

The National Mining Association's Generic Environmental Report for In Situ Uranium Recovery Facilities

Prepared for the National Mining Association/Nuclear
Regulatory Commission Annual Conference

Denver, 2008

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Introduction

- The Uranium Recovery Industry Has Estimated That as Many as 26 License/License Amendment Applications Will Be Submitted by the End of 2009 for:
 - New Uranium Recovery Projects (Conventional/In Situ Recovery (ISR));
 - Construction/Operation of New Facilities at Licensed Sites;
 - Project Restarts & Expansions

Introduction

■ A Majority of These Newly Proposed & Submitted License/License Amendment Applications Will Involve ISR Facilities:

- Crowe Butte (Nebraska, Submitted);
- Energy Metals/Uranium One (Wyoming, Submitted);
- Ur-Energy (Wyoming, Submitted);
- Uranerz (Wyoming, Submitted)
- COGEMA (Restart Christensen Ranch/Wyoming, Submitted);
- Uranium Energy (Texas, Submitted)

New Projects (List Not Exhaustive)

■ Pending ISR Projects:

- Powertech Uranium (Dewey Burdock, South Dakota;)
- Powertech Uranium (Centennial, Colorado);
- Energy Metals/Uranium One (Antelope, Wyoming);
- Uranium Resources, Inc. (Ambrosia Lake/New Mexico/Resin Stripping);

■ Proposed ISR Projects:

- Powertech (Dewey Terrace, Aladdin/Wyoming);
- Energy Metals/Uranium One (Ludeman, Allemand-Ross/Wyoming)
- Strathmore Minerals (Reno Creek/Wyoming)
- Ur-Energy (Lost Creek/Wyoming (Expansion))
- Kennecott Uranium Company (Sweetwater/Wyoming/Resin Stripping/Elution)

Expeditious Review of Applications

- NRC Has Anticipated and Attempted to Prepare for the Resurgence of Primary Uranium Production in the United States By:
 - Hiring Additional Technical Staff;
 - Instituting New Procedures for License Applications (i.e., Notice of Intent (NOI) Letters);
 - Instituting New Administrative Hearing Procedures (New 10 CFR Part 2 Procedures);
 - Preparing Rulemaking for ISR Facilities Clarifying & Modifying 10 CFR Part 40, Appendix A Criteria Regarding Groundwater Restoration;
 - Preparing New Generic Environmental Impact Statement for ISR Facilities (ISR GEIS)

ISR GEIS Proposal

- NRC Staff Has Proposed to Expedite Review of ISR License/License Amendment Applications by:
 - Creating a Draft Generic EIS (DGEIS) Specifically Tailored to ISR Projects;
 - Engaging Industry, Agencies, Members of the Public, and Public Organizations in the Scoping and Notice-and-Comment Process;
 - Preparing and Publishing a Final GEIS (FGEIS) From Which Site-Specific Environmental Assessments (EAs) or Supplemental EISs May Be “Tiered”

NRC Proposed Timetable for ISR GEIS

- **Scoping Comment Period Terminated on November 30, 2007**
- **DGEIS to be Issued for Public Comment April/May 2008;**
- **Time Allotted for Public Comment and Other Interested Stakeholder Input (e.g., Public Meetings);**
- **FGEIS to be Issued January/February, 2009**

ISR GEIS Proposal: Industry Response

- In Response to NRC's Request for Scoping Comments, NMA Has Prepared and Submitted:
 - Scoping Comments Addressing Issues of Concern to Industry, NRC/Agreement States, and Interested Stakeholders;
 - Detailed Generic Environmental Report (GER);
 - Appendices

- NMA's Ultimate Goal: To Assist in the Development of a Final ISR GEIS Which Will Provide NRC, Agreement States, Industry Members, and Members of the Public with A SINGLE RESOURCE Wherein Detailed Information Regarding Generic ISR Agency/Industry Regulatory Experience & Results Can Be Found to Allow More Focus on Site-Specific Issues in Agency Regulatory Reviews

Industry GER: Preparers & Contributors

■ NMA Issued an Invitation for Bids (IFB) to Companies to Prepare the GER & the Project Was Completed By:

