lixiviant. The barren lixiviant can have uranium concentrations of approximately 1-3 mg/L U_3O_8. The loaded resin is transferred to specially designed tanker trailers that will hold approximately 500 ft^3 of loaded resin. Most of the barren lixiviant is removed prior to shipping to minimize that amount of water weight in the tanker trailer. Because of the size of the trucks hauling the resin being consistent with a standard tractor-trailer combination, the trucks hauling the loaded resin should withstand the impact of most collisions.

If an accident were to occur with a loaded resin truck, a rupture to the tanker trailer carrying the loaded resin could happen. The ruptured tank could result in a portion of the loaded resin to be spilled on the ground. The uranium that is attached to the loaded resin would remain attached to the resin, but any residual barren lixiviant contained in the tank could spill to the ground carrying the resin a short distance from the accident scene. The environmental impact that would result would be minimal. The uranium on the resin would stay attached to the resin as would the uranium contained in any barren lixiviant that might spill. No airborne release of uranium would result from the spill. The spilled resin and lixiviant will typically collect in the low areas

surrounding the accident scene trapping the resin for cleanup. The loaded resin and contaminated soil from the barren lixiviant would be removed and processed at a uranium mill or disposed of in a NRC licensed facility. The disturbed areas would then be reclaimed in accordance with all applicable NRC and State regulations.

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7.5.3 Pipeline Failure

7.5.3.1 Process Pipelines

The failure of a process pipeline could result in the discharge of pregnant or barren lixiviant to the surface if the failure were to occur in the pipelines located in the wellfield. Measures such as high and low pressure alarms/shutdowns and flowmeters will be utilized on the piping leading to and from the wellfield to the CPP and satellite plant to minimize the amount of process fluid that is lost if a failure were to occur. ~~If the amount and/or concentration of the process fluid lost in a pipeline failure constitute an environmental concern, the~~ In the event of a spill, the spill area will be surveyed with a gamma meter and soil samples ~~will~~ may be collected throughout the wetted area. A ~~spill~~ record of spills will be made documenting the volume of the spill, the area affected and the corrective action taken ~~(sampling and results of analysis). Areas exceeding twice background gamma will receive additional soil sampling to determine whether radiological concentrations (radium-226, thorium-230, lead-210) have increased significantly above background. Soils will also be analyzed for uranium. If soil sampling results show an increase from baseline, 2.5 – 3 pCi/g, for example, the soil will be removed and placed in approved by-product storage containers prior to shipping to a licensed site.~~Spills that occur at the Nichols Ranch will be evaluated to determine prudence of reclamation at the time of the spill or at decommissioning. Spills will be assessed to the radium benchmark dose using the unity rule at the time of decommissioning. Spills that result in a total effective dose greater than 100 mrem per year analyzed through sampling and RESRAD modeling software will be cleaned prior to decommissioning (Decommissioning File).

The probability of a failure to a process pipeline located in the wellfield is considered small since most pipelines will be buried approximately two to five feet below the surface and made out of corrosion free high density polyethylene. The pipelines will also be inspected and tested prior to burial to ensure that the pipelines are sound. Pressure test results will be documented.

The worst case scenario for a pipeline failure would involve a major pipeline rupture releasing barren or pregnant lixiviant for an hour at full operating capacity. If this were to occur,

210,000 gallons of barren or pregnant lixiviant would be released to the environment surrounding the area of the incident at the Nichols Ranch CPP. The pipeline would have to suffer a complete line break with no operators or plant personnel detecting the failure in a timely manner. The likelihood of this happening is considered very low since most industry experience has been that major pipeline ruptures are not complete line breaks, but smaller openings such as

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The worst case scenario for a pipeline failure would involve a major pipeline rupture releasing barren or pregnant lixiviant for an hour at full operating capacity. If this were to occur, 210,000 gallons of barren or pregnant lixiviant would be released to the environment surrounding the area of the incident at the Nichols Ranch CPP. The pipeline would have to suffer a complete line break with no operators or plant personnel detecting the failure in a timely manner. The likelihood of this happening is considered very low since most industry experience has been that major pipeline ruptures are not complete line breaks, but smaller openings such as

gas. If such an event were to occur, the area surrounding the rupture would have to be evacuated with all equipment being shutdown and if necessary, a total plant shutdown and evacuation if the rupture was located near the CPP or satellite plant. The area in the vicinity of the methane pipeline rupture would remain sealed off until such time that the methane gas is turned off and the pipeline repaired. The environmental impact of such a failure would be minimal as the methane would be released to the atmosphere where it would quickly dissipate. The probability of such an event occurring is low since the methane pipelines that would be located in the Hank and Nichols Ranch Units would be buried approximately 6 ft under the surface and clearly identified with signage.

