UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
612 EAST LAMAR BLVD, SUITE 400
ARLINGTON, TEXAS 76011-4125

February 25, 2011

Donna L. Wichers
Senior Vice President, ISR Operations
Uranium One USA, Inc.
907 No. Poplar Street, Suite 260
Casper, Wyoming 82601

SUBJECT: NRC TEAM INSPECTION 040-08502/10-001

Dear Ms. Wichers:

This refers to the team inspection conducted on October 25-28 and December 7-9, 2010, at your Irigaray and Christensen Ranch facilities located in Johnson and Campbell Counties, Wyoming. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel.

A preliminary exit briefing was presented to Uranium One at the conclusion of the onsite inspection, and the inspection results were discussed with Uranium One staff by telephone on December 14, 2010, and January 28, 2011. The enclosed report presents the results of this inspection.

The purpose of the inspection was to determine whether your facilities were prepared for startup and operations. Overall, the team determined that your facilities were ready to commence with in-situ uranium recovery operations. Authorization for startup of the two facilities was granted to Uranium One by NRC letter dated December 17, 2010, with some exceptions. As stated in the December 17, 2010, letter, the inspectors did not agree with Uranium One's Safety and Environmental Review Panel conclusion regarding the use of sulfuric acid in place of hydrochloric acid during the precipitation process. Also, we have not reviewed dryer operability, decommissioning, or restoration activities. These program areas will be reviewed during future inspections.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this letter, please contact Ms. Linda Gersey, Health Physicist, at 817-860-8299, or the undersigned at 817-860-8197.

Sincerely,

/RA/

Jack E. Whitten, Chief
Nuclear Materials Safety Branch B
Division of Nuclear Materials Safety

Docket: 040-08502
License: SUA-1341

Enclosure:
NRC Inspection Report 040-08502/10-001

cc w/enclosure:
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ADAMS	☐ No	■ Yes	■ SUNSI Review Complete	Reviewer Initials: LMG
■ Publicly Available		☐ Non-publicly Available	☐Sensitive	■ Non-sensitive

RIV:DNMS/NMSB-B	DNMS/RSFS	FSME:DURLD	FSME:DURLD
LMGersey;dlf	RJEvans	THYoungblood	JLSaxton
T - RJEvans	***/RA/***	***E - RJEvans***	***E - RJEvans***
2/24/11	2/24/11	2/22/11	1/31/11

FSME:DURLD	C:NMSB-B		
RCLinton	JEWhitten		
E - RJEvans	***/RA/***		
2/11/11	2/25/11		

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket:	040-08502
License:	SUA-1341
Report:	040-08502/10-001
Licensee:	Uranium One USA, Inc.
Facility:	Irigaray and Christensen Ranch
Location:	Johnson and Campbell Counties, Wyoming
Dates:	October 25-28 and December 7-9, 2010
Inspectors:	Linda M. Gersey, Health Physicist, Team Leader Nuclear Materials Safety Branch B Robert J. Evans, PE, CHP, Senior Health Physicist Repository and Spent Fuel Safety Branch
Accompanied By:	Thomas Youngblood, CHP, Health Physicist Decommissioning and Uranium Recovery Licensing Directorate Division of Waste Management and Environmental Protection Office of Federal and State Materials and Environmental Management Programs John L. Saxton, Hydrogeologist Decommissioning and Uranium Recovery Licensing Directorate Division of Waste Management and Environmental Protection Office of Federal and State Materials and Environmental Management Programs Ron C. Linton, Project Manager Decommissioning and Uranium Recovery Licensing Directorate Division of Waste Management and Environmental Protection Office of Federal and State Materials and Environmental Management Programs
Approved By:	Jack E. Whitten, Chief Nuclear Materials Safety Branch B
Attachments:	Supplemental Inspection Information Uranium One USA, Inc. Preoperational Inspection Field Notes

ENCLOSURE

EXECUTIVE SUMMARY

Uranium One USA, Inc.
Irigaray and Christensen Ranch Facilities
NRC Inspection Report 040-08502/10-001

Amendment 13 to NRC Materials License SUA-1341 dated September 30, 2008, authorized Uranium One USA, Inc. (Uranium One) to resume with in-situ recovery operations. The NRC established two conditions that had to be completed prior to Uranium One actually resuming operations. The first condition was to update the financial surety; the second condition was to allow the NRC to conduct a preoperational inspection before startup of facility operations.

The first condition was completed when the NRC approved the licensee's updated surety. The NRC's approval was documented in Amendment 19 to the license dated December 16, 2010. The second condition was completed when the NRC conducted a team inspection of the facilities on October 25-28 and December 7-9, 2010. Upon completion of these two conditions, the NRC issued a letter dated December 17, 2010, authorizing the licensee to commence with preoperational and operational activities.

However, as documented in the NRC's letter of authorization for restart, the team did not review two program areas — dryer operations and decommissioning/reclamation activities. These program areas will be reviewed during future inspections. Also, the inspectors did not agree with the licensee's Safety and Environmental Review Panel conclusion regarding use of sulfuric acid in place of hydrochloric acid during the precipitation process, as this appears to be a departure from the method of evaluation described in the license application used in establishing the final safety evaluation report, the environmental assessment, or technical evaluation reports as required by License Condition 9.4(b). In response to this inspection finding, the licensee submitted a license amendment request to the NRC on February 4, 2011, to allow sulfuric acid to be used in lieu of hydrochloric acid. The licensee may continue to use hydrochloric acid in the precipitation process, but the licensee may not use sulfuric acid in place of hydrochloric acid until the NRC reviews and approves this license amendment request.

Site Status

At the time of the inspection, the licensee was preparing the facilities for operations. At the Christensen Ranch facility, the licensee was completing construction of the equipment that will be used to support plant operations, including upgrading pumps and filters, refurbishing tanks, and procuring needed chemicals. In addition, the licensee recently relined an evaporation pond that was previously identified as leaking.

The licensee plans to restart the Christensen Ranch facility first by conducting operations in Mine Unit 7-1. The license allows the licensee to conduct operations at a maximum flow rate of 4,000 gallons per minute. The licensee estimated that the capacity of Mine Unit 7-1 was about 500 gallons per minute. During the inspection, the licensee was constructing Mine Unit 7-2. This second mine unit and subsequent mine unit modules will be placed into service at later dates.

At the Irigaray facility, the licensee was in the final stages of plant refurbishment. The licensee had the equipment necessary to support plant operations up to the thickener tanks. The licensee, at the time of the inspection, had not completed restoration of the dryer and

associated support equipment. This work will be completed prior to operation of the dryer, currently scheduled for mid-2011.

There were no restoration activities in progress. Restoration has been completed at the Irigaray facility. At Christensen Ranch, the licensee was conducting routine monitoring at all existing mine units (2 through 6). Mine Units 2 through 6 have undergone restoration, and the restoration report was being reviewed by NRC staff.

Management Organization and Controls

The licensee had staffed all management level positions with qualified and experienced individuals. The licensee had sufficient support staff to commence with plant startup and site operations. The licensee established contingency plans for providing around-the-clock health physics support until radiation protection staff members were fully qualified. The licensee established procedures for health physics, transportation, emergency response, spill response, environmental safety, industrial safety, worker training, wellfield operations, plant operations, and quality assurance/quality control. The licensee established a program for the performance-based license, including implementation of the Safety and Environmental Review Panel. The licensee established a written safety policy that described each employee's authority and responsibility for operational safety, radiation protection, fire protection, and chemical safety. The written program for evaluating, detecting, and correcting incidents was contained in the draft Safety, Health and Environmental Procedures. Injury and incident damage reporting and analysis were outlined in the Industrial Safety Program. The licensee established programs for routine audits, including the daily and weekly radiation protection, pond operability, and safety inspections. At the end of the inspection period, procedure upgrades and staff training were still in progress.

In-Situ Leach Facilities

The Christensen Ranch and Irigaray facilities were prepared for startup and routine operations, with some exceptions. At the time of the inspection, the yellowcake dryer and support equipment at Irigaray were not ready for operations. Plant drawings and procedures may be revised during future startup and plant operations as potential problems are identified and corrected. The licensee plans to start operations at Mine Unit 7-1 during early 2011 and sequentially add other mine units to the process circuit at later dates. The team reviewed the licensee's technical justification for approval of the mine unit well field and baseline water quality standards. The methodologies documented in the well field package were consistent with methodologies presented in the approved license application. The licensee established a program for monitoring and recording critical plant parameters, and the effectiveness of this program area will be reviewed during a future inspection. The licensee developed programs for receipt and transfer, in-plant possession, and security and control of source material. Responses to security threats are included in the Emergency Response Plan. Annual dried yellowcake production limits are controlled by a site procedure. The licensee established a training program for employees, contractors, and visitors. The training program includes radiation safety, industrial safety, transportation function specific, and environmental protection training. The licensee established area radiation and contamination controls in accordance with license and regulatory requirements. Fences, gates, and perimeter signs help define the site restricted area boundaries. The licensee established procedures for wellfield design and operation, pond operation, and waste water disposal. The licensee established the various programs necessary to monitor for releases to the environment. The licensee also implemented programs for establishing groundwater upper control limits and for responding to excursions.

