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Chief, Rules and Directives Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

2/5/02
67 FR 5347
(1)

Gentlemen:

Subject: The Wyoming Mining Association's Comments on Draft Standard Review Plan (NUREG–1569) for Staff Reviews for in Situ Leach Uranium Extraction License Applications Federal Register, Vol. 67, No. 24, Tuesday, February 5, 2002, page 5347

The Wyoming Mining Association (WMA) is an organization of mining companies and mining related vendors, suppliers, and contractors in the State of Wyoming. Among the association's members are a number of uranium recovery (UR) licensees, including two of the three producing in-situ leach uranium recovery facilities remaining in the U.S. The WMA also represents uranium in-situ leach operations in restoration, several conventional uranium mill tailings sites in reclamation, and a single conventional uranium mill currently in standby. The WMA has reviewed the above described Federal Register notice and has the following comments concerning the *Draft Standard Review Plan (NUREG–1569) for Staff Reviews for in Situ Leach Uranium Extraction License Applications.* The comments have been grouped by broad subject area for readability.

A. Background Radiological Characteristics

1. The document should contain language similar to the language below excerpted from *Draft Standard Review Plan (NUREG–1620) for Staff Reviews of Reclamation Plans for Mill Tailings Sites Under Title II of the Uranium Mill Tailings Radiation Control Act that states:*

   "At some mill facilities, uranium deposits, open pit uranium mines, overburden piles (soil moved from the pit area), and/or reclaimed mining areas are on or near the site. All of these areas would contain elevated levels of uranium, radium, and the other radionuclides in the uranium decay chain. In determining what surrounding soil values may be compared to the radionuclide content of the disposal cell cover, the mining areas reclaimed/restored under state regulations may be included."

   NUREG-1569 should include specific similar language allowing in-situ uranium recovery licensees to include mining areas reclaimed/restored under state regulations in background dose calculations and activity measurements. Such language could be included in Section 2.9.

2. The SRP adds the requirement that the preoperational monitoring program for radionuclides should be reviewed against NUREG-5849, *Draft Manual for Conducting Radiological Surveys in Support of License Termination* and NUREG-1575, *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, Revision 1. These new references are in addition to Regulatory Guide 4.14,

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Manual (MARSSIM), Revision 1. These new references are in addition to Regulatory Guide 4.14, *Radiological Effluent and Environmental Monitoring at Uranium Mills* (1980), which was cited in the Draft SRP. Both of these new references were developed for decommissioning activities and do not provide guidance relevant to baseline preoperational surveys. The intensity of the radiological surveys described in these documents are warranted during decommissioning activities, but should not be used as a basis for site preoperational characterization activities. If there are specific sections of these documents that NRC wants licensees to consider in preparing the preoperational monitoring program (e.g., instrument selection criteria), these sections should be explicitly referenced. Otherwise, Regulatory Guide 4.14 discusses an appropriate approach for determination of background radiological characteristics that suits uranium recovery.

B. Wells and Well Completion Techniques

1. The SRP states that polyvinyl chloride (PVC), fiberglass, or acrylonitrile butadiene styrene (ABS) plastic casing is generally not strong enough for use in wells over 500 feet deep or those subject to high-pressure cementing techniques. The SRP states that the licensee should demonstrate that these materials may be safely used for wells completed to a greater depth. This requirement appears to overlook extensive operating experience in the industry and the standard reference that the reviewer is expected to use. For instance, the Crow Butte mine has routinely used PVC casing to depths up to 900 feet. Crow Butte has installed in excess of 2,500 wells using this material, using a high pressure cementing technique. Of these 2,500 wells, there have been no operational well failures due to a casing failure related to the materials of construction. Other operating sites have similar experience. Furthermore, the reference provided for reviewers in Section 3.1.2 (Driscoll, F. G. *Groundwater and Wells*, 1989) states that PVC casing is generally acceptable to depths of 1,000 feet. In order to be consistent with extensive operating experience and industry standards, NRC should revise this section to require justification for use of these materials only at depths greater than 1,000 feet.

2. This section also provides examples of acceptable well development methods. In addition to the cited methods, the EPA and State regulatory programs allow the use of other well development methods or a combination of methods. The SRP should recognize that other well development methods besides air lifting and swabbing are acceptable under the relevant regulatory programs.

3. Acceptance criterion (2)(b) states that a well mechanical integrity test (MIT) is acceptable if a pressure drop of less than ten percent occurs over one hour or less than five percent over ½ hour. NRC should provide the reasoning for these acceptance criteria, since they are more stringent than those contained in State UIC programs and Class III UIC permits. MIT requirements are part of the UIC regulatory program (40 CFR §146.8). Therefore, NRC acceptance should be based on meeting the appropriate UIC program and permit requirements.

C. Groundwater Baseline Quality Evaluation, Monitoring and Restoration

1. The SRP provides a good discussion of the regulatory programs that govern aquifer protection at ISL facilities, including the EPA UIC program and purpose of aquifer exemptions. The advice to closely coordinate with the EPA or EPA-Authorized State to avoid unnecessary duplication in reviewing restoration plans and results is appropriate and clearly stated in Section 6.1, which states:

"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."