The worst case scenario for a methane pipeline would involve a major pipeline rupture as a result of a drilling rig drilling into the pipeline. This event could potentially result in an explosion of the methane gas, which could result in significant property loss and fatalities. The probability of this happening is low given that coal bed methane pipelines located in the Hank and Nichols Ranch Units will be clearly identified with signage. In addition to the signage, procedures will be developed on steps to be taken when drilling near methane pipelines. Measures such as verifying the location of the pipeline, flagging off the pipeline corridor, and maintaining a set distance from the methane pipeline when drilling wells will be implemented. Most of the methane pipelines will be in place before the Nichols Ranch ISR Project begins. Communication with the coal bed methane producers and Uranerz Energy Corporation has taken place and will continue so that any potential incidents involving methane pipelines are minimized.

7.5.4 Fires and Explosions

Fire and explosion hazards for the Nichols Ranch CPP and Hank satellite will be low since neither of the two plants uses flammable liquids or products in the yellowcake process. Propane will be utilized for the heating of oil for the vacuum dryer located at the Nichols Ranch CPP. The propane would be the primary source for a potential fire at the CPP. Building heat at Hank and Nichols Ranch Units will be supplied by ~~electric~~ heaters such as electric and/or gas. If an

explosion were to occur at the CPP, the uranium present in the plant would not appreciably disperse to the environment.

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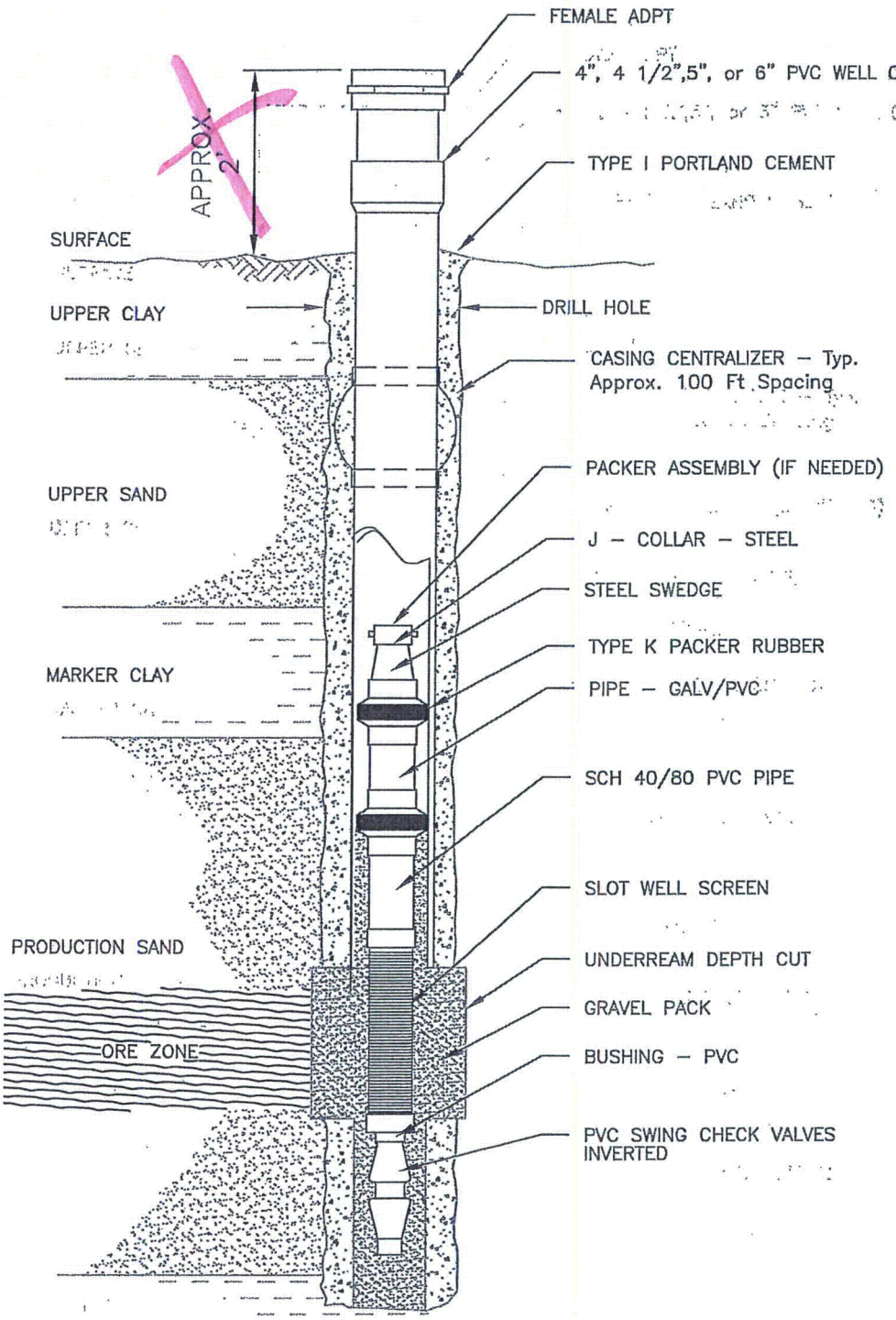