The licensee updated the financial surety during the inspection. The revised surety accounts for decommissioning at both Irigaray and Christensen Ranch as well as new operations at Mine Unit 7. The licensee established a program for non-routine notifications and reports. The licensee is required to monitor for sage grouse leks on an annual basis, and the licensee plans to develop and implement a procedure for this activity in the near future.

Radiation Protection

The licensee established a radiation protection program that met the intent of 10 CFR Part 20, the license, and the license application. The established program areas include implementing procedures, instrumentation and equipment, personnel monitoring, bioassays, training, and exposure calculations. The training of site staff was incomplete at the time of the onsite inspection, but training would continue in the upcoming weeks. In accordance with the license, procedures have been established for non-operational activities, including in-plant monitoring, bioassay analyses, and instrument calibrations. Procedures were also established for internal and external occupational exposures, radiation work permits, respiratory protection, contamination control, transportation activities, notices to workers, and area postings. During future inspections, updates and revisions to the health physics procedures will be reviewed. The licensee established log sheets and forms for recording of survey results. During future inspections, the inspectors will review the licensee's implementation of personnel contamination surveys, in part, to ensure that site workers understand contamination survey techniques and are capable of demonstrating their proficiency in conducting contamination surveys. Emergency notification instructions involving radioactive materials are provided in the Emergency Response Plan. Finally, the licensee established an As Low As Reasonably Achievable (ALARA) program that includes a management commitment to ALARA as well as routine ALARA audits.

Effluent Control and Environmental Protection

The licensee implemented environmental protection and effluent monitoring programs to monitor the effects of radioactive releases to the environs of the site and to the public. The inspection team reviewed environmental procedures, performance-based license documents, and the organization chart to ensure that the licensee had established management controls for the effluent and environmental monitoring programs. Audit programs have been established to verify program implementation. The licensee implemented quality assurance/quality controls to verify the quality of the effluent monitoring information. The licensee had adequate procedures, equipment, and personnel with appropriate training to implement the programs. At the time of the inspection, the licensee was implementing the environmental monitoring program as described in the license application, except for particulate air sampling. The yellowcake dryer was not operating; therefore, the licensee was not required to conduct particulate air sampling. The licensee established procedures for monitoring and controlling the liquid effluent disposal pathways, daily or weekly inspections of plant equipment, spill detection equipment, and cleanup of environmental spills. The licensee established programs for disposal of waste water, including discharge into deep disposal wells, evaporation in ponds, or cleanup by reverse osmosis. The licensee established air sampling programs to monitor for effluent releases, including stack, particulates, and radon sampling. The licensee also established procedures for sampler calibrations. The licensee established a program to demonstrate compliance with dose limits for individual members of the public. The NRC staff had questions about details of the licensee's implementation of the environmental and effluent monitoring programs, and these questions were presented to the licensee during the inspection for consideration.

Maintaining Effluents from Materials Facilities As Low As Reasonably Achievable

The licensee established programs for maintaining effluents ALARA. The licensee issued a written policy on ALARA. Management is made aware of the effectiveness of the ALARA program through monthly summaries. These summaries specifically address trends or deviations from the ALARA program. The licensee conducts annual ALARA program reviews to monitor program effectiveness. The results of the audit are submitted to corporate management. The licensee committed to conduct routine quality assurance/quality control audits and reviews to ensure quality implementation of the radiation protection and environmental programs. The inspectors reviewed site procedures and confirmed that the procedures have incorporated ALARA techniques, as well as engineering and process controls, to minimize effluents. The licensee installed instrumentation and equipment to specifically detect for process leaks in ponds, piping, and well heads. Instrumentation will be supplemented by routine visual inspections. The inspectors reviewed the training procedures and training records and determined that employees are instructed in ALARA principles.

Inspection of Transportation Activities

The licensee established programs to ensure that packages are prepared for shipment as required by NRC and U.S. Department of Transportation regulations. The licensee developed procedures to ensure that packages have been prepared for shipment, including preparation of shipping papers and marking and labeling of packages. The licensee has procedures and equipment to measure and record external radiation and removable contamination levels of packages prior to shipment. Recordkeeping requirements have been established and implemented. The licensee established procedures for designating hazardous materials employees. The training program was outlined in the licensee's Training Plan. The Emergency Response Plan provides instructions for actions to be taken in response to a transportation event. The licensee established procedures for reporting of radioactive shipment incidents.

Radioactive Waste Management

The licensee established programs for management of solid and liquid wastes. Solid wastes will be stored onsite in containers until transferred to the disposal site. A site procedure provides instructions for classification of wastes and shipment for disposal. The licensee has a signed an agreement with a disposal facility that will accept the licensee's byproduct material wastes. Security and control of liquid and solid wastes are provided by restricted area access controls, postings, fencing, gates, and/or locked doors. Liquid wastes will be disposed via a deep well, evaporated in a holding pond, or processed via reverse osmosis. The licensee established procedures for monitoring pond freeboards, leak detection systems, and impoundment integrities. Periodic audits will be conducted under the licensee's quality assurance/quality control program. Also, the licensee will provide oversight of solid and liquid wastes during routine plant tours and inspections. The licensee had personnel with appropriate training and procedures that were adequate to implement the solid and liquid waste handling programs.

Emergency Preparedness

The licensee established an emergency preparedness program as described in the Emergency Response Plan and associated implementing procedures. The licensee has sufficient equipment and trained personnel to respond to emergency incidents, including personnel injuries as well as releases or spills of radioactive materials. Audits of the program may be

conducted as part of the ALARA program review. The licensee plans to update the Emergency Response Plan to include annual mock drills and to enhance communications with offsite emergency response entities.

Emergency Response Procedures

The licensee established a detailed Emergency Response Plan for responding to emergency situations. The Plan was supplemented by implementing procedures. During the inspection, the licensee was contemplating the idea of deleting the emergency procedures since they duplicated the instructions provided in the Emergency Response Plan.

Fire Protection

The licensee established an Industrial Safety Program that provides the fire protection and prevention program requirements. The program includes fire response instructions. The licensee has equipment for fighting fires and conducts routine inspections of this equipment. Fire protection training was included in the industrial safety training program.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

D. Wichers, Senior Vice President ISR Operations
M. Griffin, Vice President, Safety Health and Environment
J. Winter, Manager, Environmental and Regulatory Affairs, Wyoming
R. Kukura, Site/Construction Manager
G. Kruse, Manager, Production Geology
L. Arbogast, Radiation Safety Officer
J. Durand, Christensen Ranch Plant Supervisor
S. Graham, Wellfield Operations Supervisor
H. Ballinger, Irigaray Plant Supervisor
P. Avila, Production Manager
J. Richards, Lab Supervisor
S. Schierman, Senior Safety Health and Environment Specialist

INSPECTION PROCEDURES USED

IP 88005	Management Organization and Controls
IP 89001	In-Situ Leach Facilities
IP 83822	Radiation Protection
IP 88045	Effluent Control and Environmental Protection
IP 87102	Maintaining Effluents from Materials Facilities ALARA
IP 86740	Inspection of Transportation Activities
IP 88035	Radioactive Waste Management
IP 88050	Emergency Preparedness
IP 88064	Emergency Response Procedures
IP 88055	Fire Protection

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS

ALARA	as low as reasonably achievable
CFR	*Code of Federal Regulations*
IP	NRC Inspection Procedures
NRC	U.S. Nuclear Regulatory Commission

Category:	Management Organization and Controls
Topic:	Organizational Structure
Reference:	IP 88005, Section 02.01
Requirement:	LC 9.3; Application Section 5.1, Figure 5.1
Findings:	The licensee had staffed all management level positions. Management-level staff members were highly qualified and experienced for the work to be performed. The licensee also had sufficient support staff to commence with plant startup and site operations. The support staff included plant and wellfield operators, laboratory technicians, and well drillers. The licensee was aware that it may have to augment its staff as more mine units are brought into service. The inspectors questioned the training qualifications of selected radiation protection staff members, and the licensee established contingency plans for providing around-the-clock health physics support until all staff members are fully qualified for their respective positions.
Documents Reviewed:	RG 8.31; training records, personnel interviews

