

Staff Technical Position
on
Effluent Disposal
at Licensed Uranium Recovery Facilities

Division of Waste Management
U. S. Nuclear Regulatory Commission

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Background

NRC-licensed uranium recovery facilities, including milling and in situ leach (ISL) facilities, generate liquid wastes (i.e., effluent) that require proper disposal. At uranium mills, effluent may include contaminated water recovered from ground-water corrective action programs and tailings dewatering activities, and tailings liquor that must be extracted and properly disposed of before surface site reclamation can proceed.

At ISL facilities, effluent is generated from four liquid waste streams: Two involving the host aquifer and the other two originating at the main uranium recovery plant. Liquid waste streams involving the host aquifer include production bleed and ground-water sweep. Production bleed is ground water extracted from the aquifer during the uranium recovery operation, in excess of injected water, in order to maintain a net ground-water inflow into the recovery zone and minimize or eliminate the migration of lixiviant and dissolved uranium outside the recovery zone. Ground-water sweep is ground water extracted at the end of a uranium recovery operation primarily to restore ground-water quality in the recovery zone. Liquid waste streams originating at the main uranium recovery plant include wastewater from yellowcake processing and reject brine from reverse osmosis treatment of contaminated water.

Evaporation has generally been used for management of liquid waste at licensed uranium mills and mill tailings disposal sites. This practice involves discharging liquid waste in one or more on-site lined evaporation ponds where the water is lost to the atmosphere by surface evaporation and other evaporation enhancement systems, and the remaining sludge is placed in a licensed tailings disposal facility. At ISL facilities, management of liquid waste has generally involved such disposal practices as release to surface waters, on-site land applications including on-site irrigation, and injection in deep wells.

Purpose and Applicability

This Staff Technical Position (STP) provides guidance and discusses the technical and regulatory basis for review and evaluation of proposals for disposal of liquid waste at licensed uranium recovery facilities. The STP is primarily intended to guide NRC staff reviews of site-specific proposals for disposal of liquid waste at uranium mills and ISL facilities. The STP can also be used for preparation of proposals for liquid waste disposal by uranium recovery licensees and applicants.

This STP is applicable to both licensed and new facilities. Previously

approved limits at licensed sites that may not conform to the applicable regulations can be changed by a site-specific license amendment.

Applicable Regulation and Standards

In general, applications and proposals for disposal of liquid waste at licensed uranium recovery facilities must comply with the regulations in Appendix A to 10 CFR Part 40, and Subparts K and D, 10 CFR Part 20, as applicable depending on the proposed disposal procedure. All terms and characterizations in this STP are to be used consistent with their definitions in the applicable regulations.

Applicable regulations in Appendix A to 10 CFR Part 40 mainly include design standards for construction, maintenance, and operation of surface impoundments that are used for disposal of liquid waste or waste containing free liquids (Criteria 5A(1) through 5A(5)); installation of liners (Criterion 5E); and seepage control (Criterion 5F). Appendix A also includes other generally applicable provisions, including in particular site-specific ground-water protection standards for both radioactive and non-radioactive hazardous constituents (Criteria 5B and 5C); corrective action programs (Criterion 5D); ground-water monitoring requirements (Criterion 7); and closure requirements (Criterion 6).

Furthermore, Criterion 8 of Appendix A to 10 CFR Part 40 requires that byproduct materials must be managed so as to conform to the applicable EPA regulations in 40 CFR Part 440, "Ore Mining and Dressing Point Source Category: Effluent Limitations Guidelines and New Source Performance Standards, Subpart C, Uranium, Radium, and Vanadium Ores Subcategory," as codified on January 1, 1983. These regulations provide technology-based limitations for disposal of wastewater from uranium mining and milling facilities by release in surface waters.