Included in Attachment 1 is a copy of a policy entitled, *Wyoming Department of Environmental Quality In Situ Groundwater Classification and Restoration*. This policy was approved on November 14, 2001. A copy is included for informational purposes. The Wyoming Mining association requests that this policy be referenced in the guidance.

The SRP could also benefit from some discussion of how this coordination could be implemented. For instance, the Staff Requirements Memorandum for SECY-99-0013, *Recommendations on Ways to Improve the Efficiency of NRC Regulation at In Situ Leach Uranium Recovery Facilities*, approved discussions with EPA and the EPA Authorized States to implement methods to reduce this duplication in effort, including the use of Memorandums of Understanding (MOUs). The SRP should provide some direction to NRC staff on acceptable methods to coordinate with, and ultimately defer to, the appropriate UIC program. It is recommended that NRC include a discussion of the planned MOUs with State agencies that have ISL mining regulations and programs required by State statute, and how NRC can rely on the State programs for activities at wellfields.

2. The SRP requires that licensees submit an assessment of seasonal ranges and historic extremes for surfaces of water bodies and aquifers. NRC should recognize that in many cases, available data for this requirement is limited, particularly for aquifers that are not general suitable for other uses and for small surface water features that may be near a proposed facility. Generally, the vast majority of available data will be preoperational characterization performed by the licensee and historical extremes will be difficult, if not impossible, to determine. Due to the fact that ISL activities typically occur in confined aquifers, located at considerable depth, and that available data is limited, it is not appropriate to assess water levels of surface water bodies.

3. Table 2.7.3-1 contains several parameters, which are not currently required for baseline sampling by all NRC licenses (e.g. Ra-228, gross alpha, gross beta, silver, zinc). Existing state mining permits and current guidance also do not require the sampling of these parameters. The addition of these parameters would be very costly to licensees.

   One of the major reasons for licensees to assess the background quality of ground water in the production zone is to assist in establishing the zone as an "**Exempted Aquifer**" in accordance with EPA or state requirements. Section 2.7 should be revised to reflect this important consideration.

4. The SRP should not require that "at least four sets of samples should be collected and analyzed for each listed constituent for determining baseline water quality conditions". Such a requirement is not consistent with current NRC licenses and State practices (e.g. Wyoming). For instance, some licenses only require certain parameters to be sampled four times. The proposed requirement would be very costly and would not result in a better assessment of baseline ground water quality conditions.

   Crow Butte Resources, Inc., for example, is allowed to baseline groundwater using three (3) samples. In addition, at the Crow Butte Mine analysis for the entire Guideline 8 suite is not

required since the mine possesses extensive water quality data for the Chadron Aquifer and there would be little value in collection additional data.

5. Acceptance criterion (4) discusses the preoperational determination of chemical and radiochemical conditions of aquifers at the proposed facility. Table 2.7.3-1 includes a list of constituents that NRC considers acceptable for this characterization. The SRP allows a licensee to propose an alternate list of constituents and discusses the type of justification necessary to remove constituents from consideration. Several parameters are discussed that need not be considered because it is not expected that in situ leach (ISL) operations will affect their concentrations (i.e., aluminum and thorium-230)

   This position is supported by the fact that the water bearing zones of interest at ISL sites almost exclusively consist of confined aquifers, which contain ground water of relatively consistent quality, as the water typically, only moves at a rate of a few feet per year. It is well documented from existing ISL baseline water quality databases that four samples from each well are not needed. The minimal variability typically observed in these data result from sampling and analytical variation, not actual water quality changes.

   Studies cited by EPA in the Notice of Data Availability (65 FR 21576, April 21, 2000) for the Final Rule for Radionuclides in Drinking Water and the Technical Support Document for the Radionuclides Notice of Data Availability (EPA, March 2000) noted that about 90 percent of the samples for radium-228 from the most recent nationwide studies were below the detection level of 1.0 pCi/l. The median concentration of all positive results was 1.47 pCi/l. This data indicates that there is little likelihood that radium-228 will be found in significant concentrations at ISL facilities. This conclusion is supported by historical analytical data collected by active ISL mines. Baseline radium-228 concentrations are typically near detection levels, while radium-226 may vary between tens and thousands of picocuries per liter due to the presence of elevated concentrations of uranium-238 in the ore body. Sampling performed by licensees following mining and restoration activities has confirmed that there is no affect on radium-228 concentrations.

   Based on the above stated information, it is questionable whether radium-228 should be included in Table 2.7.3-1. Radium-228 occurs as the first decay product in the thorium-232 series, with a half-life of 5.7 years. Thorium is extremely insoluble and is not subject to mobilization in most groundwater environments. Conversely, uranium forms soluble complexes under oxidizing conditions and precipitates in reducing conditions, which is the mechanism that forms roll-fronts deposits and allows ISL mining. Since the mechanism of deposition for thorium and uranium are different, the baseline concentrations of each in the mining zone are independent of one another. Mining activities should not affect the long-term concentration of thorium-232 in the mining zone due to its insolubility. With no long-term affect on the thorium-232 concentration in the formation, the radium-228 concentration will not vary. The short half-life of radium-228 also precludes the potential for significant variation due to groundwater transport, so a concentration of radium-228 without the presence of thorium-232 is unlikely. Without a process whereby the thorium-232 concentration increases in the formation and with no potential for radium-228 concentration due to transport, the baseline concentration of radium-228 should not be affected by mining operations.

