ENERGY FUELS

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February 26, 2016

Attn: Document Control Desk
Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attn: Deputy Director
Division of Decommissioning, Uranium Recovery and Waste Programs
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
11545 Rockville Pike, Mail Stop T-8F5
Rockville, MD 20852-2738

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

Dear Director and Deputy Director,

This letter and attachment serves as the Semi-Annual Report for the Uranerz Energy Corporation Nichols Ranch ISR Project that is required by License Condition 11.1 B and D 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 jmccarthy@energyfuels.com.

Sincerely,

John McCarthy
Manager, ESH
Uranerz Energy Corporation (am Energy Fuels Company)

JMc/th

Attachments – July - December 2015 Semi-Annual Report
Wind Rose and Atmospheric Stability Analysis
Revised Pages

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

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

Semi-Annual Report

July - December 2015

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ENERGY FUELS

List of Appendices

1.0 INTRODUCTION

Uranerz received Source Material License SUA-1597 on July 19, 2011. In accordance with 10 CFR 40.65 and Source Material License SUA-1597 Uranerz Energy Corporation submits the 2015 Semi-Annual Effluent and Monitoring 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 includes information for the period of July 1, 2015 through December 31, 2015. Annual Reporting is submitted per License Conditions 9.4E, 10.11, 11.2 and 11.7.

2.0 OPERATIONAL MONITORING

2.1 Activities Summary

- Production continues in Production Area #1 (PA#1) in header houses 1 through 6, with the addition of header house 5 during the report period as summarized in Quarterly Reports submitted to the NRC on October 19, 2015 for third quarter and January 25, 2016 for fourth quarter. Please refer to the Quarterly Reports for additional information (e.g. production and bleed rates) as it is not reproduced in the Semi-annual report.
- Wellfield development occurred during the quarter in header houses 7 and 8.
- Production Area #2 (PA#2) monitor well installation was completed and baseline sampling of PA#2 was initiated in December.
- No operational activities occurred at the Hank Unit during the report period.
- Operations began installation of the elution system in the CPP and scheduled for NRC inspection January 2016.

2.2 Excursion Well Status

License Condition 11.1(B) requires a status update of any long term excursion. As reported in the Quarterly reports mentioned above, no wells were on excursion status during the report period.

2.3 Disposal Well Volumes

License Condition 10.11 requires the volume disposed in each disposal well to be reported annually. Uranerz presently has two permitted deep disposal wells permitted through the Wyoming Department of Environmental Quality, Water Quality Division (WDEQ-WQD), (Permit 10-392). The purpose of the two deep disposal wells is to dispose the wellfield bleed to maintain a hydrologic inward gradient during production. Quarterly and annual reports pertaining to the use of the deep disposal wells are submitted the WDEQ-WQD. As of the 4th Quarter 2015 report submitted to WQD, 570,578 barrels (bbls) were disposed in 2015 using the deep wells.

2.4 Flow Rates and Manifold Pressures

Per License Condition 11.1C, Uranerz is required to record flow rates and manifold pressures daily. A summary of these items was submitted in the above named Quarterly reports. Otherwise, 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. Please refer to Quarterly Reports submitted October 19, 2015 and January 25, 2016.

2.6 Restoration

No areas are in restoration for the reporting period.

3.0 ENVIRONMENTAL MONITORING

3.1 Ground Water Monitoring

In accordance with License Condition 11.5 monitor wells in the production area (perimeter, overlying and underlying wells) are sampled for excursion parameters. Results of the monitor well samples are provided in Quarterly Reports submitted to the NRC.

License Condition 11.7 requires sampling of domestic and livestock wells to be sampled within 1 km of the production area on an annual basis. Collected samples are 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. Analytical results for each well are enclosed in Appendix A.

The surficial aquifer well, URNZG-15, located in Production Area #1 was sampled 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 well are as follows.

Date	Water Level Results	Date	Water Level Results
7/9/2015	dry	10/28/2015	dry
8/11/2015	dry	11/30/2015	dry
9/21/2015	dry	12/31/2015	dry

3.2 Surface Water Monitoring

In accordance with License Condition 11.1(D), Regulatory Guide 4.14 and Section 5.7.7.3.1 of the license application, surface water will be collected annually and analyzed for total uranium, Th-230, Ra-226, and Pb-210. There are two surface water self-samplers located at the Nichols Ranch Unit. Grab samples from the surface water sampling locations were collected on March 10, 2015. Analytical results for each of the locations are enclosed in Appendix B. As per discussion with NRC staff, the Hank Unit is not operational at this time, therefore, surface water monitoring will not occur until production begins in that area. Baseline sampling for the Hank Unit was completed and approved with the issuance of the NRC license.

3.3 Summary of Unplanned Releases

There was one reportable unplanned release of production solution and one reportable unplanned release of non 11E2, Type II mineral oil during the reporting period. Verbal notifications, emails, and written notifications were provided to the NRC, WDEQ-LQD and WDEQ-WQD accordingly. Documentation pertaining to the unplanned releases is maintained onsite per License Condition 11.6.

3.4 Sediment 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-230. The analytical results for the sediment samples are enclosed in Appendix C.

Soil samples are also collected annually in the vicinity of where radon is monitored. The analytical results for the soil samples are enclosed in Appendix D.

3.5 Air Particulate, Radon, and Gamma Radiation Monitoring

Uranerz maintains an environmental 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. Uranerz also maintains radon monitors at four locations surrounding the active wellfield and eight surrounding the CPP. These are compared to background for use in calculating annual dose to the public and exposures to employees.

The air station locations are as follow:

- NA-1 monitors the nearest full time resident at Dry Fork Ranch
- NA-2 is at the southern license boundary and monitors the down wind conditions of the north west winds for the CPP.
- NA-3 is at the northern license boundary and monitors the downwind conditions of south west winds for the wellfield and the CPP

- NA-4 is at the easterly license boundary and is the background station being upwind from the wellfield and the CPP.
- NA-5 is located west of the CPP and monitors the down wind conditions of the easterly winds that occur at night.
- NA-6 is located north east of the CPP and monitors the man camp that is the 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 10 CFR 20 Appendix B, Effluent Concentration Limits. Appendix E shows the air particulate data collected for the year 2015.

Radon gas is monitored continuously at the six air particulate stations. These locations are used for environmental monitoring and for use in public dose assessments. There are eight additional radon detectors surrounding the CPP which are used for public dose assessments and for personnel dose assessments. There are also four radon monitors surrounding the active wellfield that are used for public as well as personnel dose assessments. Passive outdoor radon detectors are exchanged quarterly or semi-annually, as required, and sent to Landauer for analysis. The data is shown in Appendix I. Data is given as raw data without subtracting the background location. These values will be compared to radon daughter effluent releases found in 10 CFR 20 Appendix B values to assess dose to the public.

Passive gamma radiation is monitored continuously at the six air particulate stations and at other monitoring stations located throughout the licensed area. The added locations are additional data points that are intended to be used for determining dose to the public. 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 Appendix F. Data is given as raw data without subtracting the control badge.

3.6 Effluent Monitoring Program

The effluent monitoring program is designed to meet the requirements of 10 CFR 40.65 and is reported in accordance with License Condition 11.1. Sampling occurs inside the central processing plant, Deep Disposal Wells (DDW), and the header houses to measure long-lived particulate effluents. These measurements were performed monthly from January 2015 through June 2015. After reviewing results from all long-lived particulate air sampling since May 2014 there were no instances of exceeding 2% of a DAC. The highest concentration observed was 4.1E-12 pCi/ml of natural uranium which is the equivalent of 1.37% of a DAC. Based on these results, and the fact that processing of yellowcake did not occur at the facility, quarterly air sampling of the processing plant, DDW, and the header houses was implemented for July through December 2015. The results are summarized in Appendix H.

Sampling also occurs inside the central processing plant, DDW, and the header houses to measure radon effluents, using the modified Kusnetz method. These measurements are taken once a month except for the DDW which occurs quarterly starting in July 2015 in accordance with NRC Regulatory Guide 8.30. Radon monitoring also includes quarterly samples of at least 10% of operational recovery wells using the modified Kusnetz method as well as measurements of radon emitted from point source tank ventilation located in the CPP using Method 115 from 40 CFR 61 Appendix B. The results are summarized in Appendix E.

The total effluents emitted during the year of 2015 are a sum of each sources effluents and are calculated for long-lived particulate and radon effluents, as shown below. In order to be the most conservative all long-lived particulate effluents are considered to be related to natural uranium due to it having the most restrictive effluent concentration limit located in 10 CFR 20 Appendix B. Sampling occurs and a gross alpha measurement is performed in order to calculate activity per volume in air. These amounts will be compared to operational projections in the license application and will be analyzed and summarized in the annual ALARA report. Average concentrations are taken from Appendix D and Appendix E and the background (BKD) concentration for natural uranium is taken from averaging the concentration of natural uranium for NA-4 for 2015(which is 1.2E-22 Ci/ml). The average BKD concentration of radon is taken from averaging the concentration of radon for NR-5 for 2015 (which is 6.50E-16 Ci/ml).

$$Total\ Effluent\ of\ Natural\ Uranium\ (period\ monitored) = (CPP\ \ Ci) + (Header\ House\ Ci) + (DDW\ Ci)$$

$$CPP\ (Ci) = \left[Avg.Conc\ \left(\frac{Ci}{ml}\right) - BKD\ Conc.\left(\frac{Ci}{ml}\right)\right] * 13{,}500(cfm) * 28{,}316\left(\frac{ml}{ft^3}\right) * 525{,}600(minutes\ of\ operations\ in\ period\ monitored)$$

$$Header\ House\ (Ci) = \left[Avg.Conc\ \left(\frac{Ci}{ml}\right) - BKD\ Conc.\left(\frac{Ci}{ml}\right)\right] * 1{,}275(cfm) * 28{,}316\left(\frac{ml}{ft^3}\right) * 525{,}600(minutes\ of\ operations\ in\ period\ monitored)$$

$$DDW\ (Ci) = \left[Avg.Conc\ \left(\frac{Ci}{ml}\right) - BKD\ Conc.\left(\frac{Ci}{ml}\right)\right] * 1{,}275(cfm) * 28{,}316\left(\frac{ml}{ft^3}\right) * 525{,}600(minutes\ of\ operations\ in\ period\ monitored)$$

$$CPP\ (Ci) = (1.21E^{-18} - 1.2E^{-22}) * 13{,}500 * 28{,}316 * 525{,}600 = 2.43E^{-4}\ Ci$$

$$Header\ House\ (uCi) = (1.41E^{-18} - 1.2E^{-22}) * 1{,}275 * 28{,}316 * 525{,}600 = 2.68E^{-5}\ Ci$$

$$DDW\ (uCi) = (1.34E^{-18} - 1.2E^{-22}) * 1{,}275 * 28{,}316 * 525{,}600 = 2.55E^{-5} Ci$$

$$\textbf{Total Effluents of Natural Uranium (period monitored)} = \mathbf{2.43E^{-4} + 2.68E^{-5} + 2.55E^{-5} = 2.95E^{-4}}\ \textbf{Ci of Natural Uranium}$$

$$Total\ Effluents\ of\ Radon\ and\ its\ Progeny\ (period\ monitored) = (CPP\ (Ci)) + (CPP\ Tanks\ (Ci)) + (Header\ House\ (Ci)) + (DDW\ (Ci)) + (Recovery\ Wells\ (Ci)) + (Spills\ (Ci))$$

$$CPP\ (Ci) = \left[\left(Avg.Conc\ (WL) * 9.1E^{-14}\left(\frac{Ci/ml}{WL}\right)\right) - BKD\ Conc.\left(\frac{Ci}{ml}\right)\right] * 13{,}500\ (cfm) * 28{,}316\left(\frac{ml}{ft^3}\right) * 525{,}600(minutes\ of\ operations\ in\ period\ monitored)$$

$$CPP\ Tanks(Ci) = \left[\left(Avg.Conc\ (WL) * 9.1E^{-14}\left(\frac{Ci/ml}{WL}\right)\right) - BKD\ Conc.\left(\frac{Ci}{ml}\right)\right] * 293\ (cfm) * 28{,}316\left(\frac{ml}{ft^3}\right) * 525{,}600(minutes\ of\ operations\ in\ period\ monitored)$$

$$Header\ House\ (Ci) = \left[\left(Avg.Conc\ (WL) * 9.1E^{-14}\left(\frac{Ci/ml}{WL}\right)\right) - BKD\ Conc.\left(\frac{Ci}{ml}\right)\right] * 1{,}275\ (cfm) * 28{,}316\left(\frac{ml}{ft^3}\right) * 525{,}600(minutes\ of\ operations\ in\ period\ monitored)$$

$$DDW\ (Ci) = \left[\left(Avg.Conc\ (WL) * 9.1E^{-14}\left(\frac{Ci/ml}{WL}\right)\right) - BKD\ Conc.\left(\frac{Ci}{ml}\right)\right] * 1{,}275\ (cfm) * 28{,}316\left(\frac{ml}{ft^3}\right) * 525{,}600(minutes\ of\ operations\ in\ period\ monitored)$$

$$Recovery\ Wells\ (Ci) = \left[\left(\frac{Avg.Conc\ (WL)}{Well} * 9.1E^{-14}\left(\frac{Ci/ml}{WL}\right)\right) - BKD\ Conc.\left(\frac{Ci}{ml}\right)\right] * 133(maximum\ number\ of\ operational\ recovery\ wells) * 3{,}000\ (emmision\ rate\ in \frac{ml}{min}.) * 525{,}600(minutes\ of\ operations\ in\ period\ monitored)$$

$Spills\ (Ci) = There\ were\ no\ spills\ that\ contributed\ detectable\ amounts\ of\ radon\ to\ the\ environment\ during\ the\ reporting\ period$

$$CPP\ (Ci) = [(0.0077 * 9.1E^{-14}) - 6.50E^{-16}] * 13{,}500 * 28{,}316 * 525{,}600 = 1.06E^{-2}Ci$$

$$CPP\ Tanks\ (Ci) = [(248 * 9.1E^{-14}) - 6.50E^{-16}] * 293 * 28{,}316 * 525{,}600 = 9.87E^{+2}\ Ci$$

$$Header\ House\ (Ci) = [(0.0083 * 9.1E^{-14}) - 6.50E^{-16}] * 1{,}275 * 28{,}316 * 525{,}600 = 1.94E^{-2}\ Ci$$

$$DDW\ (Ci) = [(0.0073 * 9.1E^{-14}) - 6.50E^{-16}] * 1{,}275 * 28{,}316 * 525{,}600 = 2.93E^{-3}\ Ci$$

$$Recovery\ Wells\ (Ci) = [(0.1484 * 9.1E^{-14}) - 6.50E^{-16}] * 133 * 3{,}000 * 525{,}600 = 2.70E^{-2}\ Ci$$

$$\mathbf{Total\ Effluents\ of\ Radon\ and\ its\ Progeny\ (period\ monitored) = 1.06E^{-2}Ci + 9.87E^{+2}\ Ci + 1.94E^{-2}\ Ci + 2.93E^{-3}\ Ci + 2.70E^{-2}Ci = 987.33\ Ci\ of\ Radon - 222.\ Radon\ is\ assumed\ to\ be\ in\ equilibrium\ with\ its\ short\ lived\ progeny.}$$

3.7 Meteorological Data

In accordance with License Condition 10.15 meteorological data will be collected in order to verify the data to be representative of long term conditions at Nichols Ranch ISR Project. The data collected includes temperature, wind speed and direction. The data was recovered at better than a 98% recovery rate. A wind rose and stability analysis was prepared by third party laboratory, IML Air Science (a division of Inter-Mountain Labs, Inc.). A copy of the wind rose and stability analysis report is included with this Semi-Annual report.

A review of the report shows no changes in conditions warranting a change in environmental monitoring stations or radon detectors at this time.

4.0 SUMMARY OF EMPLOYEE URINALYSIS RESULTS

Bioassay samples are collected on all employees at initial hiring. Monthly samples are collected from plant and wellfield operators. Analysis is performed by an outside laboratory. The bioassay results are summarized annually, pursuant to 10 CFR Part 20, Subpart M. During the year 2015 there were zero cases of detectable quantities of total uranium found in a sample.

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, 10 CFR 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 or exceed 50 mrem in a year.

To demonstrate compliance with 10 CFR 20.1301 by the company, option 1 listed above was used. In order to calculate the TEDE doses from external radiation, and internal exposures to Radon-222 (and its short lived progeny) and long lived particulates were summed. Below is a description of how each exposure was calculated with the sum at the bottom.

For the 2015 calendar year, an OSL was placed at the monitoring station labeled NCBM-2 in order to determine exposure to external radiation. This station is located on the unrestricted area boundary surrounding the CPP. The doses from the first through the fourth quarter of 2015 were summed. Once the exposures from the year are summed, the background station (NR-5) is subtracted from the total.

This difference is the resulting exposure that a member of the public, with an occupancy factor of 100%, would have received at the uncontrolled area boundary. Below is the calculation with the result.

$$External\ Radiation\ (mrem) = (sum\ of\ NCBM\ 2\ doses\ in\ mrem) - (sum\ of\ NR\ 4\ doses\ in\ mrem)$$

$$External\ Radiation\ (mrem) = (40.9 + 39.9 + 42.2 + 43.2) - (38.0 + 38.9 + 38.7 + 40.1) = 10.5\ mrem$$

In order to determine compliance with 10 CFR 20.1301 for the 2015 calendar year, measurements were made with radon track etch detectors at eight different location surrounding the CPP on the fence boundary of the uncontrolled area. For all calculations it is assumed that Radon-222 is in equilibrium with its associated progeny. The CPP was chosen as the primary source for radon emissions during the calendar 2015 period as demonstrated in section 3.6 above where the CPP accounted for nearly 100% of all radon effluents generated at the Nichols Ranch facility. The detectors were changed semi-annually and ran from beginning of October 2014 through end of April 2015, April 2015 through October 2015, and from July 2015 through end of December 2015. Since there was no way to distinguish between the concentration difference between the fourth quarter 2014 and the first quarter 2015, it was assumed that the background radon emissions at the plant could be compared with an average of the two background (NR-5) samples taken during the six month time period. The eight track etch detectors were averaged for the six month periods, and then an average background concentration was calculated and subtracted off (See below for the calculation and final concentration above background.). This average concentration was compared with the value in 10 CFR 20 Appendix B Table 2 effluent concentration limit for Radon-222 with Daughters Present which is the equivalent of 50 mrem if exposed to the concentration for an entire year for a conversion to mrem (see below calculation for result).

$$Average\ Radon\ with\ Daughters\ Present\ Concentration\ (WL) = \left(\frac{(CPP\ Q4Q1) + (CPP\ Q2Q3) + (CPP\ Q3Q4)}{3}\right) - \left(\frac{(NR5Q4Q1 + NR5Q2Q3 + NR5Q3Q4)}{3}\right)$$

Where:

CPP Q4Q1 = Average concentration in uCi/ml of CPP fence line track etch detectors for quarter 4 2014 through quarter 1 of 2015.

CPPQ2Q3 = Average concentration in uCi/ml of CPP fence line track etch detectors for quarter 2 through 3 of 2015.

CPPQ3Q4 = Average concentration in uCi/ml of CPP fence line track etch detectors for quarter 3 through 4 of 2015.