Byproduct material disposal under Part 20 requires compliance with the applicable regulations in 10 CFR Part 20, Subpart K (§20.2001, §20.2002 and §20.2007), and Subpart D (§20.1301 and §20.1302). Subpart K offers provisions for byproduct material disposal by "release in effluents" (§20.2001), or other disposal methods proposed by the licensee (§20.2002). Among other requirements, the provisions in §20.2001 and §20.2002 require compliance with the radiation dose limits for individual members of the public in §20.1301, and a demonstration of compliance with these limits as provided in §20.1302.

The dose limits in §20.1301 include the total effective dose equivalent to individual members of the public (0.1 rem/year), as well as the dose in any unrestricted area from external sources in any one hour (0.002 rem in any one hour) (§20.1301 (a) and (b)). In addition, the regulations allow a licensee to apply for Commission authorization in advance to operate up to an annual dose limit for an individual member of the public (0.5 rem), which the Commission may generally authorize on a temporary basis or under special circumstances involving existing facilities (those designed prior to January, 1994), subject to the requirements in §20.1301 (c) (1), (2), and (3). The

regulations also require (in §20.1301 (d)) that licensees who are subject to the provisions of U.S. Environmental Protection Agency's (EPA) generally applicable environmental standards in 40 CFR Part 190 shall comply with these standards. In some cases, the Commission may impose additional restrictions on radiation levels and on the total quantity of radionuclides that may be released in effluents in order to restrict the collective dose at a particular site (§20.1301 (e)).

In order to demonstrate compliance with the dose limits for individual members of the public in §20.1301, licensees and applicants must do so according to the provisions of §20.1302, which require that licensees:

(a) demonstrate compliance with the dose limits for individual members of the public by conducting surveys of radiation levels in unrestricted and controlled areas and radioactive materials in effluents released to unrestricted and controlled areas; and,

(b) show compliance with the annual dose limit by demonstrating, by measurement or calculation, that the total effective dose equivalent to the individual likely to receive the highest dose from the licensed operation does not exceed the annual dose limit; OR, by demonstrating that the annual average concentrations of released radioactive materials do not exceed the effluent concentration values (for water) provided in Table 2 of Appendix B to §20.1001-§20.2401 and that the dose from external sources to a continuously exposed individual would not exceed the established standard (0.002 rem/hour and 0.05 rem in a year).

The provisions of §20.1302 also allow licensees, upon approval by the Commission, to adjust the effluent concentration values in Table 2 of Appendix B to §20.1001-§20.2401 for members of the public to take account of the actual characteristics of effluent that will be released (§20.1302 (c)).

The provisions in §20.2007 require that licensees and applicants must also comply with other applicable federal, state, and local environmental and health protection regulations governing any other toxic or hazardous properties of licensed materials disposed of under Part 20, Subpart K.

In addition to the above requirements, licensees and applicants considering disposal of licensed materials under the provisions of either §20.2001 or §20.2002 are further required to comply with NRC's regulatory provisions for decommissioning of licensed facilities, prior to facility closure and license termination. These provisions include the interim cleanup criteria presently in use, and those specified in the final rule when the final rule is promulgated (the proposed radiological criteria for decommissioning are provided in the proposed rule in 10 CFR Part 20, Subpart E: §20.1401 through §20.1405, FR Vol 59, No. 161, page 43228, dated August 22, 1994).

Proposal Review and Evaluation Criteria

In general, licensees of uranium recovery facilities are required to submit proposals for disposal of liquid waste, and obtain NRC's approval of the

proposed procedures. Proposals will be approved on a site-specific basis by NRC staff based on demonstrated compliance with all of the applicable regulations.

Proposal review and evaluation criteria that will be used by the staff are discussed in the following paragraphs for four disposal procedures that have been in practice or proposed at licensed uranium recovery facilities. These include: on-site evaporation; release in surface waters; on-site land applications; and injection in deep wells.

On-Site Evaporation

In accordance with Appendix A, 10 CFR Part 40, proposals for on-site evaporation systems must demonstrate that the proposed disposal facility is designed, operated, and closed in a manner that prevents migration of waste from the evaporation systems to a subsurface soil, ground water, or surface water. In addition, applicants must demonstrate that site-specific ground-water protection standards and monitoring requirements are adequately established to detect any migration of contaminants to the ground water and to implement corrective action to restore ground-water quality if and when necessary as required by the regulations.