   A conclusion similar to that cited by NRC for thorium-230 may be made for radium-228.

Alternatively, NRC may determine that some limited radium-228 analysis as part of the initial site characterization process may be advisable in order to provide preoperational data. However, the inclusion of this isotope in Table 2.7.3-1 carries through the groundwater monitoring requirements in this SRP. Specifically, Section 5.7.8.3 (Ground-Water and Surface-Water Monitoring Programs) references Table 2.7.3-1 for use as the parameter list during preoperational baseline sampling for *each new wellfield*. This analysis would apply to every monitor well and every baseline restoration well. Furthermore, including radium-228 in the baseline-sampling regimen would result in post-mining and post-restoration stabilization sampling for this parameter. The cost for unnecessary radiochemical analysis for radium-228 would be significant for an ISL mine. Currently, radium-228 analysis using EPA Method 904.0 is at least $75 per sample and is not included in the typical analytical suite used at most ISL mines.

6. Section 5.7.8.3(5) states that an excursion is deemed to occur if any two excursion indicators exceed their respective UCLs, **"or a single excursion indicator exceeds its UCL by 20 percent".** This statement conflicts with Section 5.7.8.3(2), which states an excursion occurs when two or more excursion indicators exceed the respective UCLs. There is no reference to one indicator exceeding its UCL by 20%.

   Additionally, the apparent new policy that corrective actions for excursions can be determined complete when **all** excursion indicators are below the respective UCLs is not consistent with historic NRC policy, which conveyed that a monitor well no longer meets "excursion" criteria when the applicable criteria are no longer exceeded (e.g. If only one parameter is above its UCL, it is no longer on excursion). The historic policy is also consistent with some State programs.

7. Acceptance criterion (4)(b) provides a discussion of acceptable secondary restoration standards. The criterion states that since the return of all parameters to baseline concentrations is not likely, the applicant will identify acceptable secondary restoration goals based on the preoperational class of use and that these may be based on "drinking water, livestock, agricultural, or limited use". This part of the criterion correctly recognizes that the secondary restoration goals will be based on the preoperational water quality and the class of use as determined by the appropriate State and that these standards will not necessarily correspond to the federal primary or secondary drinking water standards. However, the second paragraph of the criterion states that it is acceptable to apply the lower of the State or EPA primary or secondary drinking water standards. The second paragraph also states that radionuclide standards may be based on the concentrations for unrestricted release to the public from Table 2 of 10 CFR Part 20, Appendix B. The second paragraph directly contradicts the first and is incorrect. NRC must recognize that ISL mining aquifers have been exempted from drinking water standards by the EPA and the State before mining is allowed. There is no mechanism for removing this exemption, so these aquifers will not be used as a source of drinking water in perpetuity. The use of the lowest drinking water standard for secondary restoration goals or radionuclide concentrations intended for unrestricted release to the public is not risk-informed and is inappropriate for these aquifers.

8. Acceptance criterion (4)(b) also states that the secondary restoration goals will not be applied "...so long as restoration continues to result in significant improvement in groundwater quality." The criterion then states that license conditions should be set up to require an amendment before secondary goals may be applied. Since these secondary goals have been reviewed and approved by

the EPA or EPA-Authorized State and the NRC during the licensing and permitting process, no benefit accrues from requiring a license amendment each time the secondary goals are applied. The licensee typically provides the agencies with a comprehensive restoration report that describes the efforts made to reach the primary restoration goals. These agencies can withhold approval of the restoration if it is determined that good faith efforts were not made to reach the primary goals. Since the secondary goals have been previously approved as protective of the public and environment, there is no basis for requiring that the application of these goals should require a license amendment. Approval of any standards that do not meet the primary or secondary goals (as discussed in acceptance criterion (4)(c)) would be appropriate for requiring a license amendment since these proposed standards would not be previously reviewed and approved.

9. In general, the "Acceptance Criteria" for assessing the adequacy of ground water restoration at ISL sites also regulated by a State UIC program, State ISL mining program and statutes is far too detailed and onerous. The NRC should rely on any State with a recognized program to determine whether restoration of ground water of that State has been sufficiently restored.

10. In respect to Section 6.13, page 6-5, and the statement "The EPA authorized state typically imposes the ground water restoration requirements in accordance with the state's ability to implement requirements that are more stringent than the delegated federal program" is an incorrect statement. There are no EPA or other federally mandated regulations that require ground water restoration of an "Exempted Aquifer". State regulations, such as those in Wyoming, that pertain to ground water restoration at ISL sites, are based on State statute and are not related to any federally mandated program.

