

Compilation of All Presentation Slides for Workshop on the NRC's Rulemaking for Groundwater Protection Requirements at *In Situ* Leach (ISL) Uranium Recovery Facilities

June 29, 2006

Workshop on the NRC's Rulemaking for Groundwater Protection Requirements at *In Situ* Leach (ISL) Uranium Recovery Facilities

*U.S. Nuclear Regulatory Commission (NRC)
Office of Nuclear Material Safety and Safeguards*



June 29, 2006

Welcome

- ◆ Sponsored by Rulemaking and Guidance Branch, Division of Industrial and Medical Nuclear Safety, NRC
- ◆ Other Participants
 - Division of Fuel Cycle Safety and Safeguards, NRC
 - Environmental Protection Agency

Purpose

- ◆ Inform Stakeholders
- ◆ Solicit Comments for Consideration During Development of Proposed Rule

Agenda

- ◆ Welcome and Introductory Remarks
- ◆ Background
- ◆ Statement of Problem
- ◆ Rulemaking Process
- ◆ Proposed Changes
- ◆ Open Forum

Public Participation

- ◆ Appropriate Times for Comments
 - End of Each Presentation
 - Open Forum
- ◆ Methods to Provide Comments
 - Oral Comments at Appropriate Times
 - Written on Cards Provided
 - Submit via email or by letter (earlier the better)
- ◆ Other Opportunities Will be Discussed During Rulemaking Process Segment

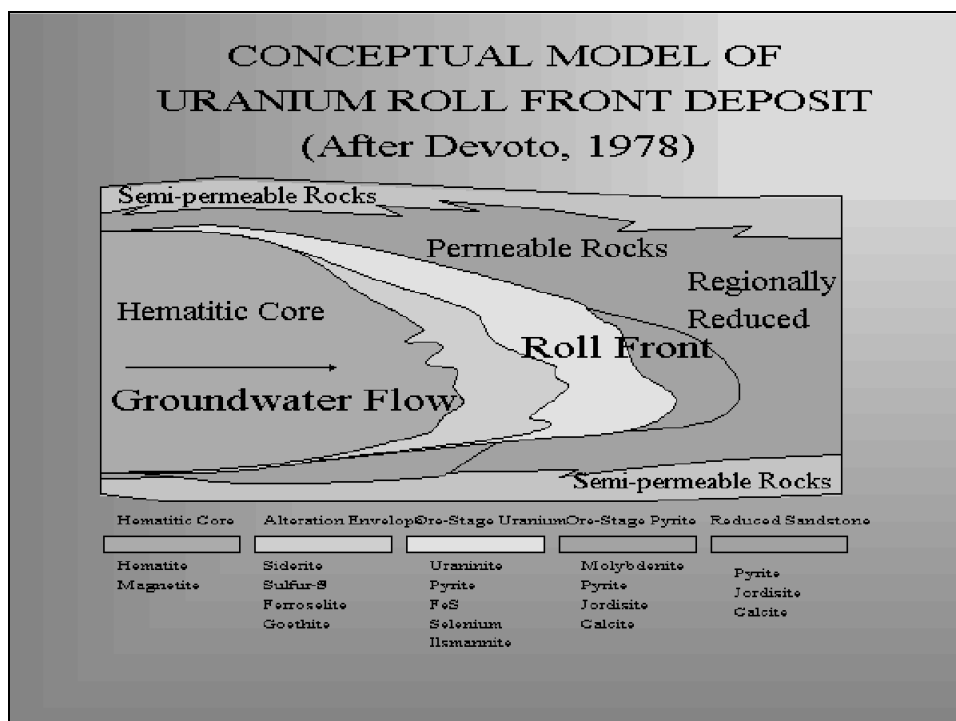
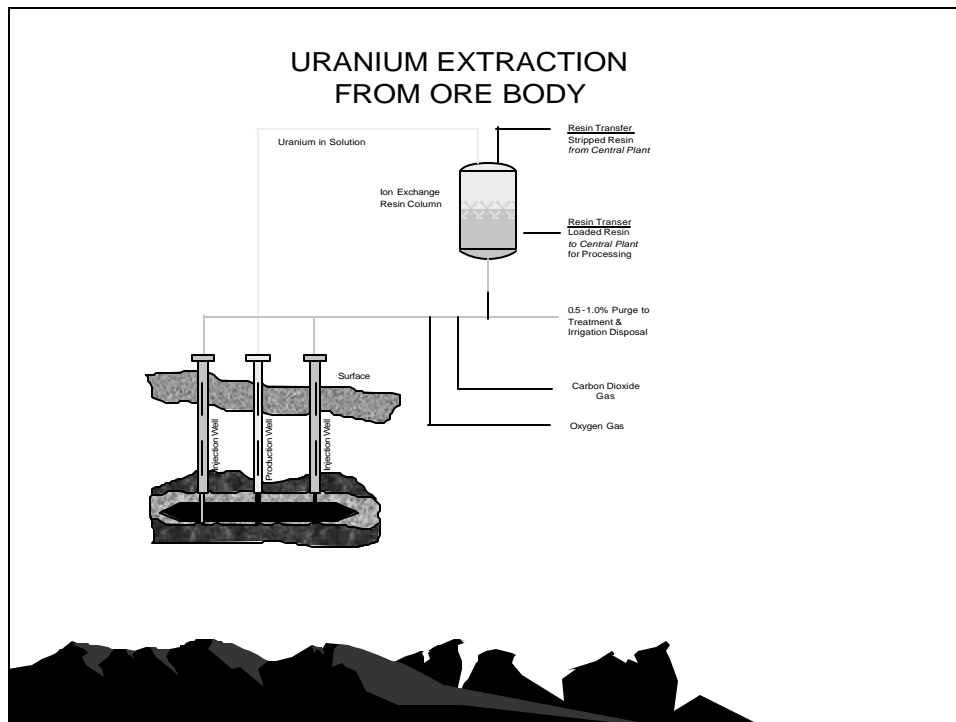
Other Items