NR5Q4Q1 = Average concentration of track etch detector in uCi/ml located at background location NR-5 for quarter 4 2014 through quarter 1 2015.

NR5Q2Q3 = Average concentration of track etch detector in uCi/ml located at background location NR-5 for quarter 2 through 3 2015.

NR5Q3Q4 = Average concentration of track etch detector in uCi/ml located at background location NR-5 for quarter 3 through 4 2015.

$$Average\ Radon\ with\ Daughters\ Present\ Concentration\ (uCi/ml) = \left(\frac{6E^{-10} + 6.1E^{-10} + 9.5E^{-10}}{3}\right) - \left(\frac{5E^{-10} + 6E^{-10} + 7E^{-10}}{3}\right) = 1.2E^{-10}\ uCi/ml$$

$$\frac{1.2E^{-10}\frac{uCi}{ml} * 50\ mrem}{1.0E^{-10}\frac{uCi}{ml}} = 60\ mrem$$

In order to determine compliance with 10 CFR 20.1301 for the 2015 calendar year, measurements were made at air sampling station NA-6. This station is co-located with station NR-7. The sum of each isotope for 2015 was calculated and then the background station was subtracted from the total. If a value was reported as non-detectable (ND), then the reporting limit was used in the calculation (See below for the calculation and final concentrations for natural uranium (U-nat), Th-230, Ra-226, Pb-210 and Po-210.). The concentrations were compared with the values in 10 CFR 20 Appendix B Table 2 effluent concentration limits where the most conservative value was used which is the equivalent of 50 mrem if exposed to that concentration for an entire year for a conversion to mrem (see below calculation for result). If a value was negative, its dose was assumed to be zero. The values were then summed to get an overall mrem of exposure to long-lived particulate radiation (see below).

$$Average\ Airborne\ Long\ Lived\ Particulate\ Concentration\ \left(\frac{uCi}{ml}\right) = (Sum\ of\ NA-6\ concentrations) - (Sum\ of\ NA-4\ concentrations)$$

$$Airborne\ Natural\ Uranium\ Particulate\ Concentration\ \left(\frac{uCi}{ml}\right) = (1.0E^{-16} + 1.0E^{-16} + 1.0E^{-16} + 1.2E^{-16}) - (1.1E^{-16} + 1.0E^{-16} + 1.0E^{-16} + 1.0E^{-16}) = \frac{-0.1E^{-16}\frac{uCi}{ml} * 50\ \text{mrem}}{9.0E^{-13}\frac{uCi}{ml}} = 0.0\ mrem$$

$$Airborne\ Th\ 230\ Particulate\ Concentration\ \left(\frac{uCi}{ml}\right) = (1.0E^{-16} + 1.0E^{-16} + 1.0E^{-16} + 1.2E^{-16}) - (1.1E^{-16} + 1.0E^{-16} + 1.0E^{-16} + 1.0E^{-16}) = \frac{0.1E^{-16}\frac{uCi}{ml} * 50\ \text{mrem}}{2.0E^{-14}\frac{uCi}{ml}} = 0.03\ mrem$$

$$Airborne\ Ra\ 226\ Particulate\ Concentration\ \left(\frac{uCi}{ml}\right) = (2.8E^{-16} + 1.0E^{-16} + 1.0E^{-16} + 1.0E^{-16}) - (2.7E^{-16} + 1.0E^{-16} + 1.0E^{-16} + 1.1E^{-16}) = \frac{0.0E^{-16}\frac{uCi}{ml} * 50\text{ mrem}}{9.0E^{-13}\frac{uCi}{ml}} = 0.0\ mrem$$

$$Airborne\ Pb\ 210\ Particulate\ Concentration\ \left(\frac{uCi}{ml}\right) = (2.1E^{-14} + 1.8E^{-14} + 1.9E^{-14} + 1.8E^{-14}) - (1.8E^{-14} + 2.0E^{-14} + 2.1E^{-14} + 2.2E^{-14}) = \frac{-0.5E^{-14}\frac{uCi}{ml} * 50\text{ mrem}}{6.0E^{-13}\frac{uCi}{ml}} = 0.0\ mrem$$

$$Airborne\ Po\ 210\ Particulate\ Concentration\ \left(\frac{uCi}{ml}\right) = (3.9E^{-15} + 8.8E^{-15} + 1.4E^{-14} + 7.0E^{-15}) - (4.5E^{-15} + 3.7E^{-15} + 1.4E^{-14} + 7.4E^{-15}) = \frac{4.1E^{-15}\frac{uCi}{ml} * 50\text{ mrem}}{9.0E^{-13}\frac{uCi}{ml}} = 0.23\ mrem$$

$$Sum\ of\ Long\ Lived\ Airborne\ Particulate\ Exposures\text{: } 0.0 + 0.03 + 0.0 + 0.0 + 0.23 = 0.26\ mrem$$

$$Sum\ of\ all\ Exposures = External\ exposure\ (mrem) + Radon\ exposure\ (mrem) + Long\ Lived\ Airborne\ Particulate\ Exposure\ (mrem) = 10.5 + 60 + 0.23 = 70.73\ mrem$$

This demonstrates that if a person were to occupy the boundary of the unrestricted area near the CPP 100% of the year it would result in a dose of 70.73 mrem which is less than the 100 mrem requirement in 10 CFR 20.1301.

6.0 SAFETY AND ENVIRONAMENTAL REVIEW PANEL (SERP) EVALUATIONS

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 eight (8) SERPs during the year. A summary of SERPs performed during the annual report period are enclosed in Appendix J. Page changes related to the approved SERPs are attached.

7.0 RADIATION PROTECTION PROGRAM

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 10 CFR 20.1101(c). These results shall include doses to individual members of the public. The annual ALARA audit was conducted September 15, 2015 through September 17, 2015. The ALARA audit report, including the analysis of the dose to public for 2014, was submitted to the NRC under cover letter dated December 18, 2015. Doses to the public for 2015 are located in section 5.0.

8.0 SURETY

All activities conducted, to date, at the Nichols Ranch ISR Project are covered in the surety estimate as required by License Condition 9.5. The surety estimate is reviewed annually and submitted to the NRC by December 29. The WDEQ-LQD also requires an annual surety review in December and therefore Uranerz reviews the surety annually in December, thus aligning the NRC and LQD surety reviews for consistency, standardization and reduced redundancy. Uranerz updated the surety estimate and submitted it to the NRC under cover letter dated December 18, 2015. The updated surety pends approval from the NRC. The next annual surety review will occur in December 2016.

Appendix A

Livestock and Domestic Wells Within 1 Kilometer

Water Quality Analysis

July to December 2015 Semi-Annual Report

Sample Location	Sample Date	Uranium-Natural (Total)		Radium 226			Alkalinity (mg/l)	Conductivity (umhos/cm)	Chloride (mg/l)
		Concentration (µCi/ml)	Reporting Limit (µCi/ml)	Concentration (µCi/ml)	Precision (±) (µCi/ml)	MDC or RL (µCi/ml)			
Nichols Ranch Unit									
DW-4L	27 Aug 15	ND	2.031E-10	1.2E-10	1.2E-10	1.6E-10	110	614	10
DW-4M	11 Sep 15	4.07E-10	2.031E-10	3E-10	1E-10	2E-10	182	1210	23
DW-4U	11 Sep 15	3.66E-08	2.031E-10	6E-10	1E-10	2E-10	138	1390	3
Nichols #1	10 Mar 15	1.67E-08	2.031E-10	2.4E-10	1.3E-10	1.6E-10	131	492	6
Pats #1	20 Aug 15	2.13E-08	2.031E-10	5E-10	1E-10	2E-10	136	616	6
Pug #2	20 Aug 15	ND	2.031E-10	ND	NA	2E-10	275	504	3
Red Springs Artesian	Not Sampled, Dry Well (Checked May 14,2015)								
Dry Fork #3	Not Sampled, Dry Well (Checked August 26, 2015)								
Pug #1	Not Sampled, Dry Well (Checked August 20, 2015)								

Notes:

ND =Not Detected at the Reporting Limit

MDC = Minimum Detectable Concentration

RL = Reporting Limit

NA = Not Applicable

Appendix B

Uranerz Surface Water Quality Analysis

July to December 2015 Semi-Annual Report

Sample Location	Sample Date	Uranium-Natural (Total)		Radium 226			Lead 210			Thorium 230		
		Concentration (µCi/ml)	Reporting Limit (µCi/ml)	Concentration (µCi/ml)	Precision (±) (µCi/ml)	MDC or RL (µCi/ml)	Concentration (µCi/ml)	Precision (±) (µCi/ml)	MDC or RL (µCi/ml)	Concentration (µCi/ml)	Precision (±) (µCi/ml)	MDC or RL (µCi/ml)
NRSSW (Cottonwood D Nichols)	10 Mar 15	2.97E-07	2.031E-10	5.4E-09	1.1E-09	1.8E-10	-4E-10	8E-10	1.4E-09	2E-10	9E-11	1E-10
NRSSE (Cottonwood U Nichols)	10 Mar 15	6.36E-08	2.031E-10	4.5E-09	9.2E-10	1.5E-10	-7E-10	8E-10	1.4E-09	3E-10	1E-10	2E-10
NRSSW (Cottonwood D Nichols)	30 Apr 15	2.03E-08	2.031E-10	2.2E-10	1.4E-10	2E-10	4E-10	8E-10	1.3E-09	6E-11	1E-10	2E-10
NRSSE (Cottonwood U Nichols)	30 Apr 15	4.96E-08	2.031E-10	3.2E-10	2E-10	2.7E10	6E-10	8E-10	1.3E-09	1E-10	2E-10	4E-10
NRSSW (Cottonwood D Nichols)	8 Jun 15	1.90E-09	2.031E-10	2.2E-10	1.2E-10	1.4E-10	-3E-10	7E-10	1.2E-09	3E-11	2E-10	4E-10
NRSSE (Cottonwood U Nichols)	8 Jun 15	1.51E-07	2.031E-10	7.4E-10	2.2E-10	1.9E-10	-2E-10	7E-10	1.2E-09	2E-10	2E-10	4E-10

Notes:

ND =Not Detected at the Reporting Limit

MDC = Minimum Detectable Concentration

RL = Reporting Limit

Appendix C

Uranerz Sediment Analysis

July to December 2015 Semi-Annual Report

Sample Location	Sample Date	Uranium-Natural (Total)		Radium 226			Lead 210			Thorium 230		
		Concentration (µCi/g-dry)	Reporting Limit (µCi/g-dry)	Concentration (µCi/g-dry)	Precision (±) (µCi/g-dry)	MDC or RL (µCi/g-dry)	Concentration (µCi/g-dry)	Precision (±) (µCi/g-dry)	MDC or RL (µCi/g-dry)	Concentration (µCi/g-dry)	Precision (±) (µCi/g-dry)	MDC or RL (µCi/g-dry)
NRSSW (Cottonwood D Nichols)	27 Aug 15	4.33E-06	1.36E-07	1.2E-09	2E-10	3E-11	1.9E-09	4E-10	2E-10	6E-10	1E-10	2E-10
NRSSE (Cottonwood U Nichols)	27 Aug 15	1.35E-06	1.36E-07	1.5E-09	3E-10	3E-11	1.4E-09	3E-10	2E-10	7E-10	1E-10	2E-10

Notes:

ND =Not Detected at the Reporting Limit

MDC = Minimum Detectable Concentration

RL = Reporting Limit

Appendix D

Uranerz Soil Analysis

July to December 2015 Semi-Annual Report

Sample Location	Sample Date	Uranium-Natural (Dissolved)		Radium 226			Lead 210			Thorium 230		
		Concentration (µCi/g-dry)	Reporting Limit (µCi/g-dry)	Concentration (µCi/g-dry)	Precision (±) (µCi/g-dry)	MDC or RL (µCi/g-dry)	Concentration (µCi/g-dry)	Precision (±) (µCi/g-dry)	MDC or RL (µCi/g-dry)	Concentration (µCi/g-dry)	Precision (±) (µCi/g-dry)	MDC or RL (µCi/g-dry)
SD-1 (Previously reported as SS-1)	31 Mar 15	5.42E-07	6.77E-09	6E-10	1E-10	3E-11	5E-10	2E-10	2E-10	3E-10	6E-11	2E-10
SD-2 (Previously reported as SS-2)	31 Mar 15	2.98E-06	6.77E-09	1.1E-09	2E-10	4E-11	8E-10	2E-10	2E-10	8E-10	1E-10	1E-10
SD-3 (Previously reported as SS-3)	31 Mar 15	1.56E-06	6.77E-09	1E-09	2E-10	3E-11	1.1E-09	2E-10	2E-10	1E-09	2E-10	2E-10
SD-4 (Previously reported as SS-4)	31 Mar 15	1.90E-06	1.35E-08	1.5E-09	3E-10	4E-11	1.2E-09	2E-10	2E-10	9E-10	2E-10	1E-10
SD-5 (Previously reported as SS-5)	31 Mar 15	1.69E-06	6.77E-09	1.2E-09	2E-10	3E-11	8E-10	2E-10	2E-10	7E-10	1E-10	2E-10
SD-6 (Previously reported as SS-6)	31 Mar 15	2.10E-06	1.35E-08	8E-10	2E-10	4E-11	1.6E-09	3E-10	2E-10	2E-10	4E-11	1E-10
SD-7 (Previously reported as SS-7)	31 Mar 15	3.11E-06	1.35E-08	1.6E-09	3E-10	3E-11	1.5E-09	3E-10	2E-10	7E-10	1E-10	2E-10
SD-7 (Duplicate QA/QC)	31 Mar 15	2.44E-06	1.35E-08	1.5E-09	3E-10	4E-11	1.7E-09	3E-10	2E-10	8E-10	1E-10	2E-10
SD-8	31 Mar 15	1.29E-06	1.35E-08	1.4E-09	3E-10	4E-11	1.5E-09	3E-10	2E-10	8E-10	1E-10	2E-10
SD-9	31 Mar 15	1.42E-06	1.35E-08	1.6E-09	3E-10	4E-11	1.2E-09	2E-10	2E-10	8E-10	2E-10	2E-10
SD-10	31 Mar 15	1.62E-06	1.35E-08	1.3E-09	3E-10	3E-11	1.5E-09	3E-10	2E-10	8E-10	2E-10	2E-10

Notes:

ND =Not Detected at the Reporting Limit

MDC = Minimum Detectable Concentration

RL = Reporting Limit

Uranerz Energy Corporation
Appendix E
Air Particulate Data
July to December 2015

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	1st Quarter 2015	U-Nat	1.3E-16	N/A***	1.0E-16	9.0E-14	0.1
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	1.1E-16	3.2E-17	1.0E-16	9.0E-13	0.0
		Pb-210	1.7E-14	1.6E-15	2.0E-15	6.0E-13	2.8
		Po-210	3.70E-15	1.0E-15	N/A***	9.0E-13	0.4
	2nd Quarter 2015	U-Nat	1.1E-16	N/A***	1.0E-16	9.0E-14	0.1
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.9E-14	2.6E-15	2.0E-15	6.0E-13	3.2
		Po-210	3.8E-15	1.7E-15	2.0E-15	9.0E-13	0.4
	3rd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.7E-14	1.3E-15	2.0E-15	6.0E-13	2.8
		Po-210	8.9E-15	1.8E-15	2.0E-15	9.0E-13	1.0
	4th Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	2.2E-14	1.6E-15	2.0E-15	6.0E-13	3.7
		Po-210	7.6E-15	1.8E-15	2.0E-15	9.0E-13	0.8
NA-2 Air Station Downwind Southern Boundary	1st Quarter 2015	U-Nat	2.5E-16	N/A***	1.0E-16	9.0E-14	0.3
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	4.0E-16	6.6E-17	1.0E-16	9.0E-13	0.0
		Pb-210	1.7E-14	1.6E-15	2.0E-15	6.0E-13	2.8
		Po-210	2.7E-15	8.9E-16	N/A***	9.0E-13	0.3
	2nd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.7E-14	1.7E-15	2.0E-15	6.0E-13	2.8
		Po-210	5.7E-15	1.4E-15	2.0E-15	9.0E-13	0.6
	3rd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	2.0E-14	1.5E-15	2.0E-15	6.0E-13	3.3
		Po-210	1.3E-14	2.3E-15	2.0E-15	9.0E-13	1.4
	4th Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	2.1E-14	1.7E-15	2.0E-15	6.0E-13	3.5
		Po-210	6.4E-15	1.8E-15	2.0E-15	9.0E-13	0.7

Uranerz Energy Corporation
Appendix E
Air Particulate Data
July to December 2015

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-3 Air Station Downwind North Boundary	1st Quarter 2015	U-Nat	2.3E-16	N/A***	1.0E-16	9.0E-14	0.3
		Th-230	ND	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	5.5E-16	9.1E-17	1.0E-16	9.0E-13	0.1
		Pb-210	1.6E-14	1.5E-15	2.0E-15	6.0E-13	2.7
		Po-210	3.5E-15	9.7E-16	N/A***	9.0E-13	0.4
	2nd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.5E-14	1.6E-15	2.0E-15	6.0E-13	2.5
		Po-210	2.3E-15	9.6E-16	2.0E-15	9.0E-13	0.3
	3rd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.7E-14	1.4E-15	2.0E-15	6.0E-13	2.8
		Po-210	4.3E-15	1.4E-15	2.0E-15	9.0E-13	0.5
	4th Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.8E-14	1.6E-15	2.0E-15	6.0E-13	3.0
		Po-210	7.6E-15	1.9E-15	2.0E-15	9.0E-13	0.8
NA-4 Air Station Background Site	1st Quarter 2015	U-Nat	1.8E-16	N/A***	1.0E-16	9.0E-14	0.2
		Th-230	1.1E-16	6.4E-17	1.0E-16	3.0E-14	0.4
		Ra-226	2.7E-16	6.4E-17	1.0E-16	9.0E-13	0.0
		Pb-210	1.8E-14	1.7E-15	2.0E-15	6.0E-13	3.0
		Po-210	4.5E-15	1.1E-15	N/A***	9.0E-13	0.5
	2nd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	2.0E-14	1.7E-15	2.0E-15	6.0E-13	3.3
		Po-210	3.7E-15	1.1E-15	2.0E-15	9.0E-13	0.4
	3rd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	2.1E-14	1.5E-15	2.0E-15	6.0E-13	3.5
		Po-210	1.4E-14	2.4E-15	2.0E-15	9.0E-13	1.6
	4th Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	1.1E-16	3.4E-17	1.0E-16	9.0E-13	0.0
		Pb-210	2.2E-14	1.7E-15	2.0E-15	6.0E-13	3.7
		Po-210	7.4E-15	1.8E-15	2.0E-15	9.0E-13	0.8