Evaporation pond systems will be approved if they comply with the regulatory requirements in Appendix A, 10 CFR Part 40. These mainly include the design provisions for surface impoundments (Criteria 5A(1) through 5A(5)); installation of liners (Criterion 5E); and seepage control (Criterion 5F). In addition, evaporation ponds must also meet other generally applicable regulatory provisions in Appendix A, including in particular the site-specific ground-water protection standards (Criteria 5B and 5C); corrective action programs (Criterion 5D); ground-water monitoring requirements (Criterion 7); and closure requirements (Criterion 6).

Release in Surface Waters

Proposals for release of liquid waste in surface waters must demonstrate compliance with the provisions of §20.2001 and §20.2007, and the provisions of 40 CFR Part 440 as required by Criterion 8 of Appendix A to 10 CFR Part 40, as applicable based on site-specific conditions.

Specifically, release in surface waters must meet the regulatory provisions in §20.2001 (a)(3), which requires that licensees comply with the dose limits for individual members of the public in §20.1301. In order to demonstrate compliance with the dose limits for individual members of the public in §20.1301, licensees and applicants must do so according to the provisions of §20.1302 (The provisions of §20.1301 and §20.1302 have already been discussed under Applicable Regulations).

Licensees and applicants must also comply with other applicable federal, state, and local environmental and health protection regulations governing any other toxic or hazardous properties of licensed materials disposed of under Part 20, Subpart K, pursuant to the provisions in §20.2007.

Compliance with Criterion 8 of Appendix A to 10 CFR Part 40 requires conformance to the provisions in 40 CFR Part 440, as applicable. These regulations provide technology-based effluent limitations for existing point sources, in §440.32 and §440.33) and new source performance standards (NSPS), in §440.34, promulgated by EPA under the Clean Water Act. Licensees must demonstrate compliance with these EPA regulations and standards, as applicable, including the obtaining of a National Pollutant Discharge Elimination System (NPDES) permit issued or approved by the EPA.

The regulatory provisions and requirements for release of liquid waste under a NPDES permit are outside the scope of this technical position; however, specific effluent limitations and standards in 40 CFR Part 440 (§440.30 through §440.34) that are applicable to discharges from mills and ISL uranium recovery facilities are provided and briefly discussed in an appendix to this STP.

As indicated in the appendix, there is a distinction in 40 CFR Part 440 Subpart C (i.e., NPDES standards) between "process wastewater" and "mine wastewater" with respect to ISL facilities. "Process wastewater" is wastewater and liquid waste generated from uranium recovery operations; it includes production bleed or ground water extracted from the aquifer during the uranium recovery operation, and liquid waste generated at the main uranium recovery plant. "Mine wastewater" is wastewater from post-operation ground water sweep, or ground water extracted to restore water quality in the recovery zone after a uranium recovery operation is stopped.

NPDES effluent limitations in 40 CFR 440 that are applicable to NRC licensed facilities are provided in the appendix in Tables A1 and A2. The effluent limitations in Table A1 are applicable to mills, including "process wastewater" from ISL facilities. The effluent limitations in Table A2 are applicable to mines, including "mine wastewater" from ISL facilities.

Staff notes that NRC's ISL licensees must comply with the NPDES effluent limitations for uranium in Table A2, which applies to existing mines, including "mine wastewater" from ISL facilities; this is because mines and "mine wastewater" are not covered by NRC regulations in Part 20. However, there is no such standard for uranium in Table A1, which applies to existing mills, including "process wastewater" from ISL facilities; licensees must in this case comply with the provisions in 10 CFR Part 20, Subpart K (i.e., meet the dose limits for individual members of the public pursuant to §20.1301 and other requirements to satisfy the provisions in Subpart K). Moreover, the NPDES effluent limitations for certain non-radioactive constituents for release of "process wastewater" may be different from those for release of "mine wastewater" (e.g., the effluent limitations for the chemical oxygen demand or COD in Tables A1 and Table A2, for example).

