

September 11, 2008

Mr. Michael Thomas
Environmental, Safety, and Health Manager
Uranerz Energy Corporation
1701 East "E" Street
P.O. Box 50850
Casper, WY 82605-0850

SUBJECT: LICENSE APPLICATION REQUEST – URANERZ ENERGY CORPORATION'S
NICHOLS RANCH ISR PROJECT - REQUEST FOR ADDITIONAL
INFORMATION (TAC J00553)

Dear Mr. Thomas:

By letter dated November 30, 2007, Uranerz Energy Corporation, (Uranerz) submitted a Source Materials License application to the U.S. Nuclear Regulatory Commission (NRC) staff for the Nichols Ranch ISR Project, a proposed *in situ* leach (ISL) uranium recovery facility in Johnson and Campbell Counties, Wyoming. By letter dated April 14, 2008, the staff informed you that we completed our acceptance review of your application and found it acceptable for technical review. NRC staff has now completed a detailed review of the Technical Report supporting your application. Our review has identified deficiencies in the Technical Report and we will need additional information from Uranerz to complete our review of your license application.

During the technical review, the staff identified issues related to both groundwater and radiological protection. The staff's groundwater issues regard the effects of coal bed methane produced water on surface and groundwater, the unconfined conditions in the Hank production zone, the estimate of the number of pore volumes that will be required to restore the production zone, and supporting basis that Uranerz will be able to restore the production zone to NRC standards. The staff's radiological protection issues regard the adequacy of the meteorological data, radiological environmental monitoring and gaseous effluent monitoring.

The request for additional information (RAI) is included in the enclosure. Within 30 days, please either provide the information requested or a schedule for submitting the requested information. Please note that untimely responses to this RAI, could delay completion of the safety review. We are available to meet with you to discuss the requested information.

If you have any questions concerning this letter, please contact me, either by telephone at (301) 415-7777, or by e-mail at ron.linton@nrc.gov.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Ron C. Linton, Project Manager
Uranium Recovery Licensing Branch
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Docket No. 040-09067

Enclosure: Request for Additional Information

cc: G. Mooney, WDEQ

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Docket No. 040-09067

Enclosure: Request for Additional Information

cc: G. Mooney, WDEQ

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**U.S. Nuclear Regulatory Commission Request for Additional Information
Uranerz Energy Corporation Nichols Ranch ISR Project
Application for a U.S. Nuclear Regulatory Commission Source Materials License**

By letter dated November 30, 2007, Uranerz Energy Corporation (the applicant) submitted a Source Materials License application to the U.S. Nuclear Regulatory Commission (NRC) staff for the Nichols Ranch ISR Project, a proposed *in situ* leach (ISL) uranium recovery facility. NRC staff has completed its technical review of this application and offers the following Request for Additional Information (RAI). In this RAI, staff refers to the Nichols Ranch ISR Project, which consists of the Nichols Ranch Unit and the Hank Unit. In various portions of the RAI, the staff may request information for the entire Nichols Ranch ISR Project or for the Nichols Ranch Unit and Hank Unit, individually. Individual information requests are organized by the section in which the subject matter is found in the application. A basis for requesting the information is provided for each section of the RAI.

Section 2.0 Site Characterization

Section 2.5 Meteorology

The applicant has not provided sufficient information regarding the meteorological characteristics of the site in Section 2.5 to enable the staff to fully understand this topic and to support other reviews dependent on that understanding, such as dose to members of the public. Specifically, please provide the following information:

- a. Section 2.5.2, pg. TR-26. Provide maximum, minimum, and average monthly temperatures. The applicant provides a brief narrative of the temperature data; however, the actual data is not included.
- b. Section 2.5.3, pg. TR-26. Provide maximum, minimum, and average monthly. The applicant provides a brief narrative of the precipitation data; however, the actual data is not included.
- c. Section 2.5.4, pg. TR-26 and TR-27
 - i. Provide average monthly wind speed data and identify the maximum, minimum, and average monthly wind speed.
 - ii. The applicant provides a wind rose for January (1961-1990) but does not show any additional wind roses for other months. Provide average monthly wind rose data (for each month), along with the average annual wind rose data.
 - iii. See comment 7.3(b).

Enclosure

- d. General Comment(s) for Section 2.5
- i. Provide seasonal diurnal data for a 24-hour period.
 - ii. Provide information on the height of the meteorological instruments used to generate the data in this application and provide the average mixing layer or inversion height data. This information is important to assess doses to individual members of the public.
 - iii. It is noted in Figure 1-3, Hank Unit Contour Map, that several buttes are located within the vicinity of the Hank unit. In light of this observation, the applicant does not provide any information about the effects of nearby water bodies or terrain on meteorological measurements. Please provide such information for both the Nichols Ranch Unit and the Hank Unit.

2.6 Geology and Seismology

The geologic descriptions provided in the application are insufficient to fully interpret the geology of the license area. This information is important for understanding the degree and extent of production zone confinement and the adequacy of the hydraulic testing and proposed monitoring networks. Provide the following:

- a. Isopachs for the “B sand”, overlying shale, “A sand,” underlying shale, and “1 sand” for the Nichols Ranch Unit.
- b. Cross-section for the west limb of the Nichols Ranch Unit.
- c. Isopachs for the “G sand”, overlying shale, “F sand”, underlying shale, and “B sand” for the Hank Unit.
- d. Surface geological maps in Nichols Ranch and Hank units clearly showing areas of alluvium.
- e. Explain how a porosity of 0.05 was determined for the “A sand” and “F sand” at the Nichols Ranch and Hank units.

Section 2.7 Hydrology

Section 2.7.1 Surface Water

The analysis of the surface water hydrology and quality in the proposed license areas is currently insufficient to determine the potential for floods to disrupt the operation of the facility or to interpret the impact of operations on surface water quality. Please provide the following:

- a. Maps at appropriate scale clearly showing the location, size and shape of surface water features within each proposed license area.