Category:	Management Organization and Controls
Topic:	Management and Administrative Practices for Operational Safety, Radiation Protection, Fire Protection, Chemical Safety, and Nuclear Criticality Safety
Reference:	IP 88005, Section 02.02
Requirement:	LCs 9.3 & 11.5
Findings:	The licensee's written safety policy was provided in the Willow Creek Project Industrial Safety Program. This document described each employee's authority and responsibility for operational safety, radiation protection, fire protection, and chemical safety. This document outlined both management and employee responsibilities for safety. All employees have the responsibility and authority to suspend unsafe and non-compliant operations per Section 2.2 of the Industrial Safety Program. Section 2.9.1 defines the roles and responsibilities of the plant safety committee. The committee consists of the radiation safety officer (RSO) plus four non-supervisory volunteer members serving one year terms. Section 2.10 indicates that regularly scheduled safety meetings will be held with all employees. The purpose of these meetings is to encourage communication concerning health and safety at the facilities. The inspectors confirmed that the plant safety policy expresses the overall importance of safety in relation to production activities, and that production activities shall not be allowed to compromise plant safety. The plant safety policy empowers each employee to question the adequacy of safety requirements and prohibits operations when safety questions cannot be immediately resolved. The plant safety policy stipulates that each individual, regardless of position, is ultimately responsible for safety in his or her own work area. At the time of the onsite inspection, the program requirements for the safety committee had not been fully established and implemented. The licensee plans to establish the safety committee in the near future. The licensee plans to hold its first formal safety committee meeting during the first quarter 2011. A safety meeting (not a committee meeting) was

	held with site staff during the week of November 29th, 2010. The inspectors suggested that the licensee may want to consider staggered terms for safety committee members such that all four non-supervisory members don't leave committee after one year at the same time. The licensee agreed with the concept, although the licensee did not specifically make a commitment to implement this suggestion. Three additional issues were presented to the licensee, and the licensee agreed to consider the issues, although the licensee did not specifically commit to any particular response: (1) the term "competent person," first used in Section 2.6.1 and in other areas of the Program, was not defined; (2) Section 2.12.5.2 states, "do not discuss the accident with anyone without Uranium One management approval," yet, licensee should clarify that this statement doesn't apply to regulatory or law enforcement personnel; and (3) in Section 2.12.4.1, the term "minor injury" was not defined, and the inspectors were not sure of the difference between a minor injury and a major injury. The licensee established programs for routine audits, including the daily and weekly RSO inspections. These routine inspections were described in Procedure HP-12, ALARA Commitment and Audit. Instructions for pond inspections, including inspection of leak detection systems, are provided in Procedure ENV-5, Pond Inspections, Sampling and Repair. Operations-related inspections are provided in the various operating procedures, and the licensee has established log sheets for recording of critical data. Finally, the requirements for routine industrial safety inspections are provided in Section 2.6 of the Industrial Safety Program.
Documents Reviewed:	Willow Creek Project Industrial Safety Program; Procedures HP-12, ALARA Commitment and Audit & ENV-5, Pond Inspections, Sampling, and Repair

Category:	Management Organization & Controls
Topic:	Procedure Controls
Reference:	IP 88005, Section 02.03
Requirement:	LC 9.6; Application Section 5.2.1
Findings:	The licensee is required to establish procedures for operational and non-operational activities. The licensee established procedures for performance-based licensing, health physics, transportation, emergency response, spill response, environmental, industrial safety, worker training, wellfield operations, and plant operations. The licensee also created an integrated plant startup procedure to control the process for starting plant equipment and establishing flow paths. The inspectors questioned the level of detail provided in a number of procedures, and in response, the licensee provided additional details in these procedures. The inspectors also reviewed a number of operational and wellfield log sheets and determined that these forms were incomplete. The inspectors understood that the licensee planned to identify procedure and log sheet deficiencies during startup operations. The inspectors did not review the procedures for the yellowcake dryer and support systems as well as restoration and decommissioning instructions. Further, the licensee did not have procedures in place for evaporation pond operations. These procedures will be

	reviewed during a future inspection.
Documents Reviewed:	Various operating and non-operating procedures; procedure index

Category:	Management Organization & Controls
Topic:	Problem Identification and Resolution and Incident Investigations
Reference:	IP 88005, Section 02.04
Requirement:	LCs 11.6 & 12.2; Application Sections 5.7.1.2 & 5.10.2
Findings:	Injury and incident damage reporting and analysis are outlined in Section 2.12 of the Willow Creek Project Industrial Safety Program. However, this document does not provide details about the process for evaluating, detecting, and correcting incidents. For example, the Industrial Safety Program did not provide guidance for documenting lessons learned or for performing root cause investigations. The licensee indicated that the process to evaluate, detect, and correct incidents are contained in the draft Safety, Health and Environmental Procedures. The licensee developed a condition investigation report procedure (S-26) that was in draft during the inspection. This program area is expected to be implemented during 2011 and will be reviewed during a future inspection.
Documents Reviewed:	Willow Creek Project Industrial Safety Program; Procedure S-26, Condition Investigation Reports (draft)

Category:	Management Organization & Controls
Topic:	Plant Safety Committees
Reference:	IP 88005, Section 02.05
Requirement:	LCs 9.4 & LC 12.6; Application Sections 5.2.2 & 5.3
	NRC staff has determined that SERP Procedure PBL-1 outlines the responsibilities, personnel, and purpose of the SERP, consistent with LC 9.4. The procedure discusses the evaluation of potential changes and evaluation of change significance. The inspectors reviewed Procedure PBL-1 and suggested a few procedure enhancements to the licensee, although the procedure adequately outlined how the Safety and Environmental Review Panel (SERP) process will be documented. The enhancements included ensuring completeness of the SERP packages, numbering of all pages, and clearly documenting the page changes approved by the SERP. In addition to the SERP process, the licensee plans to implement a safety committee in accordance with the Industrial Safety Program and to conduct annual ALARA audits in accordance with Procedure HP-12, ALARA Commitments and Audits.
Documents Reviewed:	Procedures PBL-1, Performance-Based Licensing & HP-12, ALARA Commitment and Audit; Willow Creek Project Industrial Safety Program; management interviews

Category:	Management Organization and Controls
Topic:	Quality Assurance Programs
Reference:	IP 88005, Section 02.06
Requirement:	Application Sections 5.3 & 5.9
Findings:	The license application, Section 5.9, provides the quality assurance (QA) program requirements. The program includes delineation of responsibilities and approval authorities, minimum qualifications and training requirements, written procedures, laboratory quality control (QC), and periodic management audits. License application Section 5.3 stipulates that the RSO has responsibility for implementing the QA/QC program at the facility. Section 5.3 also specifies that the QA/QC program will be audited annually. Details about the QA/QC program are provided primarily in procedure ENV-11, Quality Assurance/Quality Control Program Environmental and Radiological Monitoring. Procedure ENV-11 provides instructions for maintaining the quality of: site records, data, and calculations; sample collection and analysis; and laboratory protocols. This procedure also describes the program audit requirements. Audits of the QA/QC program will be reviewed during future inspections.
Documents Reviewed:	Procedure ENV-11, Quality Assurance/Quality Control Program Environmental and Radiological Monitoring

Category:	In-Situ Leach Facilities
Topic:	Facilities
Reference:	IP 89001, Section 02.05
Requirement:	LCs 9.6 & 10.5; Application Sections 3.4, 4.2 & 5.2.1
Findings:	The inspectors conducted site tours to observe the status of plant equipment. The areas visited include Christensen Ranch satellite facility, Mine Unit 7, and Irigaray plant. The inspectors conducted walk-downs of site procedures and equipment operability. Overall, the Irigaray and Christensen Ranch facilities were prepared for operations with some minor exceptions. The inspectors did not review dryer operability because this portion of the plant will not be placed into service until mid-2011. The inspectors provided the licensee with suggestions about the various operating procedures to improve the quality of the procedures. The inspectors also reviewed the plant integrated startup procedure and provided suggestions to the licensee for enhancing the clarity of the procedure guidance. The inspectors were aware that plant drawings and procedures may be revised during future startup and plant operations based on as-built plant conditions and changes in operational flow paths. The inspectors toured Mine Unit 7. Activities in progress included well installation and final piping connections to the header house for MU 7-1. At the end of the onsite inspection, the licensee had almost finished the construction of MU 7-1. The licensee plans to start operations at MU 7-1 during early 2011 and sequentially add other mine unit modules (7-2 through 7-6) to the process circuit during 2011.