- National Mining Association
- Tetra Tech, Inc.;
- SENES Consultants, Ltd.;
- Petrotek Engineering Corporation;
- Straughan Environmental Services, Inc.;
- Thompson & Simmons, PLLC

Industry GER: Preparers & Contributors

■ NMA Members Companies Were Intimately Involved in the Preparation of the GER:

- Denison Mines (USA) Corporation;
- Energy Metals Corporation, Uranium One Americas;
- Kennecott Uranium Company, a Rio Tinto Company;
- Mesteña Uranium, LLC;
- National Mining Association;
- Power Resources, Inc., a Cameco Company;
- Powertech Uranium Corporation;
- UR Energy;
- Uranium Energy Corporation;
- Uranium Resources, Inc.

Basic Form of the GER

- NMA's GER Takes the Form of a Hybrid Environmental Report and Environmental Impact Statement (EIS) Based on NRC Guidance (NUREG-1748):
 - Scoping Comments;
 - Preamble (Detailed Uranium Recovery Regulatory Regime Historical Development);
 - The Proposed Action;
 - Alternatives;
 - Description of the Affected Environment;
 - Potential Impacts of Proposed Action & Alternatives;
 - Mitigation Measures

Scoping Comments: Highlights

■ ISR Site Development is Frequently Misunderstood:

■ Iterative, Phased Site Development:

– Preliminary Site Characterization:

- Surface & Subsurface Geological/Geochemical Conditions

– Detailed Site Characterization:

- Baseline Surface & Subsurface Conditions
- Development of Upper Control Limits (UCLs);
- Pump Tests;
- Well-Field Installation

– Operations:

– Site Reclamation & Groundwater Restoration

■ This Development Process Results in Sequential Well-Field Development, Operation, and Restoration;

Scoping Comments: Highlights

- The Proposed ISR GEIS *DOES NOT* Obviate the Need for Site-Specific Assessments:
 - NRC Regulations (10 CFR Part 51) Expressly Require Site-Specific Assessment Even With the Benefit of a GEIS;
 - Site-Specific EAs or Supplemental EISs Are Available for Use

Scoping Comments: Highlights

- Proposed “Tiering” of Site-Specific EAs from the ISR GEIS is a Common Practice:
 - Council on Environmental Quality (CEQ) Contemplate Tiering (40 CFR § 1508.28, (Defines *Tiering*);
 - NRC Regulations Also Recognize “Tiering” (10 CFR § 51.10(a) & NUREG-1748, Section 1.6.2);

- Licensing/Permitting of ISR Projects Involves a Stringent, Three-Layer Program Enforced by Two Federal Agencies (or State-Delegated Equivalents):
 - NRC/Agreement State License (Authorizes the Recovery Possession and Disposition of Source Material Uranium);
 - EPA/Delegated State Underground Injection Control Permit (Authorizes the Injection of Lixiviant (Oxygen Etc.) Into Underground Ore Body);
 - EPA Aquifer Exemption (Certifies That Water in Permit Area Cannot Now Nor Ever in the Future Serve as a Public Drinking Water Source)

Preamble: Highlights

■ NRC/Agreement State Authority Over Source Material Recovery Originates From Federal Statute:

- Atomic Energy Act of 1954 (AEA);
- AEA Amendments in Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA)

■ Uranium Recovery Regulatory Program Has Evolved Over a Thirty Year Period:

- 10 CFR Part 40 & Appendix A Criteria (Uranium Milling Facilities);
- 10 CFR Part 20 (Radiation Protection);
- 10 CFR Part 51 (NEPA)

Preamble: Highlights

- ISR Projects Are Regulated By NRC Using License Conditions Based on 10 CFR Part 40 Regulations, Appendix A Criteria, and Applicable Guidance Including:
 - NUREG-1569 (ISR Standard Review Plan);
 - NUREG-1748 (Environmental Report Guidance);
 - Regulatory Guides 4.14 (Radiological Monitoring) & 8.31 (Occupational Protection);

- Past and Future Items Have Shaped or Will Shape Future ISR Regulation:
 - Hydro Resources, Inc. Litigation;
 - ISR Rulemaking;
 - Concurrent Jurisdiction Decision (SRM-SECY-99-027);
 - Alternate Feed Policy