- ◆ Transcripts
 - Meeting will be transcribed
 - Transcription will be available on NRC website
 - Please state name and affiliation when speaking
- ◆ Attendance List
- ◆ NRC Public Meeting Feedback Forms



ISL Rulemaking Workshop *In Situ* Leach (ISL) Uranium Milling - Description and Regulatory Requirements

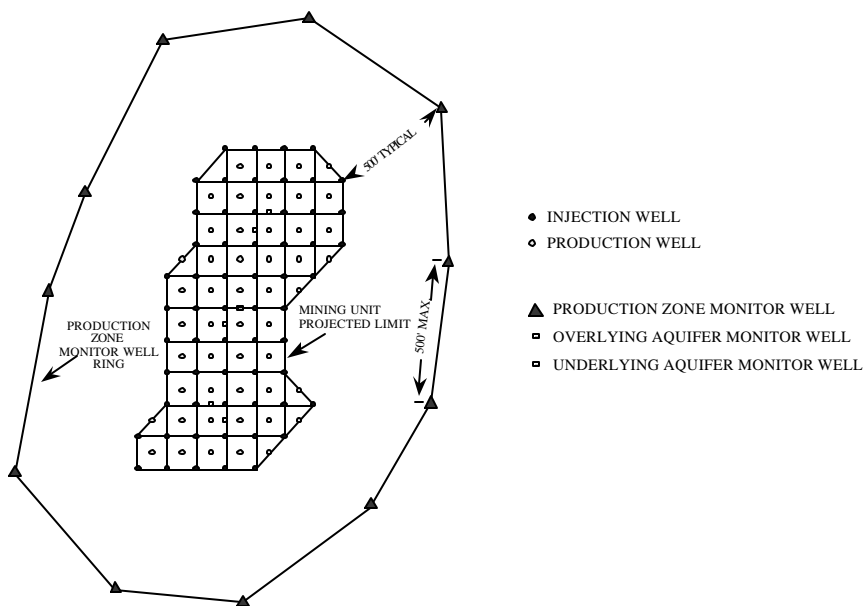
Ron C. Linton
Hydrogeologist
Fuel Cycle Safety and Safeguards
Fuel Cycle Facilities Branch
Uranium Processing Section