	The inspection team reviewed SERP 10-05 used to approve the Mine Unit 7 well field package and to establish baseline water quality. The inspection team determined that the methodologies documented in the well field package were consistent with methodologies in the approved license application.
Documents Reviewed:	Plant layout and flow path drawings as shown in License Application Figures 3.9-3.12; site procedures for Christensen Ranch, Irigaray, and Mine Unit 7

Category:	In-Situ Leach Facilities
Topic:	Equipment and Instrumentation
Reference:	IP 89001, Section 02.06
Requirement:	LCs 9.6, 10.13, 11.1 & 11.6
Findings:	The licensee established procedures for controlling radiation protection equipment, including radiological survey and sampling equipment. The procedures included instructions for instrument calibrations. The licensee also established procedures for monitoring and recording critical plant parameters. Further, the licensee established log sheets and forms for recording both operational data and radiation protection survey and sampling results. Many operations will be controlled by computer. For example, in Mine Unit 7, electronic controllers will manage pressure, flow monitoring and leak detection. The software for the computer was being updated during the inspection. The effectiveness of this program area will be reviewed during a future inspection.
Documents Reviewed:	Health physics, operations procedures

Category:	In-Situ Leach Facilities
Topic:	Materials
Reference:	IP 89001, Section 02.07
Requirement:	10 CFR 20.1801 & 1802; LCs 9.6, 10.19 & 10.20; Application Section 5.6
Findings:	The licensee developed a program for receipt and transfer, in-plant possession, and security and control of source material. The licensee has procedures in place for shipping radioactive materials including yellowcake and byproduct waste materials. The licensee also established procedures for transferring contaminated equipment or materials between NRC licensees and between the Irigaray and Christensen Ranch sites. The licensee's planned responses to security threats are included in Section 7 of the Emergency Response Plan. Annual dried yellowcake production limits are controlled by Procedure HP-33, Annual Dried Yellowcake Production.
Documents Reviewed:	Procedures HP-19, HP-20, HP-25, HP-29 & HP-33; Willow Creek Project Emergency Response Plan

Category:	In-Situ Leach Facilities
Topic:	Training

Reference:	IP 89001, Section 02.08
Requirement:	10 CFR 19.12, 49 CFR 172.704, Application Sections 5.4 & 5.5
Findings:	The Training Plan provides guidance for training of employees, contractors and visitors. The training program includes industrial safety training as required by Occupational Safety and Health Administration (OSHA), radiation safety training as required by NRC, function specific training for transportation of radioactive material as required by U.S. Department of Transportation (DOT), and environmental protection training as required by EPA and the Wyoming Department of Environmental Quality (WDEQ). Each type of training program includes classroom, task observation, and annual refresher training. The inspectors determined that the radiation safety training meets the requirements of 10 CFR Part 19, RG 8.31, RG 8.13, RG 8.29, and RG 8.25. Each employee is given initial training, job specific training, and annual refresher training. Section 5.4 of the License Application provides the minimum qualifications for RSO and the radiation safety technician. Any employee who is designated as a HAZMAT employee, as defined by DOT, is provided initial training, job specific training, and refresher training every 3 years. The licensee implemented an employee stand-down and provided training to site personnel during late November through early December 2010. This training included operations, industrial safety and emergency response training. At the time of the inspection, the licensee had adequate personnel for wellfield operations. The senior level personnel had significant experience in operations. The new eight well field operators recently hired did not have operational experience; however, experience was being gained through knowledge transfer from the more senior personnel and by working with individual components of the system.
Documents Reviewed:	Willow Creek Project Training Plan; staff interviews

Category:	In-Situ Leach Facilities
Topic:	Area Radiation and Contamination Control
Reference:	IP 89001, Section 02.09
Requirement:	10 CFR Part 20; LCs 9.10 & 9.11; Application Section 5.7
Findings:	The licensee established area radiation and contamination controls in accordance with license and regulatory requirements. The controls include area postings and boundaries. Fences, gates and perimeter signs are used to help define the site restricted area boundaries. The radiologically restricted areas, including the header houses, Christensen Ranch satellite building, and the Irigaray plant were posted. At the time of the inspection, the licensee was upgrading building security by installing touch-pad locks on doors. Due to the remote location, most deliveries are announced in advance. Breaches of security or loss of control of radioactive material will require activation of the Emergency Response Plan. The licensee does not have a procedure for administratively controlling boundaries and access, although the license doesn't specifically require a written procedure.
Documents Reviewed:	Emergency Response Plan

Category:	In-Situ Leach Facilities
Topic:	Radiation Protection
Reference:	IP 89001, Section 02.10
Requirement:	10 CFR Part 20; LCs 9.6, 9.12 & 11.6; Application Section 5.7
Findings:	The licensee established a radiation protection program that met the intent of 10 CFR Part 20, the license and the license application. Program areas include procedures, instrumentation and equipment, personnel monitoring, bioassays, and exposure calculations. The training of site staff was incomplete at the time of the onsite inspections, but training would continue in the upcoming weeks.
Documents Reviewed:	Health physics procedures, Willow Creek Project Training Plan

Category:	In-Situ Leach Facilities
Topic:	Environmental Protection
Reference:	IP 89001, Section 02.11
Requirement:	LCs 9.6, 10.1, 10.2, 10.3, 10.4, 10.16, 10.22 & 11.2; Application Sections 3.3 & 5.8.2
Findings:	The licensee implemented an environmental protection program that included the measurement of radioactive gaseous and liquid effluents as well as surface water and groundwater. The licensee also established procedures for wellfield design and operation, pond operation, waste water disposal, and groundwater restoration. In summary, the licensee had established the various programs necessary for monitoring releases to the environment. The licensee established a program for establishing upper control limits (UCLs) for wellfields. Procedure ENV-1, Groundwater Water Quality Sampling, provides instructions for collecting water samples to calculate UCLs. Procedure ENV-3, Procedures for Determining an Excursion and Sampling an Excursion, provides instructions for responding to excursions.
Documents Reviewed:	SERPs 10-05, 10-06 & 10-07; Procedures WF-4, WF-6, CR-1, ENV-1 & ENV-3

Category:	In-Situ Leach Facilities
Topic:	Effluent Monitoring Program
Reference:	IP 89001, Section 02.12
Requirement:	LC 11.3; Application Section 5.8.1
Findings:	At the time of the inspection, the licensee was implementing the environmental monitoring program as described in Section 5.8 of the license application except for particulate air sampling. Radon monitors and external radiation dosimeters were deployed as required by the license. The yellowcake dryer was not operating and the licensee is not required to conduct particulate air sampling. The licensee plans to conduct air particulate sampling at designated locations

	just prior to dryer operation, currently scheduled for mid-2011. In addition, effluent or stack monitoring will be conducted semi-annually for the Irigaray yellowcake dryer during operations. During the inspection, three issues were identified and reported to the licensee: (1) Figure 5.5 of the license application does not show the Christensen Ranch environmental monitoring station locations; also, the scale of Figure 5.5 does not allow an adequate determination of the locations of the Irigaray environmental monitoring station locations; (2) the licensee should consider adding the onsite housing for workers (man camps) to the environmental monitoring program, and the licensee should indicate the types of monitoring to be conducted because the NRC considers workers housed onsite to be members of the public during off-duty hours; and (3) Section 5.8 of the application is not clear regarding need to conduct particulate air sampling at the Christensen Ranch satellite facility. The licensee currently does not plan to deploy particulate air samplers at Christensen Ranch since that facility does not have a yellowcake dryer. The licensee established Procedure HP-5, Internal and External Occupational Dose Calculations, Section 10, to demonstrate compliance with dose limits for individual members of the public. The licensee's approach to public dose determination is potentially deficient because it does not include impacts from both radon and radon progeny. The NRC staff is currently preparing guidance for use by industry and the NRC staff for determining public doses from both radon and radon progeny concentration measurements.
Documents Reviewed:	Application Figure 5.5; Procedure HP-5, Internal and External Occupational Dose Calculations

Category:	In-Situ Leach Facilities
Topic:	Air Sampling
Reference:	IP 89001, Section 02.13
Requirement:	LCs 9.6, 10.10, 10.13 & 11.6; Application Sections 5.7 & 5.8
Findings:	The licensee established air sampling programs to monitor for both occupational exposures and effluent releases. The programs included particulates and radon sampling. The licensee also established procedures for sampler calibrations.
Documents Reviewed:	Procedures HP-6, HP-7, HP-15, HP-18, HP-27 & ENV-7

Category:	In-Situ Leach Facilities
Topic:	Financial Assurance
Reference:	IP 89001, Section 02.14
Requirement:	LC 9.5; Application Section 6.4
Findings:	The annual surety update was submitted to NRC on August 18, 2010, as updated by supplement dated November 8, 2010. The NRC approved the

	surety estimate on December 16, 2010, when Amendment 19 to the license was issued. The surety was revised to $12,928,432, an increase of $3,100,333 from the previously approved surety. The revised surety accounts for decommissioning at both Irigaray and Christensen Ranch as well as new operations at Mine Unit 7. The surety contains construction related costs for future Mine Unit 8 but does not contain any costs for groundwater restoration at Mine Unit 8. Consequently, lixiviant cannot be injected into Mine Unit 8 until a future surety update is submitted and approved that includes groundwater restoration costs. The surety instrument is currently held by the Wyoming Department of Environmental Quality, with a copy retained by the NRC. WDEQ notified NRC on December 17, 2010, of receipt of the acceptable surety revision from the licensee.
Documents Reviewed:	Surety dated August 18, 2010, as updated November 8, 2010

Category:	In-Situ Leach Facilities
Topic:	Waste Management
Reference:	IP 89001, Section 02.15
Requirement:	LC 9.7; Application Section 4.2
Findings:	The licensee established programs for management of solid and liquid wastes. Solid wastes will be stored onsite in containers until transfer to the disposal site. Liquid wastes will be disposed via deep well, evaporated in a holding pond, or cleaned via reverse osmosis. The licensee did not have a procedure specifically for the control of solid wastes within the restricted area. The licensee considers the control of solid wastes comparable to general housekeeping. Trash bins containing radwaste will be transferred to an intermodal or dumpster for temporary storage until offsite disposal. Used filters will be changed using radiation work permits (RWPs) until the licensee establishes procedure for these activities. This program area will be reviewed during a future inspection to ensure that the licensee has established effective radiation protection controls for filter change-outs.
Documents Reviewed:	RSO Interview