- b. Maps showing areas inundated during major flood events within each proposed license area.
- c. A discussion of the potential for flooding of the area around the central plant facility and the provisions to protect critical equipment and components.
- d. Name, physically describe, and provide peak flow estimates at recurrence intervals for all drainages within the Nichols Ranch Unit near or crossing the planned wellfields noted on topographic maps. One such drainage is marked by sediment sampling points SD 2, 3, and 4. A second drainage is marked by SD 1 and 6.
- e. Provisions for erosion and wellhead protection against the effects of flooding from all drainages in the Nichols Ranch Unit that flow near or through planned wellfields or an explanation why protection is not necessary. All berms, culverts, rock riprap, drainage or diversion channels must be designed to meet the requirements of 10 CFR Part 40, Appendix A.
- f. Name, physically describe, and provide peak flow estimates at recurrence intervals for all drainages within the Hank Unit near or crossing the planned wellfields noted on topographic maps. These drainages are denoted by sediment sampling points SD 8, SD 10, SD 11, SD 12, SD 14, SD 15, SD 18, and SD 19.
- g. Provisions for erosion and wellhead protection against the effects of flooding from all drainages in Hank Unit that flow near or through planned wellfields or explain why protection is not necessary. All berms, culverts, rock riprap, drainage or diversion channels are suggested to follow a design which meets the requirements of 10 CFR Part 40, Appendix A.
- h. Maps which show the existing or planned National Pollution Discharge Elimination System (NPDES) permit Coal Bed Methane (CBM) water discharge points to surface water features or drainages in or surrounding each license area within a five-mile radius.
- i. Tables of existing or planned volumes and water quality standards for each identified NPDES permit CBM produced water discharge point within a five mile radius of each license area.
- j. A discussion of how CBM produced water discharge to surface water or drainages may or may not impact the surface water quality at Nichols Ranch or the Hank Unit.
- k. Maps which show the existing or planned NPDES permit CBM produced water surface impoundments in or surrounding each license area within a five mile radius.
- l. Tables of existing or planned NPDES permit volumes and water quality standards for each CBM produced water impoundment within a five mile radius of each license area.
- m. A discussion of how CBM produced water infiltration from impoundments may or may not impact the surficial aquifer water quality at Nichols Ranch or the Hank Unit.

- n. A separate map for each unit showing the exact locations of the surface water sampling sites given in Table D6A.1-1. The table provides coordinates which appear to indicate none of the surface water samples were located within any of the license areas.
- o. Recent surface water samples from all sites within the Nichols Ranch and Hank Unit to provide baseline values. All surface water quality values provided in the application are based on 1978 and 1979 samples outside the license areas.

Section 2.7.2 Groundwater Hydrology

The analysis of the groundwater hydrology and quality in the proposed license areas is currently insufficient to interpret the impact of operations on groundwater flow and quality. This requested information will allow the staff to assess the applicant's ability to control its subsurface process fluids and the applicant's monitoring program. Please provide the following:

- a. A map of "F sand" water level contours at the Hank Unit alone with the same scale and contour level used in Figure 2-19 for the "A sand" at the Nichols Ranch Unit. The current scale of the "F sand" water level contour map on Figure 2-20 is too large to interpret the groundwater flow field at the Hank Unit.
- b. A notation for the type of water use for all wells in Tables 2-10 and 2-11 (stock, drilling water, etc.). Also identify all artesian wells (water level above ground surface) in and surrounding the Nichols Ranch and Hank units in the tables.
- c. A clarification of specific well conditions at the Hank Unit (Table 2-11), specifically: multiple screens or completions in North Dry Willow and others; a description of Connie #2; a definition of the "X aquifer."
- d. Corrected time series plots of aquifer water levels at the Nichols Ranch and Hank units to reflect corrected water levels (Figures D6D1-1.-1-3 and D6D2-1-2-4).
- e. Cross-sections showing the water levels in the overlying, ore zone, and underlying aquifers at the Nichols Ranch Unit (Sands 1, A, B, F).
- f. Cross-sections that show water levels for the alluvium, "G sand" and "F sand" at Nichols Ranch Unit to clearly identify the surficial aquifer. The applicant has identified the "F sand" as the overlying and surficial aquifer at Nichols Ranch Unit. It is not clear if the "F sand" aquifer is the only sand acting as the surficial aquifer across this unit. The "G sand" is also present across this license area and its saturation is not addressed. In addition, alluvium deposits are present across this unit and one alluvium well, URNZQ-4, has water at a depth of 9.5 ft bgs. Based on this information, the sands which act as the surficial aquifer may vary across the permit area and be the "F sand", "G sand" or alluvium.
- g. A surface map showing the names and locations of the sands that act as the surficial aquifer and contours of their water levels in feet below ground surface across the proposed Nichols Ranch Unit.

- h. A description and discussion of the vertical hydraulic gradients across aquitards at Nichols Ranch Unit.
- i. Cross-sections showing the water levels in the overlying, ore zone, and underlying aquifers at the Hank Unit (C, F, G). Specifically note where the Hank "F sand" aquifer is unconfined.
- j. Cross-sections with water levels for the "G sand", "H sand", and any alluvium at the Hank Unit to identify those sands that act as the surficial aquifer and the locations, thereof.
- k. A surface map showing the names and locations of the sands that act as the surficial aquifer and contours of their water levels in feet below ground surface across the proposed Hank Unit permit area.
- l. A description and discussion of the vertical hydraulic gradients across aquitards at Hank Unit. Substantial variation in water levels exists across aquitards. For example, the reported Hank Unit "H sand" ground water levels are 150 ft higher than "G sand" at URZ1HH-7).
- m. Information regarding past, current and future operations for DW-4L and an estimate of the volume of water produced from this well to date.
- n. A discussion of any potential effects of the pumping activity at DW-4L on the water level elevations in the "A sand" at the Nichols Ranch Unit.
- o. Tables identifying the existing or planned locations, rates and total withdrawal of pumping wells associated with CBM operations in the A, B, F or 1 sand within a five mile radius of the Nichols Ranch Unit. Estimate how these well operations may affect water levels in these sands within this radius.
- p. Tables identifying the existing or planned locations, rates and total withdrawal of pumping wells associated with CBM operations in the B, C, F, G or H sand within a five-mile radius of the Hank Unit license area. Estimate how these well operations may affect water levels in these sands within this radius.
- q. A demonstration that hydraulic conductivity determined from the drawdown portion of a single pumping well test is accurate. Hydraulic conductivity determined from the drawdown portion of a single pumping well test would likely be subject to large errors due to wellbore pumping head loss.
- r. An explanation of why the BR-G pump test should be considered representative of "F-sand" ore zone conditions. The BR-G pump test resulted in a transmissivity that was two orders of magnitude smaller than other "F-sand" tests at the Hank Unit.
- s. An explanation of how future pump tests will be designed for the "F sand" in the Hank Unit to provide adequate hydrogeologic characterization of the wellfields considering the small drawdowns developed in the Hank Unit pump tests. These small drawdowns may

make it difficult to demonstrate communication across the production zone with monitoring wells and isolation from the overlying and underlying aquifers.