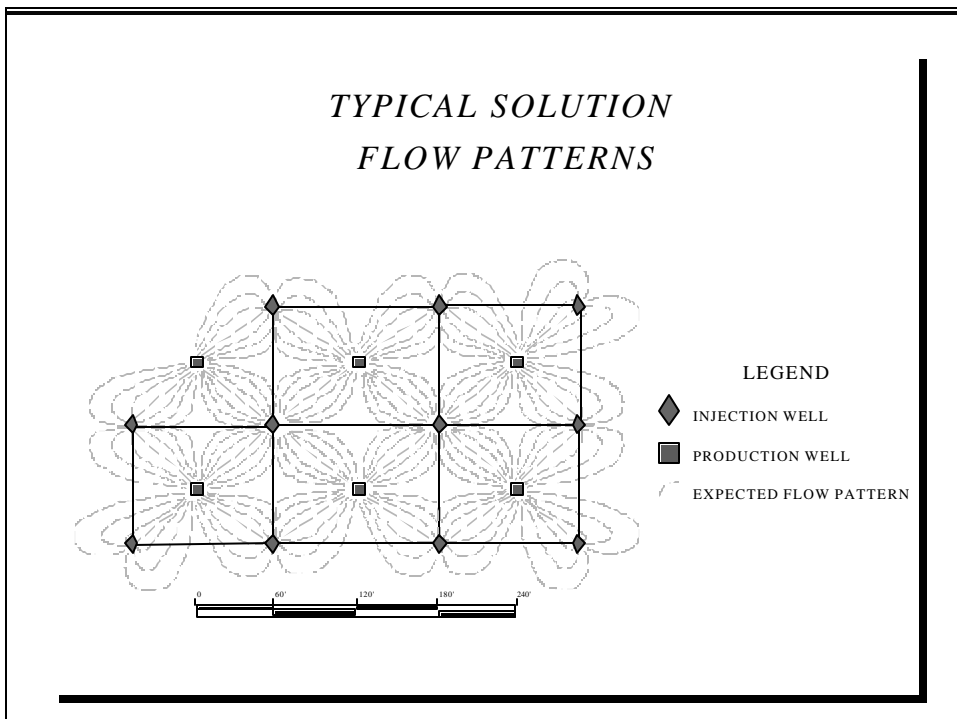
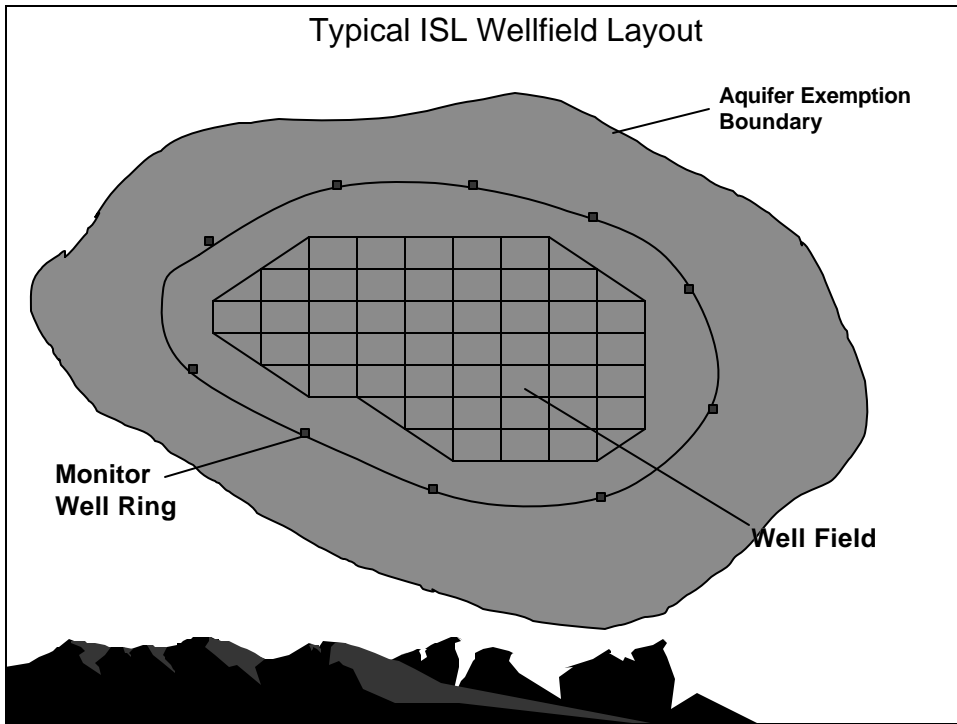