Category:	In-Situ Leach Facilities
Topic:	Transportation
Reference:	IP 89001, Section 02.16
Requirement:	10 CFR 71.5; Application Section 7.5.2
Findings:	The licensee established a procedure for transportation of radioactive material, including drummed yellowcake, uranium-bearing resins, and 11.e(2) byproduct material. The Training Plan provides instructions for hazardous materials transportation training. The Emergency Response Plan provides instructions for actions to be taken in response to a transportation event.
Documents	Procedure HP-19, Shipping Radioactive LSA Materials; Willow Creek Project

Reviewed:	Training Plan; Willow Creek Project Emergency Response Plan

Category:	In-Situ Leach Facilities
Topic:	Posting and Labeling
Reference:	IP 89001, Section 02.17
Requirement:	10 CFR Part 20; LC 9.11; Application Section 5.6
Findings:	The licensee established a program for posting and labeling that met the intent of the license and regulations. Program details are provided in Procedure HP-24, Radiological Postings. Postings were observed at the Christensen Ranch facility and the Irigaray plant, including building doors. Containers of radwaste material were appropriately labeled in accordance with Procedure HP-19, Shipping Radioactive Low Specific Activity (LSA) Materials.
Documents Reviewed:	Procedures HP-19, Shipping Radioactive LSA Materials & HP-24, Radiological Postings

Category:	In-Situ Leach Facilities
Topic:	Generic Communications of Information
Reference:	IP 89001, Section 02.18
Requirement:	None
Findings:	The licensee acknowledged that it was receiving generic communications from the NRC. These communications were being sent to the licensee's home office and were being forwarded to the site staff as necessary. The licensee was also reminded that generic communications are available for review and download from the NRC's web page.
Documents Reviewed:	Interview with RSO

Category:	In-Situ Leach Facilities
Topic:	Notifications and Reports
Reference:	IP 89001, Section 02.19
Requirement:	LCs 9.2, 12.1, 12.2 & 12.6; Application Section 5.10
Findings:	The licensee established a program for routine and non-routine notifications and reports. Emergency response notification instructions are provided in Section 11 of the Emergency Response Plan. The licensee does not have a procedure for routine reports, but there is no license requirement for such a procedure. However, the licensee appears to have established internal controls for ensuring that routine reports are submitted to the NRC because the licensee has submitted all required reports in the last few years.
Documents Reviewed:	Willow Creek Project Emergency Response Plan

Category:	In-Situ Leach Facilities
Topic:	Special License Conditions
Reference:	IP 89001, Section 02.20
Requirement:	LC 9.13, Sage Grouse
Findings:	The licensee is required to monitor for sage grouse leks on an annual basis. The licensee has not established a procedure to control this activity, but the licensee plans to develop and implement a procedure in the near future. The licensee's annual monitoring results will be reviewed during future inspections.
Documents Reviewed:	None

Category:	In-Situ Leach Facilities
Topic:	Independent and Confirmatory Measurements
Reference:	IP 89001, Section 02.21
Requirement:	NRC Manual Chapter 2641, Section 7
Findings:	The NRC staff typically conducts surveys during each onsite inspection. The routine surveys include measurement of ambient gamma exposure rates inside the plant, near stored wastes, and in the environment. In addition, the NRC will conduct additional radiological surveys and sampling as conditions warrant. For example, the NRC will most likely conduct split sampling and decommissioning confirmatory sampling during future inspections.
Documents Reviewed:	NRC Inspection Procedures

Category:	Radiation Protection
Topic:	Radiation Protection Program
Reference:	IP 83822, Section 02.01
Requirement:	10 CFR Part 20; LC 11.6; Application Section 5
Findings:	The licensee established a radiation protection program that met the intent of 10 CFR Part 20, the license and the license application. The established program areas include implementing procedures, instrumentation and equipment, personnel monitoring, bioassays, and exposure calculations. The training of site staff was incomplete at the time of the onsite inspection, but training would continue in the upcoming weeks.
Documents Reviewed:	Health physics procedures, Willow Creek Project Training Plan

Category:	Radiation Protection
Topic:	Radiation Protection Procedures

Reference:	IP 83822, Section 02.02
Requirement:	LC 9.6
Findings:	In accordance with LC 9.6, procedures have been established for non-operational activities to include in-plant monitoring, bioassay analyses, and instrument calibrations. Radiation protection procedures have also been established for transportation activities. The inspectors did not review dryer operations procedures because the dryer was not ready to be operated. The inspectors will review the licensee's procedures for dryer operations, including associated radiation protection procedures, during a future inspection.
Documents Reviewed:	Health Physics procedures

Category:	Radiation Protection
Topic:	Instruments and Equipment
Reference:	IP 83822, Section 02.03
Requirement:	LCs 9.6 & 10.13
Findings:	The licensee established procedures for controlling radiation protection equipment, including instrument calibrations. The licensee also established procedures, log sheets, and forms for routine monitoring and recording of survey results.
Documents Reviewed:	Health physics, operations procedures

Category:	Radiation Protection
Topic:	Exposure Controls (external, internal, respiratory protection)
Reference:	IP 83822, Section 02.04
Requirement:	LCs 9.6, 10.9, 10.10, 10.12, 10.18 & 11.7; Application Section 5.7
Findings:	The licensee established procedures for measuring and recording internal and external exposures. The licensee also established an RWP process to help control exposures during non-routine activities. The respiratory protection program was implemented to control the inhalation of radioactive material during yellowcake drumming operations and during non-routine maintenance work. The licensee established a bioassay program to monitor for potential uptakes of radioactive material. The licensee also established a program for controlling contamination, including requirements for personnel surveys. The inspectors observed that site employees conducted alpha contamination surveys prior to exiting the restricted areas at Irigaray and Christensen Ranch in accordance with license requirements. During future inspections, the inspectors will review the licensee's implementation of personnel contamination surveys. The inspectors will ensure that site workers understand contamination survey techniques and are capable of demonstrating their proficiency in conducting contamination surveys.

Documents Reviewed:	Health Physics procedures, Willow Creek Project Training Plan

Category:	Radiation Protection
Topic:	Posting, Labeling and Control
Reference:	IP 83822, Section 02.05
Requirement:	10 CFR Parts 19 & 20; LC 9.11; Application Section 5.7
Findings:	The licensee implemented a posting program that included notices to workers and identification of radiation areas, radioactive materials areas, and mill entrances. The licensee also effectively labeled dumpsters containing radioactive wastes. During site tours, the inspectors confirmed that the various areas of the site were properly posted, labeled, and controlled.
Documents Reviewed:	Various health physics procedures

Category:	Radiation Protection
Topic:	Surveys
Reference:	IP 83822, Section 02.06
Requirement:	LCs 9.6, 9.8 & 10.11; Application Section 5.7.6
Findings:	The licensee established contamination controls including surveys for surface contamination, personnel, equipment prior to release, and transportation of radioactive material. The licensee had the equipment, procedures, and forms for conducting and documenting these surveys. Although LC 10.11 allows workers to shower in lieu of an exit survey, the licensee requires all workers to survey prior to leaving the facility. The inspectors discussed several potential problem areas with the licensee for its consideration: (1) whether the radium-226 release limits are applicable for this site; and (2) whether plant operators are authorized and properly trained to conduct radiological surveys to meet DOT requirements.
Documents Reviewed:	Procedure HP-10, Equipment or Material Release to Unrestricted Areas, HP-17, Yellowcake and Process handling, IR-12, Drypack-Yellowcake Drying and Drumming

Category:	Radiation Protection
Topic:	Notifications and Reports
Reference:	IP 83822, Section 02.07
Requirement:	10 CFR Part 20, Subpart M, Reports
Findings:	Emergency notification instructions involving radioactive materials are provided in Section 11 of the Emergency Response Plan. These instructions include the immediate, 24-hour, 48-hour, and 30-day reporting requirements as specified in 10 CFR Part 20, Subpart M, as well as 10 CFR 40.60. The licensee has not

	established a procedure for routine reports, but there is no license requirement for this procedure. However, the licensee's internal controls for submitting routine reports to the NRC must be effective because the licensee has submitted all required reports in the past few years.
Documents Reviewed:	Willow Creek Project Emergency Response Plan

Category:	Radiation Protection
Topic:	As Low As Reasonably Achievable (ALARA)
Reference:	IP 83822, Section 02.08
Requirement:	10 CFR 20.1101(b)
Findings:	The licensee established an ALARA program in accordance with Procedure HP-12. The program includes management commitment to ALARA as well as routine ALARA audits. The ALARA program also includes routine inspections of plant conditions and training/retraining of site workers.
Documents Reviewed:	Procedure HP-12, ALARA Commitment and Audit

Category:	Effluent Control and Environmental Protection
Topic:	Management Controls
Reference:	IP 88045, Section 02.01
Requirement:	LCs 10.17, 11.3 & 11.6
Findings:	The inspection team reviewed all environmental procedures, SERPs, and the organization chart to ensure that the licensee has established management controls for the effluent and environmental monitoring programs. Audit programs have been established to verify program implementation. The inspection team determined that the licensee had adequate procedures, equipment, and personnel with appropriate training to meet the license.
Documents Reviewed:	Environmental procedures

Category:	Effluent Control and Environmental Protection
Topic:	Quality Control of Analytical Measurements
Reference:	IP 88045, Section 02.02
Requirement:	LCs 9.6, 10.17, 11.3 & 11.6
Findings:	The inspection team reviewed historical data and all procedures and SERPs related to the quality control of effluent and environmental monitoring programs. The inspection team determined that the licensee had adequate procedures, personnel with appropriate training, and a history of compliance that meets the requirements of the license.