The Proposed Action: Highlights

- ISR Companies are Required to Submit Applications to NRC Under the AEA. NRC May:
 - Approve;
 - Approve with Conditions; or
 - Deny

- **The GER's Purpose is to Provide a Programmatic Compilation and Analyses of All ISR Issues Based on Over Thirty Years of Research, Development, Operations, and Reclamation/Restoration;**

- NMA Recommends the Use of Standard "Tiering" Checklists as a Tool to Assist in the Evaluation of Applications:
 - Bureau of Land Management (BLM) Currently Uses Such Checklists;
 - GER Provides Sample BLM Checklist Cross-Referenced with NRC Guidance

Alternatives: Highlights

■ Alternatives Were Formulated Based on Previous EIS Experience and Other Uranium Recovery Methods:

- The Proposed Action;
- No-Action;
- Conventional Uranium Recovery (Underground & Surface Mining/Conventional Milling & Heap Leaching);
- Byproduct/Sidestream Recovery

Alternatives: Highlights

- GER Provides a Generic Overview of the Entire ISR Process Lifecycle from Exploration/Site Characterization to Operations to Groundwater Restoration & Surface Reclamation:
 - Overview;
 - Site and Facility Infrastructure;
 - Instrumentation & Control;
 - Uranium Recovery from ISR-Amenable Underground Ore Bodies;
 - Waste Management

Description of Model ISR Region: Highlights

- The GER Lays the Foundation for Its Analysis Based on the Use of a Model Region:
 - Similar to the Approach Used in NUREG-0706 (1980 GEIS);
 - Focuses on Well-Understood Characteristics of Traditional Regions Where ISR Amenable Deposits are Located:
 - South Texas;
 - Great Divide/Powder River Basin;
 - New Mexico/”Four Corners” Area;

Description of Model ISR Region: Highlights

■ The GER Utilized NRC EIS/Environmental Report Guidance to Develop the Model Region Description:

- Land Use;
- Transportation;
- Geology & Soils;
- Water Resources & Hydrology;
- Ecology;
- Meteorology & Climatology, Air Quality & Noise;
- Historic & Cultural Resources;
- Visual & Scenic Resources;
- Socioeconomics;
- Environmental Justice

Description of Model ISR Region: Highlights

■ Important Notes from the Model Region Description:

■ Analyses of Model Region Characteristics Demonstrate that Surface Conditions are Substantially Similar:

- Surface Lands Typically Consist of Rangeland (50-60 Percent);
- Well-Fields Utilize Similar Equipment on the Surface;
- Central Processing Plants Utilize Similar Technology;
- Waste Management Procedures are Standardized

Description of Model ISR Region: Highlights

■ Important Notes from Model Region Description:

■ Analyses of Model Region Characteristics Demonstrate that Subsurface Hydrologic and Geochemical Conditions are Substantially Similar:

- Regional Redox Front & Geochemical “Trap;”
- Generally, Some Confining Layers Above and Below the More Porous Sands Through Which Uranium-Bearing Groundwater Flows;
- Natural Reducing Processes in Recovery Zone Created and Still Create Roll-Front Uranium Deposits;
- Recovery Zone Water Cannot Ever Be Used as Public Drinking Water Source But Can Be Restored to Prior Class of Use;

NOTE: IF SUBSURFACE CONDITIONS AT MODEL SITES WERE NOT SUBSTANTIALLY SIMILAR, THEN THEY MAY NOT CONTAIN SIMILAR URANIUM DEPOSITS AMENABLE TO THE ISR PROCESS

Potential Environmental Impact Assessment: Highlights

- **The GER Assesses All Potential Environmental Impacts Under Model Region Description Headers;**

- **NRC's Evaluation of ISR Projects Evolved Over Time:**
 - **Prior to the Mid-1980s, NRC Conducted Site-Specific EISs for ISR Projects;**
 - **In the Mid-1980s, Environmental Reviews Shifted to Site-Specific EAs Likely Due to Minimal Potential Impacts;**
 - **Post-2000, NRC Staff Interprets 10 CFR Part 51 to Mandate Site-Specific EISs for ISR Projects**

Potential Environmental Impact Assessment: Highlights

■ Land Use Impacts:

■ Liquid Waste Disposal Impacts:

- Mud Pits;
- Process Pad;
- Deep-Well Injection;
- Evaporation & Retention Ponds;
- Surface Discharge & Land Application

■ Solid Waste Disposal Impacts:

- On-Site Non-AEA Solid Waste Burial;
- Off-Site of Non-AEA Solid Wastes & 11e.(2) Byproduct Material Disposal

Potential Environmental Impact Assessment: Highlights

■ Transportation Impacts:

- Temporary Roadway Impacts;
- Vehicle Accidents;
- NRC Has Conducted Multiple Transportation-Related Assessments:
 - 1980 GEIS;
 - NUREG-0535;
 - NUREG-0170;
 - NUREG-1508

Potential Environmental Impact Assessment: Highlights

■ Geology & Soil Impacts:

■ Construction Activities:

- Well-Fields and Associated Piping;
- Uranium Processing Facilities

■ Operations:

- Active Well-Field Operations
- Uranium Processing

Potential Environmental Impact Assessment: Highlights

■ Water Resource Impacts:

■ Surface and Groundwater:

- Surface Discharges;
- Groundwater Consumption;
- Groundwater Quality:
 - Excursions;
 - Accidents (e.g., Surface Spills/Leaks);
 - Restoration

Potential Environmental Impact Assessment: Highlights

■ Public & Occupational Health Impacts:

■ Non-Radiological Impacts:

- Construction;
- Operations

■ Radiological Impacts:

- Construction;
- Operations:

■ Yellowcake Drying & Packaging Facilities

Mitigation Measures: Highlights

■ The GER Emphasized the Critical Nature of Mitigation Measures for ISR Projects With a Focus on:

- Groundwater Mitigation;
- Airborne Emissions Mitigation;
- Radiological Dose Mitigation

Mitigation Measures: Highlights

■ The GER Places Particular Emphasis on Groundwater Mitigation:

■ Natural Geologic, Hydrologic, and Geochemical Conditions:

- Regional Aquifer Conditions: Redox Front;
- Overlying & Underlying Confinement;
- Regional/Local Groundwater Travel Times;
- Natural Attenuation

Mitigation Measures: Highlights

■ Additional Groundwater Mitigation:

■ Measures Inherent in the ISR Process Now Routinely Reflected in Mandatory NRC-Imposed License Conditions:

- Develop Detailed Baseline Water Quality Parameters on a Well-by-Well and Well-Field-by-Well-Field Basis
- Develop UCLs Based on Most Mobile Constituents to Provide “Early Warning” of Excursions;
- Well Construction & Mechanical Integrity Testing (MIT);
- Pump Tests to Determine Confinement;
- Well-Field Balance and Process “Bleed” to Control Radial Groundwater Flow Into and Within Recovery Zone;
- Monitor Wells Around the Recovery Zone to Monitor Excursions

Mitigation Measures: Highlights

■ Additional Groundwater Mitigation:

■ NRC & EPA Regulatory Requirements:

- NRC-Mandated Groundwater Restoration Can Utilize:
 - Active Groundwater Sweep;
 - Reverse Osmosis and Re-Injection of Ion-Filtrated Water;
 - Brine Concentration to Minimize Resulting Wastes;
 - Bioremediation

- NRC Financial Assurance & Restoration Action Plans:
 - Mandated by the Commission in HRI Litigation

- EPA Area of Review & Post-Restoration Excursion Remediation:
 - Area of Review: 40 CFR § 146.6
 - Post-Restoration Excursion Remediation: 40 CFR § 146.7

Mitigation Measures: Highlights

■ Important Notes from Assessment of Potential Groundwater Impacts:

- Natural Conditions Dictate the Formation of Roll-Front Uranium Deposits and Assist in Future Restoration of Recovery Zone Aquifer;
- Protection of Groundwater Resources Subject to Multi-Layered ISR Control Techniques Reflected in Mandatory NRC License Conditions;
- Excursions Must Be Immediately Addressed and Redressed Under Current Regulatory Program or Operations Must Cease;
- Financial Assurance is Strictly Imposed to Ensure that Groundwater is Restored in Compliance With Regulatory Requirements