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www.uranerz.com

FIG. 3-13 - NICHOLS RANCH ISR PROJECT

TYPICAL INJECTION / RECOVERY WELL CONSTRUCTION DIAGRAM

JOB NO. URZ Well Design
DATE: Sep
SCALE:
APPROVED
DRAWN BY:
DRAWING N
F

FIGURE 3-13

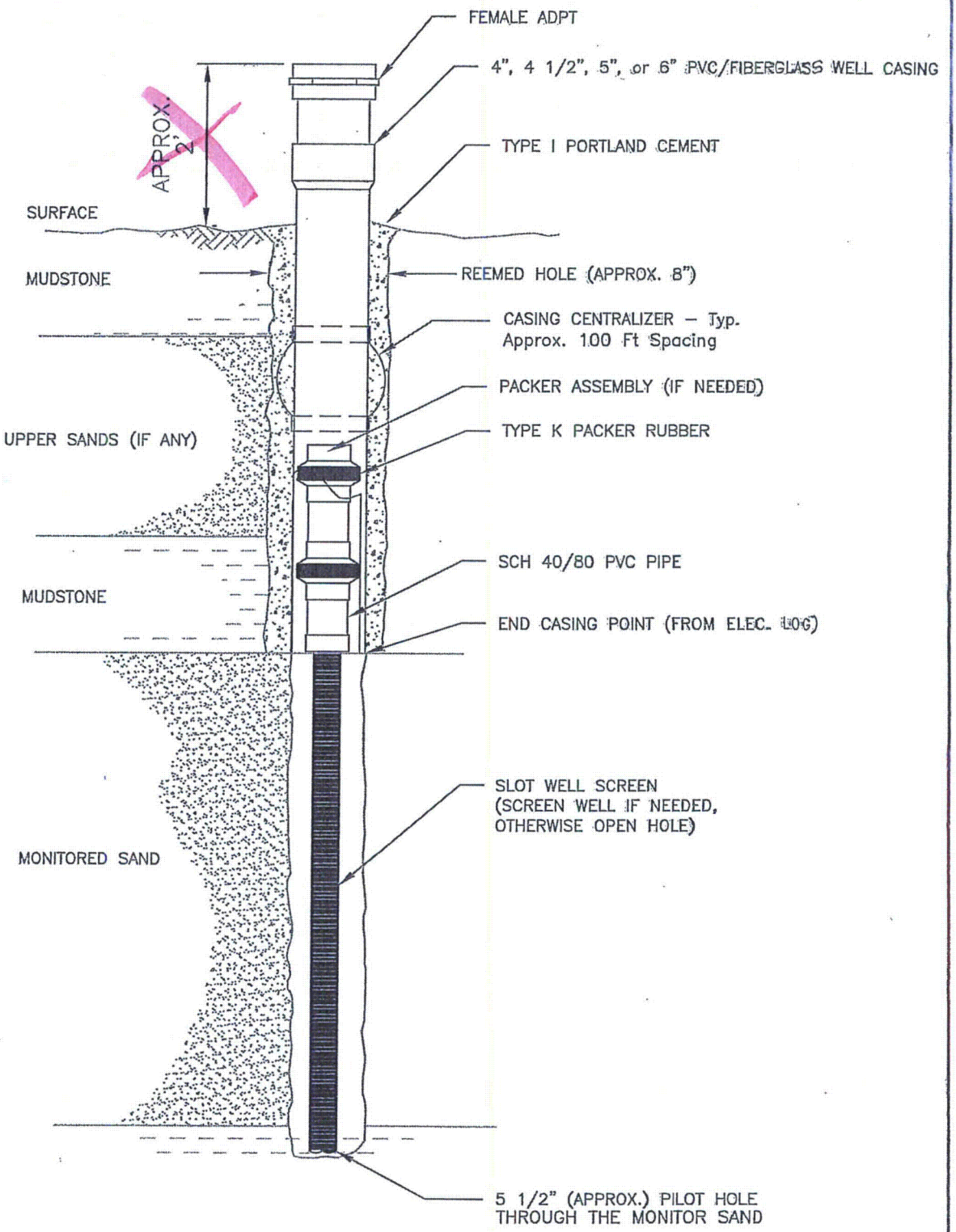

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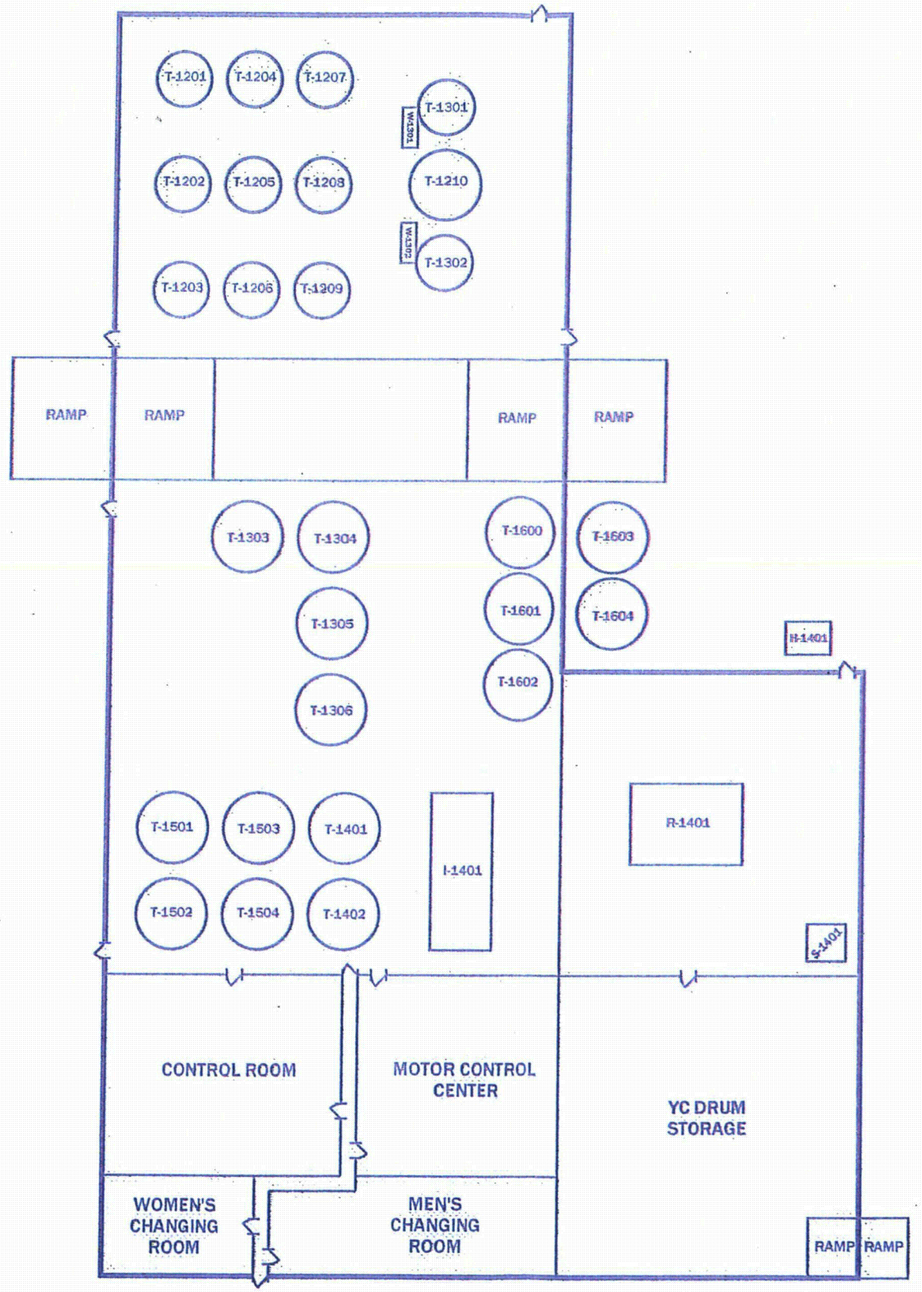
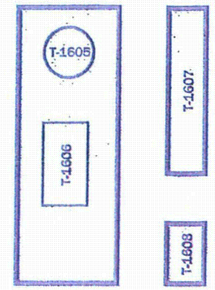
FIG. 3-14 - NICHOLS RANCH ISR PROJECT

JOB NO. Monitor Well Design
DATE: Sept. 25, 2007
SCALE:
APPROVED I
DRAWN BY:
DRAWING NO Fi

TYPICAL MONITOR WELL CONSTRUCTION DIAGRAM

FIGURE 3-14





LEGEND

WELL FIELD = 1100'S
IX = 1200'S
ELUTION = 1300'S
YELLOWCAKE = 1400'S
WASTE = 1500'S
CHEMICALS = 1600'S
TANKS = T
SCREENS = W
FILTERS = I
DRYERS = R
HEATERS = S
COOLING TOWERS = H
PUMPS = P