11. The evaluation finding states that the "...applicant has identified and committed to use the federal primary and secondary drinking water standards" as a secondary restoration goal. This finding should be revised to reflect the comments on Criterion (4)(b) above.

12. Section 6.1.3(4), pages 6-8 to 6-10, concerning restoration standards, is much too detailed for licensees operating in states with a State ISL mining program (see previous Comment No. 1 in this section). Many of the "Acceptance Criteria" exceed current NRC license requirements and are not consistent with State program requirements. References to "Class of Use" are not appropriate, and the apparent requirement that "secondary restoration standards must be established by applying the lower of the State or EPA primary or secondary drinking water standards" may be overly burdensome, and not consistent with State requirements. It should be noted that some water quality parameters routinely required for monitoring do not have any "Primary" or "Secondary Federal Drinking Water Standards".

13. Section 5.7.8.3(1) states, in part, that the primary restoration goal is to return each wellfield to its pre-operational water quality conditions. It is not practicable to return all ground water quality parameters within the production zone to pre-operational conditions, nor is it required by all State programs and statutes. Additionally, EPA requirements result in the production zone being classified as an "Exempted Aquifer".

Additionally, why should "license conditions be set up such that a license amendment is necessary before the applicant can revert to secondary goals"? This requirement is not consistent with some existing ISL licenses.

14. Section 6.1.3(6) states, concerning the "likely external effects of ground water restoration", that "Ground water quality should not exceed the appropriate State water use standards for aquifers that cannot support a drinking water use". It is unclear what authority NRC has for this requirement, especially since some states may not have any standards for ground water, which is currently not being used and/or is unsuitable for domestic drinking water.

15. The evaluation finding also states that the "...applicant provided an acceptable mix of ground-water sweep, reverse osmosis, and ground-water recirculation." This finding is too specific with regard to the restoration technologies that could be potentially used. The acceptance criterion at 6.1.3 (3) recognizes that additional technologies are currently used (e.g., reductant addition) and that other technologies are under development (e.g., biorestoration) by stating:

    "Other restoration approaches, such as in-place biological remediation techniques, have been discussed by some applicants. These techniques show promise, but have not been tested or evaluated at commercial scale in situ leach operations."

    While no published data is available to date on the use of in-place biological remediation to restore in-situ wellfields, the technology has been proven to be effective in the removal of uranium and selenium from a large pit lake.

16. In respect to Section 6.1.3(3), page 6-7, contrary to the discussion concerning reverse osmosis treatment, the injection of permeate is considerably less than injection rates typically used during production.

17. Section 6.1.3(9) states that an applicant who "proposes no ground water restoration activities within the exploited ore zone" would be required to show that adequate "institutional control provisions" are in place to assure that the exploited ore zone would not be accessed for use. It should be noted that the water in the ore zone naturally possesses significant health hazards, prior to mining. It is questionable whether mining, with or without any ground water restoration, significantly changes the health risks associated with this ground water. It is a general practice in Wyoming to ensure that the Wyoming State Engineer's Office has a record of all Commercial and R&D ISL operations in order that the future installation of wells in these areas is prevented, or limited to aquifers that do not naturally contain uranium and its daughters.

D. Radiation Safety Programs

1. The SRP requires that the reviewer evaluate the minimum qualifications and experience levels proposed by the licensee for the health physics staff. Then, the reviewer is instructed to evaluate the qualifications of "...people specifically proposed for these positions." Does NRC intend that licensees must propose individuals and provide their qualifications with a license application? In many cases, these individuals have not been identified at this stage of the process. It would seem that a description of the proposed requirements would be adequate to meet NRC guidance

regarding this aspect of the radiological protection program without the submission of individual qualifications.

2. A table of release limits is presented on page 5-34. It should be explicitly stated that the release limits in the first row with listed nuclides Natural uranium, Uranium-235, -238, and associated decay products applies to in-situ uranium recovery facilities since they are licensed to extract natural uranium. Regulatory Guide 8.30 in Table 1 entitled *Surface Contamination Levels for Uranium and Daughters on Equipment to be Released for Unrestricted Use, Clothing and Non-operating Areas of Mills* specifies the use of the limits in the first row of the table on page 5-34.

3. Criterion (1) contains a reference to Regulatory Guide 4.14, Sections 1.1.1 and 2.1.2. It is unclear how this reference applies to this section of the SRP since these sections of the Regulatory Guide apply to preoperational and operational environmental air samples and provide no useful guidance appropriate to external radiation programs.

4. Criterion (6) should be clarified. It is unclear what corrective action levels from 10 CFR 20 should be addressed. The only corrective action level per se in Part 20 are contained in 10 CFR §20.1101, which apply to exceedance of the dose constraint for exposure to the public from air emissions.

5. Criterion (3) contains a reference to Regulatory Guide 8.24. The title of this guidance is *Health Physics Surveys During Enriched Uranium 235 Processing and Fuel Fabrication*. It appears that the correct reference should be Regulatory Guide 8.25, *Air Sampling in the Workplace*, Revision 1, June 1992. (Note that this reference is also not contained in Section 5.7.3.5.)