Uranerz Energy Corporation
Appendix E
Air Particulate Data
July to December 2015

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	1st Quarter 2015	U-Nat	1.2E-16	N/A***	1.0E-16	9.0E-14	0.1
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	1.5E-16	5.7E-17	1.0E-16	9.0E-13	0.0
		Pb-210	1.8E-14	1.5E-15	2.0E-15	6.0E-13	3.0
		Po-210	4.5E-15	9.9E-16	N/A***	9.0E-13	0.5
	2nd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.5E-14	1.4E-15	2.0E-15	6.0E-13	2.5
		Po-210	8.2E-15	1.6E-15	2.0E-15	9.0E-13	0.9
	3rd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.9E-14	1.6E-15	2.0E-15	6.0E-13	3.2
		Po-210	1.4E-14	2.5E-15	2.0E-15	9.0E-13	1.6
	4th Quarter 2015	U-Nat	1.1E-16	N/A***	1.0E-16	9.0E-14	0.1
		Th-230	1.2E-16	1.0E-16	1.0E-16	3.0E-14	0.4
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.8E-14	1.4E-15	2.0E-15	6.0E-13	3.0
		Po-210	7.0E-15	1.7E-15	2.0E-15	9.0E-13	0.8
NA-6 Air Station Downwind North East of CPP	1st Quarter 2015	U-Nat	1.4E-16	N/A***	1.0E-16	9.0E-14	0.2
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	2.8E-16	6.9E-17	1.0E-16	9.0E-13	0.0
		Pb-210	2.1E-14	1.8E-15	2.0E-15	6.0E-13	3.5
		Po-210	3.9E-15	1.0E-15	N/A***	9.0E-13	0.4
	2nd Quarter 2015	U-Nat	1.2E-16	N/A***	1.0E-16	9.0E-14	0.1
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.8E-14	1.7E-15	2.0E-15	6.0E-13	3.0
		Po-210	8.8E-15	1.8E-15	2.0E-15	9.0E-13	1.0
	3rd Quarter 2015	U-Nat	ND*	N/A***	1.0E-16	9.0E-14	0.0
		Th-230	ND*	N/A**	1.0E-16	3.0E-14	0.0
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.9E-14	1.6E-15	2.0E-15	6.0E-13	3.2
		Po-210	1.4E-14	2.5E-15	2.0E-15	9.0E-13	1.6
	4th Quarter 2015	U-Nat	1.1E-16	N/A***	1.0E-16	9.0E-14	0.1
		Th-230	1.2E-16	1.0E-16	1.0E-16	3.0E-14	0.4
		Ra-226	ND*	N/A**	1.0E-16	9.0E-13	0.0
		Pb-210	1.8E-14	1.4E-15	2.0E-15	6.0E-13	3.0
		Po-210	7.0E-15	1.7E-15	2.0E-15	9.0E-13	0.8

* Non detectable at the LLD as provided from laboratory
** provided as results from laboratory
*** No result provided from laboratory

Uranerz Energy Corporation
Appendix F
Radon Monitoring
July to December 2015

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)	7.00E-10	5.00E-11	3.00E-10	2.00E-11	8.00E-10	5.00E-11	9.00E-10	5.00E-11	6.75E-10	1.00E-10
NR-2 (Southern Boundary Downwind)	7.00E-10	5.00E-11	6.00E-10	4.00E-11	7.00E-10	5.00E-11	1.00E-09	5.00E-11	7.50E-10	1.00E-10
NR-3 (North Boundary Downwind)	5.00E-10	4.00E-11	3.00E-10	2.00E-11	4.00E-10	3.00E-11	9.00E-10	5.00E-11	5.25E-10	1.00E-10
NR-5 (Background)	7.00E-10	5.00E-11	5.00E-10	4.00E-11	7.00E-10	4.00E-11	7.00E-10	4.00E-11	6.50E-10	1.00E-10
NR-6 (West of CPP downwind)	5.00E-10	3.00E-11	3.00E-10	3.00E-11	6.00E-10	4.00E-11	9.00E-10	5.00E-11	5.75E-10	1.00E-10
NR-7 (North East of CPP Downwind Maximally Exposed Member of the Public)	6.00E-10	4.00E-11	6.00E-10	4.00E-11	6.00E-10	4.00E-11	9.00E-10	5.00E-11	6.75E-10	1.00E-10
NR-1 (Duplicate #1)	4.00E-10	3.00E-11	3.00E-10	2.00E-11	8.00E-10	5.00E-11	6.00E-10	4.00E-11	5.25E-10	1.00E-10
NR-1 (Duplicate #2)	5.00E-10	4.00E-11	4.00E-10	3.00E-11	1.00E-09	6.00E-11	1.00E-09	5.00E-11	7.25E-10	1.00E-10
Nichols Ranch CPP Locations (9 locations changed semi-annually)										
Location Nichols Ranch Project	**Quarter 4 2014 to Quarter 1 2015**	**Uncertainty**	**Quarter 2 2015 to Quarter 3 2015**	**Uncertainty**	**Quarter 3 2015 to Quarter 4 2015**	**Uncertainty**			**Location Average (µCi/ml)**	**10CFR 20 APP B Table 2 Values (µCi/ml)**
Man Camp	5.00E-10	3.00E-11	2.00E-10	2.00E-11	5.00E-10	3.00E-11			4.00E-10	1.00E-10
CPP Ranch (East Side)	7.00E-10	4.00E-11	6.00E-10	3.00E-11	1.10E-09	5.00E-11			8.00E-10	1.00E-10
CPP Fence (SW Corner)	6.00E-10	3.00E-11	6.00E-10	3.00E-11	1.00E-09	5.00E-11			7.33E-10	1.00E-10
CPP Fence (South Corner)	4.00E-10	3.00E-11	6.00E-10	3.00E-11	8.00E-10	4.00E-11			6.00E-10	1.00E-10
CPP Fence (SE Corner)	7.00E-10	4.00E-11	6.00E-10	3.00E-11	1.00E-09	5.00E-11			7.67E-10	1.00E-10
CPP Fence (NW Corner)	6.00E-10	3.00E-11	6.00E-10	3.00E-11	1.00E-09	4.00E-11			7.33E-10	1.00E-10
CPP Fence (North Side)	6.00E-10	4.00E-11	6.00E-10	3.00E-11	9.00E-10	4.00E-11			7.00E-10	1.00E-10
CPP Fence (NE Side)	7.00E-10	4.00E-11	7.00E-10	4.00E-11	8.00E-10	4.00E-11			7.33E-10	1.00E-10
CPP Fence (West Side)	6.00E-10 **	3.00E-11	6.00E-10	3.00E-11	1.00E-09	5.00E-11			8.00E-10	1.00E-10

Uranerz Energy Corporation
Appendix F
Radon Monitoring
July to December 2015

Location Nichols Ranch Project	Quarter 4 2014 to Quarter 1 2015	Uncertainty	Quarter 2 2015 to Quarter 3 2015	Uncertainty	Quarter 3 2015 to Quarter 4 2015	Uncertainty			Location Average (µCi/ml)	10CFR 20 APP B Table 2 Values (µCi/ml)
Nichols Ranch Wellfield Locations (4 locations changed semi-annually)										
NCBM-5	4.00E-10	5.00E-11	7.00E-10	4.00E-11	8.00E-10	4.00E-11			6.33E-10	1.00E-10
NCBM-6	5.00E-10	5.00E-11	6.00E-10	3.00E-11	9.00E-10	4.00E-11			6.67E-10	1.00E-10
Wellfield (Fence)	5.00E-10	3.00E-11	6.00E-10	3.00E-11	1.10E-09	5.00E-11			7.33E-10	1.00E-10
NR-4 (North Wellfield Boundary)	6.00E-10	3.00E-11	8.00E-10	4.00E-11	9.00E-10	5.00E-11			7.67E-10	1.00E-10

MDA for all samples is 3.00E-10

* Values less than MDA

Green box indicates no data was collected during that time due to semi-annual changeout

** This value was reported as 6.00E-11 in the Jan-June 2015 Semi-Annual Report which was a typographical error.

Appendix G
Passive Gamma Radiation Monitoring
July to December 2015

Location Nichols Ranch Project (2015)	1st Quarter (mrem/quarter)	2nd Quarter (mrem/quarter)	3rd Quarter (mrem/quarter)	4th Quarter (mrem/quarter)	Location Average (Net mrem/quarter)
Control Badge (Nichols Ranch Offices)	48.4	32.8	31.1	32.3	36.2
NR-1(Nearest Resident)	37.3	42.2	40.1	41.7	40.3
NR-2 (Southern Boundary Downwind)	40.4	43.1	38.5	41.8	41.0
NR-3 (North Boundary Downwind)	39.1	38.6	36.9	39.6	38.6
NR-5 (Background Upwind)	38	38.9	38.7	40.1	38.9
NR-6 (West of CPP downwind)	36.5	38.7	41.2	40.7	39.3
NR-7 (North East of CPP Downwind, maximally exposed member of the public)	38.4	42.5	39.3	40.2	40.1
Quarterly Average*	38.3	40.7	39.1	40.7	

* Control Badge data excluded from Average

Appendix H
Effluent Program
Particulates
July to December 2015

Sample Location	Sample Date	Radionuclide	Concentration (µCi/ml)	Error ±(µCi/ml)	MDC (µCi/ml)
CPP*	1/5/2015	U-Nat	5.41E-13	0.00E+00	5.41E-13
Header House**	1/8/2015	U-Nat	1.39E-12	0.00E+00	1.39E-12
DDW***	1/8/2015	U-Nat	1.39E-12	0.00E+00	1.39E-12
CPP*	2/9/2015	U-Nat	1.36E-12	0.00E+00	1.36E-12
Header House**	2/10/2015	U-Nat	2.18E-12	8.67E-13	1.36E-12
DDW***	2/10/2015	U-Nat	1.36E-12	0.00E+00	1.36E-12
Header House**	3/10/2015	U-Nat	1.40E-12	0.00E+00	1.40E-12
CPP*	3/11/2015	U-Nat	1.40E-12	0.00E+00	1.40E-12
DDW***	3/11/2015	U-Nat	1.40E-12	0.00E+00	1.40E-12
Header House**	4/8/2015	U-Nat	1.42E-12	0.00E+00	1.42E-12
CPP*	4/9/2015	U-Nat	1.53E-12	1.03E-13	1.53E-12
DDW***	4/15/2015	U-Nat	1.35E-12	0.00E+00	1.35E-12
DDW***	5/7/2015	U-Nat	1.41E-12	0.00E+00	1.41E-12
Header House**	5/7/2015	U-Nat	1.41E-12	0.00E+00	1.41E-12
CPP*	5/18/2015	U-Nat	1.37E-12	0.00E+00	1.37E-12
DDW***	6/10/2015	U-Nat	1.30E-12	1.05E-13	1.19E-12
Header House**	6/10/2015	U-Nat	1.27E-12	1.03E-13	1.19E-12
CPP*	6/10/2015	U-Nat	1.66E-12	4.38E-13	1.19E-12
CPP*	7/14/2015	U-Nat	1.46E-12	9.90E-14	1.39E-12
Header House**	7/16/2015	U-Nat	1.21E-12	0.00E+00	1.21E-12
DDW***	7/16/2015	U-Nat	1.17E-12	4.00E-14	1.17E-12
CPP*	10/15/2015	U-Nat	3.40E-13	1.25E-13	1.81E-13
Header House**	10/15/2015	U-Nat	1.01E-12	4.74E-13	8.45E-13
DDW***	11/5/2015	U-Nat	1.36E-12	0.00E+00	1.36E-12

Average CPP measurements	1.21E-12	9.56E-14	1.12E-12
Average Header House measurements	1.41E-12	1.80E-13	1.28E-12
Average DDW measurements	1.34E-12	1.81E-14	1.33E-12

*CPP concentrations are taken from an average of six different sampling locations inside the CPP
** Header House concentrations are taken from an average of each operational header house (4 houses were operational January through May, a 5th house was added in June, a 6th house was added in October)
***DDW concentrations are taken from an average of each operational DDW (currently 2)

Appendix I
Effluent Program
Radon
January to December 2015

Sample Location	Sample Date	Radionuclide	Concentration (Working Levels)	Error ±(Working Levels)	MDC (Working Levels)
CPP*	1/5/2015	Rn-222 and progeny	0.0070	0.0008	0.0070
Header House**	1/8/2015	Rn-222 and progeny	0.0065	0.0005	0.0065
DDW***	1/8/2015	Rn-222 and progeny	0.0095	0.0025	0.0095
CPP*	2/9/2015	Rn-222 and progeny	0.0066	0.0004	0.0065
DDW***	2/10/2015	Rn-222 and progeny	0.0060	0.0000	0.0060
Header House**	2/10/2015	Rn-222 and progeny	0.0078	0.0025	0.0078
Header House**	3/10/2015	Rn-222 and progeny	0.0093	0.0019	0.0093
DDW***	3/11/2015	Rn-222 and progeny	0.0075	0.0005	0.0075
CPP*	3/11/2015	Rn-222 and progeny	0.0062	0.0004	0.0062
Recovery Wells****	3/26/2015	Rn-222 and progeny	0.0070	0.0007	0.0070
CPP Tanks	3/26/2015	Rn-222 and progeny	2.7725	N/A*****	0.1897
Header House**	4/8/2015	Rn-222 and progeny	0.0083	0.0019	0.0083
CPP*	4/9/2015	Rn-222 and progeny	0.0082	0.0007	0.0082
DDW***	4/15/2015	Rn-222 and progeny	0.0060	0.0000	0.0060
Header House**	5/7/2015	Rn-222 and progeny	0.0075	0.0017	0.0075
DDW***	5/7/2015	Rn-222 and progeny	0.0080	0.0010	0.0080
CPP*	5/18/2015	Rn-222 and progeny	0.0068	0.0007	0.0068
Recovery Wells****	6/9/2015	Rn-222 and progeny	0.0100	0.0018	0.0100
Header House**	6/10/2015	Rn-222 and progeny	0.0092	0.0021	0.0092
DDW***	6/10/2015	Rn-222 and progeny	0.0060	0.0000	0.0060
CPP*	6/10/2015	Rn-222 and progeny	0.0095	0.0024	0.0095
CPP Tanks	6/17/2015	Rn-222 and progeny	389.8250	N/A*****	0.0630
CPP*	7/14/2015	Rn-222 and progeny	0.0078	0.0013	0.0078
Header House**	7/16/2015	Rn-222 and progeny	0.0078	0.0008	0.0078
DDW***	7/16/2015	Rn-222 and progeny	0.0085	0.0005	0.0085
CPP*	8/13/2015	Rn-222 and progeny	0.0075	0.0011	0.0072
Header House**	8/13/2015	Rn-222 and progeny	0.0070	0.0030	0.0070
Recovery Wells****	8/20/2015	Rn-222 and progeny	0.4007	0.9679	0.0092
Header House**	9/2/2015	Rn-222 and progeny	0.0070	0.0000	0.0070
CPP*	9/17/2015	Rn-222 and progeny	0.0078	0.0007	0.0078
CPP Tanks	9/30/2015	Rn-222 and progeny	241.7638	N/A*****	0.0907

Appendix I
Effluent Program
Radon
January to December 2015

Sample Location	Sample Date	Radionuclide	Concentration (Working Levels)	Error ±(Working Levels)	MDC (Working Levels)
Header House**	10/15/2015	Rn-222 and progeny	0.0083	0.0013	0.0083
CPP*	10/22/2015	Rn-222 and progeny	0.0072	0.0004	0.0072
Recovery Wells****	11/3/2015	Rn-222 and progeny	0.1760	0.4848	0.0087
Header House**	11/3/2015	Rn-222 and progeny	0.0123	0.0069	0.0083
CPP*	11/3/2015	Rn-222 and progeny	0.0073	0.0004	0.0072
DDW***	11/11/2015	Rn-222 and progeny	0.0070	0.0000	0.0070
CPP*	12/3/2015	Rn-222 and progeny	0.0108	0.0004	0.0108
Header House**	12/3/2015	Rn-222 and progeny	0.0085	0.0015	0.0085
CPP Tanks	12/30/2015	Rn-222 and progeny	360.8474	N/A*****	0.0856

Average CPP measurements	0.0077	0.0008	0.0077
Average Header House measurements	0.0083	0.0020	0.0080
Average DDW measurements	0.0073	0.0006	0.0073
Average Recovery Wells	0.1484	0.3638	0.0087
Average CPP Tanks	248.8022	N/A*****	0.1073

*CPP concentrations are taken from an average of six different sampling locations inside the CPP
** Header House concentrations are taken from an average of each operational header house (4 houses were operational January through
***DDW concentrations are taken from an average of each operational DDW (currently 2)
****Recovery well concentrations are an average of at least 10% of active recovery wells during the sampling period. The average number of wells sampled each quarter was 16 wells with a maximum number of operational recovery wells of 133 during the year.
*****No published way to perform uncertainty calculations with sampling method.

Appendix J
Annual SERP Summary
July to December 2015

SERP No.	Date	SERP Topic	Evaluation Summary
SERP-4-2014	3/12/2015	Portable Office Trailer Re-Location	Individuals working in the wellfield currently return to the plant to scan prior to eating or leaving for the day. A request was made to provide a portable trailer to the wellfield to allow employees and contractors closer access to
SERP-5-2014	4/14/2015	Header House Design Change	Minor design changes to header house specification were proposed. The changes include the number of wells going into a header house, the header house dimensions, revised basement options and a change to include the potential for a separate electrical room within the header house building. The SERP discussed the flexibility to be able to add more wells to a header house depending on area and location. Potentially the change could decrease the number of header houses needed which decreases excavations, and ultimately reduces reclamation costs and surety costs. As well not all the accomodations may be used in all header houses. The SERP agreed to increase the number of wells per house up from 60 well accommodations to approximately 110. Next changes to the basements were evaluated. Environmental impacts were evaluated concluding that changes to the basement would be be impacted due to the use of automatic sump pumps designed to start prior to loss of containment. Safety impacts were a concern with the current configuration the changes were evaluated concluding that changes to the basement removed a confined space concern by allowing easier and safer access during maintenance or repair. Changes to the header house dimension, making it slightly longer, would allow for a separate electrical room from the main house thereby improving employee safety by creating a physical barrier between the electrical components and potential leaks within the header house itself. The radiological evaluation concluded that the implementation of the proposed changes would positively impact ALARA because it would allow workers to bea able to work more efficiently inside header houses thereby decreasing the time needed to be in the header house, ultimately reducing potential exposure to hazards. The SERP concluded to approve changes. Pages changes were made to the license application as a result of this SERP.
SERP-1-2015	1/13/2015	RSO Qualification Review	Employee qualifications were presented and reviewed to determine suitability for RSO. The SERP utilized Regulatory Guide 8.31 during the review and determination. The SERP concluded to approve the employee as an RSO.
SERP-2-2015	1/13/2015	Well Installation Figure Change	Changes to a figure were made in the Wyoming Department of Environmental Quality/Land Quality Division (LQD) Permit. There are many figures in the permit and license application that are identical and in order to avoid contradictions figures should be kept consistent. Therefore the figure having been updated an ultimately approved by LQD was updated in the license application. The SERP concluded that this revision was necessary and approved the figure for replacement in the application document.
SERP-3-2015	3/12/2015	Management Structure Changes	Changes were made to the organizational structure to remove the Senior Vice President Operation, and as such a SERP was held to evaluate and determine that adequate personnel were available to provide support and resources to ensure radiation safety, safety and environmental programs are in compliance. NUREG 1569, and the SER were reviewed and used during the evaluation. The SERP concluded that with the changes to the organization structure other positions held sufficient accountability and responsibility to provide the same level of support. Therefore, the SERP was approved.