Dark area is the uranium deposit in the roll front

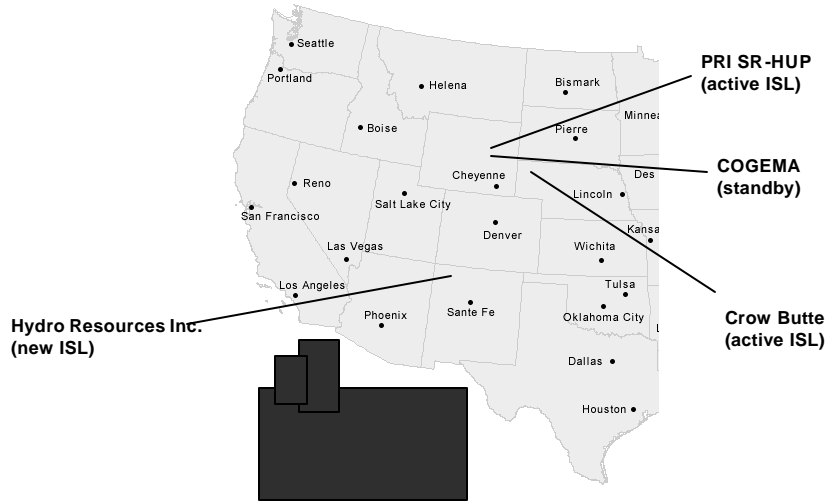


Typical ISL Wellfield Layout





Uranium Recovery ISL Sites



Typical ISL Wellfield

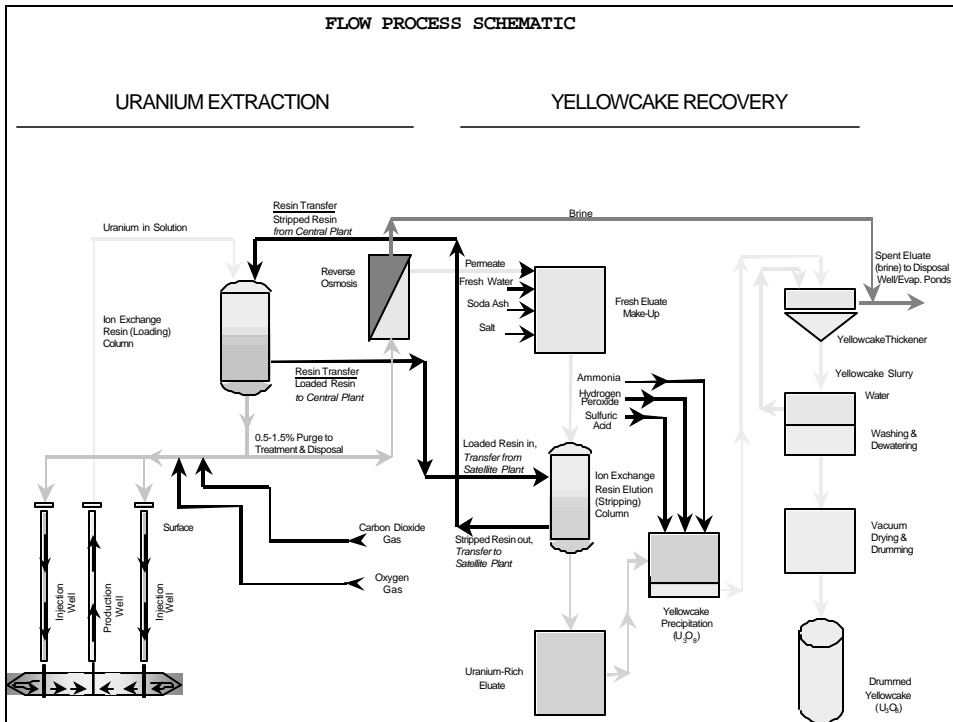


Injection Well Head



ISL Central Processing Plant





Existing Regulatory Requirements

Landmark Legislation

- Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA)
 - Title I - inactive uranium mill tailings piles (circa 1978)
 - Title II - uranium recovery facilities licensed by NRC



Uranium Recovery Regulations

Title II

- Regulated under 10 CFR Part 40
- Materials Regulated:
 - Source Material (ores and product)
 - 11e.(2) Byproduct Material (Uranium Mill Tailings)
- Uranium Recovery Regulations are in 10 CFR 40, Appendix A



Uranium Recovery Regulations are in 10 CFR 40, Appendix A

Appendix “A,” has Thirteen Technical Criteria

I. Technical Criteria (selected criteria)

Criterion 5 – Groundwater Protection Standards

Criterion 7 – Preoperational Monitoring Criteria



Ground Water Standards

- **Criterion 5** (intended for conventional mills)
- Ground water protection standards
 - Background
 - MCL
 - Alternate Concentration Limit
- **NUREG – 1569** (specific to ISL's)
- Restoration Standards, Chapter 6.1 (4)
 - Primary restoration standard to background
 - Secondary restoration standard to class of use
 - Alternate restoration standard, no threat to public health and safety or the environment or produce an unacceptable degradation to the water use of adjacent ground water resources



THE END



EPA ISL GROUND WATER PROTECTION – EXISTING REGULATORY REQUIREMENTS

Loren Setlow

U.S. EPA, Office of Radiation and Indoor
Air (6608J)

Washington, DC 20460

2006 NRC Uranium ISL Rulemaking
Workshop



Primary Issue – UIC/UMTRCA

- UIC program exempts portions of the aquifer within the wellfield
- UMTRCA standards require restoration/prevention beyond the wellfield
- NRC has historically required ISL licensees to meet UMTRCA within the wellfield
- Will this approach be continued under envisioned NRC rulemaking?
- Who will have what responsibilities?