- t. A comprehensive explanation of how the applicant will operate the wellfields in the Hank Unit "F sand" to address the potential that these small drawdowns could affect the applicant's ability to control wellfield balancing and prevent, correct, and monitor excursions.
- u. A description regarding presence of sufficient head in the "F sand" at Hank Unit to prevent substantial dewatering of the sand during production and restoration operations, especially during the groundwater sweep phase of restoration.
- v. A discussion and statement of what actions the applicant plans to take to mitigate the impact of large water level drawdowns from consumptive use in the "A sand" on water wells within a five mile radius of the Nichols Ranch unit. Uranerz pumping drawdown analysis, shown in Figure 7.1, indicates large water level drawdown created by planned consumptive use over a wide area surrounding Nichols Ranch.
- w. A discussion of the implications to lixiviant composition and flow in the unconfined aquifer setting. Lixiviant composition and flow could be impacted by the unconfined aquifer setting (e.g. added oxygen may evolve out of solution to create a gas and liquid phase in the ore body, which can lead to reduced permeability and preferential flow paths).

Section 2.7.2.4. Groundwater Quality

The analysis of the groundwater quality in the proposed Nichols Ranch ISR Project is currently insufficient to interpret the impact of ISL recovery operations on water quality. The requested information will allow staff to assess the applicant's excursion monitoring program, the preoperational monitoring program, and the potential effects of CBM production on the applicant's operations:

- a. The location, water quality, permitted volume and known volume of any CBM produced water to be discharged to surface drainages or impoundments within the license area and an estimate of how much will infiltrate to the overlying aquifer at Nichols Ranch Unit. The applicant has informed NRC staff that CBM discharge points will be located in the Nichols Ranch Unit.
- b. An assessment of CBM produced water discharge on baseline water quality in the surface water and overlying aquifers.
- c. Verification that both Hank and Nichols Ranch units have not been impacted by CBM produced water discharge. If this is not the case, provide an explanation of how the applicant can assess baseline surface water and surficial aquifer ground water quality when it is variably impacted by CBM discharge.
- d. A rationale for the number and location of wells selected for preoperational groundwater quality monitoring for both the Nichols Ranch and Hank units. For comparison,

Regulatory Guide 4.14, Revision 1, Radiological Effluent and Environmental Monitoring at Uranium Mills provides guidance for preoperational monitoring at conventional uranium mills. While Regulatory Guide 4.14, Revision 1, was developed only for uranium mills, the regulatory objectives of Regulatory Guide 4.14, Revision 1, as well as some of the detailed guidance, are applicable to all types of uranium recovery facilities and The applicant should propose an appropriate preoperational monitoring program for the Nichols Ranch and Hank units with these objectives and guidelines in mind.

Section 2.7.3 Water Rights

Provide a list, or a reference where a list can be found in the application, of wells that will be abandoned or will be used as monitoring wells. On page TR-67, the applicant indicates that, "Those wells that are completed in the ore bearing sands will be abandoned...or will be used as monitoring wells if not completed in multiple sands."

Section 2.7.5 Exploration Drill Holes

NRC staff requests additional information regarding the exploration borings. Poorly abandoned exploration borings could provide vertical migration pathways causing vertical excursions. Please provide the following:

- a. An estimate of the number of exploration drill holes abandoned prior to 1997, and an assessment of the impact that these borings could have on production zone confinement.
- b. Location where abandonment methods are defined. Table D6I.1-1 notes, "*see Section D6.5 of the text for a definition of the abandonment methods", however Section D6.5 does not contain abandonment methods.

2.9 Background Radiological Characteristics

The analysis of background radiological characteristics is currently insufficient. Background radiological characterization is necessary to determine whether the applicant's future operations will affect human health and the environment. Please provide the following information:

- a. Section 2.9.1.1, TR-77 and TR-78. The applicant did not provide air particulate results in the application. It appears that the applicant did not collect air particulate samples for three major reasons, as follows: 1) the recovery technique does not require the removal of overburden nor does it require the physical removal of the ore zone; 2) it is a wet process up to the stage of drying and packaging; and 3) modern dryers and packaging systems do not emit significant particulate discharges. The applicant does not define what is significant.

Regulatory Guide 4.14, Revision 1, April 1980 provides several objectives for radiological effluent and environmental monitoring at uranium mills. As previously noted, these objectives are applicable to uranium recovery facilities, including ISL facilities. The regulatory guide objectives are, as follows: 1) to estimate the maximum potential annual radiation dose to the public resulting from effluent releases, 2) to ascertain

whether the regulatory requirements of the NRC (including 10 CFR part 20 dose limits, release limits, and the “as low as is reasonably achievable” requirements of 40 CFR Part 190, “Environmental Radiation Protection Standards for Nuclear Power Operations”) have been met, 3) to evaluate the performance of effluent controls, including stabilization of active and inactive tailings piles, 4) to evaluate the environmental impact of milling operations, both during operations and after decommissioning, and 5) to establish baseline data to aid in evaluation of decommissioning operations or decontamination following any unusual releases such as a tailings dam failure. Please provide a demonstration that air particulate sampling is not needed while meeting the regulatory objectives of Regulatory Guide 4.14, Revision 1.