Appendix J
Annual SERP Summary
July to December 2015

SERP No.	Date	SERP Topic	Evaluation Summary
SERP-4-2015	3/12/2015	Equivalent Feed of Uranium Loaded Resin	A SERP was held to evaluate whether or not the Uranium Loaded Resin meets the Equivalent Feed definition as per NRC regulatory issue (RIS) 2012-06, NRC Policy Regarding Submittal of Amendments for Processing of Equivalent Feed at Licensed Uranium Recovery Facilities, in order to receive resin from a General License Utility (municipality water treatment plant). The criteria described in the RIS was used to help evaluate the resin to be received. In addition to the RIS, 10 CFR Part 40.51 was cited allowing transportation of source material between authorized licensed facilities. Furthermore, SUA-1597 authorizes Uranerz to receive source and byproduct materials to or from another authorized licensee. Based on the evaluation performed, the SERP concluded to approve the change.
SERP-5-2015	8/18/2015	Management Structure Changes	Changes were made to the organizational structure within management as a result of the merger. Management titles and roles were changed and updated in the license application. The changes included adding a Sr. Director of Regulatory Affairs, changing the VP of Regulatory and Public Affairs to Director ISR Regulatory Affairs, and changing the COO to Executive VP ISR Operations. The SERP was held to evaluate that adequate personnel remained to provide support and resources to ensure radiation safety, safety and environmental programs are in compliance. NUREG 1569, and the SER were reviewed and used during the evaluation. The SERP concluded that with the changes to the organization structure other positions held sufficient accountability and responsibility to provide the same level of support. Therefore, the SERP was approved. Pages to the license application were revised on the conclusion of this SERP.
SERP-6-2015	10/28/2015	Shipment of Yellowcake Slurry	A SERP was held to evaluate and determine if transportation of yellowcake slurry to an authorized conversion facility for drying and packaging is possible. An extensive evaluation was prepared and presented which included safety considerations, a description of materials transportation, radiological consideration, environmental impacts, tranportation impacts (accidents/incidents/hazards), etc. Additionally, authorization from the state where the material would be transported was provided to the SERP. To support the evaluation several regulatory references were cited allowing the SERP to conclude that transportation of slurry was allowable with the confines of the license. Pages in the license application were revised from this SERP.

Wind Rose and Atmospheric Stability Analysis

Semi-Annual Update for Nichols Ranch Site

17 February 2016

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Figures

Tables

Introduction

Baseline hourly meteorological data were collected at the Nichols Ranch site from 6/28/2011 to 7/3/2012. This period was established as the baseline year and results were provided in a previous report. Meteorological monitoring at Nichols Ranch has continued through 1/4/2016, providing an additional 3 ½ years of hourly data. This report summarizes the wind monitoring results from the second half of 2015 and compares these to the project-to-date results. These results include wind roses and joint distributions of atmospheric stability class, wind speed and wind direction.

Wind Monitoring Results

July – December 2015

Figure 1 shows the most recent six-month wind rose for Nichols Ranch. Joint wind data recovery exceeded 99% for this period. The highest wind speeds occur from the north-northwest and southwest directions. The dominant wind direction overall is from the east. A previous report demonstrated that this pattern is due mostly to night-time drainage, or downslope convection winds from nearby North Pumpkin Butte.

Project-to-Date Results

Table 1 presents the project-to-date monitoring results for all recorded meteorological parameters. Joint wind speed and wind direction data recovery was 99.1% over the entire monitoring period. East winds accounted for nearly 16% of the total hours.

Figure 2 shows the project-to-date wind rose, which corresponds to the same period of record reported in Table 1. Winds were calm (less than 0.5 m/sec) only 0.2% of the time. Table 2 lists the joint frequencies of wind speed categories and wind direction sectors that make up the project-to-date wind rose.

Figure 1. Nichols Ranch Semi-Annual Wind Rose

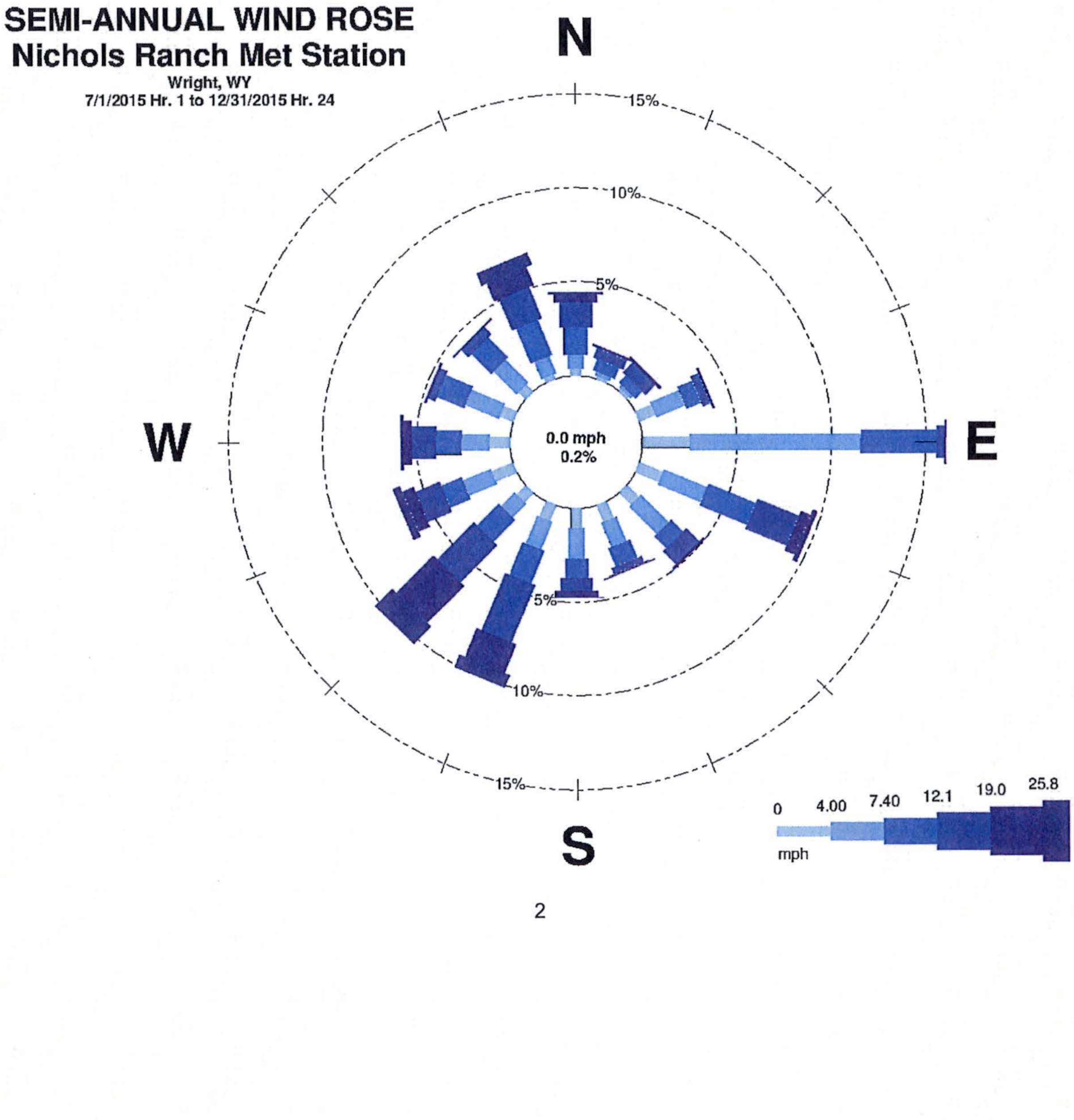


Table 1. Nichols Ranch PTD Meteorological Summary

Nichols Ranch

Meteorological Data Summary

6/28/2011 - 1/4/2016

Hourly Data

	Average/Total	Max	Min
Wind Speed (mph)	10.7	51.3	0.3
Sigma-Theta (°)	16.0	82.7	1.3
Temperature (C)	8.9	38.2	-32.5

Predominant wind direction was from the E sector, accounting for 15.8% of the possible winds

Data Recovery

Parameter	Possible (hours)	Reported (hours)	Recovery
Wind Speed	39618	39263	99.10%
Wind Direction	39618	39263	99.10%
Sigma-Theta	39618	39263	99.10%
Temperature	39618	39079	98.64%

Figure 2. Nichols Ranch PTD Wind Rose

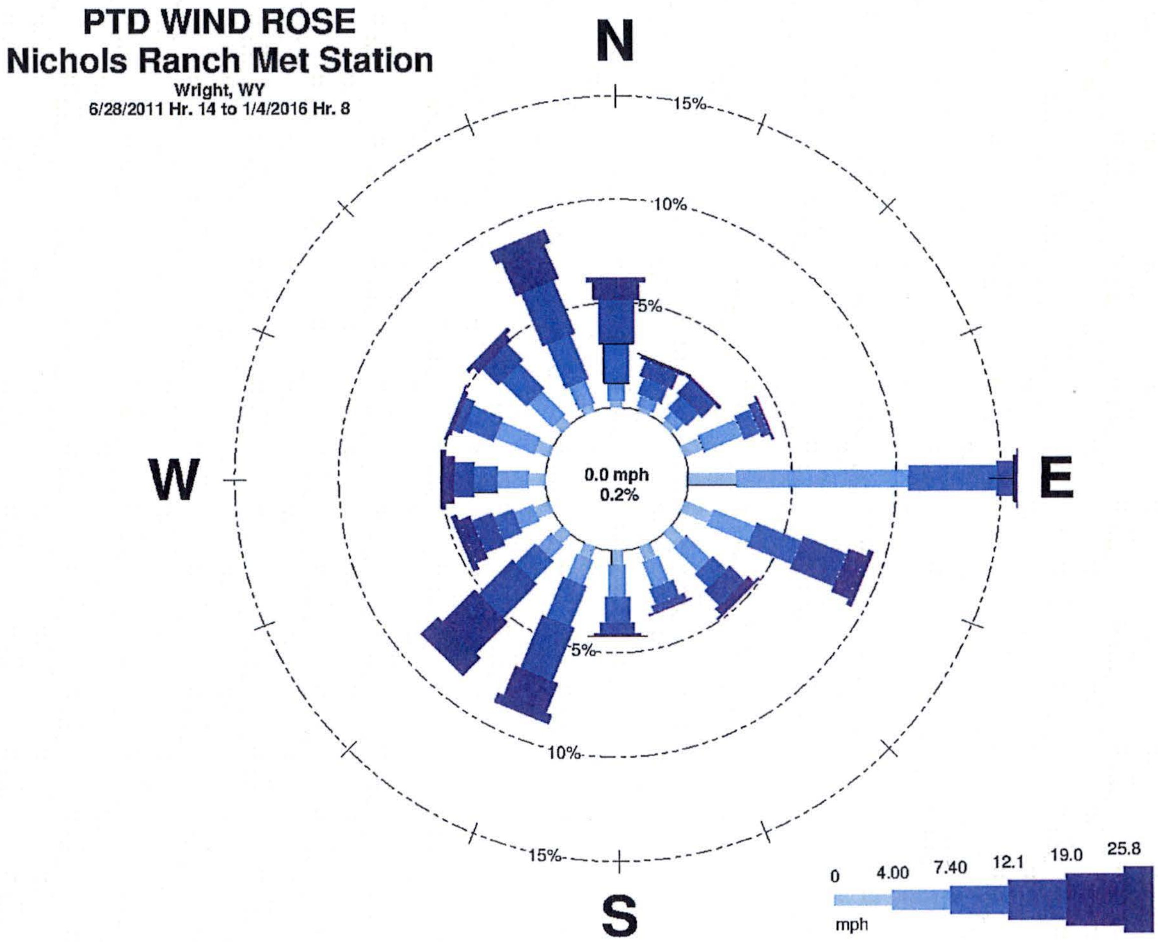


Table 2. Nichols Ranch PTD Wind Rose Matrix

PTD WIND ROSE
Nichols Ranch Met Station
Wright, WY
6/28/2011 Hr. 14 to 1/4/2016 Hr. 8

RELATIVE FREQUENCY (% of Recorded Winds) TABLE

	mph						
Wind Direction	0.0- 4.0	4.0- 7.4	7.4-12.1	12.1-19.0	19.0-25.8	25.8-100.0	Row Tota
0.0 deg.(North)	0.31	0.87	1.89	2.10	0.85	0.21	6.2
22.5 deg.	0.21	0.55	0.84	0.78	0.16	0.00	2.6
45.0 deg.	0.28	0.48	0.83	0.86	0.15	0.00	2.6
67.5 deg.	0.98	2.01	0.83	0.42	0.07	0.00	4.3
90.0 deg.	2.33	8.29	4.18	0.83	0.15	0.00	15.8
112.5 deg.	1.43	2.18	2.32	2.26	0.89	0.24	9.3
135.0 deg.	0.85	1.64	0.89	0.99	0.39	0.10	4.8
157.5 deg.	0.77	1.35	0.79	0.33	0.07	0.00	3.3
180.0 deg.	0.70	1.59	1.24	0.57	0.13	0.00	4.2
202.5 deg.	0.64	1.31	2.10	2.81	1.51	0.46	8.8
225.0 deg.	0.65	0.92	1.36	2.32	2.18	1.20	8.6
247.5 deg.	0.79	1.00	1.02	1.05	0.60	0.27	4.7
270.0 deg.	0.86	1.51	1.14	0.94	0.46	0.19	5.1
292.5 deg.	0.74	2.05	1.57	0.47	0.18	0.00	5.0
315.0 deg.	0.53	1.60	1.70	1.07	0.36	0.17	5.4
337.5 deg.	0.36	1.19	2.28	2.71	1.79	0.67	9.0
	12.42	28.54	24.98	20.50	9.94	3.63	100.0

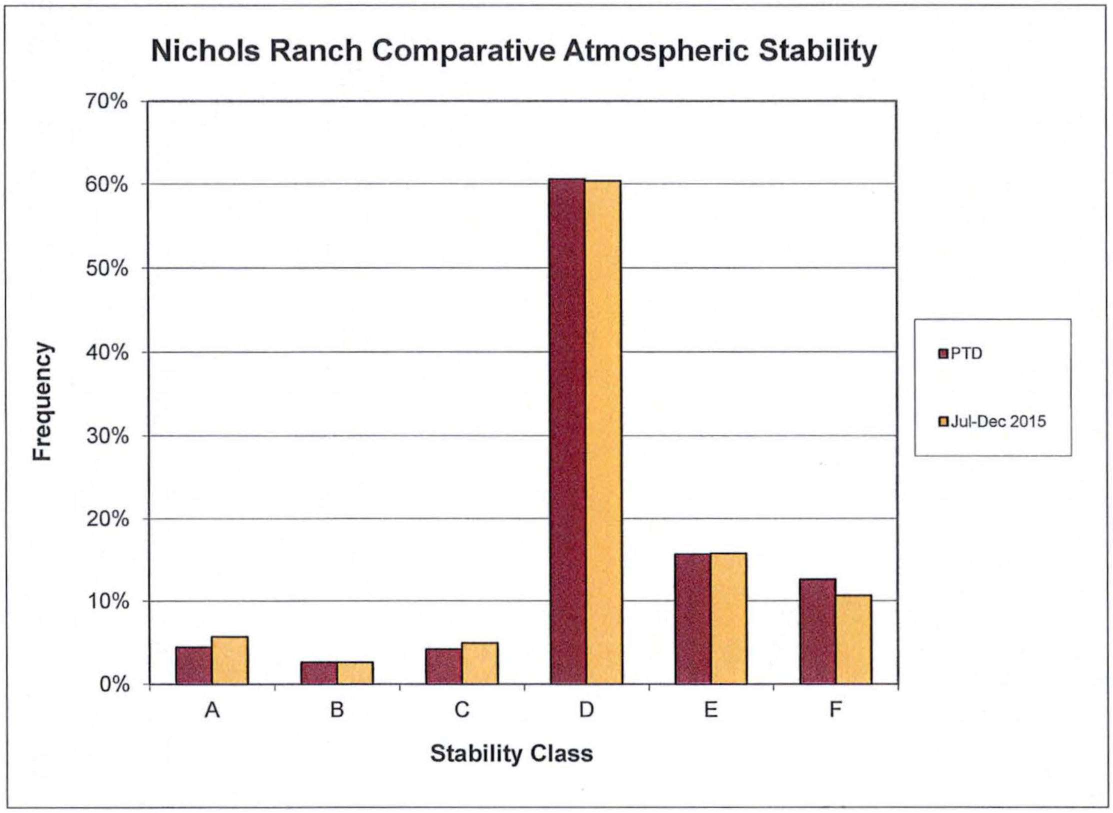
0 mph (0.2%) INVALID READINGS 356

NUMBER OF POSSIBLE READINGS 39619 VALID READINGS 39263 DATA CAPTURE 99.10%

Atmospheric Stability Results

Figure 3 compares the most recent atmospheric stability class distribution to the PTD distribution for Nichols Ranch. Roughly 60% of the winds at the project site consistently fall into stability class D which represents near neutral to slightly unstable conditions. The light-to-calm winds which accompany stable environments, corresponding to stability class F, are also quite consistent for the two periods.

Figure 3. Nichols Ranch Atmospheric Stability Class Period Comparison



The σ_θ method was used to determine the Pasquill-Gifford stability class, where σ_θ refers to the standard deviation of the horizontal wind azimuth angle in degrees. This method is also referred to as the σ_A method in EPA's Meteorological Monitoring Guidance for Regulatory Modeling Applications (February 2000). It is a lateral turbulence based method which uses the standard deviation of the wind direction in combination with the scalar mean horizontal wind speed. Wind speed and direction data are recorded hourly at a height of 10 meters. To minimize the effects of wind meander, the 1-hour σ_θ is defined using 15-minute σ_θ values which are in turn based on more frequent sampling of wind direction (e.g. every five seconds). According to this method, initial stability classes are assigned based solely on standard deviation of wind direction, or σ_θ. The initial assignments are then adjusted for horizontal wind speed. The magnitude of this adjustment depends on whether the measurement is taken during daylight or nighttime hours, a diurnal dependency that varies with the time of year.

Tables 3 and 4 present the most recent six-month joint frequency distribution (JFD) at Nichols Ranch. Stability classes A, B, and C appear in Table 3, while stability classes D, E, and F appear in Table 4. Tables 5 and 6 present the project-to-date joint frequency JFD. Stability classes A, B, and C appear in Table 5, while stability classes D, E, and F appear in Table 6. The JFD partitions hourly wind speed and direction by stability class, wind direction sector, and wind speed category. It is the basis for meteorological input to the MILDOS dispersion model.