Documents Reviewed:	Environmental procedures

Category:	Effluent Control and Environmental Protection
Topic:	Program Implementation
Reference:	IP 88045, Section 02.03
Requirement:	LC 11.3; Application Section 5.8
Findings:	The licensee established and implemented the environmental monitoring program as described in Section 5.8 of the license application except for particulate air sampling. Particulate air sampling will be conducted to support dryer operations, and the licensee does not plan to operate the dryer until mid-2011. The inspectors identified three potential problems that were reported to the licensee for consideration: (1) Figure 5.5 of the license application does not show the Christensen Ranch environmental monitoring station locations, also, the scale of Figure 5.5 does not allow an adequate determination of the locations of the Irigaray environmental monitoring station locations; (2) the licensee should add the worker onsite housing locations (man camps) and indicate the types of monitoring conducted because workers housed onsite are considered members of the public during off-duty hours; and (3) the application is not clear whether particulate air sampling will be conducted at the Christensen Ranch satellite facility. The inspectors understood that the licensee will most likely not conduct particulate air sampling at Christensen Ranch since that facility does not have a yellowcake dryer.
Documents Reviewed:	Figure 5.5 IR & CR Environmental Monitoring Station locations; environmental procedures

Category:	Effluent Control and Environmental Protection
Topic:	Radioactive Liquid Effluents
Reference:	IP 88045, Section 02.04
Requirement:	LC 10.7; Application Section 4.2
Findings:	According to the license, all liquid effluents from the process waste streams, with the exception of sanitary wastes, shall be returned to the process circuit, discharged to the solution evaporation ponds or disposed as allowed by NRC regulations. The licensee plans to dispose of waste water via deep disposal well, by evaporation in ponds, or cleaned by reverse osmosis. The licensee is authorized to dispose of process solutions, wellfield bleed, and restoration brine in the following wells: CR18-3, CR DW-1, CR DW-2, and CR DW-3. At the time of the inspection, the first two disposal wells were in service, and the second two were idle. The licensee is required to maintain a record of the volumes of solutions disposed in these well and to submit this information in the annual monitoring report. The licensee presented the required information in the most recent report, the 2009 annual report. Instructions for calculating public doses from effluents are provided in Procedure HP-5, Internal and External Occupational Dose Calculations.

Documents Reviewed:	2009 Annual Effluent and Monitoring Report; Procedures HP-5, Internal and External Occupational Dose Calculations, CR-12, Disposal Well and Surface Injection Systems, CR-7, Reverse Osmosis Operation

Category:	Effluent Control and Environmental Protection
Topic:	Radioactive Airborne Effluents
Reference:	IP 88045, Section 02.05
Requirement:	LCs 10.8 & 11.3; Application Sections 4.1 & 5.7.1.1
Findings:	The licensee established air sampling programs to monitor for effluent releases. The programs included stack, particulates and radon sampling. The licensee also established procedures for sampler calibrations. The licensee's environmental air particulate and stack sampling will be reviewed during a future inspection, prior to first operation of the yellowcake dryer. Instructions for calculating public doses from effluents are provided in Procedure HP-5, Internal and External Occupational Dose Calculations.
Documents Reviewed:	Procedures ENV-6, Environmental Gamma Monitoring, ENV-7, Environmental Radon Monitoring, HP-5, Internal and External Occupational Dose Calculations, & HP-27, Environmental Air Particulate Sampling During Dry-Pack Operations

Category:	Effluent Control and Environmental Protection
Topic:	Procedures for Controlling the Release of Radioactive Liquid and Gaseous Effluents
Reference:	IP 88045, Section 02.06
Requirement:	LCs 9.6 & 11.3
Findings:	The licensee has established procedures for controlling the release of liquid and gaseous effluents. The procedure controls include liquid effluent disposal pathways, daily or weekly inspections of plant equipment, spill detection equipment, and cleanup of environmental spills. The licensee also has implemented QA/QC controls to verify the quality of the effluent monitoring information.
Documents Reviewed:	Various environmental, health physics, spill response & operating procedures

Category:	Effluent Control and Environmental Protection
Topic:	Identification and Resolution of Problems
Reference:	IP 88045, Section 02.07
Requirement:	LCs 11.6 & 12.2; Application Sections 5.7.1.2 & 5.10.2
Findings:	The process to evaluate, detect, and correct incidents are contained in the draft Safety, Health and Environmental Procedures. The licensee developed a condition investigation report procedure (S-26) that was in draft during the inspection. This program area is expected to be implemented during 2011 and will be reviewed during a future inspection.

Documents Reviewed:	Procedure S-26, Condition Investigation Reports (draft)

Category:	Maintaining Effluents from Materials Facilities ALARA
Topic:	Management Commitment
Reference:	IP 87102, Section 02.01
Requirement:	10 CFR 20.1101(b); Application Section 5.2
Findings:	Procedure HP-12 includes the licensee's written policy statement on ALARA. Management is made aware of the effectiveness of the ALARA program through monthly ALARA program summaries. These summaries specifically address trends or deviations from the ALARA program. Finally, the licensee conducts an annual ALARA program review to monitor program effectiveness.
Documents Reviewed:	Procedure HP-12, ALARA Commitment and Audit

Category:	Maintaining Effluents from Materials Facilities ALARA
Topic:	Audits and Appraisals
Reference:	IP 87102, Section 02.02
Requirement:	10 CFR 20.1101(c), Application Section 5.3
Findings:	An audit of the radiation protection and ALARA program is conducted on an annual basis, and a written report of the results of the audit is submitted to corporate management. In addition, the licensee has committed to conduct routine QA/QC audits and reviews to ensure quality implementation of the radiation protection and environmental programs. In addition to the annual audits, the licensee's staff conducts daily, weekly, and monthly inspections or reviews to verify compliance with license and industrial safety requirements.
Documents Reviewed:	Procedures HP-12, ALARA Commitment and Audit, ENV-11, QA/QC Program Environmental and Radiological Monitoring, Willow Creek Project Industrial Safety Program

Category:	Maintaining Effluents from Materials Facilities ALARA
Topic:	Procedures, Engineering Controls, and Process Controls
Reference:	IP 87102, Section 02.03
Requirement:	Application Section 5.2
Findings:	The inspectors reviewed site procedures and confirmed that the procedures have incorporated ALARA techniques, as well as engineering and process controls, to minimize effluents.
Documents Reviewed:	Environmental, health physics, and operations procedures

Category:	Maintaining Effluents from Materials Facilities ALARA
Topic:	Instrumentation
Reference:	IP 87102, Section 02.04
Requirement:	Application Section 5.7
Findings:	The licensee installed instrumentation and equipment to specifically detect process leaks. Leak detection systems are installed in the various evaporation ponds to detect potential liner leaks. The licensee plans to use flow and pressure instrumentation to detect system piping leaks, and float switches will be installed at each well to detect for leaks at the well heads. Dryer effluents will be monitored with semi-annual effluent samples and continuous environmental air particulate samplers. The instrumentation will be supplemented by daily visual inspections. The inspectors did not review the procedures for dryer effluent controls. This program area will be inspected at a later date, prior to dryer operations.
Documents Reviewed:	Procedures HP-27, Environmental Air Particulate Sampling During Dry-Pack Operations, WF-4, Wellfield Operations

Category:	Maintaining Effluents from Materials Facilities ALARA
Topic:	Surveys and Effluent Monitoring
Reference:	IP 87102, Section 02.05
Requirement:	10 CFR 20.1302, 10 CFR 40.65, LC 11.3, Application Sections 5.7 & 5.8.1
Findings:	At the time of the inspection, the licensee was implementing the environmental monitoring program as described in Section 5.8 of the license application except for particulate air sampling. The licensee plans to conduct air particulate sampling at designated locations just prior to dryer operation, currently scheduled for mid-2011. In addition, effluent or stack monitoring will be conducted semi-annually for the Irigaray yellowcake dryer during operations. Radon monitors and external radiation dosimeters were deployed as required by the license.
Documents Reviewed:	Procedures HP-26, Airborne Uranium Sampling/Exposure in the Dry-Pack Area, HP-27, Environmental Air Particulate Sampling During Dry-Pack Operations

Category:	Maintaining Effluents from Materials Facilities ALARA
Topic:	Worker Training
Reference:	IP 87102, Section 02.06
Requirement:	10 CFR 19.12, Application Sections 5.4 & 5.5
Findings:	The inspectors reviewed the training procedures and training records and determined that employees are instructed in ALARA principles. Radiation safety training requirements were established and implemented in the Willow Creek Project Training Plan and Procedure HP-12, ALARA Commitment and Audit.