- b. Exhibit 5-1. Provide an explanation for why surface water samples were not collected or direct the NRC staff to the surface water results in the application. The applicant shows several surface water sampling locations on Exhibit 5-1 for the Nichols Ranch and Hank units but did not provide results for surface water samples for these units consistent with the guidance in Regulatory Guide 4.14, Revision 1, for surface water sampling.
- c. Section 2.9.4, Flora and Fauna, Table 2.26 and Table 2.27.
 - i. Describe the type of vegetation sampled and demonstrate that the vegetation samples collected by the applicant, as suggested in Regulatory Guide 4.14, Revision 1. Regulatory Guide 4.14, Revision 1, Table 1 states that three vegetation samples should be collected near the site in different sectors that will have the highest predicted air particulate concentrations.
 - ii. Define the location “grazing area” as identified in the aforementioned tables.
- d. Section 2.9.3.3, Nichols Ranch Unit Results, Table 2-22. Regulatory Guide 4.14, Revision 1, Table 1 suggests that radon gas samples should be collected at five or more locations that are the same as the locations for air particulates. These locations would include three samples at or near the site boundaries, one sample at or close to the nearest residence or occupiable offsite structure(s) (if within 10 km of the site) and one sample at a control or background location remote from the site. For the Nichols Ranch Unit only four radon gas locations are identified. Please explain why a fifth location is not necessary.
- e. Section 2.9.3.3, Nichols Ranch Unit Results, Table 2-23.
 - i. Provide correct locations for background gamma exposure rates for those listed in Table 2-23 and shown in Exhibit D11-1. The locations identified in Table 2-23 are not consistent with the locations identified in Exhibit D11-1.
 - ii. As suggested in Regulatory Guide 4.14, the integrated exposure measurements should be made at the sites chosen for air particulate samples. This should include, at a minimum, five locations. Only four locations were reported in the application.
- f. Section 2.9.3.4, Hank Unit Results, Table 2-25

- i. Identify what “H” means in Table 2-25. Two results for the third quarter (7/07 to 10/07) were reported as “H” and “H” is unidentified in the table.
- ii. Describe in more detail the vendor product and measuring characteristics of the X-9 gamma dosimeter. In section 2.9.3 of the technical report, the X-9 gamma dosimeter is used to collect integrated gamma exposure.

Section 3.0 Description of the Facilities

The applicant does not provide sufficient information to assess all the necessary safety aspects of the proposed facilities for extracting and processing uranium. Additional information regarding the extracting process, emissions sources, process monitoring, and instrumentation is requested to allow staff to adequately understand and assess the applicant’s proposed facilities. Please provide the following information:

Section 3.1 ISL Leaching Process and Equipment

The applicant has not provided sufficient information regarding the ISL leaching process and equipment to enable the staff to fully understand this topic and to support other reviews dependent on that understanding. Specifically, the following information should be provided:

- a. The design, operation, and monitoring of the wellfield header houses where fluids will be injected and recovered from wellfields.
- b. A discussion of proposed Hank Unit “F” sand bleed and whether it will be sufficient to maintain an inward gradient in the unconfined aquifer conditions in the Hank Unit “F sand” production zone. The discussion should account for the reduced drawdown anticipated in the unconfined setting and for dewatering and mounding of fluids at the production/injection wells.
- c. General locations for the underlying and overlying aquifer monitoring wells.
- d. Methods for timely detection and remediation of leaks in the wellfield at wellheads and in surface and buried lines in the wellfield.
- e. A description of the number, location, design, and capacity of deep disposal wells.
- f. An explanation for how the applicant will handle waste fluids should the disposal wells become inoperable short term or long term.

Section 3.2 Site Facilities Layout

- a. Provide (in one location) a specific listing of each potential source of emissions or releases, a clear description (or location on the plant layout figure) of potential source locations, the planned monitoring associated with the potential release, and the preventive/mitigative controls for the potential release. In Chapter 3.0, The applicant addresses what general potential radioactive and chemical emissions or releases would

exist at the Nichols Ranch and Hank sites, and, in Chapter 4.0, provides some detail on effluent controls.

- b. Figures 3-3 and 3-4 need to be either re-titled to describe accurately what is shown or re-drawn to display accurately what is labeled. Figures 3-3 and 3-4 are labeled as "Process Flow" diagrams for the Nichols Ranch Unit and Hank Unit respectively. These figures in fact merely show the general locations of major process equipment in the process buildings.

Section 3.3 Chemical Storage Facilities

Provide detailed and specific descriptions of the process and wellfield instrumentation, controls and radiation safety monitoring instrumentation, including their minimum specifications and operating characteristics. The applicant provides only a general commitment to have instrumentation and controls to monitor production, injection, and waste flows, and to have instrumentation to alarm for system failures. The descriptions of the process and wellfield instrumentation and controls and radiation safety monitoring instrumentation need to be more detailed and specific, including their minimum specifications and operating characteristics (alarms, interlocks, etc.). The descriptions should focus on how the instrumentation and controls are adequate to quickly identify and remedy all potential processing problems that can increase exposures to radiological and chemical hazards.

Section 3.5 Plant Equipment, Instrumentation, and Control

Provide the following additional information related to the liquid effluents at the proposed facility:

- a. As part of the discussion of potential spills from pipelines and well heads, provide the plans for inspection of these aspects of the facility, including frequency of inspection, and provide the contingency plans and procedures for responding to system failures resulting in liquid waste release, including notifications and recordkeeping.
- b. Provide information on the ability of the sump system to handle the volume of the largest hazardous materials source.

Section 4.0 Effluent Controls System

The applicant did not provide sufficient information to assess the effluent control systems for the proposed facility. Information regarding the workplace ventilation, radiation monitoring, effluent composition, liquid and solid wastes is necessary to allow the staff to assess the manner in which the applicant is protecting public health and the environment. Please provide the following information:

Section 4.1 Gaseous and Airborne Particulates

- a. General Comments
 - i. Describe the work area ventilation system in more detail. In general, the current description of the ventilation system is not adequate. For example, the discussion

should include how many fans are used to ventilate the general area facility, the intake and exhaust points for the general area ventilation, the general area ventilation intake flow rate into the facility, the exchange rate and how radiation monitors are used to measure effluent releases. Consider that open doorways and convection vents will assist in providing satisfactory work area ventilation.

- ii. Describe the acceptable radiation monitoring criteria and flow rates for these systems.
 - iii. Provide a map or diagram (similar to Figure 5-2a and Figure 5-2b) that shows the ventilation system.
 - iv. Describe what is meant by “a satisfactory work area ventilation.”
 - v. In Figure 5-2a, explain why radon airborne radioactivity monitoring is not conducted in the YC Drum Storage area.
- b. Section 4.1.2, TR-133
- i. In Section 4.1.2, explain what is meant by “low intermittent air flow.” In Section 4.1.2, sixth bullet, the applicant states that the low intermittent air flow exiting the vacuum system precludes sampling of this effluent.
 - ii. In Section 4.1.2, demonstrate why sampling of the effluent is not necessary.

