SAFETY EVALUATION REPORT
AMENDMENT OF NO. 11 TO
SOURCE MATERIAL LICENSE NO. SUA-1548
ADDITION OF REYNOLDS RANCH ISL SATELLITE FACILITY

POWER RESOURCES, INC.
SMITH RANCH-HIGHLAND URANIUM PROJECT (SR-HUP)
CONVERSE COUNTY, WYOMING

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Enclosure 2

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1.0 INTRODUCTION

By letter dated January 14, 2005 to U.S. Nuclear Regulatory Commission (NRC) staff, Power Resources, Inc. (PRI) submitted an application requesting an amendment to Source Material License SUA-1548) to allow the operation of a satellite *In Situ* Leach (ISL) uranium recovery facility at the Reynolds Ranch Project site (PRI 2004 and 2005a). The Reynolds Ranch Satellite will be operated as part of the adjacent Smith Ranch-Highland Uranium Project (SR-HUP) in Converse County, Wyoming. The application was supplemented and revised by PRI in correspondence dated April 7, 2005, March 15, 2006, and September 19, 2006 (PRI 2005b, 2006a, and 2006b).

1.1 Description of the Proposed Action

PRI, through Source Material License SUA-1548, is currently permitted to conduct ISL uranium recovery activities at its SR-HUP facility in Converse County, Wyoming. These activities include injection of lixiviant and recovery of uranium-impregnated lixiviant from the ore body, ion exchange (IX), elution, precipitation, and yellowcake drying and packing operations. Currently, Source Material License SUA-1548 limits PRI to an average monthly flow rate of 20,000 gallons per minute, exclusive of restoration flow and an annual yellowcake production total not to exceed 5.5 million pounds as U_3O_8 [License Condition (LC) 10.1.1].

PRI is requesting authorization, through an amendment to Source Material License SUA-1548, to construct and operate a satellite ISL uranium recovery facility at the Reynolds Ranch ISL Satellite site. The satellite operation would include the injection/recovery and IX portions of the ISL process. Elution, precipitation, and yellowcake drying and packing operations would be conducted at PRI's SR-HUP Central Processing Plant (CPP).

1.2 Review Scope

Consistent with the requirements of 10 CFR 40.32 and 40.45, the PRI license amendment request will be approved by NRC staff if, among other things:

- The application is for a purpose authorized by the Atomic Energy Act;
- The applicant is qualified by reason of training and experience to use the source material for the purpose requested in such a manner as to protect health and minimize danger to life or property;
- The applicant's proposed equipment, facilities, and procedures are adequate to protect health and minimize danger to life or property; and
- The issuance of the license amendment will not be inimical to the common defense and security or to the health and safety of the public.

To determine whether the stipulations above will be met as conditions for approval of the proposed action, the NRC staff has performed an evaluation of the safety and environmental aspects of the proposed action, including an evaluation to determine PRI's compliance with the specific requirements and objectives set forth in 10 CFR 40, Appendix A (Criteria Relating to the Operation of Uranium Mills and the Disposition of Tailings or Wastes Produced by the

Extraction or Concentration of Source Material from Ores Processed Primarily for their Source Material Content), and 10 CFR 20 (Standards for Protection Against Radiation). The SER, provided herein, constitutes the safety portion of the staff's evaluation. An Environmental Assessment (NRC 2006) has been prepared in parallel with this SER to address the environmental impacts of the proposed action.

2.0 PROPOSED ACTIVITIES

2.1 General

PRI is the corporate entity proposing to construct and operate a satellite ISL facility at the Reynolds Ranch ISL Satellite site. Reynolds Ranch is located in Converse County, Wyoming. A portion of the southern boundary of the proposed Reynolds Ranch site is contiguous with the existing SR-HUP permit area. The Reynolds Ranch site occupies approximately 720 acres under U.S. government ownership [administered through the Bureau of Land Management (BLM)], 640 acres under State of Wyoming ownership, 240 acres directly owned by PRI, and 7,135 acres under other private ownership.

The uranium ore body at the Reynolds Ranch ISL Satellite site occurs at depths of approximately 400 to 900 feet below ground surface (bgs). PRI plans to inject the ore body with a lixiviant consisting of native ground water combined with sodium bicarbonate/carbonate, hydrogen peroxide and oxygen (i.e., the leaching solution). PRI has used this mixture successfully at SR-HUP to bring uranium within the ore body into solution. The uranium-bearing solution will be extracted from the subsurface by recovery wells. To monitor for any "excursions" (i.e., migration of uranium-bearing solution away from the injection area), PRI proposes to install monitor wells within the mineralized portion of the ore zone (i.e., the Production Zone), and outside the Production Zone in a 'ring" around the mine area. Monitor wells will also be installed within overlying and underlying aquifers.

Upon recovery from the subsurface, the uranium-bearing solution will be pumped to a series of IX columns (tanks containing IX resin) located within the Reynolds Ranch Satellite building. IX columns will be used to extract the uranium from the solution. After an IX column is loaded with uranium, it will be transferred to the SR-HUP CPP using truck transport. The Reynolds Ranch Satellite building will also house electro-dialysis reversal or reverse osmosis (RO) equipment associated with aquifer restoration activities. Liquid waste generated at the proposed Reynolds Ranch Satellite will be disposed through a deep injection well permitted through the Wyoming Department of Environmental Quality (DEQ). Additionally, 11e.(2) byproduct material will be disposed at the Pathfinder - Shirley Basin facility - Source Material License SUA-442.

The Reynolds Ranch Satellite building will occupy approximately 19,000 ft^2, with a maximum through-flow of 4,500 gallon per minute (gpm). Construction of the Reynolds Ranch ISL Satellite building and its first Mine Unit (Mine Unit 21) is expected to begin in 2007. Production is expected to begin in 2008.

2.2 Conclusions

The staff has completed its review of the summary of proposed activities at the Reynolds Ranch ISL Satellite (PRI 2004, Section 1). Information contained in PRI's application has acceptably

described the proposed activities at the Reynolds Ranch ISL Satellite including: (I) corporate entities involved; (ii) location of the facility; (iii) land ownership; (iv) ore-body locations; (v) proposed solution mining method and recovery process; (vi) operating plans, and design throughput; (vii) schedules for construction, startup, and duration of operations; and (viii) waste management and disposal plans. PRI has discussed pilot projects at the nearby Highland Uranium Project, which showed the ability of the regional uranium ore body to host ISL processing and restoration of affected ground water. PRI also discussed the active ISL operation at SR-HUP which demonstrates the ability to process uranium using in situ processes, to contain process fluids, and to complete ground water restoration.

Based on the information provided in the application, the staff has concluded that the summary of the proposed activities is acceptable and is in compliance with 10 CFR 40.32, which describes the general requirements for an application for the issuance of a specific license.

3.0 DESCRIPTION OF PROPOSED FACILITY

3.1 Proposed Satellite Facility

3.1.1 In Situ Leach Process and Equipment

PRI's detailed east-west and north-south oriented geologic cross-sections, supported with resistivity and spontaneous potential geophysical logs (PRI 2004 and 2006a, Attachment D5, Figures 5-1 and 5-2, and Plate 5-1), have established the existence of confining beds above and below the U/S-sand and O-sand, the formations containing the mineable ore deposits at the Reynolds Ranch ISL Satellite. In addition, hydraulic testing of the U/S-sand and O-sand (PRI 2004 and 2006a, Attachment D6-1) has established the hydraulic properties of the ore bodies.

Prior to full scale operations, PRI will develop a Mine Unit Hydrologic Test Document for each individual mine unit. In this document, PRI will further evaluate the hydraulic properties of the ore deposit and the over-lying and underlying aquifers. In addition, the relationship between wellfield operating pressures (projected downhole injection pressure), the hydrostatic pressure of the fluid column, sustainable well casing pressures, and formation rupture pressures will be included in the document if it is determined that significant differences exist from previous evaluations.

With respect to lixiviant, PRI plans to inject the ore body with a mixture consisting of native ground water combined with sodium bicarbonate/carbonate, hydrogen peroxide, and oxygen (i.e., the leaching solution). PRI has successfully used this lixiviant at SR-HUP to bring uranium within the ore body into solution. To reduce the potential for uranium solution excursions, PRI will recover more fluid than it injects. This over production or "bleed" will create an inward directed hydraulic gradient. PRI will use a minimal bleed rate of 0.5 percent of the total wellfield production rate, with a maximum bleed rate typically approaching 1.5 percent. PRI's wellfield injection/production pattern (i.e., the location of injection and production wells with respect to each other) is based on the conventional square five spot pattern that will be modified as needed to fit the characteristics of the ore body (NRC 2004, Section 3.2.4.3). After injection or production wells are installed, but prior to operation, PRI is required to perform mechanical integrity tests (MITs) of the well casings per Source Material License SUA-1548, License

Condition 10.1.3. In these tests, wells must maintain 90 percent of 125 percent of the maximum operating wellhead casing pressure for 10 minutes. MITs will be repeated once every 5 years for all wells used for injection of liviviant or injection of fluids for restoration operations.

As discussed above, PRI proposes to install monitor wells within the Production Zone, and outside the Production Zone and injection/production pattern area. Based on past experience, PRI expects monitor well spacing to be 500 feet between monitor wells and 500 feet between the monitor wells and the Production Zone. Monitor wells will also be installed within overlying and underlying aquifers at a density of one of each type of well per every 3 acres; however, if necessary, denser monitoring networks may be installed based on the geologic stratigraphy of the mine unit (PRI 2004 and 2006a, Section 5.1.2). Typical well casing material will be fiberglass or PVC.

3.1.2 Satellite Facility Equipment

The Reynolds Ranch Satellite building will contain IX columns, process tanks (e.g., lixiviant and waste water storage), water treatment equipment, resin transfer facilities, numerous pumps (injection of lixiviant, transfer of waste water, etc.), radon and gamma monitoring instruments, a small laboratory, and an employee break room. The layout of the Reynolds Ranch Satellite facility is shown in Figure 3.11 (NRC 2004). Separate ventilation systems (air duct or piping connected to the top of each process tank to exhaust fumes to the outside atmosphere) consisting of 4 to 6-inch PVC piping and exhaust fans, where needed, will be installed for IX columns, process tanks, and resin transfer and RO area sumps. The facility is designed for a maximum flow rate of 4,500 gallons per minute (gpm) and vessel pressures of 150 pounds per square inch (psi) during production operations.

3.1.3 Instrumentation and Control

Instrumentation and control at the Reynolds Ranch ISL Satellite starts in the wellfield. Individual flow meters will be installed for each injection and production well. Pressure gauges will be installed in injection and production trunk lines. Automatic shutdown systems will be utilized throughout the Reynolds Ranch Satellite operation. High and low pressure alarms will be used to automatically shut down pipelines, headerhouses, wellfields, disposal wells, and/or IX facilities, depending on the location and scale of the alarm.

3.2 Conclusions

The staff has completed its review of the description of the proposed activities and facility, including ISL process and equipment; satellite processing, wellfield and chemical storage facilities; and instrumentation and control. This review included an evaluation using the review procedures in SRP Sections 3.1.2, 3.2.2, and 3.3.2 and the acceptance criteria in SRP Sections 3.1.3, 3.2.1, and 3.3.1.

PRI has acceptably described the Production Zone, demonstrated protection against vertical migration of water, proposed tests for well integrity that assure facility stability, and demonstrated that the ISL process will meet the following criteria: (I) down hole injection pressures are less than formation fracture pressures; (ii) overall production rates are higher

than injection rates; (iii) plant material balances and flow rates are appropriate; and (iv) lixiviant makeup is such that restoration goals can be achieved. PRI has used the results from the existing SR-HUP operation to support the evaluation of the solution mining process. PRI has provided acceptable operating plans, schedules, and timetables for wellfield operation, surface reclamation, and ground water restoration.