Table 3. Nichols Ranch Semi-Annual JFD

Stability Class	Wind Direction	Wind Speed (mph) - Jul-Dec 2015					
		< 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24
A	N	0.001395	0.001357				
	NNE	0.000465					
	NE						
	ENE	0.000465	0.000905				
	E	0.003254	0.000452				
	ESE	0.002789					
	SE	0.002789	0.002715				
	SSE	0.002789	0.001810				
	S	0.001860	0.001357				
	SSW	0.000930	0.001357				
	SW	0.003254	0.001357				
	WSW	0.004184	0.002262				
	W	0.001860	0.004977				
	WNW	0.002325	0.001357				
	NW	0.002325	0.002262				
	NNW	0.002789	0.001357				
B	N		0.001810				
	NNE		0.000905				
	NE						
	ENE	0.000930	0.000452				
	E		0.001357	0.000452			
	ESE	0.000465	0.000452				
	SE		0.001810				
	SSE		0.002715				
	S	0.000930	0.000452				
	SSW	0.000465	0.000452	0.000452			
	SW	0.000465		0.000452			
	WSW	0.000930	0.001810				
	W	0.001395	0.000905				
	WNW		0.001810				
	NW	0.000465	0.002262				
	NNW		0.000905	0.000452			
C	N			0.002715			
	NNE			0.000452			
	NE	0.000465	0.000452				
	ENE						
	E	0.000930	0.001357				
	ESE	0.000930	0.000452	0.000905			
	SE	0.000465	0.001357	0.000905			
	SSE	0.000465	0.000905	0.001357			
	S		0.002715	0.000452			
	SSW		0.001357	0.004977			
	SW	0.000465	0.000452	0.002262			
	WSW	0.000465	0.002715	0.002262			
	W	0.000930	0.003620	0.002262			
	WNW	0.001395	0.001810	0.000452			
	NW	0.000465	0.003167	0.000905			
	NNW		0.000905	0.001357			

Table 4. Nichols Ranch Semi-Annual JFD

Stability Class	Wind Direction	Wind Speed (mph) - Jul-Dec 2015					
		< 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24
D	N	0.000465	0.004977	0.014932	0.011312	0.003167	0.000452
	NNE		0.001357	0.002262	0.001357		
	NE		0.001810	0.002715	0.001357		
	ENE	0.002789	0.007240	0.002715	0.001810		
	E	0.006974	0.047964	0.005882	0.000452	0.000905	
	ESE	0.000930	0.010407	0.014027	0.015837	0.003167	0.001810
	SE	0.000930	0.004072	0.008597	0.004072	0.000905	
	SSE	0.000930	0.005430	0.005430			
	S		0.005882	0.011312	0.003167	0.002715	
	SSW	0.000930	0.007692	0.028054	0.046606	0.023077	0.005882
	SW		0.005430	0.015385	0.039819	0.032127	0.014932
	WSW	0.000930	0.005430	0.007240	0.009955	0.003620	0.002262
	W	0.004184	0.006335	0.004525	0.005882	0.001357	0.000452
	WNW	0.000930	0.011312	0.006335	0.000452		
	NW	0.000930	0.009955	0.007240	0.003167		0.000452
	NNW		0.006787	0.024887	0.019005	0.009955	0.007692
E	N	0.000465	0.001810	0.000452			
	NNE		0.000452	0.001357			
	NE		0.000905	0.000905			
	ENE	0.002789	0.012670	0.000905			
	E	0.006974	0.047511	0.010860			
	ESE	0.001395	0.006335	0.008145			
	SE	0.000930	0.002262	0.001357			
	SSE	0.001860	0.003620	0.000452			
	S	0.000465	0.004977				
	SSW	0.000465	0.001357	0.000452			
	SW	0.000465	0.001810				
	WSW	0.001860	0.005430	0.000905			
	W	0.001395	0.001810	0.000452			
	WNW	0.001860	0.005430	0.000905			
	NW	0.000930	0.003620	0.001810			
	NNW		0.004977	0.001810			
F	N	0.001860	0.000905				
	NNE	0.000465	0.000905				
	NE	0.001860	0.000452				
	ENE	0.002325	0.001357				
	E	0.008368	0.004525				
	ESE	0.006974	0.007240				
	SE	0.007438	0.007692				
	SSE	0.003719	0.003620				
	S	0.005114	0.003620				
	SSW	0.004649	0.003167				
	SW	0.002789	0.001810				
	WSW	0.005114	0.000905				
	W	0.006044	0.000905				
	WNW	0.002325	0.001810				
	NW	0.003254	0.002262				
	NNW	0.000930	0.001810				

Table 5. Nichols Ranch PTD JFD

Stability Class	Wind Direction	Wind Speed (mph) - Project to Date					
		< 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24
A	N	0.000593	0.000780				
	NNE	0.000519	0.000071				
	NE	0.000445	0.000354				
	ENE	0.000816	0.000709				
	E	0.002003	0.000780				
	ESE	0.002299	0.000780				
	SE	0.001261	0.001772				
	SSE	0.001854	0.001772				
	S	0.001261	0.002693				
	SSW	0.001706	0.001630				
	SW	0.002299	0.001630				
	WSW	0.002225	0.001346				
	W	0.002077	0.001843				
	WNW	0.001854	0.001843				
	NW	0.001706	0.001630				
	NNW	0.001187	0.000850				
B	N	0.000074	0.000850	0.000071			
	NNE		0.000425				
	NE	0.000148	0.000071				
	ENE	0.000297	0.000354				
	E	0.000593	0.000496	0.000071			
	ESE	0.000519	0.001063				
	SE	0.000148	0.001843				
	SSE	0.000074	0.001772				
	S	0.000223	0.002764	0.000283			
	SSW	0.000445	0.002126	0.000283			
	SW	0.000223	0.000496	0.000354			
	WSW	0.000519	0.001630	0.000142			
	W	0.000816	0.001134	0.000071			
	WNW	0.000445	0.002055	0.000071			
	NW	0.000148	0.001417	0.000213			
	NNW	0.000148	0.000780	0.000142			
C	N	0.000074	0.000567	0.000992			
	NNE		0.000071	0.000142			
	NE	0.000074	0.000283				
	ENE	0.000074	0.000213	0.000142			
	E	0.001038	0.001134	0.000142			
	ESE	0.000371	0.001205	0.000354			
	SE	0.000223	0.000992	0.000780			
	SSE	0.000074	0.000709	0.000850			
	S		0.001843	0.001276			
	SSW		0.001346	0.004961			
	SW	0.000297	0.001346	0.002622			
	WSW	0.000223	0.001984	0.002055			
	W	0.000297	0.001701	0.001843			
	WNW	0.000297	0.002693	0.001488			
	NW	0.000148	0.001559	0.001630			
	NNW	0.000074	0.000850	0.000850			

Table 6. Nichols Ranch PTD JFD

Stability Class	Wind Direction	Wind Speed (mph) - Project to Date					
		< 3	4 - 7	8 - 12	13 - 18	19 - 24	> 24
D	N	0.000297	0.006945	0.013606	0.010347	0.004181	0.001346
	NNE	0.000074	0.002480	0.003260	0.001205	0.000071	0.000142
	NE	0.000148	0.001913	0.002480	0.001417	0.000071	
	ENE	0.002596	0.011480	0.001134	0.000780	0.000142	
	E	0.006527	0.044788	0.006661	0.001063	0.000283	
	ESE	0.000668	0.007583	0.010276	0.009496	0.001701	0.000567
	SE	0.000223	0.003756	0.004465	0.002622	0.000850	0.000071
	SSE	0.000223	0.004394	0.004961	0.000354		
	S	0.000074	0.008008	0.013819	0.003969	0.001134	0.000071
	SSW	0.000371	0.010559	0.033945	0.045284	0.021118	0.005598
	SW	0.000445	0.004323	0.018638	0.034441	0.029977	0.013110
	WSW	0.000742	0.003402	0.008362	0.011197	0.004181	0.001772
	W	0.001483	0.007370	0.006378	0.006095	0.001913	0.001346
	WNW	0.001187	0.012047	0.007158	0.002126	0.000709	0.000071
	NW	0.000668	0.009071	0.011976	0.008291	0.003047	0.001559
	NNW	0.000297	0.007724	0.018921	0.024449	0.014669	0.005173
E	N	0.000519	0.002268	0.000850			
	NNE	0.000223	0.000425	0.000921			
	NE	0.000148	0.001134	0.001063			
	ENE	0.003189	0.011480	0.000638			
	E	0.005489	0.053221	0.009354			
	ESE	0.001632	0.006449	0.002906			
	SE	0.000445	0.003756	0.000425			
	SSE	0.000816	0.004819	0.000071			
	S	0.000297	0.005457	0.000283			
	SSW	0.000519	0.003472	0.000638			
	SW	0.000593	0.001984	0.000142			
	WSW	0.001706	0.002197	0.000921			
	W	0.001409	0.002622	0.000780			
	WNW	0.001558	0.004961	0.001772			
	NW	0.000890	0.004252	0.001984			
	NNW	0.000445	0.002976	0.002339			
F	N	0.001706	0.001063				
	NNE	0.001113	0.000921				
	NE	0.001854	0.000425				
	ENE	0.003783	0.001772				
	E	0.010013	0.006378				
	ESE	0.009123	0.007087				
	SE	0.006527	0.008504				
	SSE	0.004376	0.007583				
	S	0.004154	0.007158				
	SSW	0.003931	0.003756				
	SW	0.003189	0.002268				
	WSW	0.004673	0.001559				
	W	0.004747	0.001913				
	WNW	0.004450	0.002409				
	NW	0.003338	0.002268				
	NNW	0.001632	0.001701				

***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

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

License NO.: SUA-1597

Statement: I, John McCarthy, 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.

JMC 3-25-16

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	Pages TR-179 through TR-180a	Pages TR-179 through TR-180a	Changes to description of header house design
Volume I	Table of Contents page TR-ii	Table of Contents page TR-ii	Revised and updated to remove Figure 3-9C
Volume I	Figures 3-9A and 3-9B	Figures 3-9A and 3-9B	Figures were revised to reflect changes to text descriptions on pg TR-170 through TR-180a
Volume I	Figure 3-13	Figure 3-13	Figure updated
Volume I	Figure 5-1	Figure 5-1	Figure updated with new titles and positions per text changes on pages TR-201 through TR-204
Volume I	Pages TR-201 through TR-204	Pages TR-201 through TR-204	Pages revised to include new titles and positions post merger with Energy Fuels
Volume I	Pages TR-309, TR-310	Pages TR-309, TR-310	Pages revised to account for yellowcake slurry shipment
Volume III	Pages ER-78 through ER-80	Pages ER-78 through ER-80	Pages revised to account for yellowcake slurry shipment

LIST OF FIGURES (Continued)

Delete Figure 3-9C altogether

designated as the F Sand. The average grade of the two units is above 0.1%, the average thickness is above seven feet, and the combined areal distribution is near 100 acres.

3.4.2 Wellfield Areas

Wellfields are designated areas above the ore zone that are sized to reach the desired production goals. The ore zone is the geological sandstone unit where the leaching solutions are injected and recovered in an in situ recovery wellfield and it is bounded between impermeable aquiatards. Production areas are the individual areas that will be mined in the wellfield. The injection and recovery wells are completed in the ore zone intervals of the production sand. Horizontal monitor wells are located in a ring around the wellfields. Vertical monitor wells for overlaying and underlying aquifers are installed accordingly for one monitor well for every 4 acres of wellfield area. The distance between the monitor wells in the same aquifer shall not exceed 1,000 ft, and all monitor wells are installed within the production area unit. The final locations of the horizontal and vertical monitor wells will be submitted in the Production Area Pump Test Document as described in Section 5.7.8. This is because the actual locations might need to be changed because of topography, access, etc. The screened intervals for the excursion monitor wells are across the entire production zone.

3.4.3 Wellfield Injection and Recovery Patterns

The patterns for the injection and recovery wells follow the conventional 5-spot pattern. Depending on the ore zone shape, 7-spot or line drive patterns may be used. A typical 5-spot pattern is shown in Figure 3-9 (see map pocket) and contains 4 injection wells and 1 recovery well. The dimensions of the pattern vary depending on the ore zone, but the injection wells will likely be between 50 and 150 ft apart. In order to effectively recover the uranium and also to complete the groundwater restoration, the wells will be completed so that they can be used as either injection or recovery wells. The leaching solution will be injected into the injection wells, and the solution will be recovered through the recovery wells. To create a cone of depression in the wellfield, a greater volume of water is recovered than injected. The excess water or wellfield 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~~approximately ~~60~~ 110 well accommodations, but may contain more or less. The~~re are two possible designs for a~~ typical header house design is ~~, and they are~~ shown in Figure~~s~~ 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 3-9B~~C~~ Header House Piping and Instrumentation (see map pocket).

The header houses will be metal buildings. The dimensions for the header houses will be approximately 40 feet by 20 feet, but may be more or less. ~~There are two possible designs for the buildings and foundations.~~ The terrain and logistics in the wellfield will determine which engineered foundation (e.g. pad, pillar, or basement) the header house will be built on. The foundations will be constructed of durable materials that meet engineering requirements or other suitable materials with sealed penetrations (as needed) to provide containment. ~~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 system~~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~~

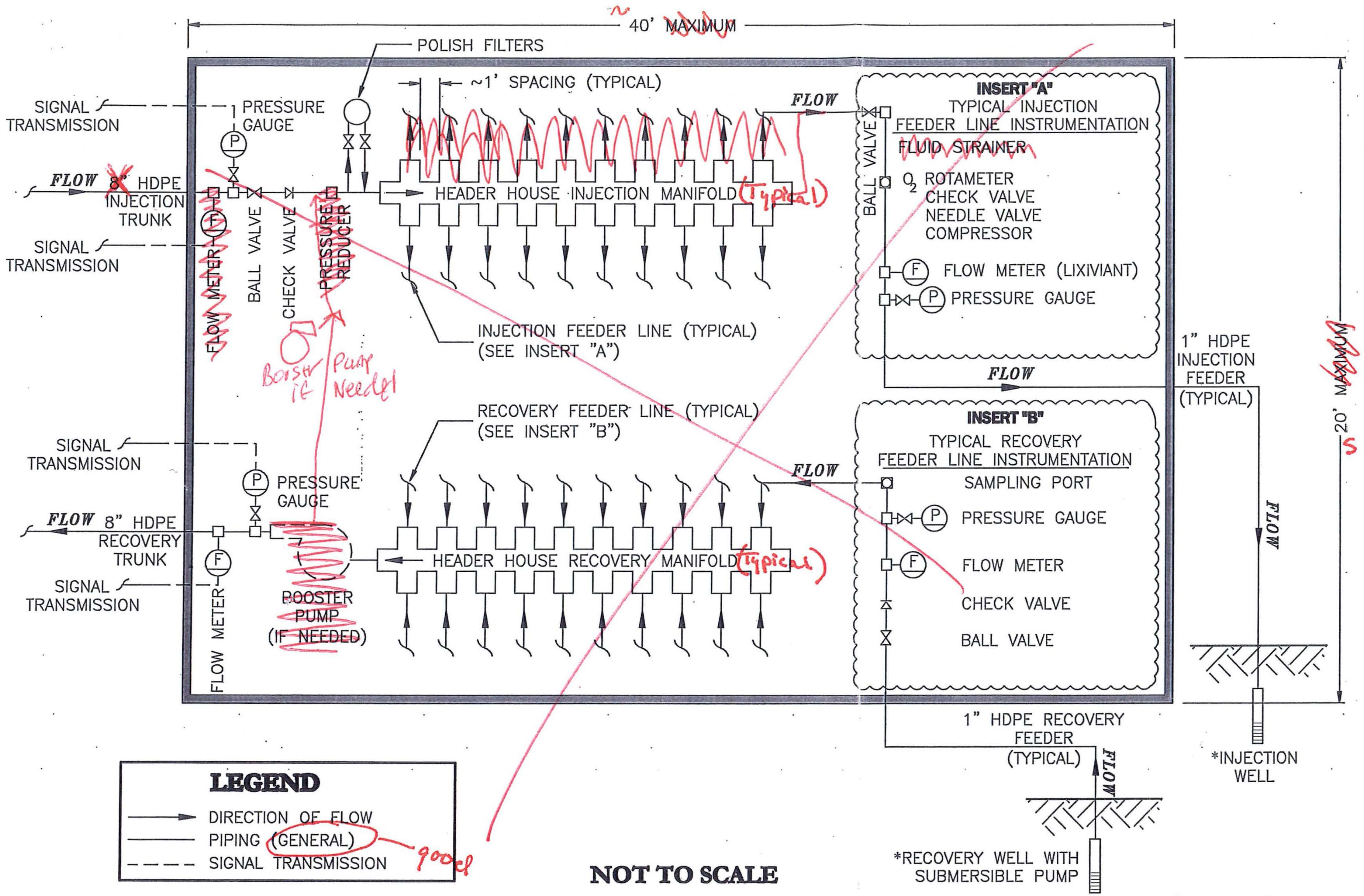
~~the length of the header house. The walls will be three to four feet from the building edges, and thus allow for maintenance and operators to conduct their inspections and work on the ground level, and not in the sub floor area.~~ In header houses with basements the basement will contain the hose runs and injection and recovery lines. The header house may be designed to contain the electrical equipment in the same room with the piping or the electrical room may be attached to the main header house building and placed on concrete pillars that are buried underground for structural support.

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.



LEGEND

- DIRECTION OF FLOW
- PIPING (GENERAL)
- SIGNAL TRANSMISSION

good

NOT TO SCALE

*NOTE: MAY CONTAIN UP TO 30 INJECTION & 30 RECOVERY ACCOMMODATIONS FOR WELLS.