Section 4.2 Liquids and Solids

Section 4.2.1 Liquid Effluents

The applicant needs to provide the following additional information related to the liquid effluents at the proposed facility:

- a. Information on the expected chemical and radiological composition of the liquid waste stream to be disposed of in the deep wells.
- b. A demonstration that well development and pumping test water will have a minimal potential radiological impact on soils or surface water.
- c. The basis for the number of deep wells needed for liquid waste disposal.
- d. Plans for inspection of pipelines and well heads as part of the discussion of potential spills from the facility, including frequency of inspection, and the contingency plans and procedures for responding to system failures resulting in liquid waste release, including notifications and recordkeeping.

Section 4.2.2 Solid Wastes

Please provide a statement that the applicant will notify NRC staff within 7 days if any disposal agreement is terminated and will submit a new agreement to NRC staff for approval within 90 days of expiration or termination. Also, discuss why soils contaminated from operations (spills, leaks, etc.) are not included in the listing of contaminated solid wastes.

Section 5.0 Operations

Section 5.1 Organizations

Provide information on the integration among management groups below senior management that support the operation and maintenance of the facilities. The description of the applicant's organization provides no information on the integration among groups below senior management that support these functions. The applicant needs to show this integration aspect of the site organization, including integration between plant construction and plant management. Demonstration of this integration is necessary to all the staff to determine whether or not the corporate structure is appropriate to operating the Nichols Ranch project safely.

Section 5.2 Management Control Program

Providing the information presented below will allow NRC staff to ensure that the proper information is being reported and cultural resources will be protected.

- a. Please provide a commitment to administer a cultural resources inventory before engaging in any development activity not previously assessed by NRC, and that any disturbances associated with such development will be completed in compliance with the National Historic Preservation Act, the Archeological Resources Protection Act, and their implementing regulations. In addition, please provide a commitment to cease any work resulting in the discovery of previously unknown cultural artifacts to ensure that no unapproved disturbance occurs.
- b. Specify that spills, leaks, or excursions will be reported per 10 CFR Part 40.60.
- c. Specify the contents of an annual report that will be submitted to the NRC.
- d. Note that Section 5.2.2.4, "SERP Reports," consists of the identical language that is in Section 5.2.2.3, "SERP Records." Correct this error so that Section 5.2.2.4 discusses reports, not records.

Section 5.6 Security

Please specify the type of fencing proposed to provide security for all wellfields and processing areas. This information is necessary to allow the staff to assess the degree to which the access to radiation or other controlled areas by the public will be limited.

Section 5.7 Radiation Safety Controls and Monitoring

Section 5.7.1 Effluent Control Techniques

The applicant did not provide sufficient information regarding effluent controls for the proposed facility. This information is necessary for the NRC staff to assess the ability of the applicant to control and monitor emissions, protect worker health and collect the necessary data to calculate doses to the public. Please provide the following information:

- a. Section 5.7.1.1.1, Particulate, TR-152. It states in the last sentence in the first paragraph, "This type equipment has been shown to eliminate particulate releases from drying and packaging activities at ISR uranium processing facilities." Please demonstrate that this system will not release any particulate emissions.
- b. Section 5.7.1.1.1, Particulate, TR-152.
 - i. It states in the second paragraph, first sentence, "Additionally, the vacuum drying and packaging will occur in a dedicated room or enclosure." Figure 3-1, shows two areas. Describe the room or enclosure in terms of dimensions, ventilation flow, and potential release points, as well as how the dryer and YC drum storage relate to each other.
 - ii. Discuss the relationship using maps or system diagrams of the equipment of the independent ventilation and filtration systems within this room or enclosure.
 - iii. Describe in additional detail, all major operational activities or tasks that will take place in this area.
- c. Section 5.7.1.1.1, TR-152
 - i. Describe in detail, the operations and emission controls for yellowcake drying and packaging with respect to the monitoring parameters and set points.
 - ii. Describe how entry to this room or enclosure will be controlled.
 - iii. Please describe the manner in which the applicant will determine the amount of material released in the event of a mechanical failure or human error operating the equipment.
- d. Section 5.7.1.1.1, TR-152 and Section 5.7.1.1.2, TR-153. Describe the minimum performance specifications for the operations of the effluent controls and the frequencies of tests and inspections to ensure proper performance to specifications.

Section 5.7.2 External Radiation Exposure Monitoring Program

The applicant did not provide sufficient information regarding the external radiation exposure monitoring program for the proposed facility. This information is necessary for the NRC staff to determine whether or not the applicant's proposed program adequately protects worker and public health. Please provide the following information:

- a. Describe the possible major work activities in the plant and wellfields, including CBM work activities in the Nichols Ranch ISR Project area, and the anticipated exposure rate levels that may be expected in these areas.
- b. Describe those areas where elevated exposure rates are anticipated.

- c. Describe how the external radiation exposure monitoring program will be integrated with the exposure calculations.
- d. Describe the type of survey instruments (i.e., G-M, Proportional, etc.), including instruments used for beta measurements that will be used to conduct exposure rate surveys, and the range of each type of survey instrument.
- e. Explain why survey instruments would only need to operate to the maximum range of 5 mrem per hour. Describe those instruments that could be used to document exposure rates exceeding 5 mrem per hour?
- f. Discuss and define action levels that would require more frequent exposure rate surveys.
- g. Section 5.7.2.1, Personnel Monitoring, TR-155
 - i. The applicant does not identify the group or category of workers who will receive the greatest external occupational dose. Define all groups or category of workers and identify those groups or category of workers who will receive occupational doses in excess of 10% of the applicable external occupational dose limit.
 - ii. Identify those groups or category of workers who will not receive individual monitoring devices.
- h. Section 5.7.2.2, Exposure Rate Surveys, TR-156. The applicant states that exposure rate surveys will be performed on at least a quarterly frequency in the process areas. The applicant does not identify the frequency of exposure rate surveys at other locations other than the process areas. Identify the locations and frequency of exposure rate surveys at other locations not depicted in Figure 5.2a and Figure 5.2b.