Documents Reviewed:	Procedure HP-12, ALARA Commitment and Audit; Willow Creek Project Training Plan

Category:	Maintaining Effluents from Materials Facilities ALARA
Topic:	Changes
Reference:	IP 87102, Section 02.07
Requirement:	LC 9.4, License Condition 5.2
Findings:	NRC staff has determined that SERP procedure PBL-1 outlines the responsibilities, personnel, and purpose of the SERP, consistent with LC 9.4. The PBL-1 procedure discusses the evaluation of potential changes and evaluation of change significance. In addition to the SERP process, the licensee plans to implement a safety committee in accordance with the Industrial Safety Program and to conduct annual ALARA audits in accordance with Procedure HP-12. The implementation of these programs will be reviewed during future inspections.
Documents Reviewed:	Procedure HP-12, ALARA Commitments and Audits, PBL-1, Performance-Based Licensing; Willow Creek Project Industrial Safety Program

Category:	Inspection of Transportation Activities
Topic:	Preparation of Packages for Shipment
Reference:	IP 86740, Section 02.01
Requirement:	10 CFR 71.5, 49 CFR Parts 171-178
Findings:	The inspectors verified that the licensee has established a program to ensure that packages are prepared for shipment as required by NRC and DOT regulations. There are four types of radioactive material considered for shipment by the licensee: (1) ion exchange resins and contaminated material shipped between the Christensen Ranch satellite plant and the Irigaray central processing plant; (2) shipment of dried yellowcake in 55 gallon drums to a processing facility; (3) shipment of radioactive waste to a licensed disposal site; and (4) liquid and solid samples shipped to an analytical laboratory. The licensee has procedures to ensure that packages have been prepared for shipment including preparation of shipping papers and marking and labeling of packages. Also, the inspectors verified that a program for external radiation and removable contamination monitoring was in place with appropriate survey methods that were able to detect the limits specified in 49 CFR 173.441 and 173.443.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Material

Category:	Inspection of Transportation Activities
Topic:	Delivery of Completed Packages to Carriers
Reference:	IP 86740, Section 02.02

Requirement:	10 CFR 71.5, 49 CFR Parts 171-178
Findings:	The inspectors verified that the licensee had procedures in place for preparation of shipping papers, when required, that will include the appropriate radiological information, emergency contact number, and certification statement. The licensee had procedures in place for loading and placarding of exclusive-use shipments. The licensee plans to ship uranium bearing ion exchange resins between the Christensen Ranch satellite facility to the Irigaray Central Processing Plant as exclusive-use shipments. The inspectors reviewed the shipping papers used for these shipments and found them to be complete for exclusive-use shipments. The licensee ships byproduct waste material to a licensed facility. The inspectors ensured that shipment paperwork met the waste shipping and disposal requirements of 10 CFR Part 20, Appendix G. The licensee established procedures for designating HAZMAT employees. The training program for HAZMAT employees was outlined in the licensee's Training Plan. All satellite operators will be designated as HAZMAT employees when operations begin. This will allow them to prepare and ship the resin trucks between the Irigaray and Christensen Ranch facilities. At the time of the inspection, most satellite operators had received training, although the licensee will provide the required HAZMAT training prior to all employees performing radioactive shipments.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Material; Willow Creek Project Training Plan

Category:	Inspection of Transportation Activities
Topic:	Receipt of Packages
Reference:	IP 86740, Section 02.03
Requirement:	10 CFR 20.1906
Findings:	The licensee receives empty 55-gallon drums that may contain residual yellowcake. These drums are shipped as excepted packages-empty packages, and thus are not required to be handled per 10 CFR 20.1906 requirements. The licensee has established procedures in the event that a barrel has evidence of damage or degradation upon receipt.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Materials

Category:	Inspection of Transportation Activities
Topic:	Records and Reports
Reference:	IP 86740, Section 02.04
Requirement:	10 CFR 20.2202, 49 CFR 171.15 & 171.16
Findings:	The licensee established procedures for reporting of incidents related to radioactive shipments. Section 9.4.2 of the Emergency Response Plan describes the procedures for reporting of incidents related to transportation of radioactive material. Record requirements are provided in Procedure HP-19,

	Shipping Radioactive LSA Materials.
Documents Reviewed:	Willow Creek Project Emergency Response Plan; Procedure HP-19, Shipping Radioactive LSA Materials

Category:	Inspection of Transportation Activities
Topic:	General License Requirements
Reference:	IP 86740, Section 02.05
Requirement:	10 CFR Part 71, Subpart C; 49 CFR 173.410-426
Findings:	Shipping under a general license under 10 CFR Part 71 is not applicable for this licensee. The inspectors verified that all packages used for shipment are industrial or excepted packages which do not require use under a general license.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Materials

Category:	Inspection of Transportation Activities
Topic:	Management Controls
Reference:	IP 86740, Section 02.06
Requirement:	10 CFR 71.5, 49 CFR Parts 171-178
Findings:	Section 3 of Procedure HP-19 outlines the responsibilities for ensuring that all radioactive shipments are prepared and shipped in accordance with all applicable regulations.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Materials

Category:	Inspection of Transportation Activities
Topic:	Indoctrination and Training Program
Reference:	IP 86740, Section 02.07
Requirement:	10 CFR 19.12, 10 CFR 71.5, 49 CFR 172 Subpart H
Findings:	The inspectors reviewed the licensee's training program for HAZMAT employees. The training consisted of interactive computer training, RSO or designee discussions using PowerPoint slides, and hands-on function-specific training. An exam is given to each HAZMAT employee to ensure understanding of the requirements. Training is given within 90 days of hire, or reassignment to a new position requiring knowledge of radioactive shipping, and every three years thereafter. The training documentation maintained by the licensee meets the requirements of 49 CFR 172.704(d).
Documents Reviewed:	Willow Creek Project Training Plan; Procedure HP-19, Shipping Radioactive LSA Materials

Category:	Inspection of Transportation Activities
Topics:	Quality Assurance Program, Audit Program, Procurement and Selection of Packages, Preparation of Packages for Shipment, Periodic Maintenance of Packages
Reference:	IP 86740, Sections 02.08 through 02.12
Requirement:	10 CFR 71.101, 10 CFR 71.137
Findings:	These Inspection Procedure sections do not apply to this licensee.
Documents Reviewed:	None

Category:	Inspection of Transportation Activities
Topic:	Records, Reports, and Notifications
Reference:	IP 86740, Section 02.13
Requirement:	10 CFR 71.91(a), 10 CFR 20.1906(d)
Findings:	The inspectors reviewed the measures taken to ensure that records of shipments are maintained on file for three years and contain the required information. Section 9.4.2 of the Emergency Response Plan describes the procedures for reporting of incidents related to transportation of radioactive material. Finally, documentation requirements are described in various sections of Procedure HP-19.
Documents Reviewed:	Willow Creek Project Emergency Response Plan; Procedure HP-19, Shipping Radioactive LSA Materials

Category:	Radioactive Waste Management
Topic:	Management Controls for Waste Classification, Shipping and Burial
Reference:	IP 88035, Section 02.01
Requirement:	Application Sections 4.2.1.5 & 4.2.2.5
Findings:	Procedure HP-19 specifies the responsibilities and instructions for classifying, shipping, and disposal of wastes. The mine manager has overall responsibility for the classification and shipment of wastes. Selected responsibilities have been assigned to the RSO and radiation safety technician.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Material

Category:	Radioactive Waste Management
Topic:	Quality Assurance
Reference:	IP 88035, Section 02.02
Requirement:	Application Section 5.9

Findings:	As described in Procedure ENV-11, periodic audits will be conducted to: (1) verify that the QA program is effectively implemented; (2) verify compliance with applicable rules, regulations and license requirements; and (3) protect employees by maintaining effluent releases and exposures ALARA. The RSO has the primary responsibility for implementing the QA/QC programs.
Documents Reviewed:	ENV-11, Quality Assurance/Quality Control Program/Environmental and Radiological Monitoring

Category:	Radioactive Waste Management
Topic:	Waste Classification
Reference:	IP 88035, Section 02.03
Requirement:	Application Sections 4.2.1.5 & 4.2.2.5
Findings:	Procedure HP-19 provides the waste classification instructions for 11e.(2) byproduct material. The byproduct material characteristics and classifications are provided in Section 8.3 of the procedure.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Material