1974 SDWA - Basic UIC Concepts

- Establishes the Underground Injection Control Program
- Requires EPA to promulgate regulations to protect drinking water sources from contamination through underground injection
- Defines “endangerment” of drinking water sources
- Designed to be implemented by States



Mission of the UIC Program

- The UIC program's mission is to protect underground sources of drinking water from contamination by regulating the construction and operation of injection wells



Classification of Injection Wells

- Five classes of wells in UIC regulations
- Categorized based on common design and operating characteristics
- Class III - Wells associated with solution mining (e.g., extraction of uranium, copper, and salts)



UIC Regulations Relevant to Protecting USDWs at ISL Sites

- 40 CFR Part 144.12(a) and (b) Prohibition of movement of fluid into underground sources of drinking water

“No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water [USDWs], if the presence of that contaminant may cause a violation of any primary drinking water regulation ... or may otherwise adversely affect the health of persons.”



UIC Regulations Relevant to Protecting USDWs at ISL Sites

- 144.51 Conditions applicable to all permits
 - Proper Operation and maintenance
 - Recordkeeping
 - Monitoring
 - Plugging and abandonment



UIC Regulations Relevant to Protecting USDWs at ISL Sites (Cont.)

- 40 CFR 144.7 Identification of underground sources of drinking water and exempted aquifers
 - Allows EPA to exempt aquifers or portions of aquifers from SDWA protection
 - It cannot or will not serve as a source of drinking water in the future because:
 - Contain TDS greater than 3,000 mg/L and is not reasonably expected to be used for a public water system. OR

UIC Regulations Relevant to Protecting USDWs at ISL Sites (Cont.)

- Contains oil or minerals
- Its use is economically not practical
- Contaminated
- It is geologically unstable due to Class III activities

UIC Regulations Critical to Protecting USDWs at ISL Sites (Cont.)

- 146.10(a)(4) - Plugging and abandoning
 - “The plugging and abandonment plan ... shall, in the case of a Class III project which underlies or is in an aquifer which has been exempted under 146.04, also demonstrate adequate protection of USDWs. The Director shall prescribe aquifer cleanup and monitoring where he deems it necessary and feasible to insure adequate protection of USDWs.”



UMTRCA Program

- Under Uranium Mill Tailings Radiation Control Act, EPA developed environmental protection standards for uranium mill tailings impoundments in 40 CFR 192: Title I and Title II facilities
- Under UMTRCA definitions, standards also apply to any processing site for which NRC issues license after 1/1/78 for production of uranium or thorium product from ore. This has been interpreted by NRC to include ISLs



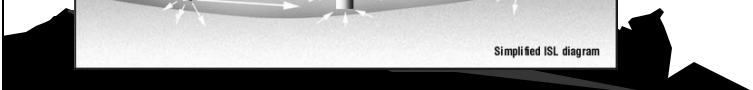
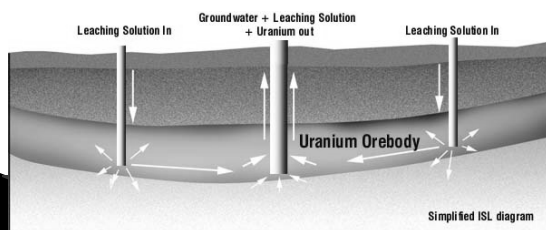
APPLICATION OF EPA UMTRCA STANDARDS TO ISLs

- Congress directed NRC to manage byproduct material in manner that conforms with EPA standards under UMTRCA
- NRC definition of 11e.(2) byproduct is tailings or wastes produced by extraction or concentration of U or Th, including surface wastes from ISL
- Under its own regulations, NRC regulates byproduct materials produced from ISLs. Milling and byproduct definitions from AEA have allowed NRC to regulate ISLs, even without explicit mention of them in AEA or UMTRCA



