3.0 DESCRIPTION OF PROPOSED FACILITY

3.1 *In Situ* Leaching Process and Equipment

3.1.1 Areas of Review

The staff should review the *in situ* leaching process as described in the application. This review should include, but not be limited to

(1) A description of the mineralized zone(s) and the feasibility of processing the defined well field areas

(2) Well construction techniques and integrity testing procedures to ensure well installations will not result in hydraulic communication between production zones and adjacent non-mineralized aquifers

(3) A process description including injection/production rates and pressures; plant material balances and flow rates; lixiviant makeup; recovery efficiency; and gaseous, liquid, and solid wastes and effluents that will be generated

(4) Proposed operating plans and schedules that include timetables and sequences for well field operation, surface reclamation, and ground-water restoration

(5) Review of techniques for ensuring that a proliferation of small waste disposal sites is avoided.

The review should also include maps showing the facilities layout, descriptions of the process and/or circuit, water and material balances, and the chemical recycling system.

3.1.2 Review Procedures

The staff should determine whether the description of the *in situ* leaching process provided in the application is sufficient to permit evaluation of the operations and processes involved in conformance with the acceptance criteria contained in Section 3.1.3. Staff should ensure the following are included in this section: a map or maps showing the proposed sequence and schedules for uranium extraction and ground-water quality restoration operations, a flow diagram of the process or circuit, a material balance diagram, a description of any chemical recycle systems, a water balance diagram for the entire system, and a map or maps showing the proposed sequence and schedules for land reclamation of the well field areas.

If wells are not properly completed, lixiviant can flow through casing breaks and into overlying aquifers. Casing breaks can occur if the well is damaged during well construction activities. Casing breaks can also occur if water injection pressures exceed the strength of the well materials. Well completion techniques should be reviewed in sufficient detail to give the reviewer a clear understanding of how recovery, injection, and monitor wells are drilled; how their location and spacing are selected; and what materials and methods are used in construction, casing installation, and abandonment. The reviewer should pay particular attention to the techniques employed to prevent hydraulic communication between overlying or

underlying aquifers through well boreholes and ensure that secondary ground-water protection standards are not violated (10 CFR Part 40, Appendix A, Criteria 5B, 5C, and 13). Additionally, the applicant should describe methods for well abandonment. The reviewer should ensure that the well casing material used is appropriate for the depths to which the wells are drilled. The reviewer should examine a description of the procedures used to test well integrity. The wells should be retested with sufficient frequency to ensure the integrity of the well construction. The reviewer should examine in detail the justification provided by the licensee for the recommended time interval between successive well integrity tests. The reviewer may refer to a well handbook (e.g., Driscoll, 1989) to verify the appropriateness and expected performance of well installation, testing, and abandonment methods.

To ensure that hydraulic communication between overlying or underlying aquifers through well boreholes is promptly detectable, the reviewer should pay particular attention to the design and installation of vertical and horizontal excursion monitoring wells. Additional review procedures for excursion monitoring systems are provided in Section 5.7.8.2 of this standard review plan.

The reviewer should also pay particular attention to the methods used for effective detection of leaks in surface and near-surface pipes carrying the lixiviant solutions to individual wells within a well field or between the well fields and the processing facilities. Spills of pregnant lixiviant in particular can constitute a significant hazard to health and the environment if allowed to pond and dry on the ground surface, to run off into surface-water bodies, or to infiltrate and transport to ground-water.

The reviewer should determine that any lined impoundment to contain wastes is acceptably designed, constructed, and installed. Materials used to construct the liner should be reviewed to determine that they have acceptable chemical properties and sufficient strength for the design application. The reviewer should determine that the liner will not be overtopped. The reviewer should determine that a proper quality control program is in place. The review should be based on the concept that the site will be in compliance with 10 CFR Part 40, Appendix A, Criterion 2, which precludes long-term disposal of byproduct material onsite and ensures that the proliferation of small waste disposal sites is avoided. The reviewer shall examine the terms of the approved waste disposal agreement.