The instrumentation and control systems have been acceptably described for components including the wellfields, wellfield houses, trunk lines, resin circuit, and deep injection disposal wells. The instrumentation allows for continuous monitoring and control of systems, including total inflow to the plant, total waste flow exiting the plant, and tank levels. Appropriate alarms (excessive high or low pressure) and automatic shutdown components are part of the instrumentation systems to provide protection against releases of leaching solutions or other fluids.

Based on the information provided in the application, the staff concludes that the proposed solution mining process and equipment; satellite processing, wellfield and chemical storage facilities; and instrumentation and controls are acceptable and are in compliance with: 1) 10 CFR 40.32© which requires PRI's proposed equipment, facilities, and procedures to be adequate to protect health and minimize danger to life or property; 2) 10 CFR 40.32(d), which requires that the issuance of the license will not be inimical to the common defense and security or to the health and safety of the public; 3) 10 CFR 40.41©, which requires PRI to confine source or byproduct material to the location and purposes authorized in the license; and 4) 10 CFR 40, Appendix A, Criterion 5B for secondary ground water protection, Criterion 5C for maximum constituent concentration values for ground water protection, and Criterion 13 for identification of hazardous constituents.

4.0 EFFLUENT CONTROL SYSTEMS

4.1 Gaseous Effluents

The primary gaseous effluent released from ISL Satellite facilities is radon-222. To address this effluent, the Reynolds Ranch ISL Satellite building design includes ventilation systems for all indoor non-sealed process tanks, and resin transfer and RO area sumps to control the release of radon-222 [PRI 2004 (Section 4.1) and 2006a]. Where needed, exhaust fans can pull air from the top of the tanks or from a sump and discharge the air to the outside through the ventilation system. Radon daughters will be monitored on a monthly basis at the Reynolds Ranch ISL Satellite building using a Gilair Air Pump. PRI has indicated that from 1988 to 1993, weekly and monthly monitoring at SR-HUP has shown radon daughters are less than 10 percent of the regulatory limit of 0.33 working level (WL) found in 10 CFR 20, Appendix B. Consequently, PRI has determined that routine exposure of workers to radon daughters only needs to be determined for Smith Ranch Central Processing Plant workers and Dryer Operators.

4.2 Liquids and Solids

Liquid effluents from the operation of the Reynolds Ranch ISL Satellite include production bleed stream, plant wash-down water, ground water restoration equipment effluent, restoration bleed, and facility sanitary waste [PRI 2004 (Section 4.2) and 2006a]. Production bleed stream, plant

wash-down water, and ground water restoration waste water will be disposed through a deep injection well permitted under the underground injection control (UIC) program through the Wyoming DEQ-Water Quality Division. PRI currently has three such permitted disposal wells (two at the Smith Ranch facility and another at the Highland facility).

Liquid effluent monitoring systems include high and low pressure alarms that automatically shut down pipelines, headerhouses, wellfields, disposal wells, and/or IX facilities depending on the location and scale of the alarm. Sumps are available in the Satellite building to contain liquid releases (e.g., tank leak, overflow, or failure). In the event of a liquid release, appropriate site personnel, including applicable managers, environmental and radiation safety personnel, and site managers are immediately notified. Corporate personnel will be notified in accordance with PRI's corporate internal notification procedures. In addition, if lixiviant, pregnant liquor, acid, solvent, process waste water or any similar stream, is released into or threatens to enter water of the state, or the release is in excess of 420 gallons, the Wyoming DEQ-Land Quality Division will be notified within 24 hours. The NRC will also be notified in 24 hours of any spill that may have a radiological impact on the environment. This notification will be followed within 30 days by a written report to the NRC Project Manger describing the event and corrective actions taken.

Facility sanitary waste will be disposed through a drain field. On-site evaporation or land application of liquid effluents has not been proposed for the Reynolds Ranch ISL Satellite.

Non-radioactive solid wastes are disposed at the SR-HUP existing solid waste disposal facility as authorized by the Wyoming DEQ. For contaminated solid wastes generated during facility operations (e.g., piping, equipment, and sediments removed from process pumps and vessels), PRI has a disposal agreement with Pathfinder Mines Corporation (PMC) to dispose their 11e.(2) byproduct material wastes (including byproduct material from the proposed Reynolds Ranch ISL Satellite) at the Shirley Basin ISL disposal facility (Source Material License SUA-442). PRI estimates that the combined SR-HUP operation currently generates about 100 to 300 yd^3 of radioactive solid waste per year.

4.3 Conclusions

The staff has completed its review of the effluent control systems, including gaseous effluents, liquid effluents, and solids. This review included an evaluation using the review procedures in SRP Sections 4.1.2 and 4.2.2 and the acceptance criteria outlined in SRP Sections 4.1.3 and 4.2.3.

PRI has acceptably described the ventilation systems and the types of effluents released to the atmosphere. PRI has provided for monitoring and control systems (i.e., ventilation) for the types of effluents generated (i.e., radon). PRI has specified acceptable monitoring criteria and has located the facility monitoring and control systems for the required functions to optimally assess worker exposure in locations of likely maximum concentrations as determined by the applicant's analysis of airflow patterns. PRI has demonstrated that ventilation systems are acceptable to prevent radon gas buildup where recovery solutions enter the satellite building and tanks are vented during the extraction process. By providing information on the health and safety impacts of system failures and identifying contingencies for such occurrences, PRI has acceptably shown that effluent control systems will limit radiation exposures under both normal

and accident conditions. PRI has committed to occupational radiation doses and doses to the general public that meet regulatory dose limits and “as low as is reasonably achievable” (ALARA) goals.

PRI has acceptably described the common liquid effluents generated at the satellite facility, from water treatment of wellfield production bleed and restoration water, and satellite building wash-down water. Deep well injection has been identified as the appropriate liquid control method in accordance with License Condition 10.1.8 of Source Material License SUA-1548. PRI will obtain an Underground Injection Control Program permit from the Wyoming DEQ-Water Quality Division to operate the injection. PRI has provided acceptable plans and procedures to address contingencies for all reasonablely expected system failures. The satellite building will be provided with sumps to contain the contents of any tank that may leak, overflow, or fail. The satellite facility has acceptable alarms to notify the operator of pressure transients within the wellfield pipeline systems. The information provided by PRI demonstrates that the effluent control systems will limit radiation exposures under both normal and accident conditions. PRI has acceptable procedures in place to document and report leakage and spill events. PRI has acceptable plans for both the storage and disposal of contaminated soil wastes generated during facility operations (piping, equipment, and sediments removed from process pumps and vessels). Contaminated waste materials and the effluent control systems will be managed to ensure that occupational doses and doses to the general public are in compliance with the limits of 10 CFR 20 and are ALARA. Material/contaminated equipment that cannot be decontaminated for unrestricted release will be disposed in an NRC-licensed facility. In this regard, PRI has a disposal agreement with an NRC-approved facility (Shirley Basin ISL disposal facility).

Based on the information provided in the application, the staff concludes that the effluent control systems for the proposed Reynolds Ranch ISL Satellite are acceptable and are in compliance with: 1) 10 CFR 20.1101, which requires that an acceptable radiation protection program that achieves ALARA goals is in place; 2) 10 CFR 20.1201, which defines the allowable occupational dose limits for adults; 3) 10 CFR 20.1301, which defines dose limits allowable for individual members of the public; 4) 0 CFR 20.1302, which requires compliance with dose limits for individual members of the public; 5) 10 CFR 20.2007, which requires that disposal by injection in deep wells must also meet any other applicable Federal, State, and local government regulations pertaining to deep well injection; 6) 10 CFR 40, Appendix A, Criterion 2, which requires that the applicant provide an estimate of the amount of contaminated material that will be generated and objective evidence of an agreement for disposal of these materials either in a licensed waste disposal site or at a licensed mill tailings facility to demonstrate nonproliferation of waste disposal sites; and 7) 10 CFR 40, Appendix A, Criterion 5(G)(1), which requires that the chemical and radioactive characteristics of the wastes be defined.

5.0 OPERATIONS

5.1 Corporate Organization, Administrative Procedures, and Management Programs

5.1.1 Corporate Organization and Administrative Procedure

PRI has a robust organization and administrative structure that was developed under Source Material License SUA-1548. PRI’s environmental, health, and safety organization and

administrative structure flows vertically downward from its Board of Directors and is detailed in the application and other related correspondence [PRI 2004 (Section 9.5) and 2006a]. Figure 1 shows a current partial organization chart for SR-HUP, that includes the proposed Reynolds Ranch ISL Satellite. The management portion of PRI's corporate organization includes its Board of Directors, President, Senior Vice President of Operations, Mine Manager, and Manager-Health, Safety, and Environmental Affairs/Corporate Radiation Safety Officer (CRSO).

The top of PRI's corporate organization is its Board of Directors. The Board of Directors has the ultimate responsibility and authority for radiation and environmental compliance. The President is responsible for interpreting and acting upon the Board of Directors policy and procedural decisions. The Senior Vice President of Operations reports to the President and is directly responsible for ensuring that Corporate Operations personnel comply with Industrial Safety, Radiation Safety, and Environmental Protection Programs. The Senior Vice President of Operations has the responsibility and authority to immediately terminate any activity that is determined to be a threat to employees, public health, the environment, or is otherwise a potential violation of state or federal regulations. The Mine Manager is responsible for managing day-to-day operations at the facility, and has the responsibility and the authority to suspend, postpone, or modify any activity that is determined to be a threat to employees, public health, the environment, or is potentially in violation of state or federal regulations. However, the Mine Manager may not unilaterally override a relevant decision by either the Senior Vice President of Operations, Manager-Health, Safety, and Environmental Affairs/CRSO, or the Radiation Safety Officer (RSO). The Manager-Health, Safety, and Environmental Affairs/CRSO reports to the Mine Manager and oversees all Radiation Protection, Health, and Environmental Programs. The Manager-Health, Safety, and Environmental Affairs/CRSO 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 is potentially a violation of state or federal regulations.

Positions under the Manager-Health, Safety, and Environmental Affairs/CRSO include Senior Environmental Scientist, Environmental Specialist (Technician), RSO, Radiation Safety Technician (RST), and Safety Supervisor. These positions are involved in implementing and monitoring compliance with environmental, health, safety, and radiation protection programs. In particular, the RSO has the responsibility and the authority, through appropriate line management, to suspend, postpone or modify any activity that is unsafe or is potentially in violation of NRC regulations or license conditions

As part of PRI's compliance with License Condition 9.4d of Source Material License SUA-1548, it has established a Safety and Environmental Review Panel (SERP) to internally determine adherence with license conditions. SERP reviews can cover a wide variety of issues including: operations safety, environmental impact, health physics, and regulatory compliance. The SERP consists of a minimum of three individuals: a Facility Management member with responsibility for managerial and financial approval for changes, an Operations Management member with expertise in implementing changes in operations and/or construction, and the RSO or Manager-Health, Safety, and Environmental Affairs..

5.1.2 Management Control Program

PRI's Environmental Health and Safety (EHS) Management System is the basis for its approach to EHS management. PRI's EHS Management System is compatible with the International Organization for Standardization – ISO 14001 Environmental Management System, which is an international standard that specifies a process for controlling and improving a company's environmental performance. PRI's EHS Management System uses a series of standards that aligned with specific management processes and sets out the minimum expectations for EHS performance [PRI 2004 (Section 9.5)]. PRI's EHS Management System standards cover all EHS-related management processes, including assessment, planning, implementation (e.g., training, corrective actions, safe work programs, and emergency response), checking (e.g., auditing, incident investigation, compliance management, and reporting), and management review.