Category:	Radioactive Waste Management
Topic:	Waste Form and Characterization
Reference:	IP 88035, Section 02.04
Requirement:	Application Sections 4.2.1.5 & 4.2.2.5
Findings:	Procedure HP-19 provides the waste form and characterization instructions for 11e.(2) byproduct material. The byproduct material characteristics and classifications are provided in Section 8.3 of the procedure.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Material

Category:	Radioactive Waste Management
Topic:	Waste Shipment Labeling
Reference:	IP 88035, Section 02.05
Requirement:	10 CFR 71.5
Findings:	Procedure HP-19 provides the waste packaging, preparation, and loading instructions for 11e.(2) byproduct material. The byproduct material marking, labeling, and placarding requirements are provided in Section 8.4 of the procedure.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Material

Category:	Radioactive Waste Management
Topic:	Tracking of Waste Shipments
Reference:	IP 88035, Section 02.06
Requirement:	10 CFR 71.5
Findings:	Procedure HP-19 provides the waste packaging, preparation, and loading instructions for 11e.(2) byproduct material. The shipment and documentation requirements are provided in Sections 8.5-8.8 of the procedure. In general, the shipment from the site to the disposal facility should take less than a day to complete, and the RSO or designee remains on call during this time frame.
Documents Reviewed:	Procedure HP-19, Shipping Radioactive LSA Material

Category:	Radioactive Waste Management
Topic:	Disposal Site License Conditions
Reference:	IP 88035, Section 02.07
Requirement:	LC 9.7; Application Sections 4.2.1.5 & 4.2.2.5
Findings:	The disposal site is licensed by the NRC to accept 11e.(2) byproduct material wastes from Irigaray and Christensen Ranch sites. The licensee has a signed agreement with the disposal facility.
Documents Reviewed:	Byproduct Material Disposal Agreement

Category:	Radioactive Waste Management
Topic:	Management Controls and Surveys for Solid Waste Storage
Reference:	IP 88035, Section 02.08
Requirement:	10 CFR 71.5
Findings:	The licensee has established procedure controls for surveys of solid wastes in storage. These surveys are considered part of the routine plant surveys. The RSO will maintain oversight of these surveys as part of the routine plant walk-downs and document reviews as specified in Procedure HP-12.
Documents Reviewed:	Procedure HP-12, ALARA Commitment and Audit

Category:	Radioactive Waste Management
Topic:	Radioactive Solid Waste
Reference:	IP 88035, Section 02.09
Requirement:	Application Sections 4.2.1.5 & 4.2.2.5
Findings:	The licensee does not have a procedure specifically for the control of solid

	wastes within the plant. The control of solid wastes is considered part of general plant housekeeping. The restricted area access is controlled by postings, fencing, gates, or locked doors. Solid wastes stored in dumpsters or intermodals in the yard are identified with container markings and placards.
Documents Reviewed:	RSO interview

Category:	Radioactive Waste Management
Topic:	Waste Burial
Reference:	IP 88035, Section 02.10
Requirement:	LC 9.7; Application Sections 4.2.1.5 & 4.2.2.5
Findings:	The licensee has established a program for disposal of 11e.(2) byproduct material. The licensee plans to ship the waste material for burial at a site authorized by NRC to accept these wastes for disposal. The licensee has a contract in place for disposal of this material in accordance with LC 9.7 requirements. The current agreement remains in effect until early 2013.
Documents Reviewed:	Byproduct Material Disposal Agreement

Category:	Radioactive Waste Management
Topic:	Adequacy of Storage Area
Reference:	IP 88035, Section 02.11
Requirement:	Application Sections 4.2.1.5 & 4.2.2.5
Findings:	The licensee does not have a procedure specifically for the control of solid wastes being stored within the plant. The storage of solid wastes is considered part of general plant housekeeping. The restricted area access is controlled by postings, fencing, gates, or locked doors. Solid wastes stored in laydown yards are stored in fenced-in areas, while wastes stored in dumpsters or intermodals in the yard are identified with container markings and placards.
Documents Reviewed:	RSO interview

Category:	Radioactive Waste Management
Topic:	Earthen (Surface) Waste Retention Systems
Reference:	IP 88035, Section 02.12
Requirement:	LCs 10.6 & 11.4; Application Section 4.2
Findings:	The inspection team visually inspected the evaporation ponds at both Irigaray and Christensen Ranch sites, deep disposal well, and temporary storage tank. The inspectors reviewed the historical data, as well as procedures and SERPs related to the waste disposal retention system. The licensee has four lined ponds and one unlined pond at the Christensen Ranch project. The unlined

	pond is used for permeate storage only. The lined ponds were used for storage of brine and backwash water, for short-term storage of brine that is eventually injected into the deep well, and for solar evaporation. The lined ponds are constructed with two liners, each with operable leak detection systems. The waste disposal system has the capacity of up to 200 gpm which exceeds the expected need of the licensee during startup and foreseeable future operations. Because the licensee could not repair a leak in the primary liner in Pond 1, the licensee installed a temporary tank for short-term storage of backwash water. The licensee subsequently repaired the pond liner prior to the end of the onsite inspection. The licensee has four ponds (B, D, RA and RD) for use at the Irigaray project. The ponds are lined; Ponds RA and D have a new double liner system whereas Ponds B and RB have an older single liner with a clay underliner. All ponds have operable leak detection systems. All ponds are used for solar evaporation. The pond evaporation capacity is estimated at 12 gpm. The capacity exceeds the licensee's need during startup and foreseeable future operations. (The Irigaray facility is used for the final processing and thus the disposal needs are low.) The inspection team determined that the licensee had adequate personnel with appropriate training and adequate procedures to meet the requirements for this inspection item. The licensee established a procedure (ENV-5) for monitoring pond freeboards and leak detection systems.
Documents Reviewed:	Procedure ENV-5, Pond Inspections, Sampling and Repair; SERP 10-02 Pond 1 Relining; SERP 10-03 Temporary Resin Backwash Storage Tank

Category:	Emergency Preparedness
Topic:	Program Changes, Implementing Procedures, Training and Staffing, Offsite Support Agencies, Test Drills and Exercises, Emergency Equipment and Facilities, and Audits and Assessments
Reference:	IP 88050
Requirement:	Application Section 7.5
Findings:	The licensee established an emergency preparedness program as described in the Emergency Response Plan and associated implementing procedures. The licensee also established a spill response procedure for responding to spills of radioactive and other hazardous liquids. Training requirements are established in the Emergency Response Plan and Training Plan. Training includes first aid, CPR, fire extinguisher use, first responder awareness, and security-related incident responses. The licensee had equipment available for responding to emergencies, including supplies for responding to releases of radioactive material in the public domain. Audits of the emergency preparedness program may be conducted as part of the ALARA program review. The licensee plans to update the Emergency Response Plan to include annual mock drills. The licensee also plans to provide enhanced communications with Johnson County Fire and Rescue.
Documents Reviewed:	Willow Creek Project Emergency Response Plan; Willow Creek Project Training Plan; Procedure SPCC-2, Spill Response

Category:	Emergency Response Procedures
Topic:	Program Review, Emergency Plan, Emergency Response Program
Reference:	IP 88064
Requirement:	Application Section 7.5
Findings:	The licensee established a detailed Emergency Response Plan for responding to emergency situations. The Plan was supplemented by various procedures including spill response procedure and various emergency procedures. During the inspection, the licensee was contemplating the idea of deleting the emergency procedures since they duplicated the instructions provided in the emergency plan.
Documents Reviewed:	Willow Creek Project Emergency Response Plan; Procedure SPCC-1, Spill Response; Emergency Procedures

Category:	Fire Protection
Topic:	Program Implementation, Annual Inspection, Identification and Resolution of Problems
Reference:	IP 88055
Requirement:	29 CFR Part 1910
Findings:	Section 13 of the Industrial Safety Program provides the fire protection and prevention program requirements. The program instructions include general fire safety and prevention, fire protection systems, exit routes, welding and cutting, and hot work permits. The licensee had two mobile pump tank units to support fire fighting activities. The licensee also established a routine inspection program for fire extinguishers as well as fire suppression equipment (pipes, valves, hydrants). Further, the licensee established safety, health and environmental procedures for welding and cutting, smoking, and fire prevention. The licensee's industrial safety training includes fire protection training.
Documents Reviewed:	Willow Creek Project Industrial Safety Program

LIST OF ACRONYMS FOR FIELD NOTES

ALARA	as low as reasonably achievable
CFR	*Code of Federal Regulations*
DOT	U.S. Department of Transportation
EPA	U.S. Environmental Protection Agency
gpm	gallons per minute
IP	NRC Inspection Procedures
LC	license condition
LSA	low specific activity
MU	mine unit
NRC	U.S. Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
QA	quality assurance
QC	quality control
RG	Regulatory Guide
RSO	radiation safety officer
RWP	radiation work permit
SERP	Safety and Environmental Review Panel
UCLs	upper control limits
WDEQ	Wyoming Department of Environmental Quality