Therefore, ISL licensees proposing to dispose of byproduct material by release in effluents may need to satisfy different standards, depending on whether the disposal involves releasing a "process wastewater" or a "mine wastewater." Consequently, licensed ISL facilities that involve commingling of "process wastewater" and "mine wastewater" in an interim common storage facility (i.e., storage reservoir) before the wastewater is released in surface waters have

two alternative options to satisfy the regulations. Under the first option, a licensee would monitor the incoming wastewater by source and meet the corresponding effluent limitations separately for "process wastewater" and "mine wastewater" at their respective points of discharge into the interim storage facility. If both input streams were within the appropriate effluent release limits, the licensee would be free to release the wastewater from the storage facility. In the second option, a licensee would not monitor the input streams, and would need to meet the applicable standard in 10 CFR Part 20 before releasing the commingled wastewater in surface waters.

Licensees and applicants disposing effluent by release in surface waters are further required to comply with NRC's regulatory provisions for decommissioning, prior to facility closure and license termination (decommissioning requirements have already been discussed under Applicable Regulations and Standards).

Land Applications

Proposals for disposal of liquid waste by on-site land applications, including irrigation, will be approved under the provisions of §20.2002. Licensees must in this case provide a description of the waste, including its physical and chemical properties that are important to risk evaluation; the proposed manner and conditions of waste disposal; an analysis and evaluation of pertinent information on the nature of the environment; information on the nature and location of other potentially affected facilities; and analyses and procedures to ensure that doses are maintained As Low As Reasonably Achievable (ALARA) and within the dose limits in Part 20 (i.e., §20.1301).

Proposals must analyze and assess projected concentrations of radioactive contaminants in the soil; projected impacts on ground-water and surface water quality, and on land uses including particularly crops and vegetation; and projected exposures and health risks that may be associated with radioactive constituents reaching the food chain to verify that the projected doses and risks conforming to the risk levels permitted under Part 20. It is expected that proposals include provisions for periodic soil surveys that include contaminant monitoring to verify that the contaminant levels in the soil do not exceed those projected, and a remediation plan that can be implemented in the event that the projected levels are exceeded.

In addition to the radiation dose, it may also be necessary in some cases to conduct analyses to assess the chemical toxicity of radioactive and non-radioactive constituents in order to evaluate the health risks associated with land applications involving irrigation at particular sites, in compliance with other applicable Federal, State, and local environmental and health protection regulations that must also be satisfied pursuant to §20.2007. Staff will work with appropriate State and Federal agencies if necessary to review site-specific chemical toxicity evaluations, and to verify that any necessary permits for this purpose are secured as warranted by the applicable regulations.

In the absence of compliance monitoring wells in the uppermost aquifer in the area used for effluent disposal or for installation of land application

systems including temporary surface storage facilities. proposals must demonstrate that contaminants will not be returned to the ground water and cause exceedence of any site-specific ground-water protection standards that are established pursuant to Appendix A of 10 CFR Part 40.

Licensees and applicants disposing effluent by on-site land applications are further required to comply with NRC's regulatory provisions for decommissioning, prior to facility closure and license termination (decommissioning requirements have already been discussed under Applicable Regulations and Standards).

Deep-Well Injection

Proposals for disposal of liquid waste by injection in deep wells must meet the regulatory provisions in §20.2002. Specifically, proposals must in this case include a description of the waste, including its physical and chemical properties that are important to risk evaluation; the proposed manner and conditions of waste disposal; an analysis and evaluation of pertinent information on the nature of the environment; information on the nature and location of other potentially affected facilities; and analyses and procedures to ensure that doses are ALARA, and within the dose limits in Part 20 (i.e., §20.1301).