As part of its ongoing operations, PRI has established written Standard Operating Procedures (SOPs) for all operational activities currently licensed under Source Material License SUA-1548. These include activities related to radioactive materials that are handled, processed, stored, or transported by employees; and health and safety-related activities including in-plant and environmental monitoring, bioassay analysis, and instrument calibration for activities involving radiation safety. All procedures involving radiation safety are reviewed and approved in writing by the RSO or another individual with similar qualifications, prior to being implemented. When employees are required to conduct activities of a non-routine nature where there is the potential for significant exposure to radioactive materials, and no SOPs exist for the activity, a Radiation Work Permit (RWP) is required. The RWP describes the scope of the work, precautions necessary to maintain radiation exposures ALARA, and any supplemental radiological monitoring and sampling to be conducted during the work. The RWP is reviewed and approved in writing by the RSO, RST, or Manager-Health, Safety, and Environmental Affairs prior to initiation of work.

Record keeping is a component of PRI's current EHS Management System and that program will extend to the Reynolds Ranch ISL Satellite. Records of surveys, calibrations, personnel monitoring, bioassays, transfers or disposal of source or byproduct material, and transportation accidents are maintained on site until license termination. Records containing information pertinent to decommissioning and reclamation (i.e., descriptions of spills, contamination events, drawings of buried pipes or pipelines, baseline soil and ground water quality values, etc.) are maintained on site until license termination. Duplicates of all significant records are maintained in the corporate office or other offsite locations.

5.1.3 Management Audit and Inspection Program

Per Source Material License SUA-1548, License Condition 11.7, the RSO, RST, or designee trained by the RSO, RST or Manager-Health, Safety, and Environmental Affairs is required to perform and document a daily walk-through inspection of all operating areas during commercial production. Inspection procedures are contained within PRI's SOPs. Inspection documentation is stored at the operating areas. The inspection's purpose is to ensure that all radiation protection, monitoring, and safety requirements are being followed and/or are properly functioning [PRI 2004 (Section 9.15)]. The EHS staff performs a Weekly Safety and Environmental Inspection that covers all major facilities at the Reynolds Ranch ISL Satellite and

associated wellfields. In accordance with NRC requirements, an "Annual ALARA Audit" is performed to review the radiation safety program and associated monitoring data and survey results to ensure that the program is performing consistent with the ALARA philosophy. An important part of this audit includes recommendations to further improve the radiation safety and environmental programs. In accordance with the EHS Management System, audits of the environmental, radiation safety, and industrial safety programs are periodically conducted by PRI's parent company, or outside consultants specializing in these types of operations.

5.1.4 Conclusions

The staff has completed its review of PRI's corporate organization and administrative procedures, management control program, and management audit and inspection program for use at the proposed Reynolds Ranch ISL Satellite. This review included an evaluation, using the review procedures in SRP Sections 5.1.2, 5.2.2, and 5.3.2 and the acceptance criteria outlined in SRP Section 5.1.3, 5.2.3, and 5.3.3.

PRI has an acceptable corporate organization that defines management responsibilities and authority at each level. PRI's definition of the responsibilities and procedures with respect to development, review, approval, implementation, and adherence to operating procedures, radiation safety programs, environmental and ground water monitoring programs, quality assurance programs, routine and non-routine maintenance activities, and changes to any of these items, is acceptable. Integration among groups that support operation and maintenance of the facility is demonstrated. PRI has established a SERP, with support from other qualified staff members, or consultants, as appropriate.

PRI has an acceptable management control program that assures that safety-related operating activities can be conducted according to written operating procedures. PRI has provided a process that will be used to identify and prepare operating procedures for routine work. PRI has acceptably identified radiation protection, maintenance activities (especially radiation areas), development of wellfields, and SERP reviews as areas where acceptable SOPs will be developed and correctly applied. PRI has demonstrated that non-routine work or maintenance activity will comply with radiation safety requirements and that RWPs will be issued for activities where standard operating procedures do not apply. PRI has acceptable record keeping and retention and reporting programs that will be adequate to ensure that the licensee is able to track and demonstrate control over the source and byproduct materials that are processed, produced, or stored at the facility during its operating life, through decommissioning, and to license termination. The record-keeping and retention plans will assist in ensuring that both on-site and off-site exposures are kept within regulatory limits. PRI has demonstrated an acceptable program to maintain records on spills, likely contamination events, and unusual occurrences for use in calculating annual surety amounts and to ensure acceptable cleanup and decommissioning. PRI will maintain records for decommissioning, off-site disposal of byproduct material, and off-site releases of radioactivity, as permanent records for the facility that will be transferred to any new owner or licensee, as appropriate, and ultimately to the NRC, before license termination. Reports will be made to the NRC as required by 10 CFR Parts 20 and 40.

PRI has an acceptable management audit and inspection program that provides frequencies, types, and scopes of reviews and inspections; action levels; and corrective action measures sufficient to implement the proposed actions.

Based on the information provided by PRI in its application and in supplemental information, the staff concludes that the proposed corporate organization and administrative procedures, management control program, and management audit and inspection program for the proposed Reynolds Ranch ISL Satellite are acceptable. The programs and procedures are in compliance with 10 CFR 20.1101, which defines radiation protection program requirements; 10 CFR 20.1702, which requires the use of process or other engineering measures to control the concentrations of radioactive material in the air; 10 CFR 20, Subpart L and Subpart M, which define requirements for record keeping and reporting; and 10 CFR 40.61(d) and (e), which also define requirements for record keeping. In addition, the requirements of 10 CFR 40.32(b), ©, and (d) are also met as they relate to the proposed corporate organization and SERP functions and the acceptability of management audits to ensure protection of health and to minimize danger to life and property.

5.2 Radiation Safety Program Qualifications and Training, and Security Issues

5.2.1 Qualifications for Personnel Conducting the Radiation Safety Program

Qualifications for personnel conducting the radiation safety program vary according to the level of responsibility [PRI 2004 (Section 9.3)]. The position of Mine Manager requires a Bachelor's Degree in engineering or science from an accredited college or university, or equivalent work experience, and a minimum of 5 years supervisory experience. Qualifications for the position also include industrial process/production operations and management experience.

The position of Manager-Health, Safety and Environmental Affairs/CRSO requires a Bachelor's degree in an engineering or science field from an accredited college or university, or an equivalent level of work experience. Additionally, a minimum of 5 years of experience in environmental and safety management and operations functions is required, as well as the ability to meet the requirements of Regulatory Guide 8.31 for the position of RSO.

The position of RSO requires a minimum of a Bachelor's Degree in an engineering or science field from an accredited college or university, or an equivalent level of work experience. Additionally, the position of RSO requires a combination of education, training, and/or experience in applied health physics and radiation protection to meet the requirements of NRC Regulatory Guide 8.31.

The position of Senior Environmental Scientist requires a minimum of a Bachelor's Degree from an accredited college or university in the physical sciences, biology, engineering or a related discipline and the designee must be computer literate and have at least 4 years experience in environmental compliance and permitting.

The position of Environmental Technician requires a minimum of an Associates Degree, or relevant experience in the physical sciences, environmental science, or a related field. The position of RST requires a minimum of a high school diploma, or alternatively, an equivalent

combination of experience and training in radiation protection for uranium mining and/or processing operations.

In addition to meeting the qualifications and training requirements for the RST, PRI requires that the Safety Supervisor have 2 years of college education in the physical sciences, engineering, or health fields, or 2 years of applied occupational safety experience may be substituted for each year of college. In any event, a minimum of a High School Diploma or equivalent is required.

5.2.2 Radiation Safety Training

All newly hired permanent facility employees are required to attend a training program conducted by the RSO or another qualified individual on the basic principles of radiation safety, health hazards of exposure to uranium, personal hygiene practices for uranium facilities, radiation safety procedures, and responses to emergencies or accidents involving radioactive materials [PRI 2004 (Section 9.6) and 2006a)]. The program is conducted in compliance with NRC Regulatory Guide 8.31 (NRC 2002a), Section 2.5, and NRC Regulatory Guide 8.29 (NRC 1996). All declared pregnant females are also given training on prenatal radiation exposure in accordance with Regulatory Guide 8.13 (NRC 1999). A written examination is given at the completion of the training and the instructor reviews all questions with incorrect answers with the employees. Each worker must achieve a predetermined passing score before being allowed to work in a controlled or restricted area of the facility. The written examination for these employees is maintained on file.

All permanent facility workers also receive an Annual Refresher Training course that includes a review of any new radiation safety regulations, site safety experience, and radiation exposure trends. Radiation safety problems or subjects will also be offered for discussion at least four times per year in the Quarterly Safety Meetings. Safety meeting subjects and attendance records will be maintained on file at the site. Specialized instruction on the radiation health and safety aspects of jobs involving higher than normal exposure risks is provided by the RSO, RST, and/or Supervisor. Each worker who may be required to use respiratory protective equipment receives training in the use of the specific equipment to be used. Workers are not permitted to use respiratory equipment until they are specifically trained in the use of the equipment.

5.2.3 Conclusions

The staff has completed its review of the qualifications of facility personnel conducting the radiation safety and radiation safety training programs at the proposed Reynolds Ranch ISL Satellite. This review included an evaluation using the review procedures in SRP Sections 5.4.2, and 5.5.2 and the acceptance criteria outlined in SRP Sections 5.4.3, and 5.5.3.

The radiation safety training program at the proposed Reynolds Ranch ISL Satellite is consistent with the guidance contained in NRC Regulatory Guides 8.13, 8.29, and 8.31. The content of the training material, on-the-job training, and the extent and frequency of retraining are acceptable. Radiation safety instructions for employees are acceptable.

Based on the information provided by PRI in its application and in supplemental information, the staff concludes that the qualifications of the personnel implementing the radiation safety program and the radiation safety training program for the proposed Reynolds Ranch ISL Satellite are acceptable. These programs are in compliance with 10 CFR 20.1101, which defines radiation protection program requirements, and 10 CFR 40.32(b), which specifies requirements for applicant qualifications. The qualifications of personnel conducting the radiation safety program are acceptable and are in accordance with the guidance provided in NRC Regulatory Guide 8.31.

5.3 Security

5.3.1 Security - Discussion

Measures to secure licensed material from unauthorized removal and access at the Reynolds Ranch ISL Satellite will be similar to those currently in place at SR-HUP. The facility will be manned 24 hours per day, 7 days per week, and surveillance is maintained in controlled and/or unrestricted areas through the presence of the operators and workers on site [PRI 2004 (Section 9.17) and 2006a]. All visitors will be required to check in at the office before being allowed to enter the controlled access areas of the facility.

5.3.2 Conclusions

The staff has completed its review of the security program at the proposed Reynolds Ranch ISL Satellite. This review included an evaluation using the review procedures in SRP Section 5.6.2 and the acceptance criteria outlined in SRP Section 5.6.3.

The security measures at the proposed Reynolds Ranch ISL Satellite demonstrate that PRI has acceptable active and passive constraints on entry to the licensed and restricted areas. PRI has identified acceptable passive controls such as fencing, locks, and warning signage for site control and active security systems for buildings.

Based on the information provided by PRI in its application and in supplemental information, the staff concludes that the security program for the proposed Reynolds Ranch ISL Satellite is acceptable and is in compliance with 10 CFR 20, Subpart I, which provides requirements for the security of stored material and control of material not in storage.

5.4 Radiation Safety Controls and Monitoring

5.4.1 Effluent Control Measures

At the Reynolds Ranch ISL Satellite, the principal effluent representing a potential radiological dose to individuals s radon-222 gas released to the atmosphere from the circulating leach solution. No elution or precipitation circuits are planned for the Reynolds Ranch ISL Satellite. To address exposure to radon-222 gas, PRI has designed the Reynolds Ranch ISL Satellite building with a ventilation system that is connected to all process vessels where significant radon-222 or process fumes could reasonably be expected to be released. Ventilation systems for the IX and RO area sumps are part of the building design [PRI 2004 (Section 4.1)]. Testing

for radon gas within the Reynolds Ranch ISL Satellite building is a component of the monitoring program.