1

1

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~~FIGURE 3-9C~~ Figure 3-9B

HEADER HOUSE PIPING AND INSTRUMENTATION (Typical)

By: J.F.P. / S.M.F.	Date: 2/22/2008
Datum: N/A	Revision Date: 10/21/2008
Scale: NOT TO SCALE	Contour Interval: N/A

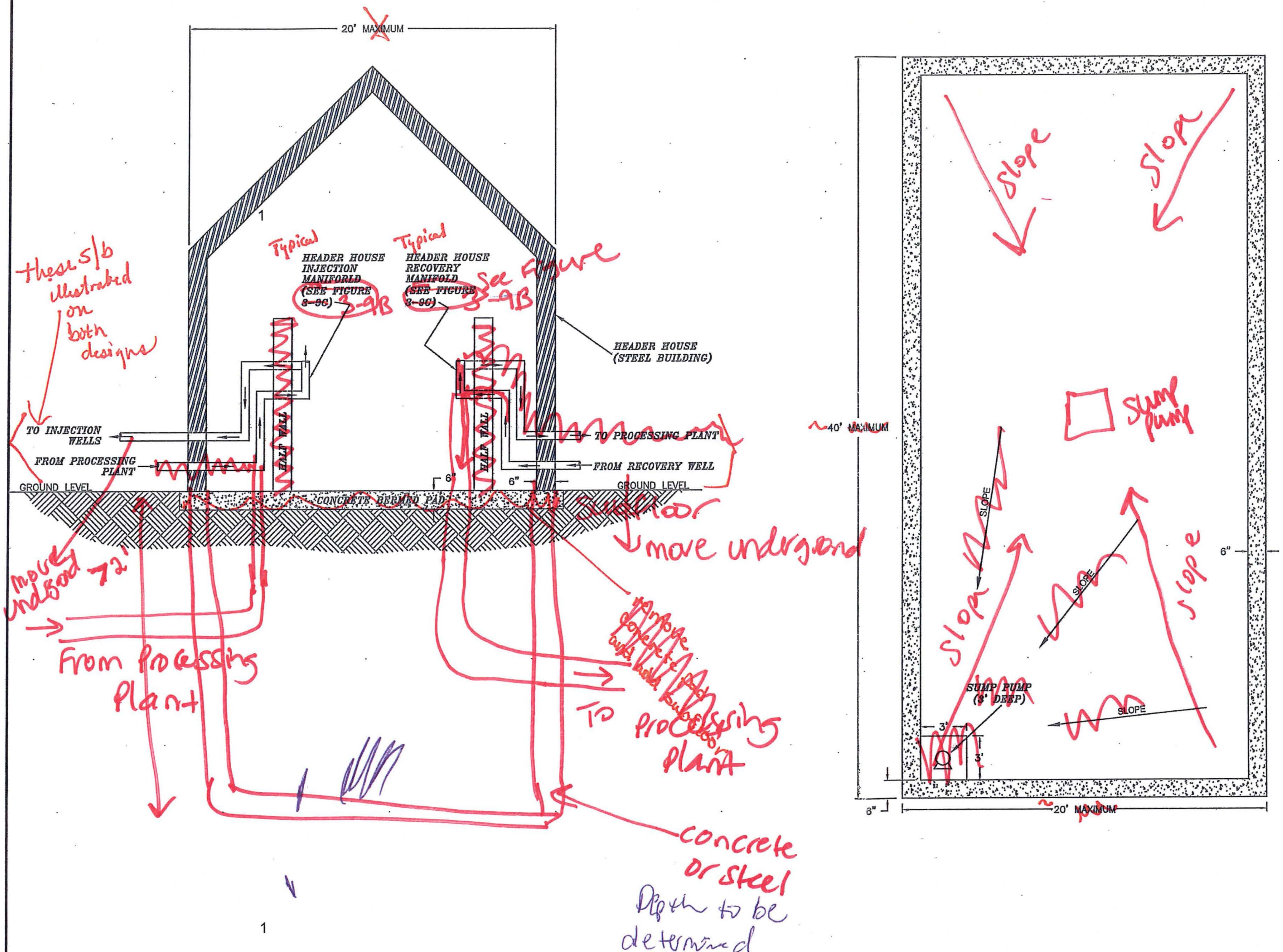

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FIGURE 3-9B A

HEADER HOUSE DETAILS

~~GROUND LEVEL~~ Design A (Typical)

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Datum: N/A	Revision Date: 10/21/2008
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LIST OF FIGURES (Continued)

designated as the F Sand. The average grade of the two units is above 0.1%, the average thickness is above seven feet, and the combined areal distribution is near 100 acres.

3.4.2 Wellfield Areas

Wellfields are designated areas above the ore zone that are sized to reach the desired production goals. The ore zone is the geological sandstone unit where the leaching solutions are injected and recovered in an in situ recovery wellfield and it is bounded between impermeable aquitards. Production areas are the individual areas that will be mined in the wellfield. The injection and recovery wells are completed in the ore zone intervals of the production sand. Horizontal monitor wells are located in a ring around the wellfields. Vertical monitor wells for overlaying and underlying aquifers are installed accordingly for one monitor well for every 4 acres of wellfield area. The distance between the monitor wells in the same aquifer shall not exceed 1,000 ft, and all monitor wells are installed within the production area unit. The final locations of the horizontal and vertical monitor wells will be submitted in the Production Area Pump Test Document as described in Section 5.7.8. This is because the actual locations might need to be changed because of topography, access, etc. The screened intervals for the excursion monitor wells are across the entire production zone.

3.4.3 Wellfield Injection and Recovery Patterns

The patterns for the injection and recovery wells follow the conventional 5-spot pattern. Depending on the ore zone shape, 7-spot or line drive patterns may be used. A typical 5-spot pattern is shown in Figure 3-9 (see map pocket) and contains 4 injection wells and 1 recovery well. The dimensions of the pattern vary depending on the ore zone, but the injection wells will likely be between 50 and 150 ft apart. In order to effectively recover the uranium and also to complete the groundwater restoration, the wells will be completed so that they can be used as either injection or recovery wells. The leaching solution will be injected into the injection wells, and the solution will be recovered through the recovery wells. To create a cone of depression in the wellfield, a greater volume of water is recovered than injected. The excess water or wellfield 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 oxygen spargers 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 approximately 110 well accommodations, but may contain more or less. The typical header house design is shown in Figure 3-9A Header House Details (see map pocket), and the details of the piping and instrumentation for the header house is shown in Figure 3-9B Header House Piping and Instrumentation (see map pocket).

The header houses will be metal buildings. The dimensions for the header houses will be approximately 40 feet by 20 feet, but may be more or less. The terrain and logistics in the wellfield will determine which engineered foundation (e.g. pad, pillar, or basement) the header house will be built on. The foundations will be constructed of durable materials that meet engineering requirements or other suitable materials with sealed penetrations (as needed) to provide containment. The foundation will have grating which will allow access to the sub floor containing valves and hose runs. The floor will curb and/or slope to a sump with an automatic level control pump. The sump will pipe to the recovery systemand will include check valves. In header houses with basements the basement will contain the hose runs and injection and recovery lines. The header house may be designed to contain the electrical equipment in the same room with the piping or the electrical room may be attached to the main header house building and placed on concrete pillars that are buried underground for structural support.

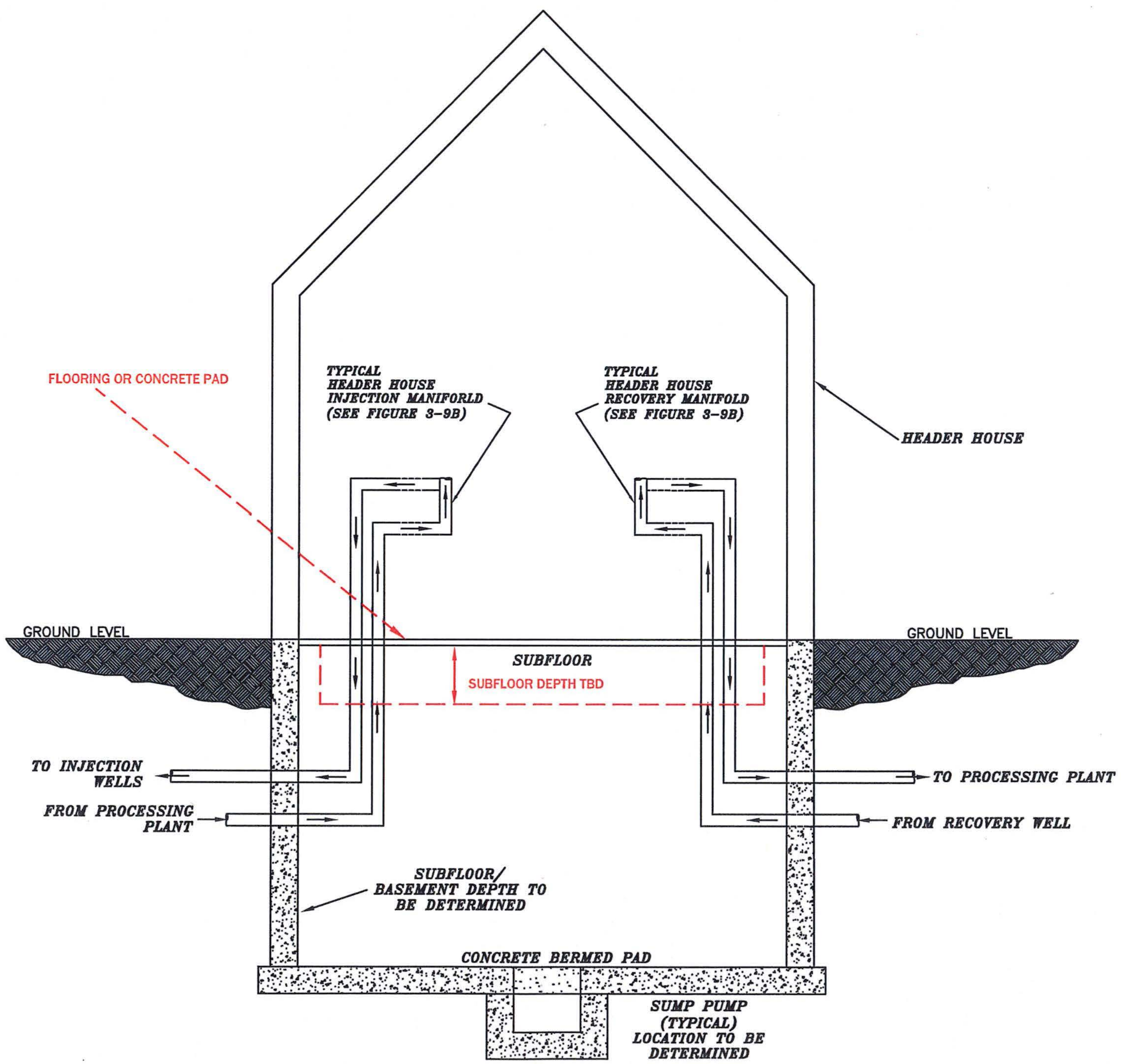
There are two separate solution trunk lines connecting the header houses. One of the trunk lines will take the recovery solutions from the header houses back to the processing plants, and the other trunk line will take injection fluid from the plants out to the header houses for injection into the wellfields.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

Section view



*Text in red designates when the basement option is not used

Plan view

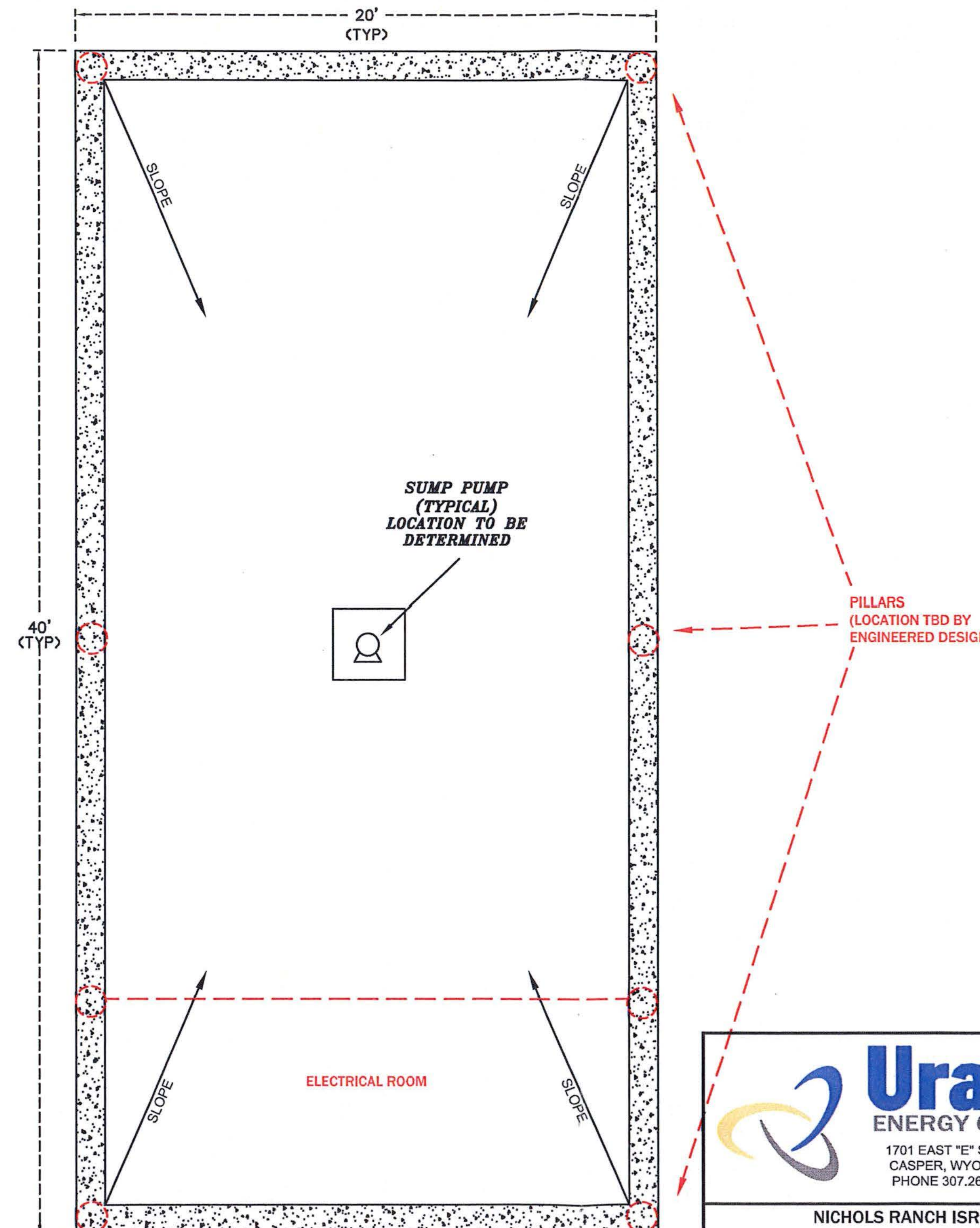


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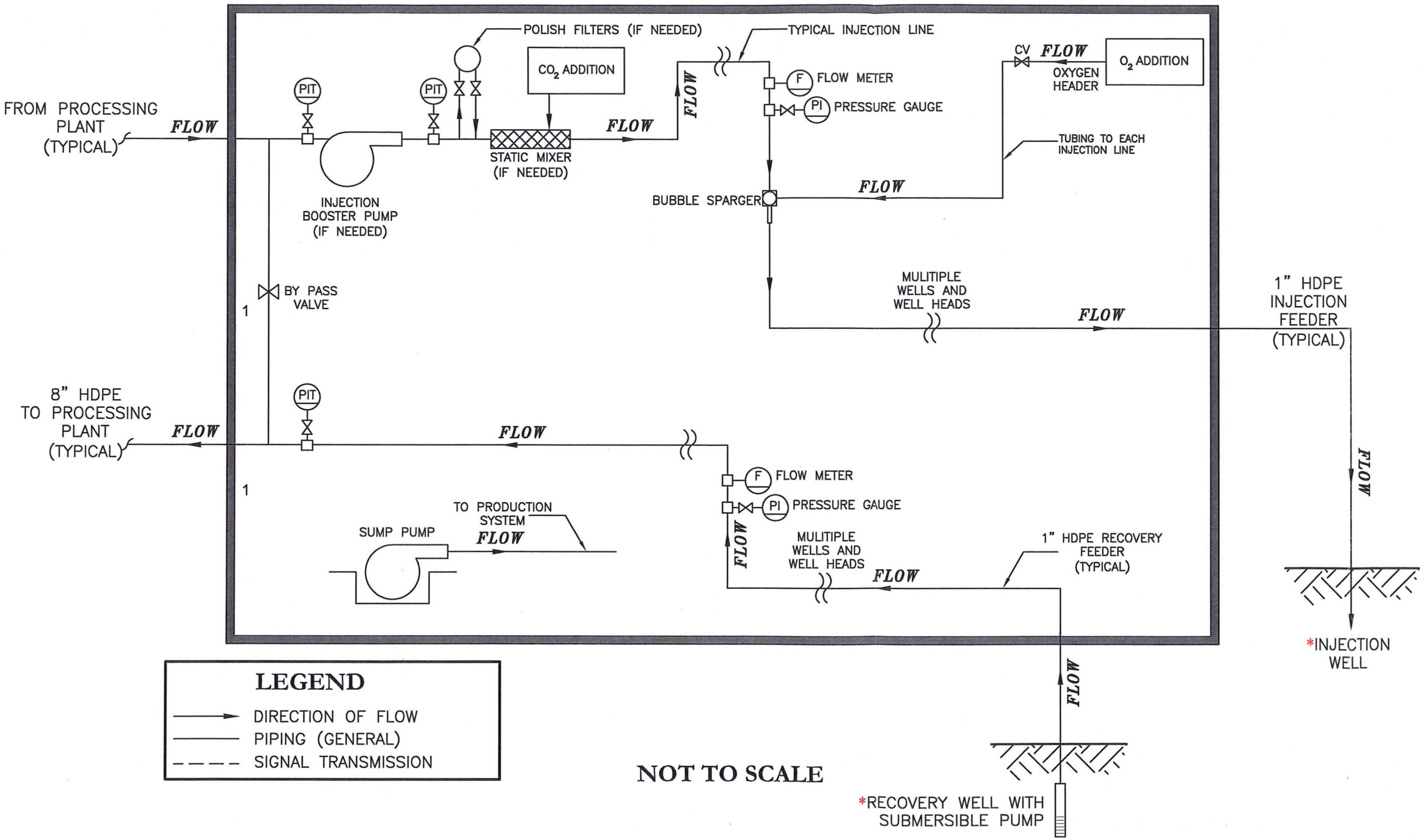
FIGURE 3-9A
HEADER HOUSE DETAILS (TYPICAL)

By: ADAM EVENSON	Date: 2/22/2008
Datum: N/A	Revision Date: 04/9/2015
Scale: NOT TO SCALE	Contour Interval: N/A



*NOTE: MAY CONTAIN UP TO 110 WELL ACCOMMODATIONS, APROXIMATELY 70 INJECTION AND 40 RECOVERY, OR A VARIATION THEREOF

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FIGURE 3-9B
HEADER HOUSE PIPING AND INSTRUMENTATION (TYPICAL)

By: DALTON TIMM	Date: 2/22/2008
Datum: N/A	Revision Date: 04/14/2015
Scale: NOT TO SCALE	Contour Interval: N/A