6. Criterion (6) contains reference to the wrong revision level of Regulatory Guide 8.15. The most recent revision is Revision 1 issued in October 1999.

7. The SRP states that airborne monitoring results "...will be used for employee exposure calculations." Actually, 10 CFR §20.1204 also allows the use of bioassay samples, in vivo counting, or a combination of these methods to assess internal exposures. This section should state that employee internal exposure calculations will be performed in accordance with 10 CFR §20.1204(a).

8. The final sentence in Criterion (2) appears to be misworded. In addition, the implication of this sentence is that unless "...site-specific solubility characterization results..." are available, Class Y should be used as the most conservative solubility class. It is well known that Class Y uranium is produced as a result of drying uranium at high temperatures. The vacuum dryers currently used at most ISL facilities do not reach the temperatures necessary to produce Class Y (or Class W, for that matter) uranium. Does the SRP intend as stated that, if a facility does not perform site-specific solubility analysis, they must apply the most conservative Class Y concentration values?

9. Reference to Regulatory Guide 8.13, Instruction Concerning Prenatal Radiation Exposure in this section is incorrect. Regulatory Guide 8.13 simply contains guidance for instructing employees concerning prenatal exposure and does not contain guidance for calculating prenatal and fetal exposures.

10. Criterion (3) contains a reference to the incorrect revision level of Regulatory Guide 8.9. The correct revision level should be Revision 1, July 1993. This reference should also be corrected in Section 5.7.5.5.

11. Criterion (4) states that the NRC will establish a new License Condition that requires reporting corrective action to NRC within 30 days of receiving bioassay results at specified action levels. The action levels are taken from Table 1 of Regulatory Guide 8.22, *Bioassay at Uranium Mills*. The NRC should recognize that a final dose determination may not be available within 30 days and that the determination of appropriate corrective action may not be completed until the dose is determined. This is particularly true of exposure determinations related to Y Class material, which may involve off-site in vivo measurement and further sampling. In fact, NRC regulations (10 CFR §20.1204(d)) allow up to seven months to complete exposure determinations for Y Class material. Furthermore, NRC currently has regulatory reporting requirements (10 CFR §20.2203) that include reports of exposure that are in excess of specified action levels. It is unclear how these new reporting requirements would improve NRC oversight of ISL radiological protection programs. The regulatory reporting requirements should be used in this section.

12. Criterion (5) would add a License Condition requiring that the annual ALARA audit address corrective actions taken for all bioassay results that are above 15 µg/l. Regulatory Guide 8.31 (which is referenced in draft form in Criterion (1)) clearly lists the topics required in an annual ALARA report, including "bioassay program results". It is unclear why a License Condition specifically requiring the ALARA report to address bioassay results at a specific concentration is necessary and how this will improve the radiological protection program. The guidance contained in Regulatory Guide 8.22 clearly addresses the proper response and corrective action requirements for bioassay monitoring results at several action levels. Regulatory Guide 8.31 contains the suggested topics for the annual ALARA Audit report. The addition of this License Condition is unnecessary.

13. The reference to 10 CFR §20.1702 does not apply to personnel contamination surveys. This regulatory requirement is part of Subpart H, *Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Area* and provides that, when it is not possible to use engineering controls to limit concentrations of radioactive material in air, other administrative controls and protective equipment may be used. The reference to Regulatory Guide 8.30 (in draft form) later in this paragraph provides the correct accepted guidance for performing these types of surveys at uranium recovery facilities.

14. Section 5.7.6.2, Criterion (1) should also be modified to remove this reference to 10 CFR §20.1702.

15. Criterion (5) incorrectly references Regulatory Guide 8.7, *Instructions for Recording and Reporting Occupational Radiation Exposure Data*, as providing guidance related to contamination control programs. This Regulatory Guide provides guidance for preparation of NRC Form 5 exposure reports. In addition, the revision level is incorrect. The most recent revision of Regulatory Guide 8.7 is Revision 1 dated 1992. This comment also applies to Section 5.7.6.4.

16. Criterion (8) has been revised to reference NUREG-1575 (MARSSIM) for release of "...equipment, or scrap for unrestricted use." The previous revision of this criterion also included the release of "premises". It is unclear why the provision for release of premises was removed. However, since "premises" has been removed from this section, it should be noted that NUREG-1575 applies only to land and buildings. As stated in NUREG-1575, "...the release of contaminated components and equipment are ... not addressed by MARSSIM." The only current NRC guidance for release of equipment and scrap material is contained in Annex B, *Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material*, May 1987. These limits are currently contained in most ISL licenses and are reproduced in Table 5.7.6.3-1 of the SRP. Therefore, reference to NUREG-1575 is unnecessary and inappropriate for the materials discussed. (Note that the reference at the bottom of Table 5.7.6.3-1 is dated June 1974. The most recent revision of this information is contained in Annex B dated May 1987.)