Proposals must also demonstrate that the injection zone is confined, that it is not a drinking water source, and that the injected contaminants will not cause exceedence of any established site-specific ground-water protection standards in the uppermost aquifer or result in any cross contamination that would adversely impact another zone that is a source of drinking water. If necessary and warranted by site conditions, proposals may include provisions for periodic ground-water monitoring in the vicinity of the injection well to verify that drinking water zones are free from cross contamination, and a remediation plan that can be implemented in the event that unacceptable levels of contamination are detected.

In addition, pursuant to the provisions of §20.2007, proposals for disposal by injection in deep wells must also meet any other applicable Federal, State, and local government regulations pertaining to deep well injection, and obtain any necessary permits for this purpose. In particular, proposals must satisfy the EPA's regulatory provisions in 40 CFR Part 146: Underground Injection Control (UIC) Program: Criteria and Standards, and obtain necessary permits from the EPA and/or States authorized by EPA to enforce these provisions. In general, proposals that satisfy the EPA regulations under the UIC program will be approved by NRC staff.

Licensees and applicants disposing effluent by injection in deep wells are further required to comply with NRC's regulatory provisions for decommissioning, prior to facility closure and license termination (decommissioning requirements have already been discussed under Applicable Regulations and Standards).

Appendix

Summary

Effluent Limitations and Standards Applicable to NRC Licensed Facilities
in 40 CFR Part 440: "Ore Mining and Dressing Point Source Category,
Subpart C. Uranium, Radium and Vanadium Ores Subcategory"

Since the NRC does not regulate conventional mining, the effluent limitations in 40 CFR Part 440 pertaining exclusively to conventional mines are not applicable to NRC licensed facilities and will not be provided or discussed in this summary.

There is a distinction in 40 CFR Part 440 Subpart C between "process wastewater" and "mine wastewater" with respect to in situ leach (ISL) facilities (see 40 CFR Part 440, Subpart L, and 47 FR 54604). "Process wastewater" is wastewater and liquid waste generated from uranium recovery operations; it includes production bleed or ground water extracted from the aquifer during the uranium recovery operation, and liquid waste generated at the main uranium recovery plant. "Mine wastewater" is wastewater from post-operation ground water sweep, or ground water extracted to restore water quality in the recovery zone after a uranium recovery operation is stopped.

Effluent limitations in 40 CFR 440 that are applicable to NRC licensed facilities are provided in Tables A1 and A2. The effluent limitations in Table A1 are applicable to mills, including "process wastewater" from ISL facilities. Effluents from existing mills, including "process wastewater" from existing ISL facilities, applying the best practicable control technology currently available (BPT) shall not exceed the attainable effluent limitations provided in Table A1.

The effluent limitations in Table A2 are applicable to mines, including "mine wastewater" from ISL facilities. Existing mines, including "mine wastewater" from ISL facilities, applying the best available technology economically achievable (BAT) shall not exceed the attainable effluent limitations provided in Table A2.

In addition to the above, the new source¹ performance standards (40 CFR Part §440.34(b)) stipulate that for new sources there shall be no discharge of process wastewater to navigable waters from mills using the acid leach, alkaline leach or combined acid and alkaline leach process for the extraction of uranium or from mines and mills using ISL methods. These regulations further stipulate that in the event that the annual precipitation falling on

¹ Pursuant to the definition of "new sources" in 40 CFR 122.2, "new" uranium recovery facilities as they pertain to the regulations in 40 CFR Part 440 are those the construction of which commenced after December 3, 1982, which is the date when the effluent standards relevant to uranium recovery were first issued. "Existing" facilities are those the construction of which commenced before December 3, 1982.

the treatment facility and the drainage area contributing surface runoff to the treatment facility exceeds the annual evaporation, a volume of water equivalent to the difference between these two values may be discharged subject to the limitations set forth above.