The Reynolds Ranch ISL Satellite will use a deep waste disposal well for liquid effluent disposal, including process bleed and restoration effluents [PRI 2004 (Section 4.2)]. No surface impoundments are planned. The deep disposal well will be operated in accordance with a UIC permit issued by Wyoming DEQ-Water Quality Division. Consistent with existing deep disposal well UIC permits at SR-HUP, quarterly monitoring for TDS, total alkalinity, natural U, ammonia, RA-226 and pH will be conducted.

5.4.2 External Radiation Exposure Monitoring Program

Uranium bearing fluids in PRI's ISL facilities are fully contained in pipes, tanks, and IX vessels. Consequently, PRI has found, based on previous experience at SR-HUP, that the potential for exposure to uranium in the air is remote. To ensure that potential exposures to gamma radiation remain less than 10 percent of the annual limit (i.e., or less than 500 mrem), Reynolds Ranch ISL Satellite operators will utilize NRC approved dosimeters. Quarterly monitoring data collected from these badges will be recorded and reviewed annually to ensure that exposures do not exceed 500 mrem. Additionally, quarterly gamma surveys will be performed at specified locations throughout the Satellite buildings to ensure that areas requiring posting as "Radiation Areas" are identified, posted, and monitored to assess external radiation conditions. "Radiation Areas" are those areas exhibiting 5 to 100 mrem per hour at a distance of 30 cm from the source. Radiation Areas will be posted at appropriate locations (e.g., IX columns and various process tanks) in the Reynolds Ranch ISL Satellite building. The layout of the satellite building, including gamma survey and radon testing locations, is contained in Figure 3.11 of PRI's Reynolds Ranch license amendment application (PRI 2004). PRI's list of radiation survey and monitoring equipment is contained in its March 15 supplemental submittal (PRI 2006a, Table 9-3).

PRI currently has an ALARA program at the operating SR-HUP facility. The Reynolds Ranch ISL Satellite will be added to the existing program. The ALARA program is designed to keep exposures to all radioactive nuclides and other hazardous material as low as possible. The program has established clearly defined responsibilities for management, supervisors, workers, and the RSO. It also includes PRI's annual ALARA audit which reviews radiation monitoring results, and procedural and operational methods.

5.4.3 Airborne Radiation Monitoring Program

No potential exposure to airborne uranium (uranium ore or yellowcake dust) is expected inside the Reynolds Ranch ISL Satellite. The potential for exposure of workers to yellowcake dust is present in certain areas of the SR-HUP CPP where yellowcake precipitation, drying and packaging is conducted. Due to the fact that the uranium-bearing fluids at the Reynolds Ranch ISL Satellite are fully contained within pipes, tanks, and IX vessels, the likelihood of any significant quantities of uranium in the air is very remote. PRI has indicated that many years of monitoring data collected at existing SR-HUP Satellites have shown virtually no occurrence of airborne uranium at these facilities and has concluded that uranium particulates need not be routinely monitored at Satellite facilities [PRI 2004 (Section 9.10)]. With respect to radon daughters, PRI found that during the period 1988 through 1993, weekly and monthly monitoring

results at numerous sites throughout SR-HUP showed that radon daughter concentrations were routinely less than 10 percent of the regulatory limit of 0.33 WL found in 10 CFR 20, Appendix B. Based on this data, PRI concluded that monitoring for routine exposure of workers to radon daughters only needed to be determined for Smith Ranch Central Plant Workers (Central Plant and Dryer Operators). Nevertheless, radon daughters will be monitored on a monthly basis at the Reynolds Ranch ISL Satellite.

5.4.4 Exposure Calculations

Employee exposures at the SR-HUP, which will include the Reynolds Ranch ISL Satellite, are monitored in accordance with NRC Regulatory Guide 8.34 (NRC 1992). Routine exposures to uranium and radon daughters are only determined for the Smith Ranch Central Plant Workers (Central Plant Operators, Dryer Operators) since they are the only workers routinely exposed to airborne radionuclides in concentrations that are likely to result in annual exposures in excess of 10 percent of the annual limit on intake (ALI), without respiratory protection [per 10 CFR 20.1502(b)(1)]. These potential exposures result from the need to work in the yellowcake dryer and yellowcake packaging facilities, neither of which is planned for the Reynolds Ranch ISL Satellite. Airborne uranium and radon daughter exposure calculations, as well as the calculation of total effective dose equivalent, are detailed in PRI's Reynolds Ranch ISL Satellite application and supplemental material [PRI 2004 (Section 9.11) and 2006a].

5.4.5 Bioassay Program

Per License Condition 9.7 of Source Material License SUA-1548, PRI utilizes a bioassay program consistent with NRC Regulatory Guide 8.22 (NRC 1988). The program is conducted on all permanent employees that handle yellowcake (work conducted in the yellowcake precipitation, drying and packaging areas) and involves submitting a baseline urinalysis prior to their initial assignment at the facility. Thereafter, employees submit monthly urine specimens for uranium analysis [PRI 2004 (Section 9.9)]. A urinalysis is also required from all permanent employees at the time of termination of employment if they were recently involved in yellowcake processing activities. Yellowcake processing is not planned for the Reynolds Ranch ISL Satellite.

Workers potentially exposed to concentrations of uranium above regulatory limits are also required to submit urine specimens for uranium analysis 2 to 4 days following the potential exposures. PRI conducts this testing, even if respiratory protection has been utilized, to ensure that the respiratory protection equipment has been worn properly and to ensure that respirators are functioning as designed. PRI also randomly obtains monthly urine specimens from other workers at the facility to confirm that workers are not subject to an unknown uptake of uranium. The contract laboratory provides immediate notification (via telephone or fax) of all urinalyses exceeding 15 micrograms per liter (ug/l) of uranium.

Per Source Material License SUA-1548, License Condition 11.2, any time uranium in a worker's urine specimen exceeds 15 ug/l, the annual ALARA audit will indicate what corrective actions were considered or performed to address the exposure issue. In addition, per License Condition 11.3, any time a uranium action level of 35 ug/l for two consecutive urine specimens,

or 130 ug/l for any one specimen, is reached or exceeded, the licensee shall provide documentation within 30 days to the NRC indicating what corrective actions have been performed.

5.4.6 Contamination Control Program

Alpha contamination surveys will be performed monthly in Reynolds Ranch ISL Satellite process areas and weekly in designated clean areas [PRI 2004 (Section 9.13)]. Routine surveys in the process area will consist of both a visual inspection for obvious signs of contamination and instrument surveys to determine total alpha contamination. If the total alpha survey indicates contamination greater than 200,000 dpm/100 cm^2, the area will be cleaned and resurveyed.

In designated Clean Areas, such as Lunch Rooms and offices, the target level of contamination is "nothing detectable". If the total uranium alpha survey in these areas indicates contamination in excess of 250 dpm/100 cm^2, a smear test will be performed to assess the level of removable alpha activity. If smear test results indicate removable contamination greater than 250 dpm/100 cm^2, the area will be cleaned promptly and resurveyed. The RSO will investigate the cause of the contamination and implement corrective action to minimize the potential for a recurrence. Surface contamination by uranium, radium-226, and their associated decay products exceeding PRI's allowable limits (PRI 2004, Table 9.2) will also require cleanup and investigation. PRI's allowable surface contamination limits for uranium and radium-226 are taken from NRC Regulatory Guide 1.86 (NRC 1974) and Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source or Special Nuclear Material (NRC 1993). Prior to release from the Reynolds Ranch ISL Satellite, PRI will perform radiation surveys on equipment and materials that have been used or stored in an area where contamination by uranium or uranium daughters could potentially occur.

5.4.7 Airborne Effluent and Environmental Monitoring Programs

PRI currently conducts a continuous air monitoring program at the SR-HUP facility [PRI 2004 (Section 5.3)]. The program consists of five separate outdoor locations at the SR-HUP site: Air Station No. 1 - Dave's Water Well (upwind of both the Smith Ranch and Highland wellfields and yellowcake processing facilities), Air Station No. 2 - Smith Ranch Restricted Area, Air Station No. 3 - Vollman Ranch, Air Station No. 4 – Overlook, and Air Station No. 5 – Fowler Ranch. Air Station No. 6 (Reynolds Ranch ISL Satellite) will be added to the program to monitor conditions downwind of the Reynolds Ranch ISL Satellite. These monitoring locations contain high flow air pumps which continuously collect particulate matter on paper filters. The filters are exchanged weekly, composited for analysis on a quarterly basis, and are analyzed for uranium, radium-226, and thorium-230 and lead-210. Passive radon-222 and gamma radiation will be monitored at the Reynolds Ranch ISL Satellite through a background station (Air Station No. 1) and Air Station No. 6. Results of the analyses are reported to the NRC in the Semi-Annual Report.

Passive environmental monitoring programs contained in Source Material License SUA-1548 include soil and vegetation sampling associated with land application of liquid effluents [PRI 2004 (Section 5.3)]. Currently, the license requires a soil monitoring program for the Highland Satellite No. 1 and Satellite No. 2 Wastewater Land Application Facilities. The program

consists of annual soil sampling at depths of 0-6 inches and 6-12 inches to assess impacts of irrigation on the irrigated soil. Vegetation (grass) at both irrigation facilities is also monitored annually to determine the potential accumulation of uranium and radium-226 in the vegetation. Land application of wastewater effluent is not currently planned for the Reynolds Ranch ISL Satellite.

5.4.8 Ground Water and Surface Water Monitoring Programs

PRI's Reynolds Ranch license amendment, Appendices D5 and D6 (PRI 2004) contain general baseline geologic and hydrologic information pertaining to the Reynolds Ranch ISL Satellite area, respectively. As part of its operations at SR-HUP, PRI has developed a program to collect and assemble very detailed information on geologic and hydrologic conditions to define ore zones, quantify geologic and hydrologic parameters, plan wellfields, develop hydrologic monitoring programs, and determine baseline ground water quality.

Detailed hydraulic evaluation of individual process units will be presented in individual Mine Unit Hydrologic Test Documents [PRI 2004 (Section 5.1) and 2006a]. These reports will be reviewed internally by the SERP and submitted to, and reviewed by, the Wyoming DEQ. Mine Unit Hydrologic Test Documents will be kept on site and available for review by the NRC during site inspections. A typical Mine Unit Hydrologic Test Document will contain the following information:

- A description of the proposed mine unit (location, extent, etc.).
- A map(s) showing the proposed production patterns and locations of all monitor wells.
- Geologic cross-sections and cross-section location maps.
- Isopach maps of the Production Zone sand, overlying confining unit, and underlying confining unit.
- Discussion of how the hydrologic test was performed, including well completion reports.
- Discussion of the results and conclusions of the hydrologic test, including pump test raw data, drawdown match curves, potentiometric surface maps, water level graphs, drawdown maps, and, when appropriate, directional transmissivity data and graphs.
- Sufficient information to show that wells in the monitor well ring are in adequate communication with the production patterns.
- Any other information pertinent to the area tested.

In addition, the following topics may be addressed in a Mine Unit Hydrologic Test Document if it is determined that significant differences exist from previous evaluations:

- The relationship between wellfield operating pressures (projected downhole injection pressure), the hydrostatic pressure of the fluid column, sustainable well casing pressures, and formation rupture pressures.

- An impact analysis that includes the ability to control the migration of lixiviant from the production zones to surrounding environs and identifies ground water and surface water pathways that might transport extraction solutions offsite in the event of an uncontrolled excursion, surface piping leak, or incomplete restoration.

- The impact of ISL operations on ground water flow patterns and aquifer levels.

- The expected post-extraction impact on geochemical properties and water quality.