17. Criterion (9) appears to apply to a specific decommissioning effort and not a general description of decontamination and release measures that may be used by a licensee during the normal operating life of a facility. In particular, subcriterion (a) through (c) require "...detailed information describing the equipment, or scrap" and "...a detailed health and safety analysis..." that addresses the risk from residual contamination to the public. This information would normally be contained in the Decommissioning Plan that must be submitted to NRC by license condition at the end of facility operations. This criterion should be revised to require a general description of the program that will be in place to control the release of residual radioactive material associated with equipment or scrap. These comments also apply to the evaluation findings contained in Section 5.7.6.4.

18. The SRP requires the staff to review the decommissioning radiological survey and other procedures during the initial licensing. This requirement conflicts which current NRC directives, which require operators to submit this information just prior to the beginning of the decommissioning process.

E. Operations, Management Control, Audit, Inspection, Reporting and Record Keeping Program

1. The SRP references the following documents:

   - Draft Regulatory Guide DG-8027, *Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Recovery Facilities Will Be As Low As Reasonably Achievable*, (2000);

   - Draft Regulatory Guide DG-8026, *Health Physics Surveys in Uranium Recovery Facilities*, (2000)

   These draft regulatory guides were published by NRC in October 2000 as complete revisions to Regulatory Guide 8.31, *Information Relevant to Ensuring that Occupational Radiation Exposures at Uranium Mills Will Be As Low As Reasonably Achievable*, May 1983 and Regulatory Guide 8.30, *Health Physics Surveys in Uranium Mills*, June 1983, respectively. Note that the uranium

recovery industry provided comments on these two draft Regulatory Guides in late 2000. The final versions of these documents have not been published and industry comments have not been addressed. Reference to the draft Regulatory Guides throughout this section will make them the de facto criteria for reviewing proposed radiological protection programs in licensing actions. NRC should finalize DG-8027 and DG-8026 before issuing the final version of this SRP and should ensure that all references in this section are to the final guidance.

(To add further confusion, the SRP as currently written references the original 1983 version of Regulatory Guide 8.31 in Sections 4.1.3 (3) and 4.1.5. Similarly, the original 1983 version of Regulatory Guide 8.30 is referenced in Sections 5.7.2.3 (4) and 5.7.6.4. These references should also be updated. In addition, the draft Regulatory Guides have removed the term "mills" and replaced it with the more appropriate "recovery facilities." In most references to the draft Regulatory Guides in Section 5, this change in the title is not used).

2. The first paragraph states that the reviewer should evaluate the methods for approval of non-routine work or maintenance activities by the "radiation *and occupational* safety" staff. References to occupational safety should be removed from this section and from Section 5.2.3 (2) and 5.2.3 (3).

3. References in Section 5.2.3 (6) and elsewhere in the SRP concerning the National Historic Preservation Act and the Archeological Resources Protection Act are redundant with the requirements contained in Section 2.4. These requirements should be consolidated within one section of the SRP.

4. Acceptance criterion (1) requires reporting to the "NRC Region IV Uranium Recovery Branch Chief and NRC Headquarters Project Manager". Please clarify whether NRC desires reporting to NRC Region IV or the NRC Uranium Recovery Branch Chief (or both).

5. The requirements for preparation of operating procedures cited in this section should be revised to supplement those contained in Section 2.2 of Regulatory Guide 8.31 where necessary, which states procedures should be developed "...for all activities that involve handling, processing, or storing radioactive materials." For instance, reference to procedures for the Safety and Environmental Review Panel (SERP) in the third paragraph should be retained since this expands the guidance provided in Regulatory Guide 8.31. However, it is unclear why NRC chose to include a requirement for operating procedures addressing "...development of well fields" since these activities typically do not involve exposure to radioactive materials and are performed to meet UIC program requirements.

6. The SRP requires that the reviewer determine that the inspections of waste retention systems are in accordance with 10 CFR 40 Appendix A, Criterion 8A. The inspection regimen in Criterion 8A is more stringent than that typically applied to evaporation ponds at ISL facilities. Evaporation pond inspections have been designed to conform to the recommendations contained in Regulatory Guide 3.11.1, *Operational Inspection and Surveillance of Embankment Retention Systems for Uranium Mill Tailings*, (1980), which provides detailed guidance and was specifically developed for these types of inspections. For instance, Part 40, Appendix A, Criterion 8A requires that a daily inspection must be performed by "...a qualified engineer or scientist..." Regulatory Guide 3.11.1

recommends that the inspection program be performed by trained field inspectors under the direction of an experienced professional. Considering the potential hazards involved with these structures, the guidance in Regulatory Guide 3.11.1 is more appropriate to this task. Note that reference to Criterion 8A is also made in Section 5.3.1.4 and should be deleted and changed to Regulatory Guide 3.11.1.

7. Acceptance criterion (1) should reference the inspection requirements from Regulatory Guide 3.11.1, which is more detailed that those contained in Regulatory Guide 3.11.

8. Acceptance criterion (2) should also reference the reporting requirements in 10 CFR §40.60. It is unclear why this "Acceptance Criteria" requires the applicant to commit to the referenced reporting which is clearly required by 40.65 through a license condition.