For surface impoundments containing 11e.(2) byproduct material, the reviewer should ensure that the applicable requirements of 10 CFR Part 40, Appendix A, Criterion 5(A) have been met. If the waste water retention impoundments are located below grade, the reviewer should determine that the surface impoundments have an acceptable liner and leak detection system in place to ensure protection of ground water. The location of a surface impoundment below grade will eliminate the likelihood of embankment failure that could result in any release of waste water. Should the applicant propose to construct a surface impoundment to handle waste water, the reviewer should determine that the design of associated dikes is such that they will not experience massive failure. The design of such dikes to resist erosion and protect against possible flooding events is evaluated in Section 2.7 of this standard review plan. In this section, the reviewer should evaluate the stability of any dikes with respect to seismic events.

In addition, the reviewer should evaluate any proposed surface impoundment to determine if it meets the definition of a dam as given in Regulatory Guide 3.11 (NRC, 1977). If this is the

case, the surface impoundment should be included in the NRC Dam Safety Program, and be subject to Section 215, National Dam Safety Program of the Water Resources Development Act of 1996. If the reviewer finds that the impoundment meets the definition of a dam, an evaluation of the dam ranking (low or high hazard) should be made. If the dam is considered a high hazard, an Emergency Action Plan is needed consistent with Federal Emergency Management Agency requirements. For low-hazard dams, no Emergency Action Plan is required. For either ranking of dam, the reviewer should also determine that the licensee has an acceptable inspection program in place to ensure routine checks, and that performance is properly maintained (see Section 5.3 of this standard review plan).

In conducting these evaluations, the reviewer shall consider the technical evaluations conducted by a state or another federal agency with authorities overlapping those of the NRC. Ground-water compliance and protection reviews are the primary technical areas impacted by overlapping authorities. The desired outcome is to identify any areas where duplicative NRC reviews may be reduced or eliminated. The NRC staff must make the necessary evaluations of compliance with applicable regulations for licensing the facility. However, the reviewer may, as appropriate, rely on the applicant's responses to inquiries made by a state or another federal agency to support the NRC evaluation of compliance. The reviewer should make every effort to coordinate the NRC technical review with the state or other federal agency with overlapping authority to avoid unnecessary duplication of effort.

For license renewals and amendment applications, Appendix A to this standard review plan provides guidance for examining historical aspects of facility operations and the approach that should be used in evaluating amendments and renewal applications.

3.1.3 Acceptance Criteria

The *in situ* leaching process and equipment are acceptable if they meet the following criteria:

(1) The description is sufficiently detailed to identify the mineralized zone(s), their areal distribution, and their approximate thickness.

If more than one mineralized zone is to be leached, each zone should be defined separately. The estimated U_3O_8 grade should be specified.

(2) Well design, testing, and inspection reflect accepted NRC practice for *in situ* leach operations.

(a) Well Design and Construction—Injection and recovery wells should be constructed from materials that are inert to lixiviants and are strong enough to withstand injection pressures. Polyvinyl Chloride, fiberglass, or acrylonitrile butadiene styrene plastic casings are generally used in wells less than 300-m [1,000-ft] deep. Wells deeper than 300-m [1,000-ft], or those subjected to high-pressure cementing techniques, are subject to collapse. With appropriate design and installation techniques, however, Polyvinyl Chloride can be used for wells greater than 300 m [1,000 ft]. In these instances, steel or fiberglass casing

is generally necessary. In all wells (including monitor wells), the annular space between the side of the borehole and the casing should be backfilled with a sealant from the bottom of the casing to the surface in one continuous operation. Proper backfilling isolates the screened formation against vertical migration of water from the surface or from other formations, and also provides support for the casing. Cement or cement-bentonite grout is generally acceptable as a sealant.

Procedures in American Society for Testing and Materials D 5092 provide acceptable methods for design and construction of monitoring wells (American Society for Testing and Materials, 1995). Material normally used for monitor well casing is either metal or plastic. The possibility that chemical reactions may take place between the casing and the mineral constituents in the water affects the choice of casing material used for monitor wells. For example, iron oxide in steel-cased wells will adsorb trace and heavy metals dissolved in the ground water. Therefore, a baseline water sampling program should be used to determine concentrations of trace metals. The applicant should use casing that is inert to these metals, such as Polyvinyl Chloride or fiberglass. When any well is completed, it should be developed until production of essentially sediment-free water is assured for the life of the well. One acceptable development method is to use a swab in the well to create a vacuum on the upstroke and positive pressure on the downstroke. Air lifting is also an acceptable method for well development. Other state- or EPA-approved well development methods may also be used.