PRI's baseline program also includes the collection, chemical analysis, and statistical analysis of baseline water quality data from three zones: Production Zone, Monitor Well Ring, and Overlying and Underlying Zones [PRI 2004 (Section 5.1.5)]. Upper Control Limits (UCLs) will be determined from the baseline water quality data. UCLs are used to determine whether production fluids have reached the monitoring well network (i.e., whether an excursion has occurred). The UCL parameters are chloride, total alkalinity, and conductivity. Restoration Target Values (RTV's) will also be determined from the baseline water quality data and will be used to assess the effectiveness of ground water restoration activities [PRI 2004 (Section 6.1 and 2006b]. Typical baseline water quality parameters are given in Table 1 (PRI 2004).

PRI's current operational monitoring program at SR-HUP includes monitoring for ground water excursions. Production Zone, overlying aquifer, and underlying aquifer monitor wells are sampled approximately every two weeks. Sample results are compared to excursion parameter UCLs. If an excursion occurs, PRI will notify the Wyoming-DEQ-Land Quality Division and the NRC, and will institute a corrective action which can include changes in pumping or injection rates. Additional measures, including suspension of injection in the immediate vicinity of the excursion to increase withdrawal within the wellfield pattern, may be implemented if a decreasing trend in excursion parameters does not occur. PRI's current operational ground water monitoring program also includes quarterly monitoring of operating domestic and stock wells located within 1 kilometer (0.62 miles) of operating wellfields [PRI 2004 (Section 5.3.5)]. Water samples are analyzed for uranium and radium-226. Domestic and stock wells near the Reynolds Ranch wellfields will be added to the program once the Reynolds Ranch wellfields are placed in operation.

PRI's current operational surface water monitoring program includes quarterly monitoring of Sage Creek, when stream flow is present [PRI 2004 (Section 5.3.6)]. The program also includes sampling of numerous stock ponds located down-stream of operating wellfields. Water samples are analyzed for uranium and radium-226. Surface water sampling locations for the Reynolds Ranch amendment area will be determined and added to the monitoring plan as Reynolds Ranch wellfield operations are initiated.

5.4.9 Quality Assurance

PRI has an established Quality Assurance Program for all radiological, and non-radiological effluent and environmental (including ground water) monitoring programs at the SR-HUP [PRI 2004 (Section 9.18)]. The Reynolds Ranch ISL Satellite operations and monitoring will be added to the program. PRI's Quality Assurance Program addresses elements discussed in the NRC Regulatory Guide 4.15 (NRC 1979). Elements of the program include radiological and

environmental monitoring procedures, duplicative sampling and inter- and intra-laboratory analyses, instrument calibrations, record keeping, and audits of the radiation safety and environmental monitoring programs.

5.4.10 Conclusions

The staff has completed its review of radiation safety controls and monitoring, including effluent control measures, the external radiation exposure monitoring program, the airborne radiation monitoring program, exposure calculations, the bioassay program, the contamination control program, airborne effluent and environmental monitoring programs, the ground water and surface water monitoring programs, and the quality assurance program at the proposed Reynolds Ranch ISL Satellite. This review included an evaluation using the review procedures and acceptance criteria in Section 5.7 of the SRP.

PRI has acceptable effluent control measures at the proposed Reynolds Ranch ISL Satellite and has demonstrated that important effluent streams will be properly controlled. PRI has proposed acceptable building ventilation systems in buildings where radon gas is vented. PRI has acceptable inspection frequencies to ensure specified performance of operating equipment. Record keeping and monitoring procedures are acceptable. Acceptable event response procedures for equipment failures or spills are described by PRI.

PRI has proposed an acceptable external radiation exposure monitoring program at the proposed Reynolds Ranch ISL Satellite. PRI has provided an acceptable description of the locations of external radiation monitors and external radiation monitors are acceptably placed. PRI has established appropriate criteria to determine which employees should receive external radiation monitoring. PRI has demonstrated that the range, sensitivity, and calibration of external radiation monitors will protect the health and safety of employees during the full scope of facility operations. Proposed radiation surveys and documentation of radiation exposures are acceptable. PRI's monitoring program is acceptable for protection of workers from alpha, beta, and gamma radiation.

PRI has an acceptable airborne radiation monitoring program at the proposed Reynolds Ranch ISL Satellite. PRI has provided an acceptable description of the locations of the airborne radiation monitors. PRI has demonstrated that the range, sensitivity, and calibration of monitors for airborne radiation will enable accurate determinations of the concentrations of airborne radioactive species to protect the health and safety of employees during facility operations. The workers will be adequately protected from radon gas releases from venting of process tanks and from spills and maintenance activities. Proposed radiation surveys and documentation of radiation exposures are acceptable and consistent with the requirements of 10 CFR 20. PRI's respiratory protection program is acceptable. PRI's program for monitoring uranium and sampling for radon or its daughters is acceptable. Employee internal exposure calculations will be performed in accordance with 10 CFR 20.1204(a).

PRI has provided acceptable measures for exposure calculations at the proposed Reynolds Ranch ISL Satellite. PRI has methods for determining intake of radioactive materials by personnel in work areas. PRI's exposure calculations for natural uranium and airborne radon daughter exposure are acceptable and are in conformance with the guidance in Regulatory Guide 8.30 and Regulatory Guide 8.34. PRI has acceptable methods to calculate prenatal

exposures consistent with Regulatory Guide 8.13. All exposure calculation methods for routine operations, non-routine operations, maintenance, and cleanup activities are acceptable and are consistent with Regulatory Guide 8.30 and Regulatory Guide 8.34. Time studies or actual employee occupancy times and the results of radioactive material monitoring will be utilized in exposure calculations. PRI has considered appropriate efficiencies of airborne particulate control systems in exposure calculations.

PRI has established an acceptable bioassay program at the proposed Reynolds Ranch ISL Satellite that is consistent with the guidance in Regulatory Guide 8.22. The program includes baseline urinalysis and exit bioassay for workers involved in yellowcake processing and handling (i.e., areas where the highest risk of exposure is expected to occur). An acceptable program to curtail uranium intake is established, and appropriate action levels are set. PRI has established reporting and record keeping protocols in conformance with the requirements of 10 CFR 20, Subpart L. Yellowcake processing and handling will not occur at the proposed Reynolds Ranch ISL Satellite.

PRI has established an acceptable contamination control program at the proposed Reynolds Ranch ISL Satellite. Acceptable controls are in place to prevent contamination from entering clean areas or from leaving the site. PRI's SOPs will include provisions for contamination control, such as maintaining change rooms, showers, and lockers for clean clothing and providing alpha radiation monitoring equipment for use before leaving radiation areas. Acceptable action levels have been set in accordance with Regulatory Guide 8.30, and plans for surveys are in place for skin and personal clothing contamination. PRI has established that all items removed from the restricted area will be surveyed by radiation safety staff and meet release limits. PRI has demonstrated that the range, sensitivity, and calibration of monitoring equipment will protect the health and safety of employees during the full scope of facility operations. PRI has demonstrated that contaminated surfaces will not be covered (i.e., with paints or other sealants) unless, before covering, a survey documents that the contamination level is below the limits specified in Table 5.7.6.3-1 of SRP Section 5.7.6.3. PRI will determine the radioactivity on the interior surfaces of pipes, drain lines, or duct work by making measurements at appropriate access points that will have been shown to be representative of the interior contamination. PRI has committed to establishing that contamination on equipment or scrap will be within the limits in Table 5.7.6.3-1 (SRP Section 5.7.6.3) before unrestricted release. If the equipment and material do not meet the limits, it will be decontaminated and resurveyed. Any material that cannot be completely surveyed will not be released and will be properly stored for subsequent disposal.

PRI has established acceptable airborne effluent and environmental monitoring programs at the proposed Reynolds Ranch ISL Satellite. The programs are consistent with the guidance in Regulatory Guide 4.14 (NRC 1980). PRI will monitor for radon, air particulate material, and direct radiation. Locations of monitoring stations are consistent with Regulatory Guide 4.14. Monitoring instrumentation is appropriate.

PRI has established acceptable ground water and surface water monitoring programs at the proposed Reynolds Ranch ISL Satellite. PRI has established an acceptable wellfield baseline sampling program, including the number of samples, constituents sampled, and appropriate statistical methods to identify outliers. PRI has selected acceptable excursion indicator constituents and an approach for establishing upper control limits. Appropriate criteria are used

to establish monitor well locations for all aquifers likely to be affected. Appropriate wellfield test procedures are established. PRI has defined acceptable operational approaches for the ground water and surface water monitoring programs, including appropriate wells for excursion monitoring, monitoring frequency, and criteria for determining the presence of an excursion. PRI has prepared an acceptable ground water corrective action plan, including notification of NRC and subsequent reporting in the event of an excursion.

PRI has established an acceptable quality assurance program for the proposed Reynolds Ranch ISL satellite facility. The quality assurance program will be applied to all radiological, effluent, and environmental programs, consistent with the guidance in Regulatory Guide 4.15. PRI will retain survey and instrument calibration records, and retain records to demonstrate compliance with 10 CFR 20 requirements and evaluate dose, intake, and releases to the environment. PRI will retain these records until NRC terminates the license.

Based on the information provided in the application and the detailed review conducted of PRI's radiation safety controls and monitoring at the proposed Reynolds Ranch ISL Satellite facility, the staff concludes that these measures are acceptable and in compliance with the following 10 CFR 20 regulations: 10 CFR 20.1101, which specifies radiation protection program and ALARA requirements; 10 CFR 20.1201(a), which provides occupational dose limits; 10 CFR 20.1201(e), which specifies allowed intake of soluble uranium; 10 CFR 20.1202, which describes the means of compliance when summing internal and external doses; 10 CFR 20.1204, for determination of dose from airborne radiation and internal exposure; 10 CFR 20.1208, which specifies the exposure limits to a fetus during pregnancy; 10 CFR 20.1401, which identifies public dose limits; 10 CFR 20.1402, which requires effluent monitoring to determine dose to individual members of the public; 10 CFR 20.1501, which provides requirements for surveying and monitoring; 10 CFR 20.1502, which defines conditions requiring individual monitoring of external dose; 10 CFR 20.1702, which allows licensees to limit dose to individuals by controlling access, limiting exposure times, prescribing use of respiratory equipment, or utilizing other controls; 10 CFR 20, Subpart L, which specifies record keeping requirements; and 10 CFR 20, Subpart M, which identifies reporting requirements.

Staff also concluded that PRI's radiation safety controls and monitoring measures are acceptable and in compliance with the following 10 CFR 40 regulations: 10 CFR 40.32(b) which establishes requirements for the use of source material to protect health and minimize danger to life and property; 10 CFR 40.32©, which requires the applicant's proposed equipment, facilities, and procedures to be adequate to protect health and minimize danger to life or property; 10 CFR 40.32(d), which requires that the issuance of the license will not be inimical to the common defense and security or to the health and safety of the public; 10 CFR 40.41©, which requires the applicant to confine source or byproduct material to the locations and purposes authorized in the license; 10 CFR 40.65, which specifies effluent and environmental monitoring requirements; 10 CFR 40, Appendix A, Criterion 5B(1), 5B(5), and 5C, which provide concentration limits for contaminants; 10 CFR 40, Appendix A, Criterion 5D, which requires a ground water corrective action program; 10 CFR 40, Appendix A, Criterion 7 and 7A, which require ground water monitoring programs; and 10 CFR 40, Appendix A, Criterion 8, which provides requirements for control of airborne effluents.