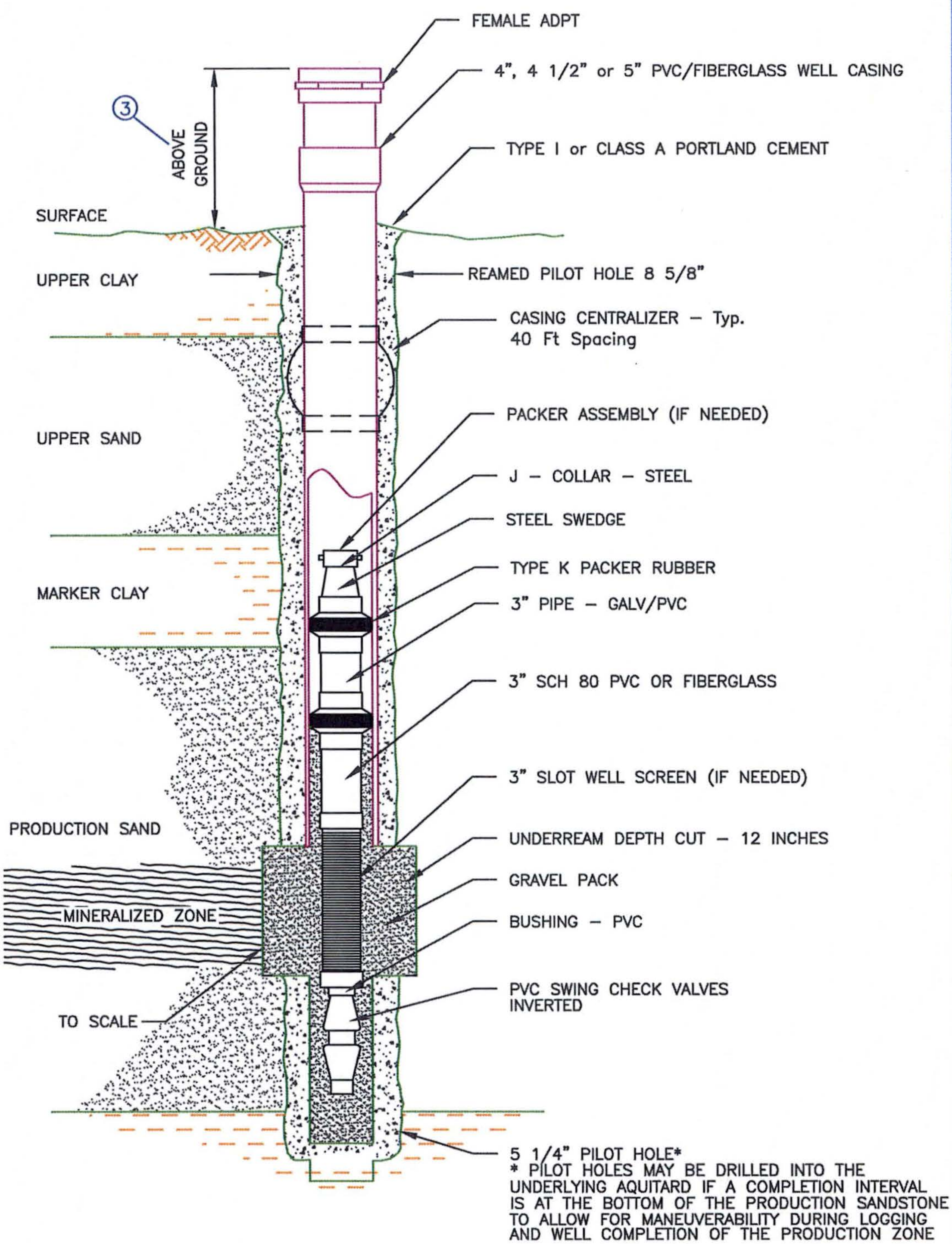

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FIGURE ~~3-1~~ 3-13 NICHOLS RANCH & HANK ISR PROJECTS

TYPICAL PRODUCTION (INJECTION/RECOVERY) WELL DIAGRAM

JOB NO. URZ Well Design	1	3/10/08		
DATE: Sept. 25, 2007	2	08/09		
SCALE: N.T.S.	3	7/11/13	SMF	
APPROVED BY: HA	4	10/30/14	LSG	
DRAWN BY: CB, JDN				
DRAWING NO. Figure ~~3-1~~ 3-13	REV.	DATE	DESCRIPTION	

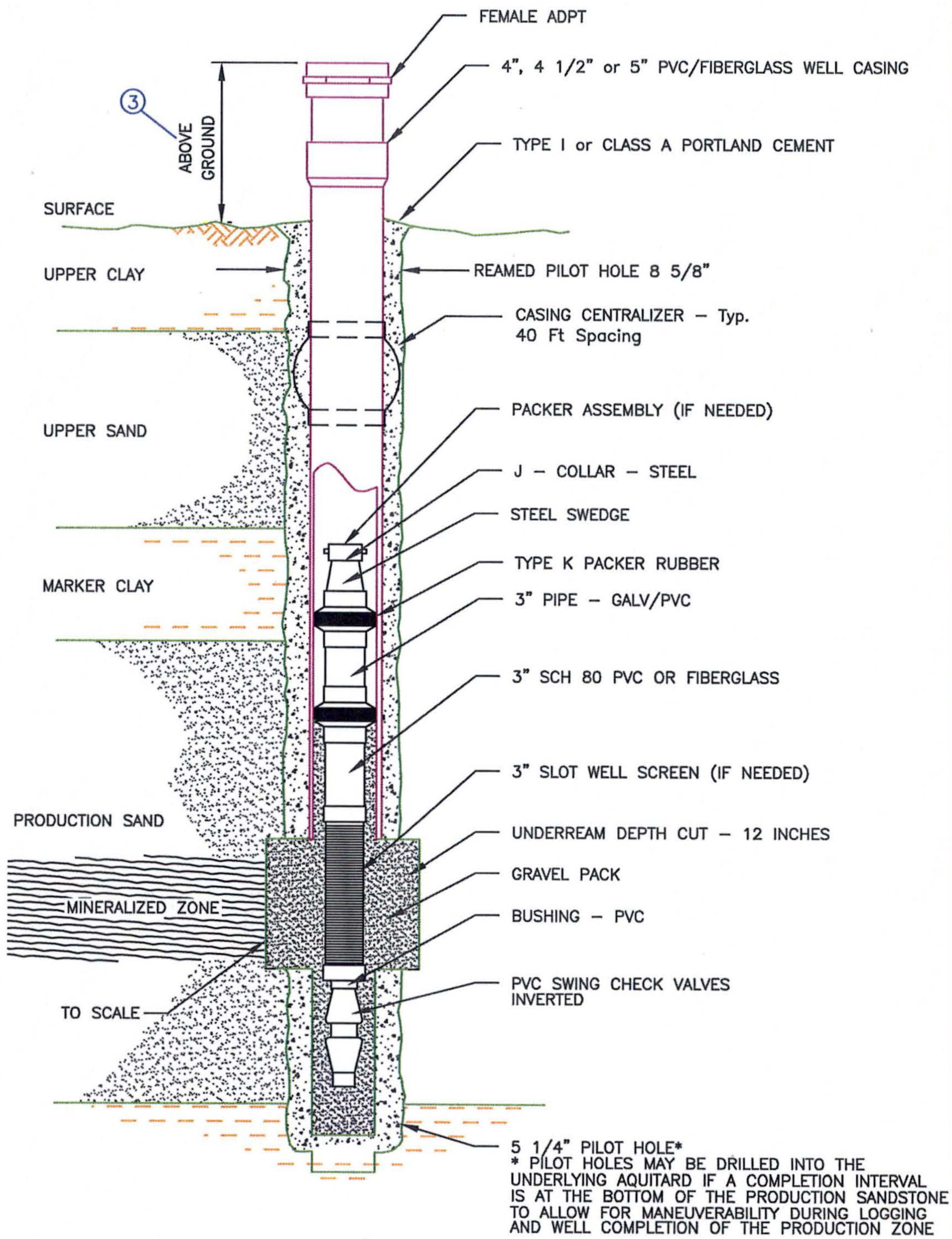

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FIGURE 3-13 NICHOLS RANCH & HANK ISR PROJECTS

TYPICAL PRODUCTION (INJECTION/RECOVERY) WELL DIAGRAM

JOB NO.: URZ Well Design
DATE: Sept. 25, 2007
SCALE: N.T.S.
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DRAWING NO.: Figure 3-13

REV.	DATE	DESCRIPTION
1	3/10/08	
2	08/09	
3	7/11/13	SMF
4	10/30/14	LSG

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 provides for direct supervision of the Executive Vice President ISR Operations and the Senior Director Regulatory Affairs.

Executive Vice President ISR Operations

The Executive Vice President ISR Operations (EVP) reports to the CEO and is directly responsible for all production activity at the site. In addition to production activities, the EVP is also directly responsible for ensuring that operations personnel comply with and implement industrial and responsible for radiation safety, and environmental protection programs. The EVP is also responsible for compliance with all federal and state regulations, license conditions, and reporting requirements. The EVP 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 EVP directly supervises the Mine Manager and indirectly supervises the Director ISR Regulatory Affairs.

Mine Manager

The Mine Manager reports directly to the EVP. 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.

Senior Director Regulatory Affairs

The Senior Director Regulatory Affairs reports directly to the CEO and supervises the Director ISR Regulatory Affairs. The Senior Director Regulatory Affairs is responsible to ensure support is provided to ISR as a regulatory resource. The Senior Director Regulatory Affairs has the 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. The Senior Director Regulatory Affairs also has the responsibility to inform and advise corporate management on matters involving regulatory items and to facilitate change implementation consistent with corporate and regulatory requirements.

Director ISR Regulatory Affairs

The Director ISR Regulatory Affairs reports directly to the Senior Director Regulatory Affairs and indirectly to the EVP. The Director ISR 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, regulatory notifications and reports are met. The Director ISR Regulatory Affairs also has the responsibility to advise senior management on matters involving environmental and radiation safety and to implement changes and/or corrective actions involving these affairs authorized by senior management. The Director ISR Regulatory Affairs is tasked to ensure that the environmental and radiation safety programs are conducted in a manner consistent with regulatory requirements. The Director ISR Regulatory Affairs has the 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. The Director ISR 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 Director ISR 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

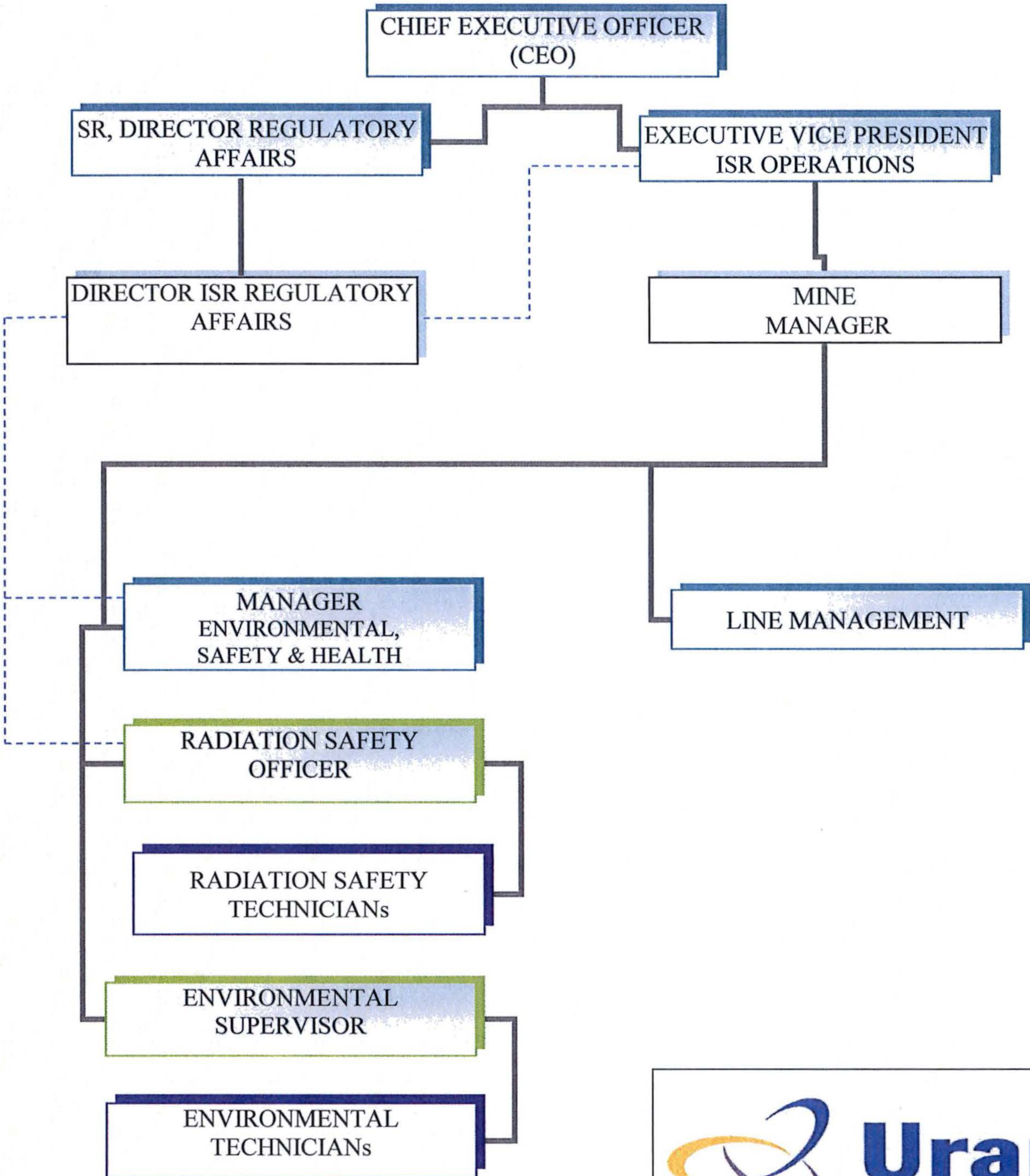
The Radiation Safety Officer (RSO) reports directly to the Manager ESH. The RSO is responsible for conducting the radiation safety program and for providing assistance in ensuring compliance with NRC regulations and license conditions applicable to worker health protection. The RSO is responsible for 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 Director ISR 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

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).



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NICHOLS RANCH ISR PROJECT

FIGURE 5-1

URANERZ ORGANIZATION

By: Aly Amzal	DATE: OCOTOBER 29, 2007
Contour Interval: N/A	Revision Date: August 18, 2015
Scale: N/A	Rev #: 4

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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 provides for direct supervision of the ~~Chief Operating Officer~~Executive Vice President ISR Operations and the Senior Director Regulatory Affairs.

Chief Operating OfficerExecutive Vice President ISR Operations

The Chief Operating Officer (COO)Executive Vice President ISR Operations (EVP) reports to the CEO and is directly responsible for all production activity at the site. In addition to production activities, the COO EVP is also directly responsible for ensuring that operations personnel comply with and implement industrial and responsible for radiation safety, and environmental protection programs. The COO EVP is also responsible for compliance with all federal and state regulations, license conditions, and reporting requirements. The COO EVP 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 COO EVP directly supervises the Mine Manager and other Vice Presidentsindirectly supervises the Director ISR Regulatory Affairs.

Mine Manager

The Mine Manager reports directly to the COOEVP. 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.

Senior Director Regulatory Affairs

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~~The Senior Director Regulatory Affairs also has the responsibility to inform and advise corporate management on matters involving regulatory items and to facilitate change implementation consistent with corporate and regulatory requirements.~~

~~Vice President Regulatory and Public Affairs~~Director ISR Regulatory Affairs

The ~~Vice President Regulatory and Public Affairs~~Director ISR Regulatory Affairs reports directly to the ~~COO~~ Senior Director Regulatory Affairs and indirectly to the EVP. The Director ISR Regulatory Affairs~~Vice President Regulatory and Public 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 and reports are met. The Director ISR Regulatory Affairs ~~Vice President Regulatory and Public Affairs~~ also has the responsibility to advise senior management on matters involving environmental and radiation safety and to implement changes and/or corrective actions involving ~~radiation safety~~these affairs authorized by senior management. The Director ISR Regulatory Affairs~~Vice President Regulatory and Public Affairs~~ is tasked to ensure that the environmental and radiation safety programs are conducted in a manner consistent with regulatory requirements. The Director ISR Regulatory Affairs has the 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.

The ~~The~~ Director ISR Regulatory Affairs~~Vice President Regulatory and Public Affairs~~ has no production-related responsibilities.

Manager Environment, Safety, and Health

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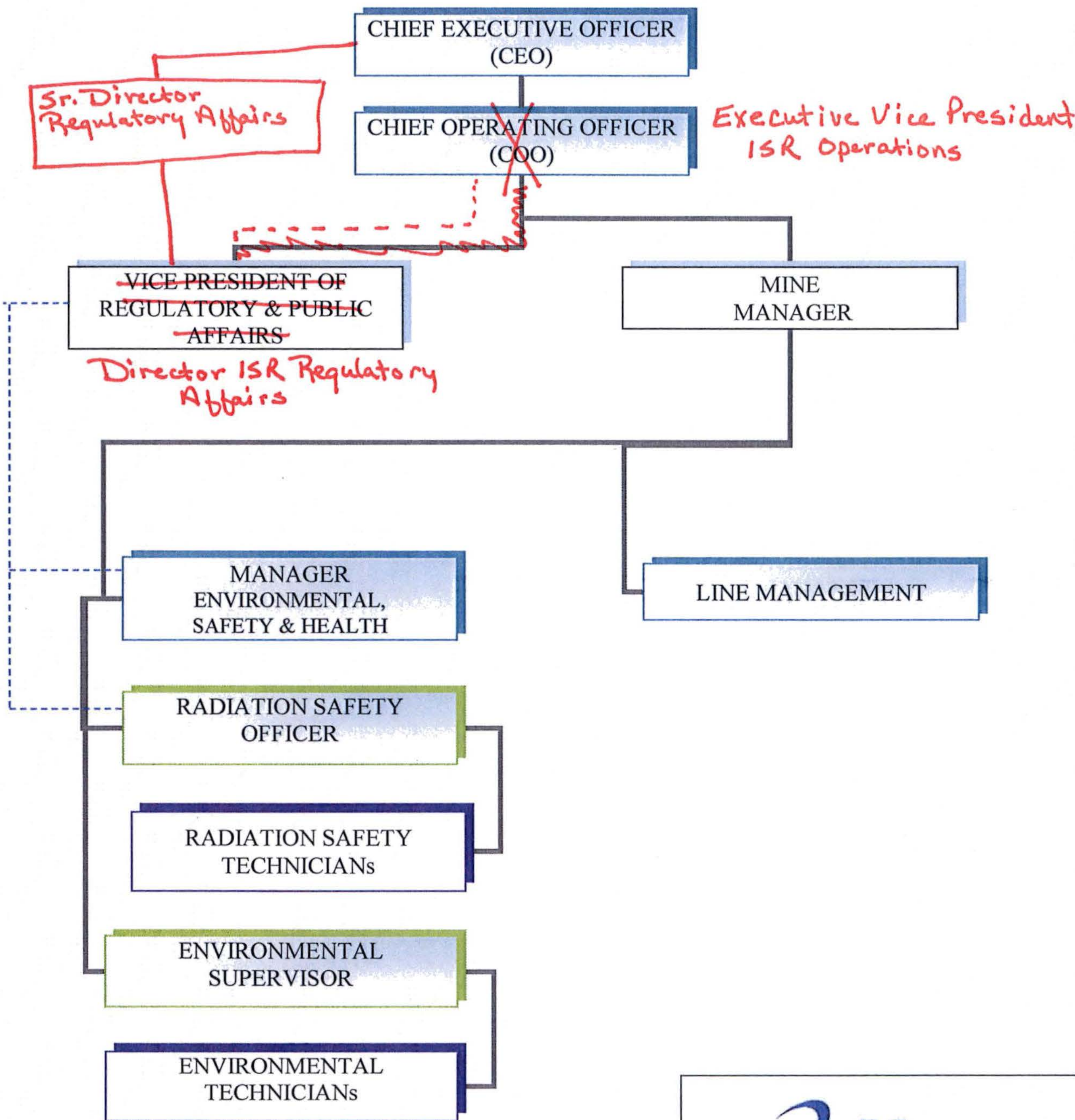
Environmental Supervisor and Environmental and Radiation Safety Technicians

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

Redline



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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: March 4, 2015
SCALE: N/A	REV. #: 3

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Chief Operating Officer

The Chief Operating Officer (COO) reports to the CEO and is directly responsible for all production activity at the site. In addition to production activities, the COO is also directly responsible for ensuring that operations personnel comply with and implement industrial and responsible for radiation safety, and environmental protection programs. The COO is also responsible for compliance with all federal and state regulations, license conditions, and reporting requirements. The COO 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 COO directly supervises the Mine Manager and other Vice Presidents.

~~Senior Vice President, Operations~~

~~The Senior Vice President, Operations reports directly to the COO. 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~~COO. 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.