Section 5.7.3 Airborne Radiation Monitoring Program

The applicant has not provided sufficient information regarding the airborne radiation monitoring program. Information regarding the air sampling program and administrative action levels is necessary to determine if the airborne radiation program is protective of worker health. Please provide the following information:

- a. Section 5.7.3.1.2, Area, TR-158
 - i. In Section 5.7.3.1.2 of the technical report, it states, "This type of air sampling will be used routinely for drying and packaging activities". Explain the phrase, "This type of air sampling."
 - ii. Discuss in more detail the frequency of sampling.
- b. Section 5.7.3.1.3, Action Level and Limit, Tr-158

- i. In Section 5.7.3.1.3 of the technical report, it states that the administrative action will be established for these types of air samples of one derived air concentration (DAC). Explain the phrase “these types of air samples.”
 - ii. The administrative level is not consistent with the ALARA philosophy and Regulatory Guide 8.31, “Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Recovery Facilities will be As Low As Is Reasonably Achievable” and Regulatory Guide 8.30, “Health Physics Surveys in Uranium Recovery Facilities,” which provides guidance to establish administrative action limits to protect the workers and investigate air sample results that are above the normal fluctuations. The use of one DAC is considered too high for an administrative action level. Develop an administrative action level consistent with the aforementioned regulatory guides.
 - iii. Provide clarification to Section 5.7.3.1.3. The limits and values cited in this section for the administrative action limit require clarification for establishing airborne radioactivity areas (See Regulatory Guide 8.25, Section 1.7). Regulatory Guide 8.31, Section 3.3, provides design objectives for ventilation systems. This design objective should be sufficient to maintain airborne concentrations to less than 25% of the DAC. Thus, establishing an administrative limit of one DAC would exceed the design objective of Regulatory Guide 8.31. Regulatory Guide 8.30, Section 4.0, provides guidance to establish administrative action limits to protect the workers and investigate air sample results that are above the normal fluctuations and that should be less than 25% of the DAC.
- c. Section 5.7.3.4, Respiratory Protection Program, TR-159
- i. In Section 5.7.3.4, Respiratory Protection, discuss the basis for the 220,000 dpm per 100 m². Include in the discussion whether this value represents gross alpha, gross beta, or beta/gamma activity.

Section 5.7.4 Exposure Calculations

The applicant does not provide sufficient information regarding the exposure calculation methods. This information is important as it provides a basis for determining compliance with worker and public dose limits. Please provide the following information:

- a. Opening paragraph, first sentence, TR-160. It states that the methodologies to calculate intake of radioactive materials by personnel in work areas where airborne radioactive material may exist are in accordance with 10 CFR 20.1204, and 20.1201. The applicant does not provide any methodologies. Provide methodologies that show the equations and input parameters for all intake pathways.
- b. Section 5.7.4.1, Uranium, TR-160
 - i. In Section 5.7.4.1, Uranium, it states that the predominant method for calculating intake of uranium will be compared to the DAC value of 10 CFR 20, Appendix B,

Table 1, Column 3 for natural uranium. Discuss this predominant method and whether this predominant method justifies the basis for this DAC value.

- ii. In Section 5.7.4.1, it states that a solubility classification “D” will be assigned to all uranium at the Nichols Ranch ISR project sites. Justify the basis for this decision.
- c. Section 5.7.4.3, Prenatal and Fetal Radiation Exposure, TR-161. Provide and discuss the methods used to calculate prenatal and fetal radiation exposures. In the discussion, identify when the more detailed methodology will be used.

Section 5.7.5 Bioassay Program, pg. TR-161

The applicant does not provide sufficient information regarding the bioassay program. This information is important as it provides a basis for determining compliance with worker dose limits. Please provide the following information:

- a. Specify reporting procedures and record keeping, including record retention.
- b. Indicate how the bioassay results will be used to confirm results derived from the airborne radiation monitoring program and exposure calculations.
- c. Indicate how the bioassay program will meet the requirements of 10 CFR Part 20, Subpart L and M, requirements for records and reporting, respectively.
- d. Describe the procedures that will be followed in the event that a bioassay result is above the action level.

Section 5.7.6 Contamination Control Program

The applicant does not provide sufficient information regarding the contamination control program. This information allows the staff to assess whether or not the applicant has established administrative and technical controls to detect and control releases. Please provide the following information:

- a. General Comment(s)
 - i. Discuss how contamination will be measured in the drying and packaging areas and at what contamination limits would the applicant enforce the use of personal protective equipment (PPE) including respiratory protection.
 - ii. Discuss the contamination controls used for wellfields.
- b. Section 5.7.6.3, Surveys for Contamination of Skin and Personal Clothing, TR-163. In Section 5.7.6.3, it states that all personnel leaving the restricted area will be required to survey the soles of their shoes and the alpha contamination limit is 5000 dpm/100 cm². In the third paragraph of this section it states that, *in lieu* of showering, employees are required to survey their clothing, shoes, hands, face and hair with an alpha survey instrument prior to leaving the site. The alpha contamination limit for these surveys is

1000 dpm/100 cm². Explain in more detail the basis for the difference between these two surveys and how the applicant will ensure that personnel leaving the restricted area will meet the removable contamination limit of 1000 dpm/100 cm².

- c. Section 5.7.6.5, Surveys for Contamination on Respirators, TR-164. Discuss how the respiratory equipment contamination surveys will be documented for respiratory protection equipment.

5.7.7 Airborne Effluent and Environmental Monitoring Program

The applicant does not provide sufficient information regarding the airborne effluent and environmental monitoring. This information allows the staff to assess whether or not the applicant has established the proper programs to estimate worker and public doses. Please provide the following information:

- a. Section 5.7.7.1, Stack Sampling, TR-165. In Section 5.7.7.1, the applicant states that no air samples will be collected from the yellowcake dryer exhaust because there are no emissions. Demonstrate that there are no emissions from the yellowcake dryer exhaust, as well as, no emissions from other operational activities at the facility.
- b. Exhibit 5-1.
 - i. Exhibit 5-1 does not present any air particulate sample locations. Identify the air particulate locations as suggested in Regulatory Guide 4.14, Revision 1, Table 1, or provide a justification for not including air particulate samples.
 - ii. If air particulate sampling was performed, demonstrate that the locations represent the highest predicted airborne radionuclide concentrations, as suggested in Regulatory Guide 4.14, Table 1.
 - iii. Regulatory Guide 4.14, Revision 1, Table 2, Operational Radiological Monitoring Program, suggests that surface water samples should be collected at the upstream and downstream site boundary on a quarterly basis. Exhibit 5-1 appears to show only one location at the Hank Unit. Please explain how one surface water sample location is sufficient to determine whether or not site activities have impacted surface water.
 - iv. Explain why the surface water samples are to be collected annually and not quarterly. Regulatory Guide 4.14, Revision 1, Table 1, Preoperational Radiological Monitoring Program, suggests that the frequency of sample collection should be quarterly at one location. In the application, Section 5.7.7.3, states that the surface water samples will be collected annually.
 - v. Clarify Section 5.7.7.3 regarding whether this section is discussing the pre-operational or the operational radiological environmental monitoring program.
 - vi. In Section 5.7.7.3, identify what radionuclides will be analyzed during the sample analysis.