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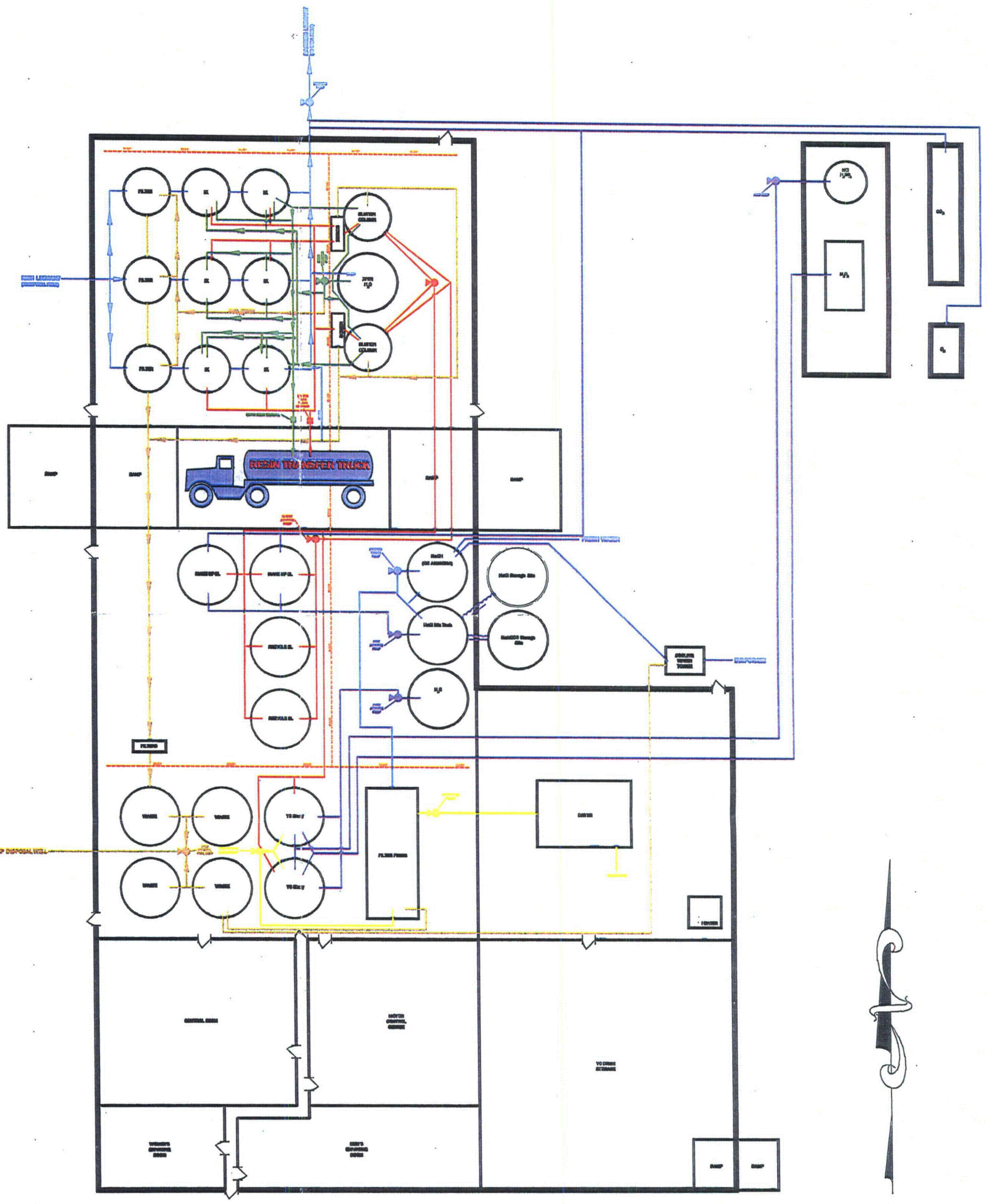
NICHOLS RANCH ISR PROJECT

FIGURE 3-3

NICHOLS RANCH UNIT PROCESS FLOW DIAGRAM

By: S.M.F.	Date: OCTOBER 18, 2007
Contour Interval: N/A	Revision Date:
Scale: 1"=30'	Datum: NAD27 UTM 13



LEGEND

- FRESH WATER
- LIXIVIANT
- TRANSFER WATER
- FINAL PRODUCT
- LOADED RESIN
- CHEMICAL
- WASTE WATER
- SUMP

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NICHOLS RANCH ISR PROJECT

FIGURE 3-3A

PROCESS FLOW DIAGRAM NICHOLS RANCH UNIT

By: S.M.F.	Date: 2/23/2008
Contour Interval: N/A	Revision Date:
Scale: See Scale Bar	DWG #: FLOW DIAGRAM