(b) Well Integrity Testing—Injection and recovery wells should be tested for mechanical integrity. The following are examples of well integrity testing procedures that have been considered acceptable in previous applications. To inspect for casing leaks after a well has been completed and opened to the aquifer, a packer is set above the well screen, and each well casing is filled with water. At the surface, the well is pressurized with either air or water to above the expected operating pressure. The well pressure is then monitored for a period of 30 minutes to 1 hour to ensure significant pressure drops do not occur through borehole leaks. Operating pressure varies with the depth of the well and should be less than formation fracture pressure. Well integrity tests should be performed on each injection and production well before the wells are utilized and on wells that have been serviced with equipment or procedures that could damage the well casing. Additionally, each well should be retested with sufficient frequency (once each 5 years or less) to ensure the integrity of the well construction if it is in use. Sole reliance on single-point resistance geophysical tools is not acceptable for determining the mechanical integrity at a well.

(3) The number, location, and screened intervals of excursion monitoring wells are described in sufficient detail, follow industry standard practice, and are adequate to ensure prompt detection of horizontal and vertical excursions, taking into account site specific parameters such as local geology and hydrology. Acceptance criteria for

methods and calculations used to determine the placement of horizontal and vertical excursion monitoring wells are presented in Section 5.7.8.3 of this standard review plan.

(4) Methods for timely detection and cleanup of leaks from surface and near-surface pipes within the well fields and between the well field and processing facilities are clearly described and included in the design.

(5) The description of the *in situ* leaching process includes the following information and demonstrations:

(a) Projected down-hole injection pressures with the hydrostatic pressure of the fluid column should be demonstrated to be maintained below casing (casing and cement) failure pressures and formation fracture pressures, to avoid hydrofracturing the aquifer and promoting leakage into the overlying units. Piping burst strength should be considered in deep well fields {greater than about 305 m [1,000 ft]}.

(b) Overall production rates should be higher than injection rates.

(c) Proposed plant material balances and flow rates should be acceptably described.

(d) Lixiviant makeup should be such that impact on the ground-water quality and the prospects for long-term ground-water restoration will be maintained at levels that ensure acceptable restoration goals can be achieved in a timely manner. Oxidants such as gaseous oxygen and hydrogen peroxide, and carbonates such as sodium bicarbonate or carbon dioxide gas have been demonstrated in a number of *in situ* leach facilities to be suitable lixiviants.

(e) The description should identify gaseous, liquid, and solid wastes and effluents that will be generated. Effluent monitoring and control measures are discussed in Section 4.0 of this standard review plan.

(f) An analysis of the effects that *in situ* leach operations are likely to have on surrounding water users has been provided. An acceptable impact analysis should be based on results of numerical or analytical modeling calculations that are used to estimate ground-water travel times from the proposed extraction areas to the nearby points of ground-water or surface-water usage, estimate the amount of process bleed necessary to prevent migration of lixiviant from the well field, and describe the applicant's mitigative measures to recover lixiviant excursions. If the applicant chooses to use nominal parameter estimates, parameter uncertainties should be considered to ensure that the selected values represent expected conditions. An acceptable impact analysis should describe the following:

(i) The ability to control the migration of lixiviant from the production zones to the surrounding environs

(ii) 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

(iii) The impact of *in situ* leach operations on ground-water flow patterns and aquifer levels

(iv) The expected post-extraction impact on geochemical properties and water quality

(6) Proposed operating plans and schedules include timetables for well field operation, surface reclamation, and ground-water restoration. Water balance calculations should be provided that demonstrate that the liquid waste disposal facilities (surface impoundments, land application, deep well injection) are adequate to process the proposed production and restoration efforts at any time.

(7) The staff should verify the applicant analyses or perform independent review analyses of floods and flood velocities. If the design assumptions and calculations are reasonable, accurate, and compare favorably with independent staff estimates, the designs are acceptable.

(8) The staff should evaluate the design of diversion channels in several critical areas using the criteria and guidance presented in NUREG–1623 (NRC, 1998). For the main channel area, the staff should verify that appropriate models and input parameters have been used to design the erosion protection. The staff should assure that flow rates, flow depths, and shear stresses have been correctly computed. The diversion channels should be sized and protected to pass a probable maximum flood with minimal, if any, damage to the diversion channel. No release of contained materials should occur during a probable maximum flood. The staff should determine that the depth of burial of any disposed of material is sufficient to preclude bottom scouring, if an existing or constructed channel is located in or near a pit or impoundment. Where practical, the use of diversion channels at new facilities should be avoided to lessen costs of reclamation and future maintenance.