6.0 GROUND WATER QUALITY RESTORATION, SURFACE RECLAMATION, AND FACILITY DECOMMISSIONING

6.1 Plans and Schedules for Ground Water Quality Restoration

PRI is currently implementing a ground water restoration program as part of its Highland operation. The Reynolds Ranch ISL Satellite will utilize the same program. PRI's restoration criteria for the ground water in a mining unit is based on the baseline water quality data collected for each mine unit from the wells completed in the planned Production Zone. All parameters are to be returned to as close to baseline as is reasonably achievable. RTVs are established for the list of baseline water quality parameters [PRI 2004 (Section 5.1)]. PRI's ground water restoration program consists of two stages, the restoration stage and the stability monitoring stage. The restoration stage typically consists of three phases: ground water transfer (water is transferred between a wellfield commencing restoration and a wellfield commencing mining operations), ground water sweep (ground water is pumped from the wellfield without injection causing an influx of baseline quality water from the perimeter of the processed unit, which sweeps the affected portion of the aquifer), and ground water treatment [recovered water is treated on the surface using either IX, RO, or Electro Dialysis Reversal (EDR)]. Following concurrence from the Wyoming DEQ that restoration has been achieved in the mining area, a 6-month stability period is assessed to show that the restoration goal has been adequately maintained. Stability monitoring includes periodic sampling to evaluate water quality parameter stability. PRI's license amendment application for Reynolds Ranch operations (PRI 2004, Figure 3.13) contains a preliminary schedule of mining activities, including ground water restoration.

Wellfield plugging and surface reclamation will be initiated after the NRC and Wyoming DEQ concur that the ground water has been adequately restored and determined to be stable. All production, injection, and monitor wells and drillholes will be abandoned in accordance with WS-35-11-404 and Chapter VIII of the WDEQ-LQD Rules and Regulations to prevent adverse impacts to ground water quality or quantity.

Concurrently with its application to amend Source Material License SUA-1548, PRI applied for an Underground Injection Control (UIC) permit from Wyoming WDEQ to conduct the production zone injection portion of the Reynolds Ranch ISL Satellite operation. The UIC permit will provide an aquifer exemption to the entire Production Zone aquifer within the permit boundary. The aquifer exemption will mandate that impacted production zone ground water within the exempted area may not threaten water quality in the aquifer adjacent to the exempted area. Wyoming regulations further require aquifer restoration to at least class-of-use.

6.2 Plans for Reclaiming Disturbed Lands

PRI has committed to returning all lands disturbed by the Reynolds Ranch ISL Satellite operations to their pre-mining land use for livestock grazing and wildlife habitat unless an alternative use is justified and is approved by the State and the landowner [PRI 2004 (Section 6.2)]. Recontouring of land where surface disturbance has taken place will restore it to a surface configuration that will blend in with the natural terrain and will be consistent with the pre-mining land use. The soils, vegetation, and radiological baseline data will be used as a guide in evaluating the final reclamation.

6.3 Removal and Disposal of Structures, Waste Material, and Equipment

Upon facility decommissioning, Reynolds Ranch ISL Satellite process equipment will be dismantled, decontaminated (if necessary), and sold to another licensed facility. The equipment will be decontaminated in accordance with Regulatory Guide 1.86 (NRC 1974) and guidelines detailed in NRC (1993) [PRI 2004 (Section 6.2.5)]. Potentially contaminated material that cannot be completely surveyed, such as pipe interiors, or materials that cannot be decontaminated to an acceptable level, will be disposed by PRI as 11e.(2) byproduct material in an NRC- approved facility (PRI 2006a). Currently, PRI uses the PMC Shirley Basin ISL disposal facility. After decontamination, materials that will not be reused or that have no resale value, such as building foundations, will be buried on-site.

6.4 Methodologies for Conducting Post-Reclamation and Decommissioning Surveys

PRI will conduct gamma surveys during the decommissioning of each ISL wellfield [PRI 2004 (Section 6.2.5)]. Material identified during the gamma surveys as having contamination levels requiring disposal in a licensed facility will be removed, packaged (if applicable), and shipped to an NRC approved facility for disposal. If soil cleanup is required during soil reclamation activities, PRI will use cleanup criteria for radium and other radionuclides (uranium and thorium) that is based on the radium benchmark dose approach of 10 CFR 40, Appendix A, Criterion 6(6). PRI's license amendment application (PRI (2004, Figure 3.13) contains a preliminary schedule of mining activities, including decommissioning.

6.5 Financial Assurance

PRI has provided a first-year operation, financial assurance surety estimate of $3,331,600 [PRI 2004 (Section 6.2.7) and 2005b]. The surety estimate for the proposed Reynolds Ranch ISL Satellite was based on July 1,1998 dollars and is adjusted for inflation to February 28, 2005, using a Consumer Price Index (CPI) escalator of 17.5 percent.

The method used to estimate the Reynolds Ranch ISL Satellite surety is virtually identical to the method used in previously approved sureties for SR-HUP and includes costs for ground water restoration, equipment removal and disposal, building demolition and disposal, wellfield building and equipment removal and disposal, well abandonment, wellfield and satellite facility surface reclamation, and other miscellaneous reclamation costs. Ground water restoration costs are based on treatment of 1 pore volume for ground water sweep and 5 pore volumes for RO [PRI 2004 (Section 6.2.7) and 2005b]. Mine Unit pore volumes are determined, using the product of the affected Production Zone area, average completed thickness of the Production Zone, flare factor, and formation porosity. The flare factor is based on numerical ground water flow modeling of the adjacent Smith Ranch facility.

6.6 Conclusions

The staff has completed its review of the plans and schedules for ground water quality restoration; plans for reclaiming disturbed lands; removal and disposal of structures, waste material, and equipment; methodologies for conducting post-reclamation and decommissioning surveys; and financial assurance at the proposed Reynolds Ranch ISL Satellite facility. This

review included an evaluation using the review procedures and acceptance criteria in Section 6.0 of the SRP.

PRI has acceptably demonstrated that wellfield ground water restoration standards will be representative of the pre-operational baseline ground water conditions. As a secondary restoration goal, PRI has committed to restore all affected ground water to at least the pre-mining State class of use standards.

PRI has provided an acceptable mix of ground water sweep, RO, and ground water re-circulation for restoration. The wellfield-specific mix of these approaches will be determined as part of the ground water restoration plan for each individual wellfield. In addition, PRI has demonstrated an acceptable method for determining the extent of wellfield flare and for ensuring acceptable restoration of the flare. PRI has committed to an acceptable schedule for complete restoration for any wellfield after ore extraction ceases.

PRI has presented an acceptable list of constituents to be monitored and has specified acceptable criteria to determine the success of restoration (i.e., average and range of baseline values determined for wells completed in the production zone within a wellfield). The number of pore volumes necessary to achieve the primary restoration targets has been provided and is acceptable. PRI has demonstrated that the primary restoration program will return the water quality of the Production Zone and affected aquifers to baseline water quality or acceptable State class-of-use water quality standards. PRI's post-restoration stability monitoring program is acceptable. The methods proposed for abandoning wells and sealing them to restore the wellfield to pre-extraction hydrologic conditions are acceptable.

PRI will conduct gamma surveys during the decommissioning of each satellite wellfield. Material identified during the gamma surveys as having contamination levels requiring disposal in a licensed facility, will be removed, packaged (if applicable), and shipped to an NRC or NRC Agreement State approved facility for disposal. All cleanup activities will be performed in accordance with an approved decommissioning and reclamation plan and applicable Wyoming DEQ and NRC rules, regulations, permits, and license conditions. The detailed (final) decommissioning and reclamation plan will be submitted to NRC for review and approval per License Condition 9.11 of Source Material License SUA-1548.

PRI has established an acceptable program for the elimination of residual contamination on structures and equipment. PRI has made acceptable plans for measurements of radioactivity on the interior surfaces of pipes, drain lines, and ductwork by making appropriate measurements at all traps, and other access points where contamination is likely to be representative of system-wide contamination. All premises, equipment, or scrap likely to be contaminated, but that cannot be measured, have been assumed by the applicant to be contaminated in excess of limits and will be treated accordingly. PRI plans to conduct a comprehensive radiation survey to establish that any contamination is within specified limits before the release of the premises, equipment, or scrap for unrestricted use. All 11e.(2) byproduct material in excess of the limits for release of materials for unrestricted use will be disposed in an NRC-licensed facility.

PRI has developed an acceptable program for cleanup of radium that ensure that the radium concentration in the upper 15 cm (6 in) of soil will not exceed 5 pCi/g and in subsequent 15 cm

(6 in) layers will not exceed 15 pCi/g. Also, the cleanup of other residual radionuclides in soil will meet the criteria developed with the radium benchmark dose approach of 10 CFR 40, Appendix A, Criterion 6(6). PRI will submit a detailed (final) decommissioning and reclamation plan to NRC for review and approval per License Condition 9.11 of Source Material License SUA-1548.

PRI has provided a first-year operation, financial assurance surety estimate of $3,331,600. PRI has provided a preliminary financial surety cost estimate based on the requirements in 10 CFR 40, Appendix A, Criterion 9. PRI has assured that sufficient funds would be available for completion of the reclamation plan by an independent contractor. PRI has included in the financial analyses all activities outlined in Sections 6.1 through 6.4 of the SRP. PRI has based the assumptions for financial surety analysis on site conditions, including experiences with generally accepted industry practices, research and development at the site, and previous operating experience. The values used in the financial surety analysis are based on 1998 dollars, which are adjusted for inflation using a CPI escalator, and reasonable costs for the required reclamation activities are defined. While the proposed surety of $3,331,600 is adequate for the purposes of the current license application review, the staff plans to condition Source Material License SUA-1548 to require PRI to establish an updated surety instrument prior to the development of the proposed Reynolds Ranch ISL satellite facility. PRI is currently developing revised surety estimates, based on re-baselining to 2006 costs, for the entire SR-HUP operation, including the Reynolds Ranch ISL Satellite. These new surety estimates are to be submitted by January 12, 2007 (PRI 2006c). The staff will determine the adequacy of the updated surety for Reynolds Ranch upon completion of the review of the January 2007 submittal.

Based on the information provided in the application and the detailed review of the plans and schedules for ground water quality restoration for the proposed Reynolds Ranch ISL satellite facility, the staff concludes that the proposed measures are in compliance with 10 CFR 40.32©, requiring the applicant's proposed equipment, facilities, and procedures to be adequate to protect health and minimize danger to life or property; 10 CFR 40.32(d), requiring that the issuance of the license will not be inimical to the common defense and security or to the health and safety of the public; 10 CFR 40.41©, which requires the applicant to confine source or byproduct material to the locations and purposes authorized in the license; 10 CFR 40, Appendix A, Criterion 2, which requires the applicant to dispose of 11e.(2) byproduct materials either in a licensed waste disposal site or at a mill tailings facility to demonstrate non-proliferation of waste disposal sites; 10 CFR 40, Appendix A, Criterion 6(6), which provides standards for cleanup of radium and other radionuclides in soil; and 10 CFR 40, Criterion 9, which requires financial surety arrangements be established by each uranium recovery facility operator.

7.0 ACCIDENTS - PREVENTIVE MEASURES AND EMERGENCY PROCEDURES

7.1 Tank Failure

Numerous process vessels and tanks will be present within the Reynolds Ranch ISL Satellite and PRI has considered failure of these vessels in its satellite building design. Alarms and automatic controls are used to monitor and keep tank fluid levels within prescribed limits. If there is a failure of a process vessel or tank occurs at the Reynolds Ranch ISL Satellite

building, the fluid or resin would be contained within the building, collected in sumps, and pumped to other tanks. The area would then be washed down with the wash water contained in a similar manner, minimizing any environmental impact from the failure. There is little risk of airborne release of uranium since it will remain fixed to the resin.

Failure of a tank outside the Reynolds Ranch ISL Satellite (e.g. during transport) could result in the spill of leach solution to a retention or containment system. The liquids would then be pumped to another tank. Any contaminated soils or material requiring controlled disposal would be removed and disposed of in accordance with NRC and/or Wyoming State requirements.