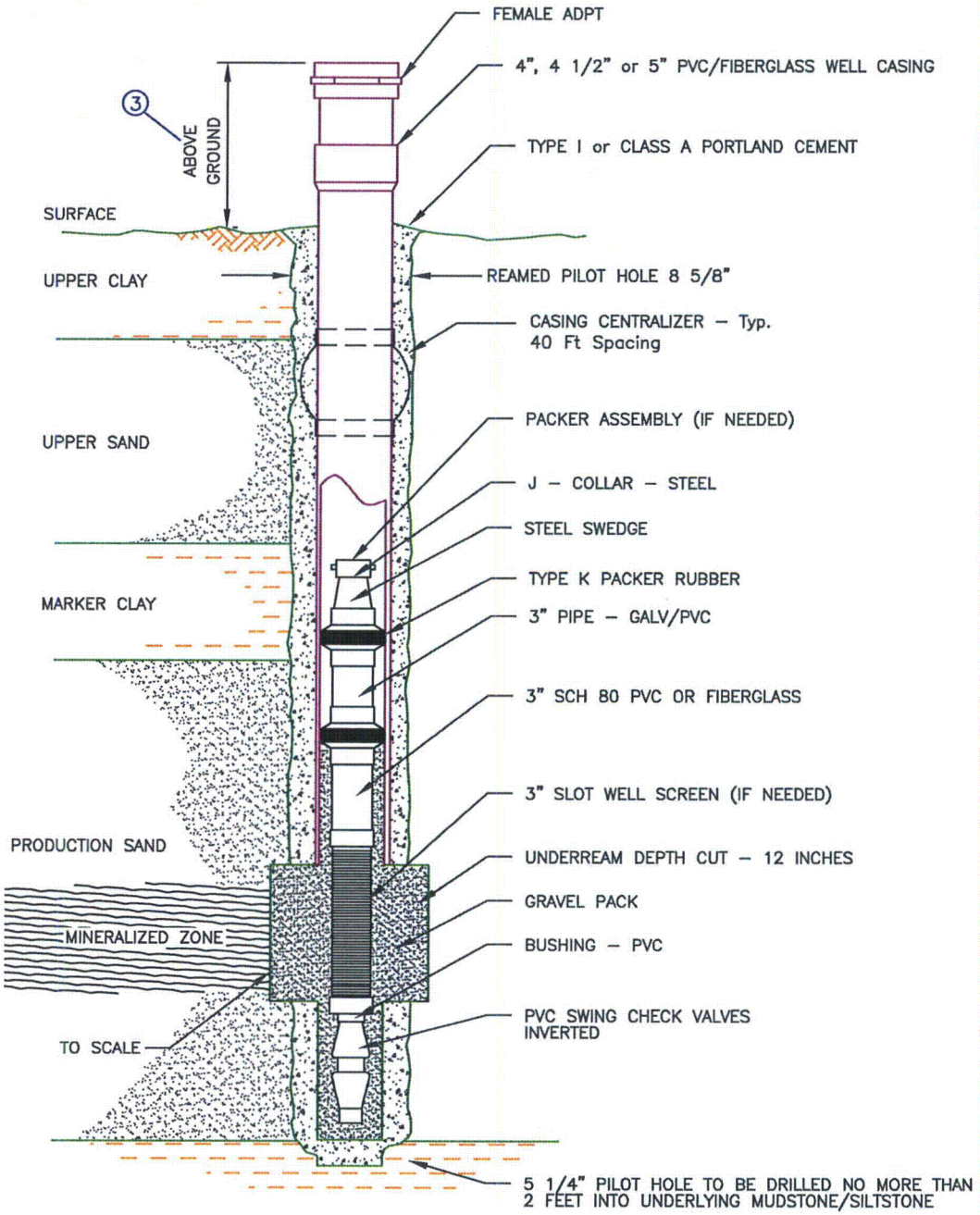

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FIGURE 3-13 NICHOLS RANCH & HANK ISR PROJECTS

TYPICAL PRODUCTION (INJECTION/RECOVERY) WELL DIAGRAM

JOB NO.	URZ Well Design
DATE:	Sept. 25, 2007
SCALE:	N.T.S.
APPROVED BY:	HA
DRAWN BY:	CB, JDN
DRAWING NO.	Figure 3-13