APPLICATION OF EPA UMTRCA STANDARDS TO ISLs

- Current practice is that NRC regulates byproduct materials at ISLs to achieve compliance with part 192 standard
- Relevance is for restoration of well field to prevent contamination of underground sources of drinking water



APPLICATION OF EPA UMTRCA STANDARDS TO ISLs

- UMTRCA required the groundwater protection standards to be consistent with the Solid Waste Disposal Act standards—now embodied in RCRA standards (40 CFR 264); this means MCLs
- EPA Office of Radiation and Indoor Air evaluating update of 40 CFR 192 uranium and arsenic standards to be consistent with MCLs



APPLICATION OF EPA UMTRCA STANDARDS TO ISL's

- Standards apply to management of uranium byproduct materials during and following processing of uranium ores, and to restoration of disposal sites
- Currently utilized by NRC and Agreement States for restoration of ISL well fields
- Regulatory agency (NRC or Agreement State) may establish alternate concentration limits to be satisfied at point of compliance, provided ALARA and that MCL's met at 500 m from site boundary or before



ISSUES FOR FUTURE RULEMAKING CONSIDERATION

- What EPA regulatory standard(s) to be referred to by NRC in a new rulemaking?
- How will the States and EPA regulate groundwater protection at existing facilities, and all the new proposed ISLs?
 - EPA to revise UMTRCA and UIC regulations, OR
 - Issue new guidance to strengthen groundwater protection/restoration in ISL wellfield to meet MCLs outside exempted aquifer?
 - Budgetary and personnel implications for EPA and states? Who will approve EIS's for groundwater at ISLs: permit stage, decommissioning?



ISSUES FOR CONSIDERATION

- What are the impacts?
- NRC has historically required ISL licensees to meet UMTRCA within wellfield
- After decision:
 - Multiple approving authorities for groundwater plans?
 - What will be license processing time impacts of separating permitting authorities?
 - Effects on decommissioning and license termination?
 - Who is responsible for groundwater contamination after license termination?





RULEMAKING FOR GROUNDWATER
PROTECTION REQUIREMENTS AT *IN SITU*
LEACH URANIUM EXTRACTION FACILITIES
- HISTORY

Myron Fliegel, Project Manager
Uranium Processing Section
U.S. Nuclear Regulatory Commission

Introduction

- Current Regulatory Scheme – Dual Regulation of Groundwater at ISLs
- NRC and States Have Been Working Together
- Looking for Formal Way to Avoid Dual Regulation
 - Conserve government resources
 - Beneficial to ISL operators

SECY-99-0013

- NMA White Paper – April 1998 – raised several uranium recovery issues
- SECY-99-0013 - March 1999 – addressed several issues related to ISLs
- SRM to SECY-99-0013 – July 2000
 - all waste from ISLs – 11e.(2) under NRC authority
 - dual regulation of groundwater protection at ISLs
 - staff directed - use EPA UIC program- try to eliminate dual regulation
- Staff held meetings with EPA, Nebraska, and Wyoming

NRC Regulation of ISLs

- UMTRCA – EPA promulgates standards, NRC conforms regulations
- EPA standards/NRC regulations – focused on conventional mills
- ISL regulation – staff guidance and license conditions
- SECY-99-011 – January 1999 - Part 41 – regulations specific to ISLs
- SRM-SECY-01-0026 – May 2001 - discontinue Part 41 effort – update guidance

SECY-03-0186

- SECY-03-0186 – October 2003
 - staff proposed – defer groundwater regulation to EPA-authorized States
 - develop MOU with each State
 - Based on compatibility of State's UIC program and NRC UMTRCA program
- SRM – November 2003 – Commission approved

Interactions with States

- Staff conducted evaluations of States' UIC programs – summer 2004
- Variances found between States' and NRC's programs
 - NRC – primary standard – restoration to background
 - if unachievable – restoration to class of use
 - States – primary standard – restoration to class of use
- Staff conveyed its findings to Commission – SECY-05-0123 – July 2005

Commission Direction

- COMJSM-06-0001 – January 2006
- SRM-COMJSM-06-0001 – March 2006
- Directed staff to initiate rulemaking
 - specifically tailored to groundwater protection at ISLs
 - focus on elimination of dual regulation
 - Provide proposed rule to Commission by January 2007

Rulemaking Process

Gary Comfort
U.S. Nuclear Regulatory Commission (NRC)
Office of Nuclear Material Safety and Safeguards
(301) 415-8106
gcc1@nrc.gov



**Workshop on NRC's Rulemaking for
Groundwater Protection Requirements at ISLs**

June 29, 2006

What is Rulemaking

- ◆ Process of developing rules by government agencies.
- ◆ NRC rules impose requirements that applicants and licensees must meet to use nuclear material or operate a nuclear facility.
- ◆ Guidance is developed to aid licensees in meeting the rules.