7.2 Pipeline Failure

The rupture of a pipeline between the Reynolds Ranch ISL Satellite and a wellfield could result in a loss of either pregnant or barren solutions to the surface. To minimize the volume of lost fluid, the pipeline systems at SR-HUP are equipped with high pressure and low pressure shutdown systems and flowmeters. The systems also are equipped with alarms so the operator will be alerted immediately if a major malfunction occurs. If the volume and/or concentration of the solutions released in such an accident did constitute an environmental concern, the area would be surveyed and the contaminated soils would be removed and disposed of according to NRC and/or State regulations.

7.3 Fires and Explosions

Fire and explosion hazards at the Reynolds Ranch ISL Satellite will be minimal as the facility does not use flammable liquids in the recovery process. Natural gas used for building heat would be the primary source for a potential fire or explosion. In the wellfields, injection and recovery-well piping systems are manifolded for ease of operational control. Piping manifolds, submersible pump motor starters/controllers, and gaseous oxygen delivery systems are situated within electrically heated, all weather buildings (“Headerhouses"). An accumulation of gaseous oxygen would be the primary source for a potential fire or explosion. Both the gaseous oxygen and primary leaching solution lines entering each Headerhouse are equipped with automatic low pressure shut off valves to minimize the delivery of oxygen to a fire or of liquids to a spill. Additionally, each Headerhouse is equipped with a continuously operating exhaust fan that would assist in preventing the build-up of oxygen in the building.

7.4 Well Casing Failure

Well casing failure in an injection well would have the potential for a significant environmental impact because the leaching fluid is injected under pressure. In the event of such a failure, the defective well would either be repaired or plugged and abandoned. If contamination of another aquifer was indicated in the monitoring network, additional wells would be installed in the contaminated aquifer and used to recover the released leaching solution. In addition, casing integrity tests will be performed on all injection wells prior to using the wells for injection and after any work that involves entering a fiberglass or PVC cased well with a cutting tool, such as a drill bit or under-reamer. Failure of a production well casing would normally not cause fluid migration to overlying aquifers because the production wells operate at pressures lower than the aquifer pressures.

7.5 Transportation Accidents - Shipments of Resin

The operation of the Reynolds Ranch ISL Satellite requires that the resin used for IX operations be transferred from the Satellite building to the Smith Ranch CPP. Resin is transported in specially designed 500 to 700 ft^3 aluminum tanks. The tanker trucks typically haul 500 ft^3 of loaded resin. An accident involving vehicles transporting resin could result in some of the resin being spilled. If an accident causes the release of resin and process water, all resin, liquids, and contaminated soils would be removed and processed through the elution circuit or disposed of in a licensed facility. All disturbed areas would then be reclaimed in accordance with all applicable State and NRC regulations. There is no risk of airborne release of uranium since it will remain fixed to the resin. There have been no spills from resin transport to date from operations at the SR-HUP.

7.6 Conclusions

The staff has completed its review of the effects of potential accidents at the proposed Reynolds Ranch ISL Satellite. This review included an evaluation of the methods that will be used to evaluate effects of potential accidents involving radioactivity, using the review procedures in SRP Section 7.5.2 and the acceptance criteria outlined in SRP Section 7.5.3. PRI has acceptably described all likely significant effects of accidents from facility operations involving radioactivity. PRI has provided an acceptable analysis of potential accidents and their consequences that reflect the facility design, site features, and planned operations. PRI has identified likely environmental impacts from such accidents and has described measures to mitigate accident impacts. The accidents evaluated have considered past operating experience from similar facilities. Adequate response and remediation procedures have been identified or referenced, and the facility personnel will be qualified to implement them. PRI's response program will comply with the notification requirements of 10 CFR 20.2202 and 20.2203. Under Source Material License SUA-1548 License Condition 12.1, PRI is required to maintain documentation on spills of source or 11e.(2) byproduct materials (including processing solutions) and process chemicals. Documented information shall include, but not be limited to: date, spill volume, total activity of each radionuclide released, radiological survey results, soil sample results (if taken), corrective actions, results of post-remediation surveys (if taken), and a map showing the spill location and the impacted area. The licensee shall have procedures that will evaluate the consequences of the spill or incident/event against 10 CFR 20, Subpart "M," and 10 CFR 40.60 reporting criteria. If PRI is required to report any spills of source, 11e.(2) byproduct material, or process chemicals, a report shall be made to the NRC Headquarters Project Manager (PM) by telephone or electronic mail (e-mail) within 48 hours. This notification shall be followed, within thirty (30) days of the notification, by submittal of a written report to NRC Headquarters, per License Condition 9.2 of Source Material License SUA-1548, detailing the conditions leading to the spill or incident/event, corrective actions taken, and results achieved.

Based on the information provided in the application and the detailed review conducted of the accidents considered for the proposed Reynolds Ranch ISL Satellite, the staff concludes that PRI has demonstrated compliance with 10 CFR 40.32©, which requires the applicant's equipment, facilities, and procedures to be adequate to protect health and minimize danger to life or property; and 10 CFR Parts 20.2202 and 20.2203, which define response program requirements for radiological accidents.

8.0 CONCLUSIONS AND LICENSE CONDITIONS

Based on the staff's detailed safety review, as provided herein, the NRC concludes that the proposed Reynolds Ranch ISL Satellite satisfies the requirements of 10 CFR 40, Appendix A, and 10 CFR 20. In a parallel environmental review, the staff has also determined that the Reynolds Ranch ISL satellite facility will not have a significant impact on the environment (NRC 2006). Lastly, the staff concludes that, consistent with the requirements of 10 CFR Parts 40.32 and 40.45:

- PRI's license amendment application for the Reynolds Ranch ISL Satellite is for a purpose authorized by the Atomic Energy Act; and

- PRI is qualified, by reason of training and experience, to use the source material for the purpose requested in such manner as to protect health and minimize danger to life or property; and

- PRI's proposed equipment, facilities, and procedures are adequate to protect health and minimize danger to life or property; and

- The issuance of the license will not be inimical to the common defense and security or to the health and safety of the public.

Based on the foregoing findings and conclusions, the staff has determined that PRI's request to amend the SR-HUP Source Material License SUA-1548 to allow the operation of the Reynolds Ranch ISL Satellite is acceptable. Accordingly, the staff approves PRI's amendment request for the Reynolds Ranch ISL Satellite, subject, however, to the following revised or new license conditions:

License Condition 9.1 (Revised)

9.1 The authorized places of use shall be the licensee's Smith Ranch-Highland Uranium Project (SR-HUP), which is the primary processing facility **located in Converse County, Wyoming**; ~~and the Highland, Ruth, North Butte, and Gas Hill Project as Satellite In-situ Leach (ISL) facilities, in Converse, Johnson, Campbell, and Fremont and Natrona Counties, Wyoming, respectively~~ **Highland In-situ Leach (ISL) Satellite facility located in Converse County, Wyoming**; **Ruth ISL Satellite facility located in Johnson County, Wyoming; North Butte ISL Satellite facility located in Campbell County, Wyoming; Gas Hills ISL Satellite facility located in Fremont and Natrona Counties, Wyoming; and Reynolds Ranch Satellite ISL facility located in Converse County, Wyoming.** As satellite facilities, operations at the Highland, Ruth, North Butte, Gas Hills, **and Reynolds Ranch** facilities shall be limited to shipments of loaded ion exchange (IX) resin or yellowcake slurry which will be transported to the central processing plant at Smith Ranch, as further explained in the commitments, representations, and statements listed in License Condition 9.3.

9.2 All written notices and reports to NRC required under this license shall be addressed to the Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate, Division of Waste Management and Environmental Protection, Office of Federal and

State Materials and Environmental Management Programs, Mailstop T7 E-18, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by express delivery to 11545 Rockville Pike, Two White Flint North, Rockville, MD 20852-2738.

Required telephone notification shall be made to the NRC Operations Center at (301) 816-5100, unless otherwise specified in license conditions.

[Applicable Amendments: 11]

License Condition 9.3 (Revised)

9.3 The licensee shall conduct operations in accordance with the commitments, representations, and statements contained in the license application and/or amendments for each facility, which are hereby incorporated by reference. These submittals include the following: Smith Ranch and Highland Uranium Project dated November 15, 1999, and May 14, 1993, respectively, as amended by submittals dated September 27, 2000, and October 12, 2000, September 27, 2001, October 18, 2001, October 22, 2001, and February 28, 2002, May 6, 2003, July 09, 2003; Ruth/North Butte license application dated April 1, 1992, as amended by submittals dated March 7, 1989, and October 3, ~~1998~~ **1988**, September 24, 1999, and November 11, 1999; Gas Hills Project application dated June 24, 1998, as amended by submittals dated September 24, 1999, November 11, 1999, May 3, 2002, October 10, 2003, October 22, 2004**; and Reynolds Ranch dated January 14, 2005, as amended by submittals dated April 7, 2005, March 15, 2006**, **and September 19, 2006,** which are hereby incorporated by reference, except where superseded by license conditions below.

License Condition 9.5 (Revised)

9.5 The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criterion 9, adequate to cover the estimated reclamation and closure costs, if accomplished by a third party, for all existing operations and any planned expansions or operational changes for the upcoming year. Reclamation includes all cited activities and groundwater restoration, as well as off-site disposal of all 11e.(2) byproduct material.

Within 3 months of NRC approval of a revised closure (decommissioning) plan and its cost estimate, the licensee shall submit, for NRC review and approval, a proposed revision to the financial surety arrangement if estimated costs exceed the amount covered in the existing financial surety. The revised surety instrument shall then be in effect within 30 days of written NRC approval of the surety documents.

Proposed annual updates to the surety amount, required by 10 CFR 40, Appendix A, Criterion 9, shall be provided to NRC 90 days prior to the anniversary date (e.g., renewal date of the surety instrument/vehicle) of September 30 of each year for Smith Ranch-Highland Uranium Project, March 26 for Ruth, April 30 for North Butte, and August 7 for the Gas Hills Project**. The surety update renewal date for Reynolds Ranch will be determined following consultation with PRI and the State of Wyoming**. If NRC has not approved a proposed revision 30 days prior to the expiration

date of the existing surety arrangement, the licensee shall extend the existing arrangement, prior to expiration, for 1 year. Along with each proposed revision or annual update of the surety, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency, changes in engineering plans, activities performed, and any other conditions affecting estimated costs for site closure.

At least 90 days prior to beginning construction associated with any planned expansion or operational change which was not included in the annual surety update, the licensee shall provide for NRC approval an updated surety to cover the expansion or change. The licensee shall also provide NRC with copies of surety-related correspondence submitted to the State of Wyoming, a copy of the State's surety review, and the final approved surety arrangement. The licensee also must ensure that the surety, where authorized to be held by the State, identifies the NRC-related portion of the surety and covers the above-ground decommissioning and decontamination, the cost of offsite disposal of 11e.(2) byproduct material, soil and water sample analyses, and groundwater restoration associated with the site. The basis for the cost estimate is the NRC-approved site closure plan or the NRC-approved revisions to the plan. Reclamation or decommissioning plan cost estimates, and annual updates, should follow the outline in Appendix E to NUREG-1569 (NRC, 2003), entitled "Recommended Outline for Site-Specific In Situ Leach Facility Reclamation and Stabilization Cost Estimates."

Power Resources, Inc., shall continuously maintain an approved surety instrument for the Smith Ranch Project, in favor of the State of Wyoming, in the amount of no less than $14,456,300.00, for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Wyoming and the NRC.

The licensee shall continuously maintain an approved surety instrument for the Highland Uranium Project in the amount of no less than $21,278,100.00, in favor of the State of Wyoming, for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Wyoming and the NRC.

The licensee shall continuously maintain an NRC-approved surety instrument for the current non-operational Ruth facility in the amount of no less than $102,300.00, in favor of the State of Wyoming, for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State and the NRC.