REV.	DATE	DESCRIPTION
1	3/18/08	
2	08/09	
3	7/11/13	SMF

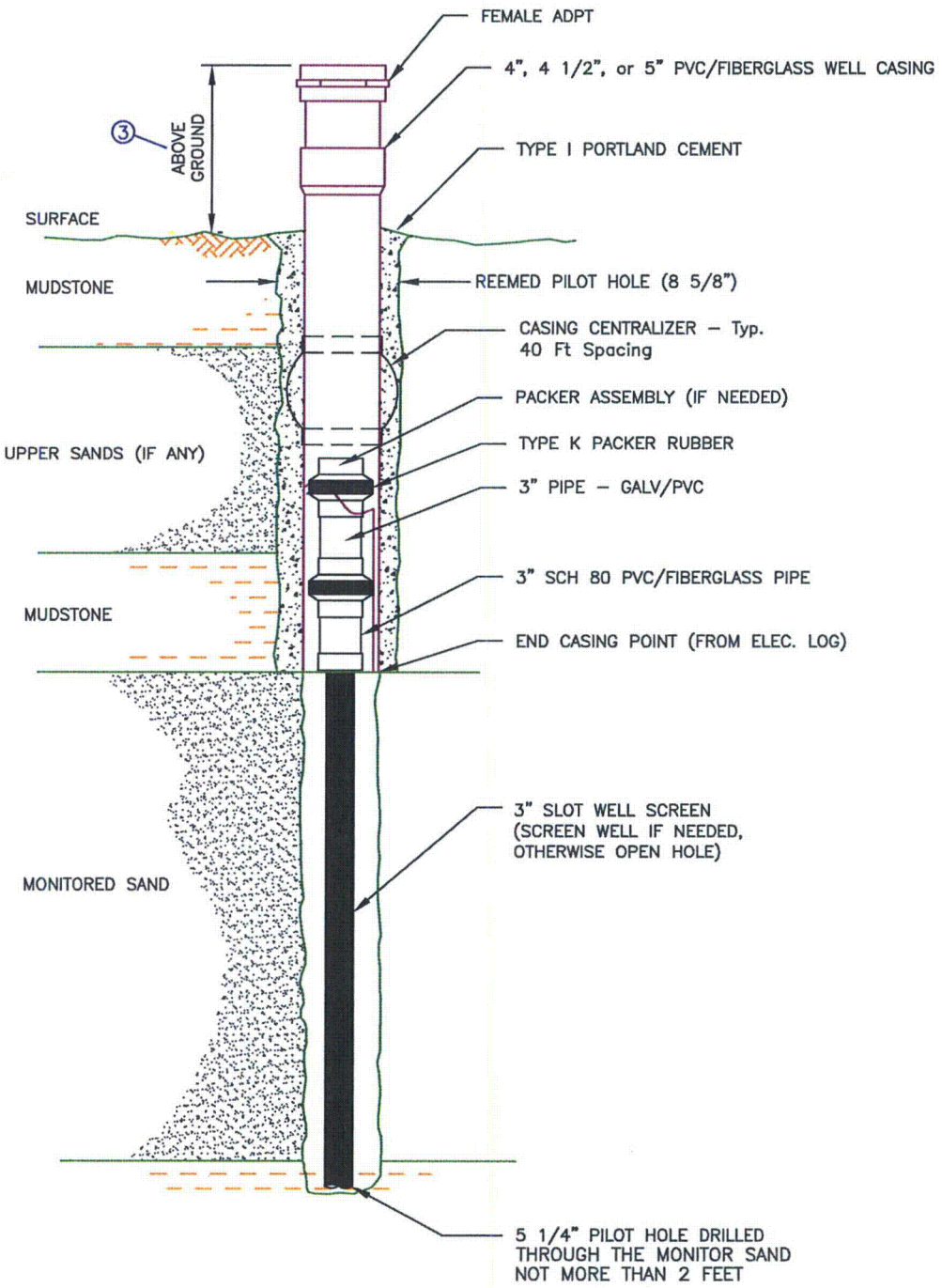

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FIG. 3-14 - NICHOLS RANCH & HANK ISR PROJECTS

TYPICAL MONITOR WELL CONSTRUCTION DIAGRAM

JOB NO.	Monitor Well Design
DATE:	Sept. 25, 2007
SCALE:	N.T.S.
APPROVED BY:	HA
DRAWN BY:	S.M.F.
DRAWING NO.	Figure 3-14

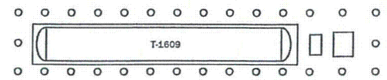
REV.	DATE	DESCRIPTION
1	3/10/08	
1	8/20/09	
3	7/11/13	SMF