Regulatory Process

- ◆ Rulemaking
- ◆ Licensing
- ◆ Inspection & Enforcement

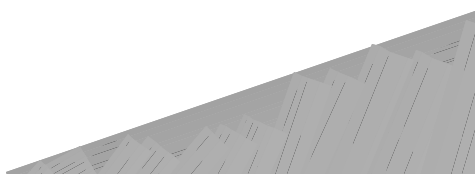
Notice & Comment Rulemaking

- ◆ Need for rulemaking
- ◆ Proposed Rule – Public Comment
- ◆ Final Rule

Proposed Rule

- ◆ Commission paper is prepared for rules going to the Commission.
 - ◆ Package includes a Federal Register notice (FRN) and supporting documents.
 - ◆ Separate OMB package prepared when OMB clearance is needed.
 - ◆ Agreement State participation.
- 

Proposed Rule

- ◆ Approved by Commission.
 - ◆ Goes out for public comment (traditionally for 75 days).
- 

Final Rule

- ◆ Package make-up similar to proposed rule package.
- ◆ FRN includes responses to public comments.
- ◆ FRN contains final rule language.
- ◆ Agreement State and advisory committee participation is similar to proposed rule.
Agreement States have 30-day comment period.
- ◆ Approved by Commission.
- ◆ Should be about 9 months to 1 year after publication of the proposed rule.

Websites

- ◆ “RuleForum” – NRC’s rulemaking website for the public.
- ◆ Proposed rules and petitions are available.
- ◆ Public comments can be uploaded to site.
- ◆ Final rules available.
- ◆ Links to rulemaking documents in PDF format.
- ◆ <http://ruleforum.llnl.gov/>

Schedules

- ◆ Working Group Meetings – Ongoing
- ◆ Issue Proposed Rule for Agreement State Comment
 - Early November
 - 30 day comment period
- ◆ Send Rulemaking Package to Commission
 - January 29, 2007

Additional Opportunities for Stakeholder Comment

- ◆ Proposed Rule Comment Period
- ◆ Potential for Additional Workshops during Comment Period



ISL Rulemaking Workshop Possible Changes to Groundwater Restoration and Monitoring Requirements

William vonTill
Section Chief
Fuel Cycle Safety and Safeguards
Fuel Cycle Facilities Branch
Uranium Processing Section



Uranium Recovery Regulations

Title II

- Regulated under 10 CFR Part 40
- Materials Regulated:
 - Source Material (ores and product)
 - 11e.(2) Byproduct Material (Uranium Mill Tailings)
- Uranium Recovery Regulations are in
10 CFR 40, Appendix A



Uranium Recovery Regulations 10 CFR 40, Appendix A

I. Technical Criteria

Criterion 1 – Site selection

Criterion 2 – Avoid proliferation of small disposal sites

Criterion 3 – Prime option

Criterion 4 – Tailings ponds design criteria

Criterion 5 – Groundwater protection standards

Criterion 6 – Disposal of waste byproduct material

Criterion 7 – Preoperational ground water monitoring criteria

Criterion 8 – Operational criteria



NUREG 1569 - Standard Review Plan for In Situ Leach Uranium Extraction License Applications

- Site characterization (section 2.5, 2.6, 2.7)
 - Meteorology, geology, hydrology
- Pre-operational monitoring (section 5.7.8)
 - Groundwater and surface water programs
- Ground water quality restoration (section 6.1)
 - Plans and schedules for ground water quality restoration