9. Acceptance criterion (5) adds significant new reporting requirements in addition to the annual SERP report. Licensees are currently required to submit the annual summary of SERP actions and changed pages from the approved application. Criterion (5) adds requirements for submittal of an annual report "...that includes the as low as reasonably achievable audit report, land use survey, monitoring data, corrective action program report, one of the semiannual effluent and environmental monitoring reports, and the Safety and Environmental Review Panel information." Requiring submittal of this material will place an unnecessary burden on licensees to prepare the information and on the NRC staff to review it. All of the material that has been added to this requirement is currently maintained at the mine sites and has typically been reviewed by NRC during routine inspections. In fact, this new requirement of the SRP reverses a recent positive trend by NRC to *reduce* the amount of material that must be submitted by licensees and managed by NRC. Most importantly, the additional burden of submitting this information will not improve NRC oversight of ISL facilities.

10. Criterion (3)(c) requires retention of records required by Criterion 8A of 10 CFR 40 Appendix A for the life of the facility. As previously noted, inspection requirements should be in accordance with Regulatory Guide 3.11.1. However, it is interesting to note that Criterion 8A only requires retention of these records for 3 years after the inspections are made. It is not clear why the SRP considers these records of such importance to require retention for the life of the facility. NRC should delete Criterion (3) and replace it with reference to the requirements contained in 10 CFR §20.2101 and §20.2108. These are the regulatory requirements for the types of records discussed in this criterion.

11. Criterion (3)(d) should be deleted in its entirety and replaced with a reference to 10 CFR §40.36(f). These are the appropriate regulatory requirements for retention of these records.

F. Operations - Environmental Monitoring

1. This section requires that reviewers evaluate effluent and environmental monitoring programs to "...limit exposures and releases of radioactive and hazardous materials to as low as is reasonably achievable...in conformance with regulatory requirements identified in 10 CFR Part 20." The SRP should define "hazardous" and should provide the specific regulatory references from 10 CFR 20 that apply to hazardous material. The only obvious reference to hazardous material is in 10 CFR §

20.2007, which provides that nothing in Part 20 "...relieves the licensee from complying with other applicable Federal, State, and local regulations governing any other toxic or hazardous properties of materials that may be disposed of under this subpart."

2. Section 5.7.7.2 also refers to 10 CFR 20 Subparts D and F in relation to "hazardous" materials released to the environment. These subparts address radiation dose limits to the public and surveys and monitoring, respectively, and clearly do not regulate hazardous materials releases.

3. The SRP should reference 10 CFR § 20.2007, requiring that licensees comply with the appropriate federal, state, and local regulations that govern this material.

4. Criterion (3) apparently includes an incorrect reference. Regulatory Guide 4.14, Section 3 refers to the quality of environmental samples and does not provide guidance for the monitoring program for specific environmental media.

5. In Criterion (5), it appears that a portion of the final sentence has been deleted from the original draft SRP.

6. The SRP includes considerable reference to the monitoring "requirements" included in NRC Regulatory Guide 4.14 "Radiological Effluent and Environmental Monitoring of Uranium Mills". It is not always appropriate to require ISL operators to submit environmental programs consistent with the requirements of RG 4.14, which is for **uranium mills**. For example, some operations may not have any drying facilities, or may utilize a vacuum dryer, which should negate the need for detailed air monitoring. Similarly, it is not apparent why an ISL operation would need to monitor surface soils, vegetation and stream or lake sediment on a routine basis. These requirements are very costly and are not currently required at all operating ISL sites.

G. Site Conditions and Site Information

1. It is unclear if all the "Acceptance Criteria" would apply to an operation wholly located on private surface. If appropriate, this section should be revised to reflect differing requirements concerning public vs. private lands.

2. ISL licensees have not routinely collected and submitted core data "of the site and environs" to NRC as part of the site characterization. This type of information could be very costly and it is questionable whether it is needed.

H. Financial Surety

1. Section 6.1.3(9) states that the "applicant must maintain a financial surety to cover potential restoration costs in the event the modeling results cannot be verified through monitoring. Such an "Acceptance Criteria" is unacceptable as it is inherent that predictive modeling is a tool, which is used to assess conditions at some distant point in the future. The fact that ground water in the deep aquifers at ISL sites typically only moves a few feet per year makes computer modeling a valuable tool to determine future off site impacts because monitoring is not feasible. The need to maintain a

financial surety to cover potential restoration costs is unreasonable. NRC does not require such an approach at uranium mill tailings sites where geochemical modeling has been used to predict future ground water conditions.

2. It should be noted that "legal expenses" have never been considered a cost item for ISL licensees.

3. Contrary to section Section 6.5.2, ISL licensees are not subject to the "long-term surveillance cost" provisions of 10 CFR Part 40 and are not required to "transfer a long-term surveillance and control fee" to the U.S. Treasury.

4. NRC should use consistent terms when discussing "well plugging". Reference to "drill holes" could be misleading.

5. It is unclear why a licensee would need to identify "the NRC related portion of the surety" when it appears, especially considering this SRP and the recent NRC decisions concerning the definition of "By-Product Material", that NRC regulates the entire ISL mining operation.