(9) The staff should review the plans, specifications, inspection programs, and quality assurance/quality control programs to assure that acceptable measures are being taken to construct the facility according to accepted engineering practices. The staff will compare the information provided with typical programs used in the construction industry.

(10) Results from research and development or other production operations are used to support the description of the *in situ* leaching process, where appropriate.

(11) The applicant has an approved waste disposal agreement for 11e.(2) byproduct material disposal at an NRC or NRC Agreement State licensed disposal facility. This agreement is maintained onsite. The applicant has committed to notify NRC in writing within 7 days if this agreement expires or is terminated and to submit a new agreement for NRC

approval within 90 days of the expiration or termination (failure to comply with this license condition will result in a prohibition from further lixivient injection).

3.1.4 Evaluation Findings

If the staff review as described in this section results in the acceptance of the *in situ* leaching process and equipment, the following conclusions may be presented in the technical evaluation report.

NRC has completed its review of the *in situ* leaching process and equipment proposed for use at the _____ *in situ* leach facility. This review included an evaluation using the review procedures in standard review plan Section 3.1.2 and the acceptance criteria in standard review plan Section 3.1.3.

The applicant has acceptably described the mineralized zone(s) demonstrated protection against vertical migration of water, proposed tests for well integrity, and demonstrated that the *in situ* leaching 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; (iv) lixiviant makeup is such that restoration goals can be achieved in a timely manner; (v) recovery efficiency is assessed through mass balance calculations; and (vi) reasonable estimates of gaseous, liquid, and solid wastes and effluents are provided (used in evaluation of effluent monitoring and control measures in standard review plan Section 4.0). The applicant has used the results from research and development or other production operations to support the evaluation of the *in situ* leaching process. The applicant has provided acceptable operating plans, schedules, and timetables for well field operation, surface reclamation, and ground-water restoration.

Based on the information provided in the application and the detailed review conducted of the *in situ* leaching process and equipment for the _____ *in situ* leach facility, the staff concludes that the proposed *in situ* leaching process and equipment are acceptable and are in compliance with 10 CFR 40.32(c), 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(c), which requires the applicant to confine source or byproduct material to the location and purposes authorized in the license; and 10 CFR Part 40, Appendix A, Criteria 2 for non-proliferation of small disposal sites; 5(A) for ground-water protection; 5B for secondary ground-water protection; 5C for maximum values for ground-water protection; and 13 for hazardous constituents. The related reviews of the 10 CFR Part 20 radiological aspects of the *in situ* leaching process and equipment in accordance with standard review plan Sections 4.0, "Effluent Control Systems;" 5.0, "Operations;" and 7.0, "Environmental Effects;" are addressed elsewhere in this technical evaluation report.

3.1.5 References

American Society for Testing and Materials. "Standard Practice for Design and Installaiton of Ground Water Monitoring Wells in Aquifers." Designation D5092-90. Philadelphia, Pennsylvania: American Society for Testing and Materials. 1995.

Driscoll, F.G. "Groundwater and Wells." St. Paul, Minnesota: Johnson Filtration Systems, Inc. 1989.

NRC. "Recommendation on Ways to Improve the Efficiency of NRC Regulation at *In Situ* Leach Uranium Recovery Facilities." SECY–99–0013. Washington, DC: NRC. 2000.

———. NUREG–1623, "Design of Erosion Protection for Long-Term Stabilization." Washington, DC: NRC. 1998.

———. Regulatory Guide 3.11, "Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills." Washington, DC: NRC, Office of Standards Development. 1977.

3.2 Recovery Plant, Satellite Processing Facilities, Well Fields, and Chemical Storage Facilities—Equipment Used and Materials Processed

3.2.1 Areas of Review

The staff should review the physical descriptions and reported operating characteristics for the major equipment items of the processing cycle. The staff should also review descriptions of the proposed process information and controls, as well as radiation sampling and monitoring equipment. Controls mean the apparatus or mechanisms that could affect the chemical, physical, metallurgical, or nuclear processes of the facility in such a manner as to influence radiation health and safety. The staff should review a diagram that indicates the plant layout and locations where dusts, fumes, or gases would be generated; locations of all ventilation, filtration, confinement, and dust collection systems; and radiation safety and radiation monitoring devices.