- c. Explain how the results from environmental monitoring will be used to demonstrate compliance with the public dose limit in 10 CFR Part 20.1301 and 20.1302.

Section 5.7.8 Groundwater and Surface Water Monitoring Programs

The groundwater and surface water monitoring programs have not been sufficiently described to determine if they will detect an excursion from the ISL operations in an effective and timely manner. Provide the following information:

- a. An analysis which takes into consideration the unconfined conditions at Hank Unit to determine the location of monitoring wells in the production zone monitoring well ring in the "F sand." The analysis provided in the application used confined conditions.
- b. A discussion of how the applicant will conduct pumping tests in the Hank Unit to establish that each wellfield production zone is in communication with the monitoring well ring, given the reduced drawdown in the unconfined aquifer which may not stress the production zone sufficiently to see communication.
- c. A statement that the applicant will also submit all wellfield hydrologic packages to NRC for review and approval before mining begins as The applicant does not have a record of performance with NRC.
- d. A standard operating procedure for sampling of the monitoring and private wells to ensure sampling is consistent for all wells during operations.
- e. The location of the surface water sampling points and description of surface water sampling methods.
- f. A discussion on the use of chloride, conductivity, and total alkalinity for excursion indicators in the overlying aquifer at Nichols Ranch or Hank units if the overlying aquifer is also impacted by future CBM produced water infiltration.
- g. Demonstrate that the applicant can distinguish between CBM produced water infiltration impacts and an excursion in the overlying aquifer from operations using chloride, conductivity, and total alkalinity as excursion indicators.

Section 6.0 Reclamation Plan

Section 6.1 Groundwater Restoration

The plans and schedules for groundwater quality restoration have not been sufficiently described to determine if they will achieve the required goals of restoration. Provide the following information:

- a. A statement that the applicant will return the groundwater quality to the standards listed in Criterion 5B(5) of 10 CFR Part 40, Appendix A.

- b. A technical basis demonstrating the applicant's ability to meet the standards in Criterion 5B(5) of 10 CFR Part 40, Appendix A. Generally such demonstrations may be based on either experience with previous ISL operations, research and development investigations in similar host rock, computations, or pilot tests.
- c. A physical justification (cores, logs, etc) for porosity values for the production ore zones in both the Nichols Ranch and Hank unit. The applicant provides estimates of the pore volume in the surety estimate using a porosity value of 0.27. T states in the Technical Report, Section 2.7.2.3, pg. TR-55, that the effective porosity values for both "A Sand" and "F Sand" are 0.05. In a different location in the Technical Report, a porosity of 0.3 is assumed for Nichols Ranch Unit and Hank Unit (Uranerz Energy Corporation, Technical Report, Tables 7-6 and 7-7).
- d. A justification for the method to estimate wellfield pore volume and the assumed 30% flare in the surety estimate. No technical details are provided for estimating the wellfield pore volume and the associated horizontal and vertical flare. Include a new schedule for restoration and surety estimate if the number of pore volumes for restoration is revised.
- e. A statement that NRC will be informed when a transition from production to restoration occurs in a mine unit and an acknowledgement that the applicant will adhere to the timeliness in decommissioning regulations of 10 CFR Part 40.42.
- f. An explanation of how the restoration methods proposed for Hank Unit which have only been applied to confined aquifers will be successful in an unconfined aquifer like the "F sand" production zone. Address issues on how to ensure contact and sweep of all parts of the mined region, including dewatered zones, predicting the behavior of each constituent in an unsaturated environment where oxygen will be present, and methods to ensure representative sampling. Provide a discussion that the proposed restoration methods are suited to the unconfined aquifer setting and will achieve the primary restoration standard of return to baseline water quality for the entire production zone.
- g. A description of the biological reduction method(s) to be used to achieve restoration for targeted constituents in the proposed wellfield mining zone including: the efficacy of the chosen method; additives and rates; how progress will be monitored; estimates of pore volumes required when using biological reductants; and how the stability of water quality in zones treated with biological reductants will be monitored and established.
- h. The use of reductant should be addressed in the application to account for any safety hazards associated with its storage and use.
- i. A description of how the mining zone will be monitored during restoration to track the success of any restoration phase or techniques such as the addition of chemical or biological reductants.
- j. Rationale for selecting wells for monitoring groundwater quality during restoration, the efficiency of the restoration techniques, and whether additional or alternate techniques are necessary.

- k. A technical basis for the method used to determine the distances between monitoring wells, including information about the groundwater model used (the applicant states that distances between monitoring wells were determined using a groundwater flow model, but provides no detailed information (Section 5.7.8.2)).
- l. A clear definition or illustration of “monitoring ring wells” as described in Uranerz Energy Corporation, Technical Report, Section 6.1.3.4.
- m. A description of how the water quality data from the horizontal wells will be combined with the data from the vertical monitoring wells to determine restoration progress.
- n. Justification of the efficacy of sampling frequencies and locations for the purpose of detecting excursions from potential preferential flow paths.
- o. A description of the spatial distributions of all the monitoring wells named MO, MR, and MP Wells in Section 5.7.8.5.1.
- p. An explanation of why the groundwater restoration operations will not adversely affect groundwater used outside the production zone.
- q. Additional description about impacts to nearby domestic wells in terms of water table drawdown during restoration and justification as to why the groundwater restoration will not affect those wells.
- r. A description of any areas of recharge for the “F sand” at the Hank Unit as the influx of oxidized water into the unconfined “F sand” from any recharge zone may impact the stability of the restoration if chemical or biological reductants are employed. An explanation of how the applicant will ensure stability in this case.
- s. A justification for the selection of a six-month stability monitoring time period to determine restoration success. Additionally, provide the criteria which will be used to establish that the water quality in the restored zone is stable.
- t. Provide an estimate, with supporting analysis, of how much waste water would be produced during restoration and the ability of the disposal wells to handle the rates and volumes.