In that the effluent limitations and standards in 40 CFR Part 440 are based on technology-based treatment requirements, effluent limitations and standards at specific sites will be imposed based on approved treatment technology on a site-specific basis by the EPA. Treatment technology would be approved for specific sites based on the regulatory provisions in 40 CFR Part 125: Criteria and Standards of the National Pollutant Discharge Elimination System; Subpart A: Criteria and Standards for Imposing Technology Based Treatment Requirements Under Sections 301 (b) and 402 of the Act (i.e. Clean Water Act) (40 CFR Part 125, §125.1 through §125.3).

Table A1
Effluent Limitations Representing the Degree of Effluent Reduction
Attainable by the Application of BPT Technology

(Applicable to existing mills, including "process wastewater" from
in situ leach facilities)

(Source: 40 CFR Part 440, §440.32(b))

Effluent Characteristic	Effluent Limitations	
	Maximum for any One Day	Average of Daily Values for 30 Consecutive Days
TSS (mg/l)	30	20
COD (mg/l)	---	500
As (mg/l)	1.0	0.5
Zn (mg/l)	1.0	0.5
Ra226 (dissolved); pCi/l	10	3
Ra226 (total); pCi/l	30	10
NH ³ (mg/l)	---	100
pH	6.0-9.0	6.0-9.0

Table A2
Effluent Limitations Representing the Degree of Effluent Reduction
Attainable by the Application of BAT Technology

(Applicable to existing mines, including "mine wastewater" from
in situ leach facilities)

(Source: 40 CFR Part 440, §440.33(a))

Effluent Characteristic	Effluent Limitations	
	Maximum for any One Day	Average of Daily Values for 30 Consecutive Days
COD (mg/l)	200	100
Zn (mg/l)	1.0	0.5
Ra226 (dissolved); pCi/l	10	3
Ra226 (total), pCi/l	30	10
U (mg/l)	4	2

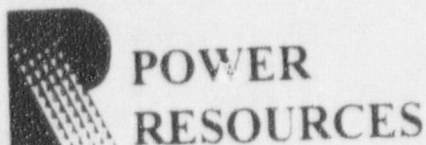
Attachment D

Selected Pages

From

Power Resources December 1, 1997 Letter

(Relevant Text Marked)



POWER
RESOURCES

Operations Office
800 Werner Ct
Suite 352
Casper, Wyoming 82601
Tel: 307-472-2035
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December 1, 1997

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



Dear Sir or Madam:

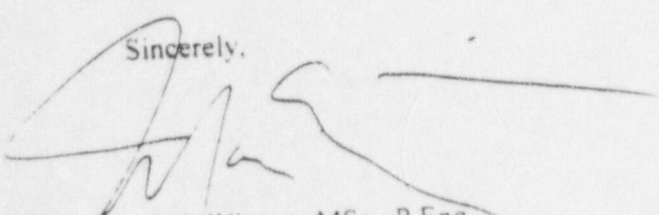
Subject: Comments On The Draft Standard Review Plan For *In Situ* Uranium Extraction Licence Applications. NUREG-1569

Please find attached Power Resources Inc., (PRI) comments on the draft Standard Review Plan for *In Situ* Uranium Extraction License Applications. PRI is a major ISL uranium producer, producing in excess of one million pounds U_3O_8 per year for domestic and foreign electrical utilities.

We are disappointed that a ninety day extension of the review period was not granted (Holonich to Wittrup, 11/20/97) as this prevented meaningful intra-industry consultation. In general, we feel that this document should be shelved and the process started from the beginning with adequate State and industry input. The document incorporates none of the previous input from the industry, and given the rush to get this document finalized, we feel doubtful that any of our comments will be addressed this time.

As an *in situ* uranium producer, we cannot stress enough the importance of an effective and thorough review of this document with input from state and federal agencies, and the ISL industry. This SRP has the potential to significantly impact our future expansion plans, and possibly our profitability and viability, if carried forward without the necessary review and input.