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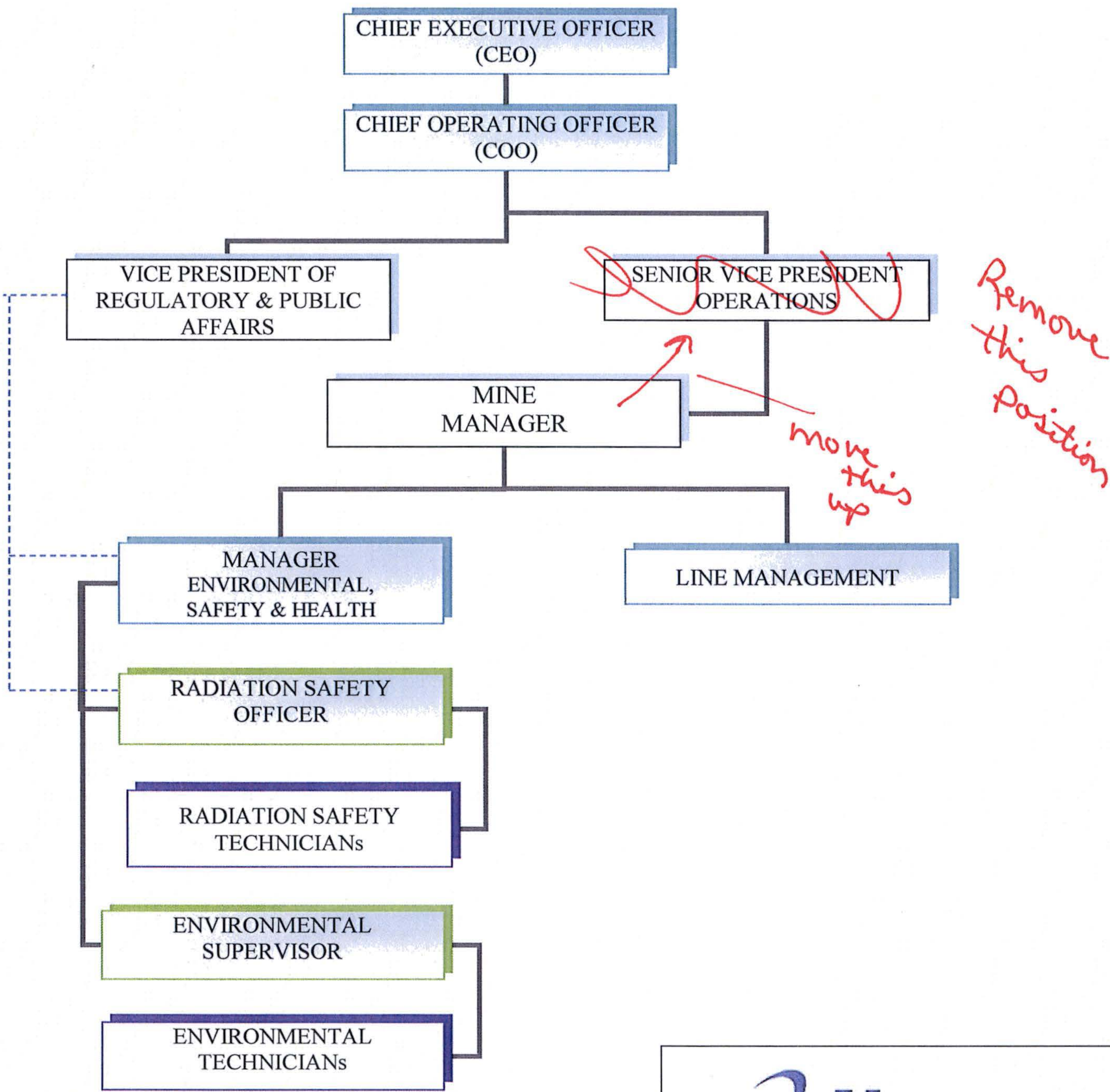

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NICHOLS RANCH ISR PROJECT

FIGURE 5-1

URANERZ ORGANIZATION

update.

BY: Dalton Timm	DATE: OCTOBER 29, 2007
CONTOUR INTERVAL: N/A	REV. DATE: December 22, 2014
SCALE: N/A	REV. #: 2
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Chief Operating Officer

The Chief Operating Officer (COO) reports to the CEO and is directly responsible for all production activity at the site. In addition to production activities, the COO is also directly responsible for ensuring that operations personnel comply with and implement industrial and responsible for radiation safety, and environmental protection programs. The COO is also responsible for compliance with all federal and state regulations, license conditions, and reporting requirements. The COO 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 COO directly supervises the Mine Manager and other Vice Presidents.

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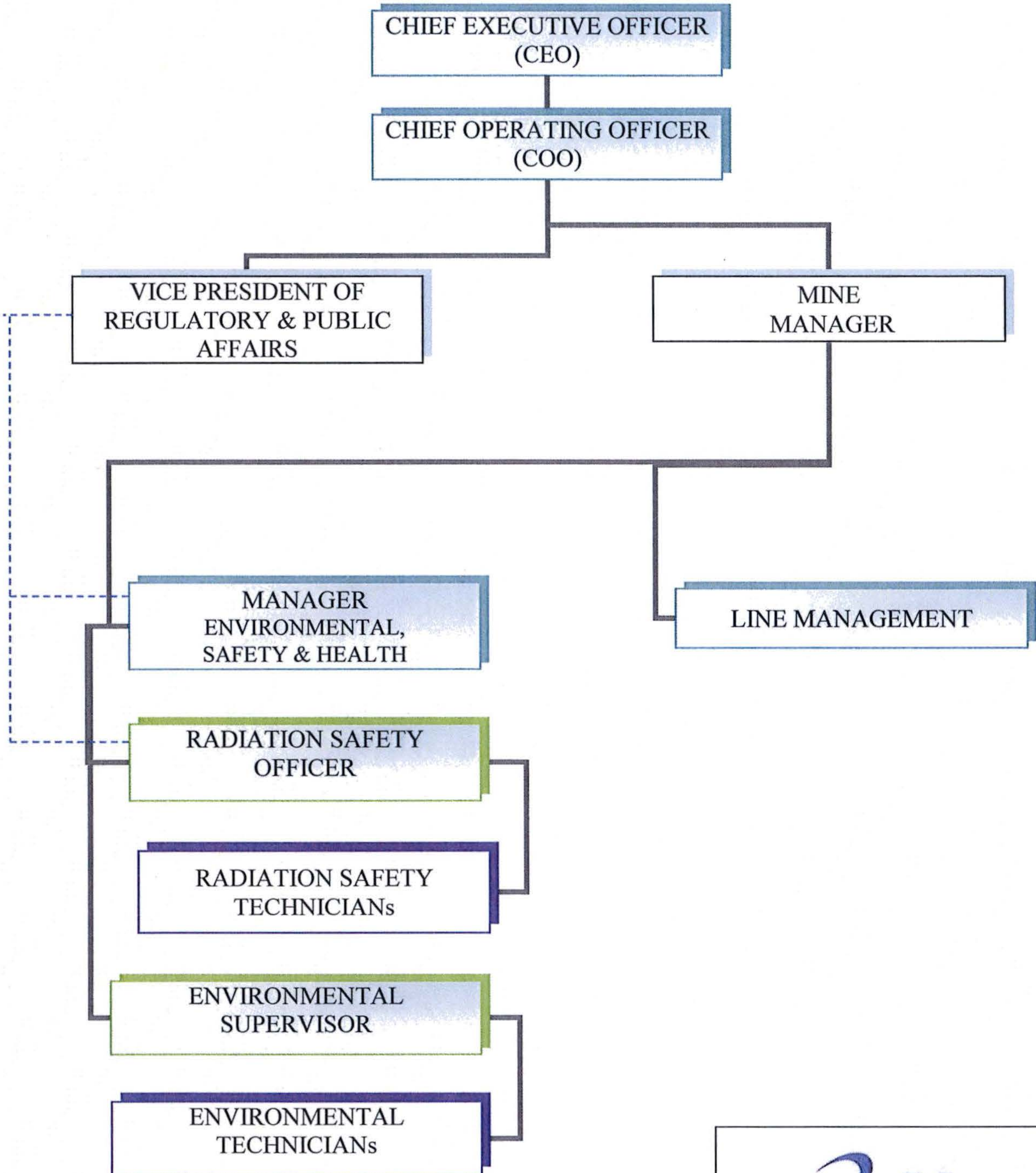

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NICHOLS RANCH ISR PROJECT

FIGURE 5-1

URANERZ ORGANIZATION

BY:Dalton Timm	DATE: OCTOBER 29, 2007
CONTOUR INTERVAL:N/A	REV. DATE: March 4, 2015
SCALE:N/A	REV. #: 3

FILE LOCATION:t:\it\drafting\nichols ranch\permitting-licensing\figure 5-1 REV-.doc properly trained personnel. The facility design, site features, and operating assumptions of the Nichols Ranch ISR Project are consistent with those of the NRC analyses. Therefore, independent accident analyses will not be conducted for the Nichols Ranch ISR Project. However, assessments are provided of applicable accident types and scenarios to include site specific conditions. More specifically, discussion is provided with respect to coal bed methane recovery, which is unique to the region.

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Uranerz will promptly initiate corrective actions in response to an accident, as presented in various parts of the Application. Uranerz will also notify the NRC and file the appropriate reports in accordance with the rules provided in 10 CFR Part 20, §§ 20.2202 Notification of Incidents and 20.2203 Reports of Exposures, Radiation Levels, and Concentrations of Radioactive Material Exceeding the Constraints or Limits.

Uranerz will also contact local fire departments, medical services, and other local agencies that may respond to emergencies in the area of the Nichols Ranch ISR Project to inform the agencies about the project; training for the agencies when dealing with fire, injury, or other emergencies, and how to contact and locate the Nichols Ranch Project.

7.5.1 Transportation Incidents

Materials transportation to and from the Hank and Nichols Ranch Units can be classified into four categories:

1) Shipment of refined yellowcake (dried or slurry form) from the Nichols Ranch Central Processing Plant to a uranium conversion facility.
2) Shipment of loaded resin from the Hank Unit to the Nichols Ranch Central Processing Plant.
3) Shipment of process chemicals from suppliers to the Hank and Nichols Ranch Units.
4) Shipments of 11(e)2 by-product material to a NRC licensed facility for disposal.

One other transportation classification is the transporting of employees to and from the plant site.

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7.5.1.1 Shipment of Refined Yellowcake

Refined Yellowcake produced at the Nichols Ranch Central Processing Plant will not differ from the refined yellowcake produced at conventional mills. The NRC evaluated transportation accidents associated with yellowcake shipments from conventional mills and published the results in a generic environmental impact statement, NUREG-0706, NRC, 1980. The following information on transportation accidents is based on the analysis on the earlier NRC study.

Refined yellowcake produced at the Nichols Ranch Central Processing Plant will be packaged in 55-gallon steel drums when in dried form. When in slurry form the product will be packaged in an exlusive use tanker trailer, specifically designed for transportation of yellowcake slurry. Dried ~~Y~~yellowcake will be shipped approximately 1,200 mi to a uranium conversion facility. This conversion facility is the first manufacturing step in converting the yellowcake into reactor fuel. An average truck shipment contains approximately 40 drums, or up to 19 tons of yellowcake. Based on the initially projected annual production rate of 800,000 pounds of yellowcake per year, approximately 21 shipments of 40 drums each would be required annually for the Nichols Ranch ISR Project. By increasing the annual production rate to 2.0 million pounds per year per the vacuum dryer designed throughput, approximately 53 shipments would be required annually. Slurry yellowcake will be transported to an approved licensed facility for drying and packaging.

According to NUREG-0706, published accident statistics predict the probability of a truck accident under three different scenarios: 1) on interstate highways in rural areas, 2) on interstate highways in urban areas, and 3) on two-lane roads typical of those in the vicinity of the proposed project. The overall average probability of a truck accident for the Nichols Ranch ISR Project based on the NUREG-0706 data is 2.2×10^{-6}/mile. This takes into account that most of the shipping of yellowcake will be on interstates in both rural and urban areas.

The truck accident statistics also include three categories of events: collisions, noncollisions, and other events. Collisions are considered to be between the trucks and other vehicles or any other object, whether moving or stationary. Noncollisions are accidents involving only the truck that result in accidents such as the truck leaving the road and rolling over. Other events include properly trained personnel. The facility design, site features, and operating assumptions of the Nichols Ranch ISR Project are consistent with those of the NRC analyses. Therefore, independent accident analyses will not be conducted for the Nichols Ranch ISR Project. However, assessments are provided of applicable accident types and scenarios to include site specific conditions. More specifically, discussion is provided with respect to coal bed methane recovery, which is unique to the region.

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3) Shipment of process chemicals from suppliers to the Hank and Nichols Ranch Units.
4) Shipments of 11(e)2 by-product material to a NRC licensed facility for disposal.

One other transportation classification is the transporting of employees to and from the plant site.

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The truck accident statistics also include three categories of events: collisions, noncollisions, and other events. Collisions are considered to be between the trucks and other vehicles or any other object, whether moving or stationary. Noncollisions are accidents involving only the truck that result in accidents such as the truck leaving the road and rolling over. Other events include process upsets (e.g. pregnant lixiviant, loaded resin, thickener, or dryer), leaks in buried lixiviant piping, and chemical releases as they might affect radiological accidents.

4.2.1.1 Transportation Incidents

Materials transportation to and from the Hank and Nichols Ranch Units can be classified into four categories:

1) Shipment of refined yellowcake (dried or slurry form) from the Nichols Ranch Central Processing Plant to a uranium conversion facility.
2) Shipment of loaded resin from the Hank Unit to the Nichols Ranch Central Processing Plant.
3) Shipment of process chemicals from suppliers to the Hank and Nichols Ranch Units.
4) Shipments of 11(e)2 by-product material to a NRC licensed facility for disposal.

One other transportation classification is the transporting of employees to and from the plant site.

4.2.1.2 Shipment of Refined Yellowcake

Refined Yellowcake produced at the Nichols Ranch Central Processing Plant will not differ from the refined yellowcake produced at conventional mills. The NRC evaluated transportation accidents associated with yellowcake shipments from conventional mills and published the results in a generic environmental impact statement, NUREG-0706, NRC, 1980. The following information on transportation accidents is based on the analysis on the earlier NRC study.

Refined yellowcake produced at the Nichols Ranch Central Processing Plant will be packaged in 55-gallon steel drums ~~.~~ when in dried form. When in slurry form the product will be packaged in an exclusive use tanker trailer specifically designed for transportation of yellowcake slurry. Dried y~~Y~~ellowcake will be shipped approximately 1,200 mi to a uranium conversion facility. This conversion facility is the first manufacturing step in converting the yellowcake into reactor fuel. An average truck shipment contains approximately 40 drums, or up to 19 tons of yellowcake. Based on the initially projected annual production rate of 800,000 pounds of yellowcake per year, approximately 21 shipments of 40 drums each would be required annually for the Nichols Ranch ISR Project. By increasing the annual production rate to 2.0 million pounds per year per the vacuum dryer designed throughput, approximately 53 shipments would be required annually. Slurry yellowcake will be transported to an approved licensed facility for drying and packaging.

According to NUREG-0706, published accident statistics predict the probability of a truck accident under three different scenarios: 1) on interstate highways in rural areas, 2) on interstate highways in urban areas, and 3) on two-lane roads typical of those in the vicinity of the proposed project. The overall average probability of a truck accident for the Nichols Ranch ISR Project based on the NUREG-0706 data is $2.2x10^{-6}$/mi. This takes into account that most of the shipping of yellowcake will be on interstates in both rural and urban areas.

The truck accident statistics also include three categories of events: collisions, noncollisions, and other events. Collisions are considered to be between the trucks and other vehicles or any other object, whether moving or stationary. Noncollisions are accidents involving only the truck that result in accidents such as the truck leaving the road and rolling over. Other events include personal injuries that are suffered from someone on the truck, someone falling from or being thrown against the truck, cases of stolen trucks, and fires occurring on a standing truck. The probability of a truck being involved in any of the accidents types during a one year period is approximately 10 percent.

A generalized accident-risk evaluation conducted by the NRC classified accidents into eight categories, depending on the combined stresses of impact, puncture, crush, and fire. Using this classification scheme as a basis, conditional accident probability was developed for eight severity levels. Two radioactive material release models were then developed to calculate the amount of yellowcake that could be released based up what severity of accident occurs. Model I is hypothetical assuming a complete loss of yellowcake drum contents when an accident occurs. Model II is based on actual tests assuming a partial loss of yellowcake drum contents. The quantity of the release for Model I and Model II in the event of an accident is 17,000 pounds and

1,200 pounds respectively, (NUREG 0706, NRC, 1980). Most of the yellowcake that is released from the container would be directly deposited on the ground in the immediate vicinity of the accident location. Some fraction of the released material would be dispersed to the atmosphere. The following expression was utilized by the NRC to estimate the amount of released material dispersed to the atmosphere:

$F = 0.001/4.6x10^{-4} (1-e^{-0.15ut}) u^{1.78}$
Where:

F = the fractional airborne release

u = the wind speed at 50 ft expressed in m/s

t = the duration of the release (hours)

In this expression, the first term represents the initial "puff" that is immediately airborne when the yellowcake drum fails in an accident. Assuming a wind speed of 10 mph (5 m/s) and a release time of 24 hours, the environmental release fraction would be $9x10^{-3}$. Since the conversion facility is located in the eastern United States, a population density of 160 people per square mile was used to calculate the 50 year dose commitments to the lungs of the general public. The calculated 50 year dose commitments are 2 man-Sv (200 man-rem) and 0.14 man-Sv (14 man-rem) for Model I and Model II. The integrated dose estimate would be lower for the more sparsely populated areas.

Any accident that results during the shipment of yellowcake product could result in some yellowcake being spilled. In the unlikely event that such an accident does occur, all yellowcake and contaminated soil would be removed, processed through a uranium mill, or disposed of in a licensed NRC disposal facility. All areas that are disturbed by the accident would then be reclaimed in accordance to all applicable NRC and State regulations.

The risk of an accident involving the transporting of yellowcake resulting in a yellowcake spill will be kept to a minimum by the use of exclusive use shipments. If an accident were to occur, impact to the environment would be further reduced by following instruction outlined in the Uranerz Energy Corporation Incident Response Guide. This guide will be included with every shipment of yellowcake that leaves the Nichols Ranch Central Processing Plant. The carrier will also be required to maintain accident response capability to specifically include spill response.

process upsets (e.g. pregnant lixiviant, loaded resin, thickener, or dryer), leaks in buried lixiviant piping, and chemical releases as they might affect radiological accidents.

4.2.1.1 Transportation Incidents

Materials transportation to and from the Hank and Nichols Ranch Units can be classified into four categories:

1) Shipment of refined yellowcake (dried or slurry form) from the Nichols Ranch Central Processing Plant to a uranium conversion facility.
2) Shipment of loaded resin from the Hank Unit to the Nichols Ranch Central Processing Plant.
3) Shipment of process chemicals from suppliers to the Hank and Nichols Ranch Units.
4) Shipments of 11(e)2 by-product material to a NRC licensed facility for disposal.

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