Possible changes

- Criterion 5
- Criterion 7
- New Criterion 14
- Changes to NUREG - 1569

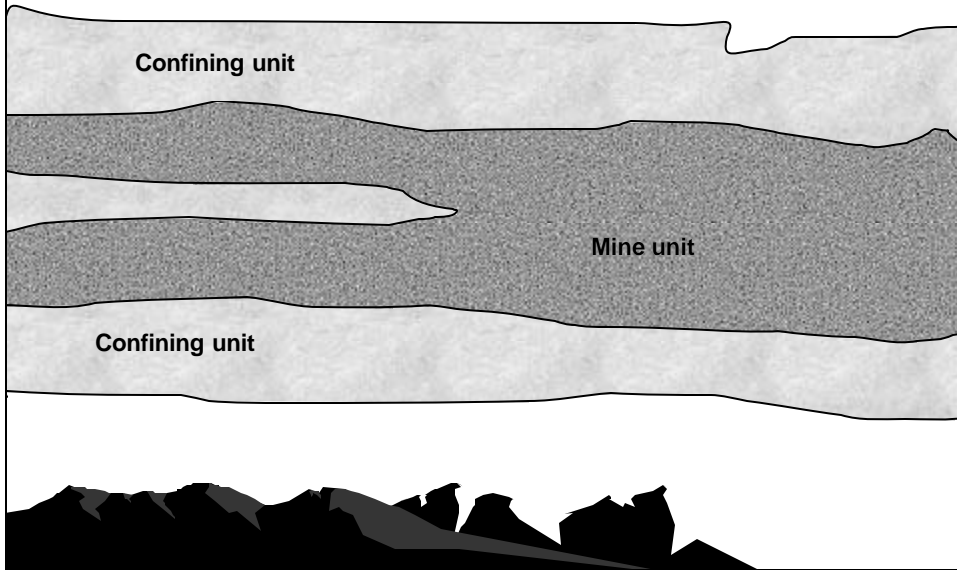


Site Characterization prior to new or satellite application

- Geology
 - Ore boundary
 - Geochemical description of mineralized zone
 - Fence diagrams
- Hydrology
 - Confining units, hydraulic isolation
 - porosity, hydraulic conductivity, formation thickness
- Meteorology
 - rainfall



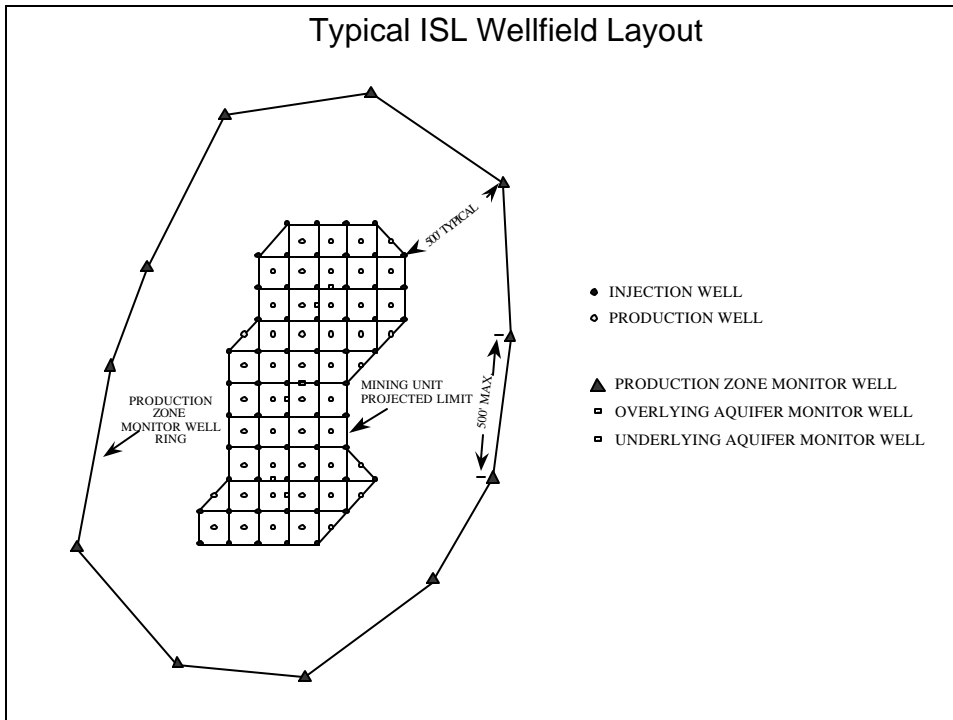
Well field characterization



Pre-operational monitoring

- Demonstrate baseline water quality
- Determine excursion indicator constituents
- Determine monitor well locations
- Demonstrate well field testing procedures
 - Pump testing
 - Vertical confinement
 - Production/injection hydraulic connection
- Determination of excursions and method to correct excursions
- Mechanical integrity testing





Ground water quality restoration

- Demonstrate water in exempted aquifer is not a threat to USDW
 - Background or MCL at exempted aquifer boundary
- Restoration demonstration pilot
- Estimate volume & quantity of lixiviant to be cleaned up
- Demonstrate process for well field restoration
- Demonstrate stability monitoring
- Demonstrate well abandonment procedures