I. Seismic Analysis

1. Acceptance criterion (11) requires that the short-term seismic stability of the *facility* be demonstrated in accordance with Regulatory Guide 3.11, *Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills* (1977). As the title suggests, this regulatory guide addresses requirements for embankment systems and does not appear to be applicable to a general facility evaluation as the SRP suggests. In addition, the acceptance criterion references Section 2.6. Regulatory Guide 3.11 does not have a Section 2.6. If it is intended that this seismic analysis only apply where evaporation ponds are planned, the SRP should clearly state this. NRC should clarify the reference to the proper section and insure that the methodology is current since this guidance is 25 years old.

The Wyoming Mining Association remains concerned that the Nuclear Regulatory Commission (NRC) has not made substantial efforts to date to resolve the dual jurisdiction issues regarding in-situ leach wellfields, possibly through the use of Memorandums of Understanding (MOUs) with the states hosting uranium in-situ mining operations. This concern is especially strong in Wyoming because the State has a comprehensive framework of regulations that apply to in-situ leach wellfields. The Wyoming Mining Association appreciates the opportunity to comment on this draft Standard Review Plan. If you have any questions please do not hesitate to contact me.

Sincerely yours,

Marion Loomis

Marion Loomis
Executive Director

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cc: Katie Sweeney - National Mining Association

Attachment I

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY
IN SITU GROUNDWATER CLASSIFICATION AND RESTORATION

Introduction

This paper summarizes the revision of policy that has been in use by the Administrators of the Water Quality Division and Land Quality Division for a number of years and most recently discussed in a letter to the Wyoming Mining Association dated June 27, 1997. The major difference is the concept of treatability of radium when classifying groundwater as Class I per WQD Chapter 8 Rules and Regulations (R&R). Currently, the radium standard for Class I, II, and III groundwaters is 5 picoCuries per liter (pCi/l). Historically, radium concentrations of up to 100 picoCuries per liter (pCi/l) were allowed in Class I groundwaters because radium could be removed using standard water treatment techniques (e.g., water softeners or ion exchangers). Treating a groundwater source which contains radium at background concentrations commonly found in the production zone could produce a filtrate or wastewater which would be prohibited for unrestricted release. Therefore, the concept of treatability for radium levels no longer seems applicable with respect to Class I groundwaters.

Groundwater Classification Within and Outside the Production Zone

For groundwater within the production zone, the available analysis for each sampling parameter for all the wells within the production zone is averaged to determine the groundwater background conditions. The production zone does not include the monitor wells and only includes the area within the production zone monitor well ring for the aquifer containing the ore zone, including the injection/production patterns are, to be consistent with the Environmental Protection Agency's (EPA's) definition of an exempted aquifer. Wells outside the production zone are classified by averaging the available analyses for each parameter on a well-by-well basis. Using the revised policy, treatability of radium will not be considered in the classification decision either within or outside the production zone.

The definition of groundwater restoration in the Environmental Quality Act (W.S. §35-11-103(f)(iii)) means the return of the groundwater quality to the pre-mining use or better. While there is a goal of using Best Practicable Technology (BPT) (LQD R&R, Chapter 11, Section 3(d)(i)), to return the groundwater within the production zone to the pre-mining average back groundwater quality, the standard is the restoration to pre-mining class of use. BPT shall be applied until the restoration results become asymptotic unless, of course, background is achieved sooner. Outside the production zone, the goal is to return the groundwater to the pre-mining back groundwater quality for each well. The standard is to return the groundwater to the pre-mining class of use.

Regardless of the restored groundwater quality in the production zone, the adjacent aquifers and other waters within the same aquifers must be fully protected to their class of use. If the restored groundwater in the production zone poses a threat to groundwater class of use outside the production zone, then flow models and fate and transport models shall be used to assist in determining what action needs to be taken. A monitoring program sufficient to verify the model will be required similar to the approach used in other industries and situations where natural attenuation is relied on for groundwater restoration.

Uranium Restoration Within and Outside the Production Zone

All wells inside the production zone are regulated as Class V under Section 4(d)(viii)(B) of Chapter 8, WQD R&R, unless the groundwater has a pre-existing use. All Class I groundwaters located outside the production zone will require uranium to be restored to background pursuant to Section 4(d)(vi) of Chapter 8, WQD R&R.

Treatability of Groundwater to a Class I Standard

As discussed in the introduction under Section 5, Chapter 8 of the WQD R&R, radium will not be considered as treatable due to concerns with the safe disposal of any water treatment by-products. In addition, this allows for consistency in the approach for Class I, II, and III groundwaters (currently treatability is only considered for Class I waters).

This policy is approved by a joint session of the Water & Waste and the Land Quality Advisory Boards on this 14th day of November, 2001

Marshall Gingery
LQD Chairman

Richard A. Chancellor
Administrator, Land Quality Division

Gene George
WQD Chairman

Gary Beach
Administrator, Water Quality Division