In addition, staff should review the list and specifications related to all radioactive and hazardous materials used in the recovery plant, satellite processing facilities, well fields, and chemical storage facilities. These should be reviewed for the hazards associated with the quantities, locations, operating flow rates, temperatures, and pressures associated with these materials.

While safety concerns with the use of all hazardous materials are important and need to be addressed, direct NRC regulatory authority is limited to situations where hazardous materials have a potential affect on radiological safety. Chemicals of concern typically used in the uranium *in situ* leach facilities are identified in NUREG/CR–6733 (NRC, 2001). Therefore, staff should review the list of applicable federal, state, and local regulations that the licensee intends

to use, to ensure that all hazardous chemicals that have the potential to impact radiological safety, are safely handled. Staff should also review the safety features used in the facility process design for eliminating or mitigating the hazards presented by these materials.

3.2.2 Review Procedures

The staff should determine whether the physical descriptions and reported operating characteristics for the major equipment items of the processing cycle, the proposed controls, and safety/radiation instrumentation are sufficient to evaluate the performance of the proposed uranium *in situ* leach facility. Staff should ensure that the application identifies all areas where releases of radioactive and hazardous materials (such as radon gas and uranium dust) can occur and that locations of control equipment (e.g., ventilation and exhaust systems) and instrumentation are provided.

Staff should determine whether the hazards associated with the storage and processing of the radioactive materials and those hazardous materials with the potential to impact radiological safety, have been sufficiently addressed in the process design for the recovery plant, satellite processing facilities, well fields, and chemical storage facilities.

For license renewals and amendment applications, Appendix A to this standard review plan provides guidance for examining facility operations and the approach that should be used in evaluating amendments and renewal applications.

3.2.3 Acceptance Criteria

The description of the equipment used and materials processed in the recovery plant, satellite processing facilities, well fields, and chemical storage facilities is acceptable if it meets the following criteria:

(1) The application provides diagrams showing the proposed (or existing) plant/facilities layout in adequate detail.

(2) Areas where dusts, fumes, or gases would be generated are clearly identified, along with a description of the source of the emissions.

(3) All ventilation, filtration, confinement, dust collection, and radiation monitoring equipment are described as to size, type, and location.

(4) Availability requirements for safety equipment are adequately stated, and measures for ensuring availability and reliability are clearly identified.

(5) Specifications, quantities, locations, and operating conditions such as flow rates, temperatures, and pressures of radioactive materials and those hazardous materials with the potential to impact radiological safety, are clearly identified together with the hazards associated with these materials.

Description of Proposed Facility

(6) A list of applicable federal, state and local regulations that the licensee intends to use to ensure that process chemicals having the potential to impact radiological safety are safely handled, is provided.

(7) Controls used for eliminating or mitigating the hazards presented by the radioactive materials and those hazardous materials with the potential to impact radiological safety, are adequately described.

Further discussion on Criteria 4–7 may be found in NUREG/CR–6733 (NRC, 2001).

3.2.4 Evaluation Findings

If the staff review as described in this section results in the acceptance of the equipment used and materials processed in the *in situ* leach facility, the following conclusions may be presented in the technical evaluation report.

NRC has completed its review of the equipment proposed for use and materials to be processed in the recovery plant, satellite processing facilities, well fields, and chemical storage facilities at the _____ *in situ* leach facility. This review included an evaluation using the review procedures in standard review plan Section 3.2.2 and the acceptance criteria outlined in standard review plan Section 3.2.3.

Based on the information provided in the application and the detailed review conducted of the equipment to be used and materials to be processed in the recovery plant, satellite processing facilities, well fields and chemical storage facilities for the _____ *in situ* leach facility, the staff concludes that the proposed equipment to be used and materials to be processed in the recovery plant, satellite processing facilities, well fields, and chemical storage facilities are acceptable and are in compliance with 10 CFR 40.32(c), which requires that applicant proposed equipment, facilities, and procedures 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; and 10 CFR 40.41(c), which requires the applicant to confine source or byproduct material to the locations and purposes authorized in the license. The related reviews of the 10 CFR Part 20 radiological aspects of the recovery plant equipment in accordance with standard review plan Sections 4.0, “Effluent Control Systems;” 5.0, “Operations;” and 7.0, “Environmental Effects” are addressed elsewhere in this technical evaluation report.