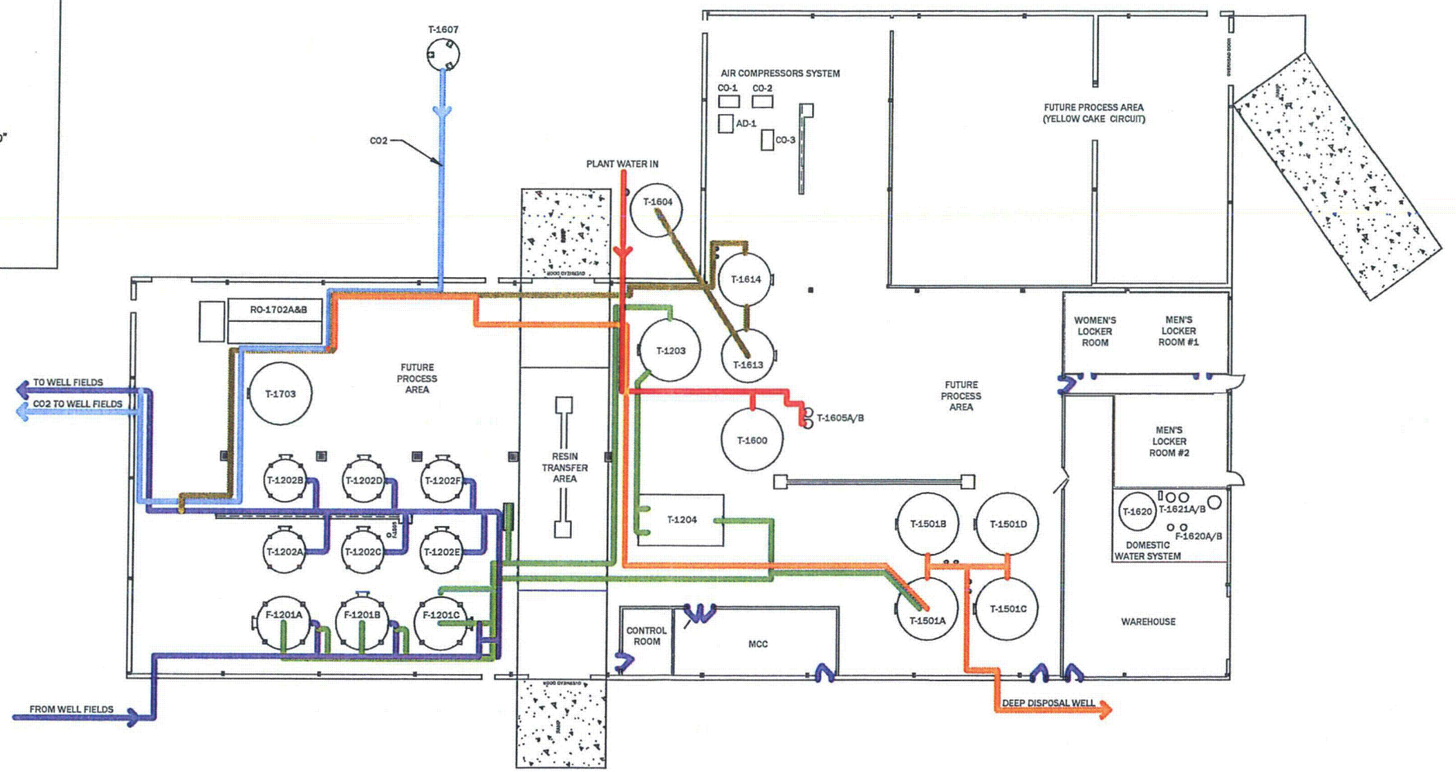
LEGEND

EQUIPMENT	DESCRIPTION
F-1201A/B/C	SAND FILTERS
RO-1702A	REVERSE OSMOSIS UNIT
RO-1702B	REVERSE OSMOSIS BRINE CONCENTRATION UNIT
T-1202A/B/C/D/E/F	IX VESSELS
T-1203	TRANSFER WATER TANK
T-1204	LAMELLA CLEARIFIER
T-1501A	WASTE WATER DECANT TANK
T-1501B/C/D	WASTE WATER TANKS
T-1600	FRESH WATER TANK
T-1604	SODIUM BICARBONATO SILO
T-1605A/B	PRESSURE TANK PLANT WATER
T-1607	CO2 TANK
T-1608	O2 TANK
T-1609	PROPANE TANK
T-1613	BICARBONATE MIX TANK
T-1614	BICARBONATE TANK
T-1620	DOMESTIC WATER TANK
T-1621A/B	PRESSURE TANK DOMESTIC WATER
T-1622	SODIUM HYPOCHLORITE TANK
T-1703	PERMEATE TANK

- SODIUM BICARBONATE
- TRANSFER WATER
- WASTE WATER
- LIXIVIANT
- CO2
- O2
- PLANT WATER
- SUMPS

SCALE: 1/16" = 1'-0"
0 30 60





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DRAWING REVISIONS TYPES: A PRE-IFC ⚠ POST IFC											
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A	10/28/13	EBJ		–	ISSUED FOR APPROVAL						

Uranerz ENERGY CORPORATION

IF THIS BAR DOES NOT EQUAL ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NO.:	CADD:	CHECKED BY:	APPROVED BY:	PLOT DATE:	SHEET
1246-001	BJCM	EB	–	11/13/2013 11:15 AM	

NICHOLS RANCH ISR PROJECT
FIG. 3-3
NICHOLS RANCH PROCESS FLOW DIAGRAM

DRAWING: 3.3.DWG