Sincerely,


Mark Wittrup, MSc., P.Eng.
Director, Environment and Safety

cc: M. Loomis, WMA
K. Sweeney, NMA
J. Holonich, NRC
G. Schmitt

M. Chalmers
P. Hildenbrand
W. Kearney

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significant flaws and inconsistencies that should be addressed by NRC. The uranium industry was told at that time that the effluent disposal document was to be reevaluated in December 1996 and that industry's comments would be addressed at that time. Comparing the 1995 guidance document with Appendix D of the draft SRP clearly shows that the document has not been reevaluated as promised nor have any of the uranium industry's concerns been addressed. Appendix D of the SRP should be revised to address industry's concerns. Comments provided to NRC by Power Resources, Inc. in October 1995 can be found as Attachment A to this document.

39. **Appendix E, Recommended Outline for Site-Specific In Situ Leach Facility Reclamation and Stabilization Cost Estimates, Pages E-1 through E-5:** Same as Comment 33 above.

Attachment A: Comments to the NRC Regarding Effluent Disposal at Licensed Uranium Recovery Facilities

BACKGROUND

1. The STP states that reverse osmosis (RO) reject brine is a liquid waste from the processing of yellowcake. This is not true. RO is used during ground water restoration as a tool to assist in returning the affected ground water to its pre-mining condition. The RO reject brine is a waste connected with ground water restoration rather than yellowcake processing.
2. The STP states that evaporation is used for management of liquid wastes at licensed uranium mills and tailings disposal sites. This is not true. Liquid wastes from conventional mills are sent to the tailings disposal facility along with the solid wastes. The only time evaporation may be used is during decommissioning when ground water from under the tailings disposal site may be pumped to evaporation ponds as part of a Corrective Action Plan to mitigate a ground water contaminant plume.
3. The STP states that management of liquid wastes at ISL sites includes release to surface waters. This is generally only true for ground water restoration fluids as the EPA NPDES regulations prohibit surface discharge of process waste water from ISL facilities. However, PRI believes that the in situ mining fluids are indeed mine water, not process waste water, and should be eligible for NPDES surface discharge. This opinion is apparently inconsistent with EPA's interpretation, which considers

the mining fluids to be process fluids.

APPLICABLE RULES AND REGULATIONS

1. The first part of this section (page 2) states that disposal of liquid waste must comply with 10 CFR 40, Appendix A requirements including the closure (decommissioning) requirements of Criterion 6. The last paragraph of this section (page 3) states that, in addition, licensees will also be required to comply with NRC regulatory provisions for decommissioning and closure and references the proposed rule at 10 CFR 20.1401 through 20.1405. These two statements are contradictory since the unrestricted release criteria for soil radium concentration in Criterion 6 of 10 CFR 40, Appendix A is 5.15 pCi/gram while the proposed criteria in 10 CFR 20.1404 has a 15 mrem TEDE requirement which, for radium, is equivalent to 0.1 pCi/gram. The language in the STP indicates that Licensees will have to meet both criteria which is not possible to accomplish. Additional clarification should be provided.
2. Proposed 10 CFR 20.1401 states that as applied to uranium mills, the proposed decommissioning criteria would apply only to decommissioning of the facility and not to the disposal of tailings or soil cleanup which is to be performed in accordance with 10 CFR 40, Appendix A. Historically, the NRC has required ISL's to comply with the Appendix A requirements for soil cleanup. Does the term "uranium mills" of the proposed 10 CFR 20.1401 include ISL facilities in this sense as it does in Appendix A of Part 40?

ON-SITE EVAPORATION

1. This section appears to confuse tailings cells with evaporation ponds. The requirements of 10 CFR 40, Appendix A apply to impoundments that are designed to dispose of liquid and solid wastes resulting from uranium or thorium milling operations, or mill tailings. Evaporation ponds are designed to contain ground water or other liquid effluents with relatively small quantities of suspended and dissolved solids. Therefore, the design criteria in Appendix A are not appropriate for evaporation ponds.
2. This section also states that evaporation ponds must comply with the closure standards of Criterion 6 in 10 CFR 40, Appendix A. Criterion 6 specifies that the waste disposal area must be closed by placing an earthen cover over the waste material (i.e., buried in place). Historically, the NRC has required that evaporation ponds be excavated and disposed at a tailings facility or other disposal facility licensed by the NRC to accept by-product material. Does the language in the STP represent a change of NRC policy regarding decommissioning of evaporation ponds?