The licensee shall continuously maintain an NRC-approved surety instrument for the current non-operational North Butte facility in the amount of no less than $55,400.00, in favor of the State of Wyoming, for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State and the NRC.

The licensee shall continuously maintain an NRC-approved surety instrument for the current non-operational Gas Hills Project facility in the amount of no less than $639,000, in favor of the State of Wyoming, for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State and the NRC.

The licensee shall continuously maintain an approved surety instrument for the current non-operational Reynolds Ranch ISL satellite facility in the amount of no less than $3,331,600, in favor of the State of Wyoming, for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Wyoming and the NRC.

At least 6 months prior to the expected commencement of construction of a commercial facility at the Ruth, North Butte, Gas Hills Project, and **Reynolds Ranch** sites, the licensee shall submit for NRC and State approval, an itemized cost estimate for implementation of the NRC-approved decommissioning/restoration plan for the commercial facility. Site construction activities shall not commence until the NRC and State approve the surety amount and accept the surety arrangement. This surety shall be written in favor of the State of Wyoming or the NRC for the purposes of complying with 10 CFR 40, Appendix A, Criterion 9, and shall be continuously maintained until a replacement is authorized by both the State and the NRC.

License Condition 9.6 (Revised)

9.6 The licensee shall dispose of 11e.(2) byproduct material from the Smith Ranch-Highland Uranium Project, Ruth, North Butte, Gas Hills Project, and **Reynolds Ranch** ISL facilities at a site licensed by NRC or an NRC Agreement State to receive 11e.(2) byproduct material. The licensee's approved waste disposal agreement must be maintained on-site. In the event the agreement expires or is terminated, the licensee shall notify NRC in writing, in accordance with License Condition 9.2, within 7 days after the date of expiration or termination. A new agreement shall be submitted for NRC approval within 90 days after expiration or termination unless further delay is justified and approved, or the licensee will be prohibited from further lixiviant injection.

License Condition 9.9 (Revised)

9.9 Before engaging in any developmental activity not previously assessed by the NRC, the licensee shall administer a cultural resource inventory. All disturbances associated with the proposed development will be completed in compliance with the National Historic Preservation Act (as amended) and its implementing regulations (36 CFR 800), and the Archaeological Resources Protection Act (as amended) and its implementing regulations (43 CFR 7).

In order to ensure that no unapproved disturbance of cultural resources occurs, any work resulting in the discovery of previously unknown cultural artifacts shall cease. The artifacts shall be inventoried and evaluated in accordance with 36 CFR 800, and no disturbance of the area shall occur until the licensee has received authorization from the NRC to proceed.

For the Gas Hills Project, the licensee shall comply with the stipulations for cultural resource protection in the Programmatic Agreement provided in the NRC letter to the Advisory Council on Historic Preservation, dated December 16, 2003.

For the Reynolds Ranch Project, prior to any developmental activity conducted in the following list of Sections, the licensee shall administer a cultural resource inventory in any area of the Section not previously inventoried: T36N R73W Sec 5, Sec 7, Sec 17, and Sec 18; T36N R74W Sec 11, Sec 12, Sec 13, and Sec 14; and T37N, R73W Sec 30.

License Condition 9.13 (new)

9.13 Before engaging in any uranium recovery operations in an undeveloped area, the licensee shall submit a complete evaluation of the area's baseline radiological characteristics for NRC 's review and approval.

License Condition 10.4 (new)

10.4 Reynolds Ranch

10.4.1 Processing operations for the Reynolds Ranch Satellite shall not exceed an average monthly flow rate of 4,500 gallons per minute, exclusive of restoration flow.

9.0 REFERENCES

Power Resources Inc. (2004) Reynolds Ranch Amendment, Volumes I through IV. December 2004 [Adams Accession No. ML050390095, ML050390126, ML050390168, and ML050460389]

Power Resources Inc. (2005a) Correspondence from W. F. Kearney to Gary Janosko, NRC concerning License Amendment Request - Addition of Reynolds Ranch Amendment. January 14 [Adams Accession No. ML050390076]

Power Resources, Inc. (2005b). Correspondence from W.F. Kearney to G Janosko, NRC containing Additional Information requested for the Reynolds Ranch amendment (TAC LU0082) April 7 [Adams Accession No. ML051150034]

Power Resources, Inc. (2006a). Correspondence from K. Milmine to G Janosko, NRC containing Response to NRC's Request for Additional Information (TAC LU0082) March 15 [Adams Accession No. ML060940386]

Power Resources, Inc. (2006b). Correspondence from J. McCarthy to P. Michalak, NRC concerning inconsistency in Restoration Target Values. September 19 [Adams Accession No. ML062710273]

Power Resources, Inc. (2006c). Correspondence from J. Winter to P. Michalak, NRC concerning surety Smith Ranch-Highland Uranium Project surety updates. December 14 [Adams Accession No. ML0636303967]

Nuclear Regulatory Commission (1974) Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors. June [Adams Accession No. ML003740243]

Nuclear Regulatory Commission (1979) Regulatory Guide 4.15, Revision 1 - Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment February [Adams Accession No. ML003739945]

Nuclear Regulatory Commission (1980) Regulatory Guide 4.14, Revision 1 - Radiological Effluent and Environmental Monitoring at Uranium Mills. April [Adams Accession No. ML003739941]

Nuclear Regulatory Commission (1988) Regulatory Guide 8.22, Bioassay at Uranium Mills. August [Adams Accession No. ML003739586]

Nuclear Regulatory Commission (1992) Regulatory Guide 8.34, Monitoring Criteria and Methods To Calculate Occupational Radiation Doses. July [Adams Accession No. ML003739502]

Nuclear Regulatory Commission (1993) Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License for Byproduct, Source or Special Nuclear Material. April [Adams Accession No. ML061980584]

Nuclear Regulatory Commission (1996) Regulatory Guide 8.29, Revision 1 - Instruction Concerning Risks From Occupational Radiation Exposure. February [Adams Accession No. ML003739438]

Nuclear Regulatory Commission (1999) Regulatory Guide 8.13, Revision 3 - Instruction Concerning Prenatal Radiation Exposure. June [Adams Accession No. ML003739505]

Nuclear Regulatory Commission (2002) Regulatory Guide 8.31, Revision 1 - Information Relevant to Ensuring that occupational Radiation Exposures at Uranium Recovery Facilities will be as low as Reasonably Achievable. May [Adams Accession No. ML021260630]

Nuclear Regulatory Commission (2003a) NUREG-1569 - Standard Review Plan for In Situ Leach Uranium Extraction License Applications. Final Report. June

Nuclear Regulatory Commission (2003b) NUREG-1620, Rev. 1 - Standard Review Plan for the Review of a Reclamation Plan for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act of 1978. Final Report. June

Nuclear Regulatory Commission (2006) Environmental Assessment for the Reynolds Ranch Amendment to Source Materials License SUA-1548) November 30 [Adams Accession No. ML062690386]

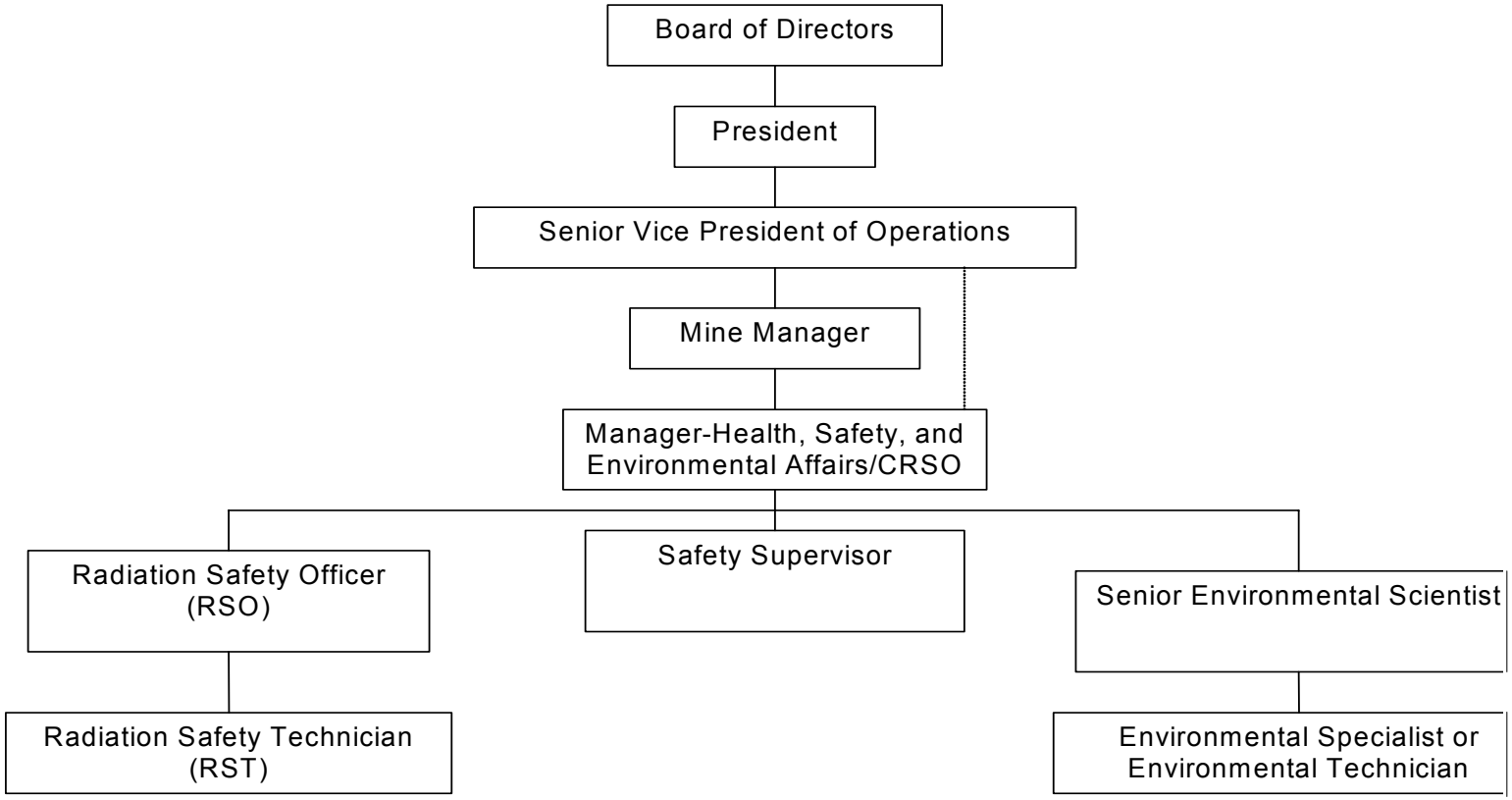

Figure1: PRI Environmental, Health, and Safety Reporting Structure (PRI 2004)

TABLE 1

BASELINE WATER QUALITY PARAMETERS

Parameter	Lower Detection Limit*
Alkalinity	0.1
Ammonium	0.05
Arsenic	0.001
Barium	0.1
Bicarbonate	0.1
Boron	0.1
Cadmium	0.1
Calcium	0.01
Carbonate	0.05
Chloride	0.1
Chromium	0.1
Copper	0.05
Electrical Conductivity @ 25 degrees C	0.01
Fluoride	1 micromho/cm
Iron	0.1
Lead	0.05
Magnesium	0.05
Manganese	0.01
Mercury	0.01
Molybdenum	0.0005
Nickel	0.05
Nitrate	0.05
pH	0.01
Potassium	0-14 s.u.
Radium-226	0.1
Selenium	0.1 pCi/L
Sodium	0.001
Sulfate	0.05
Total Dissolved Solids	0.5
Uranium	1
Vanadium	0.001
	0.1

* mg/L unless specified

PRI (2004)