3.2.5 Reference

NRC. NUREG/CR–6733, “A Baseline Risk-Informed, Performance-Based Approach for *In Situ* Leach Uranium Extraction Licensees.” Washington, DC: NRC. 2001.

3.3 Instrumentation and Control

3.3.1 Areas of Review

The staff should review descriptions of the proposed process instrumentation and controls and radiation safety sampling and monitoring instrumentation, including their minimum specifications and operating characteristics. This review should include well field process control equipment for monitoring injection pressures, injection rates, and production rates. It should also include safety related process monitoring and control equipment used in the recovery plant, satellite processing facilities, well fields, chemical storage facilities, and surface impoundments.

3.3.2 Review Procedures

The staff should review the descriptions of the proposed instrumentation and control systems provided in the application to determine whether they are sufficient to evaluate the interrelationship between the proposed instrumentation systems and the operations or processes to be controlled or monitored. The staff should also determine whether the proposed instrumentation systems are sufficient to control and monitor operations and processes identified in the description of the proposed facility. Particular attention should be focused on whether proposed monitoring and control instrumentation is adequate to quickly identify and remedy *in situ* leaching and processing problems that can increase exposures to radiological and chemical hazards. Areas of concern include monitoring and ventilation systems designed to detect and control elevated releases of yellowcake dust from drying and storage operations and radon gas buildup in buildings. Areas of concern also include instrumentation used to record, monitor and control key operating parameters of the yellowcake dryers and their associated stack emission scrubbing systems. Instrumentation to detect and control liquid releases from well field and processing pipe failures, surface impoundment leaks, and chemical tank valve failures should also be evaluated in the staff review.

For license renewals and amendment applications, Appendix A to this standard review plan provides guidance for examining facility operations and the approach that should be used in evaluating amendments and renewal applications.

3.3.3 Acceptance Criteria

The facility instrumentation is acceptable if it meets the following criteria:

(1) Instrumentation has been described for the various components of the processing facility, including well fields, well field houses, trunk lines, the production circuit, surface impoundments, and deep injection disposal wells.

(2) Instrumentation is designed to allow the plant operator to continuously monitor and control a variety of systems and parameters, including total flow into the plant, total waste flow leaving the plant, tank levels, and the yellowcake dryer. Instrumentation includes alarms and interlocks in the event of a failure.

(3) Control components of the systems are equipped with backup systems that activate in the event of a failure of the operating system or a common cause failure such as power failure.

(4) Well field operating pressures are kept below casing and formation rupture pressures to prevent vertical excursions. Well field operation pressures are routinely monitored either at the well head or on the entire system, and are measured and recorded daily.

(5) Manufacturer's recommendations for maintenance and operation of yellowcake dryers, and checking and logging requirements contained in 10 CFR Part 40, Appendix A. Criterion 8 are followed.

3.3.4 Evaluation Findings

If the staff review as described in this section results in the acceptance of the facility instrumentation and control systems, the following conclusions may be presented in the technical evaluation report.

NRC has completed its review of the instrumentation and control proposed for use at the _____ *in situ* leach facility. This review included an evaluation using the review procedures in standard review plan Section 3.3.2 and the acceptance criteria outlined in standard review plan Section 3.3.3.

The instrumentation and control systems have been acceptably described for components including the well fields, well field houses, trunk lines, production circuit, surface impoundments, 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, tank levels, and the yellowcake dryer. Appropriate alarms and interlocks are part of the instrumentation systems. Each control system is equipped with an acceptable backup system that automatically activates in the event of a failure of the operating system or a common cause failure such as a power failure.

Based on the information provided in the application and the detailed review conducted of the instrumentation and control for the _____ *in situ* leach facility, the staff concludes that the proposed instrumentation is acceptable and is in compliance with 10 CFR 40.32(c), which requires applicant 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; and 10 CFR 40.41(c), which requires the applicant to confine source or byproduct material to the locations and purposes authorized in the license. The related reviews of the 10 CFR Part 20 radiological aspects of the solution mining process and equipment, in accordance with standard review plan Sections 4.0, "Effluent Control Systems;" 5.0, "Operations;" and 7.0, "Environmental Effects" are addressed elsewhere in this technical evaluation report.

3.3.5 References

None.