Attachment E

40 CFR 440.34

(Relevant Text Marked)

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Environmental Protection Agency

§ 440.34

mines using in-situ leach methods shall not exceed:

Effluent characteristic	Effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Milligrams per liter	
TSS	30	20
COD	200	100
Zn	1.0	0.5
Ra226 ¹ (dissolved)	10	3
Ra226 ¹ (total)	30	10
U	4	2
pH	(²)	(²)

¹ Values in picocuries per liter (pCi/l).

² Within the range 6.0 to 9.0.

(b) The concentrations of pollutants discharged from mills using the acid leach, alkaline leach or combined acid and alkaline leach process for the extraction of uranium, radium and vanadium including mill-mine facilities and mines using in-situ leach methods shall not exceed:

Effluent characteristic	Effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Milligrams per liter	
TSS	30	20
COD		500
As	1.0	5
Zn	1.00	5
Ra226 ¹ (dissolved)	10	3
Ra226 ¹ (total)	30	10
NH ₃ ²		100
pH	(²)	(²)

¹ Values in picocuries per liter (pCi/l).

² Within the range 6.0 to 9.0.

§ 440.33 Effluent limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT).

Except as provided in Subpart L of this part and 40 CFR 125.30 through 125.32, any existing point source subject to this subpart must achieve the following limitations representing the degree of effluent reduction attainable by the application of the best available technology economically achievable (BAT):

(a) The concentration of pollutants discharged in mine drainage from mines, either open-pit or underground,

that produce uranium ore, including mines using in-situ leach methods, shall not exceed:

Effluent characteristic	Effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Milligrams per liter	
COD	200	100
Zn	1.00	5
Ra226 ¹ (dissolved)	10.0	3.0
Ra226 ¹ (total)	30.0	10.0
U	4.0	2.0

¹ Values in picocuries per liter (pCi/l).

§ 440.34 New source performance standards (NSPS).

Except as provided in Subpart L of this part any new source subject to this subpart must achieve the following NSPS representing the degree of effluent reduction attainable by the application of the best available demonstrated technology (BAT):

(a) The concentration of pollutants discharged in mine drainage from mines, either open-pit or underground, that produce uranium ore, excluding mines using in situ leach methods, shall not exceed:

Effluent characteristic	Effluent limitations	
	Maximum for any 1 day	Average of daily values for 30 consecutive days
	Milligrams per liter	
COD	200	100
Zn	1.0	0.5
Ra 226 (dissolved)	10.0	3.0
Ra 226 (total)	30.0	10.0
U	4.0	2.0
pH	(²)	(²)
TSS	30.0	20.0

¹ Values in picocuries per liter (pCi/l).

² Within the range 6.0 to 9.0.

(b)(1) Except as provided in paragraph (b) of this section, there shall be no discharge of process wastewater to navigable waters from mills using the acid leach, alkaline leach or combined acid and alkaline leach process for the extraction of uranium or from mines and mills using in situ leach methods. The Agency recognizes that the elimination of the discharge of pollutants to navigable waters may result in an increase in discharges of some pollutants

Differing Professional View Panel Report
Concerning Handling of
Liquid Effluent Releases from *In Situ* Leach
Operations at Licensed Uranium Recovery Facilities

ATTACHMENT B

MYRON FLIEGEL'S

**DIFFERING PROFESSIONAL VIEW
ON
COMMISSION PAPER TITLED:
RECOMMENDATIONS ON WAYS TO IMPROVE
THE EFFICIENCY OF NRC REGULATION
AT
IN SITU LEACH URANIUM RECOVERY FACILITIES
DATED NOVEMBER 19, 1998**

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