Section 6.2, Surface Reclamation and Decommissioning

The applicant does not provide a discussion of methodologies for conducting post-reclamation and decommissioning radiological surveys. Provide a description of procedures for conducting these surveys, including:

- a. How the cleanup criteria for radium in soils as provided in 10 CFR Part 40, Appendix A, Criterion 6(6), will be met.
- b. Acceptable cleanup criteria for uranium in soil, such as those in Appendix E of NUREG–1569, Standard Review Plan for In-Situ Leach Uranium Extraction License Applications.

- c. Acceptable cleanup criteria for Th-230 for areas that already meet the radium cleanup criteria but that still have elevated thorium levels.
- d. Assurance that the survey method for verification of soil cleanup is designed to provide 95% confidence that the survey units meet the cleanup guidelines.
- e. In support of the reference to MARSSIM, provide additional discussion of the soil cleanup program. The discussion should include: the areas planned to be surveyed (such as wellfield surfaces, areas around structures in process and storage areas, on-site transportation routes, historical spill areas, and areas near deep disposal wells); details of the pre-reclamation radiological survey, particularly, specifics on how it and the baseline survey will be used to identify potential contamination areas; details on how the final radiological soil conditions after cleanup will be measured and documented (Section 6.2.6).
- f. Provide a discussion of plans for decommissioning non-radiological hazardous constituents as required by 10 CFR Part 40, Appendix A, Criterion 6 (7). (Section 6.2.6).
- g. Expand on the simple commitment in Section 6.2.6 to decontaminate structures and equipment to regulatory standards, and to either dismantle and dispose of structures or release them for unrestricted use, if appropriate. The expanded discussion should include: information on the program in place to control contamination of structures and equipment; details of survey and decontamination procedures, including a commitment that radioactivity along the interior surfaces of pipes, drain lines, and duct work will be determined by measurements at traps or other access points, and a commitment that pieces of equipment that are too big to scan will be considered contaminated in excess of the limits; and details of plans for surveying structures and equipment before release for unrestricted use. (Section 6.2.6).

Section 6.2.8 Financial Assurance

The applicant has not provided sufficient information regarding financial assurance. Because groundwater restoration is an important part of the surety, more information is required for the staff to assess the adequacy of the surety amount. Please provide the following information.

- a. Identify the financial assurance funding mechanism (i.e., surety bond, cash deposit, certificate of deposit, deposit of government securities, etc.) that The applicant plans on using for the Nichols Ranch project.
- b. Provide indication in Section 6.2.8 that The applicant will automatically extend the existing surety amount for one year if the NRC has not approved a proposed revision at least 30 days prior to the expiration date for the existing surety; revise the surety arrangement within 3 months of NRC approval of a revised closure (decommissioning) plan, if estimated costs exceed the amount of the existing financial surety; update the surety to cover any planned expansion or operational change not included in the annual surety update at least 90 days prior to beginning associated construction; and provide NRC a copy of the State's surety review.

- c. The following items in the Financial Assurance spreadsheets in Appendix D of the application need to be discussed, explained, or further evaluated:
- i. Provide the justification for using 4.94 pore volumes total, considering that, for this surety estimate, the mine unit is still in the early stages of its active life.
 - ii. Provide the justification for the flare factor of 1.3.
 - iii. The years for groundwater sweep are assumed to be 2.82; a similar time for reverse osmosis is assumed. Therefore, the time multiplying factor should be 5.64, not 2.82 when calculating the total labor costs.
 - iv. The calculation for total gallons for treatment does not appear to be correct (GW RESTORATION Worksheet 1, Nos. I and II).

Section 7.0 Environmental Effects

7.3 Radiological Effects

The applicant did not provide sufficient information regarding radiological effects. Information regarding dose to members of the public and meteorological data are important for assessing the applicant's ability to operate the proposed facilities safely. Please provide the following information:

- a. General Comment for Section 7.3. In Section 7.3, Radiological Effects, it is stated in various subsections (See Sections 7.3.1, 7.3.1.1, 7.3.1.2, 7.3.1.2.7, 7.3.1.2.8.1, 7.3.1.2.8.2, 7.3.1.3, 7.3.1.5) that there are no particulate emissions. Provide a detailed basis for this statement. The applicant should address particulate emissions for each of the aforementioned sections of this application.
- b. 7.3.1.2 Exposures from Air Pathways, TR-214. The applicant indicates in Section 7.3.1.2.6, Meteorological Parameters, that the fractional joint frequency distribution of wind speed, direction, and stability are for Gillette, Wyoming, for years 1996 thru 2005. In Section 2.5, Meteorological, the meteorological data was collected from the National Weather Service, Midwest 1SW weather station located approximately 27 miles southwest of the project area, and the Natrona County International Airport near Casper, Wyoming, approximately 60 miles south southwest of the project area. The Gillette meteorological data is not identified in Section 2.5, Meteorology, of the application. Please confirm that the appropriate data were used in Section 2.5. Also, please demonstrate that the meteorological data from Gillette and Casper, Wyoming, are representative of conditions at the site.

- c. 7.3.1.3 Exposures from External Radiation, TR-219.
 - i. Demonstrate that the external radiation exposure at the site boundary meets the regulatory limits in 10 CFR 20.1301(a)(2). Discuss models and input parameters used to support the external radiation exposure at the site boundary.
 - ii. Provide an exposure pathway diagram that includes the relevant external exposure pathways or identify where this diagram exists in the application.

- d. 7.3.1.4 Total Human Exposures, TR-219
 - i. In Section 7.3.1.4, Table 7-10, The applicant provides the Total Effective Dose Equivalent, in person-rem per year for the year 2011 to the year 2019 for the population within 80 km to range from 0.04 to 0.2 person-rem per year. However, the population dose for the population beyond 80 km and for all populations ranges from 2 to 8 person-rem per year. Explain why the population doses for the population beyond 80 km and all populations are higher than the population dose to the populations within 80 km.

- e. Provide an exposure pathway diagram that includes the relevant pathways to all effluents expected from facility operations or identify where this diagram exists in the application.

Section 7.5 Effects of Accidents

This section describes the environmental effects of various accident scenarios. However, the applicant needs to provide information regarding the systems and procedures that it will use to prevent accidents at the facility or minimize the effects of such accidents on worker and public health. The requested information is described in Section C.6. of Regulatory Guide 3.5.