Mitigation Measures: Highlights

■ The GER Also Emphasizes Mitigation Measures Regarding:

■ Potential Airborne Emission Impacts:

- Drilling & Construction Emissions
- Process Emissions & Spills

■ Potential Radiological Dose Impacts:

- NRC Regulatory Dose Limits;
- On-Site Surface Reclamation;
- Decontamination and/or Off-Site Disposition;
- Survey Methods

Mitigation Measures: Highlights

■ Potential Airborne Emissions Impacts:

■ Drilling & Construction Emissions:

- Best Management Practices for Dust Suppression;
- Properly Maintained Equipment

■ Process Emissions & Spills:

- Exhaust Gases;
- Yellowcake Particulate Emissions:
 - Dryer Mechanisms Designed With Fugitive Dust Control Aspects (Vacuum & Atmospheric Dryers)
- Process Leaks or Spills:
 - Radiological;
 - Non-Radiological

Mitigation Measures: Highlights

■ Potential Radiological Dose Impacts:

■ NRC Regulatory Dose Limits:

- 10 CFR Part 20 Public & Occupational Dose Limits (Total Effective Dose Equivalent (TEDE))

■ Operational Waste Management:

- 11e.(2) Byproduct Material Disposed of:
 - Deep-Well Injection
 - Off-Site Disposal at Licensed 11e.(2) Disposal Facility

■ Decontamination and/or Off-Site Disposition:

- Dismantling and Removal of On-Site Structures in Compliance with 10 CFR § 40.42 Requirements and Applicable Guidance
- Materials Decontaminated for “Free Release” May Be Removed and Sold or Disposed

■ Survey Methods:

- Site Survey Methods Must Be In Compliance With NUREG-1575 and Applicable Appendix A Benchmark Dose

Mitigation Measures: Highlights

- Important Notes From Assessment of Airborne Emission and Radiological Impacts:
 - Active ISR Operations Are Not Considered to Pose Significant Radiological Dose Risks to Members of the Public or Workers:
 - Conventional Mill Studies Show Dose to Workers Are On the Same Order of Magnitude as Annual Average United States Background Dose;
 - Conventional Mill Studies Show No Impact to Nearby Populations and ISR Facility Dose Contribution is Orders of Magnitude Less
 - NRC Regulations Impose Stringent Radiological Dose Limits & ALARA Requirements;
 - Financial Assurance is Strictly Imposed to Mandate Complete Site Surface Reclamation to Ensure Potential Dose is Within Regulatory Limits

Summary of NMA GER

■ NMA Created Its GER to:

- Provide NRC, Its Agreement States, Members of the Uranium Recovery Industry, and Interested Stakeholders With a Resource Assisting in the Development of the ISR GEIS;
- Assist NRC & Agreement States a Means By Which Cumbersome Reviews of Generic Issues by Providing Historical Data and Analyses;
- Provide NRC & Agreement States With A Resource to Focus Regulatory Reviews on Site-Specific Issues

Conclusions

- **The Preparation of the ISR GEIS is an Important Step Towards an Efficient Licensing Process;**
- **Industry Has Considerable Experience & Expertise That Has Been Presented in Its Scoping Comments & GER;**
- **NRC Should Consider the Information in the GER & in the Draft ISR GEIS When Evaluating Applications That Have Already Been Submitted**



TETRA TECH

Paths Forward: Current International and US Initiatives to Support More Sustainable Options for Uranium Production

**NMA/NRC Uranium Recovery
Workshop**

**Denver, Colorado
29 April 2008**

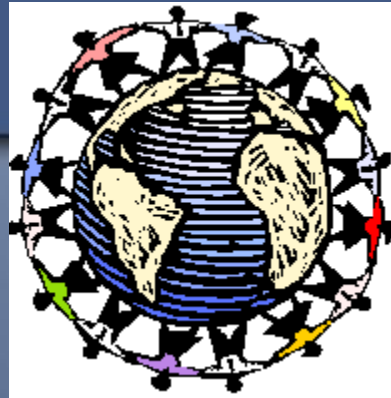
**Michelle Rehmann
Director of Uranium Projects**

**Tetra Tech Inc.
USA**

Overview

- Sustainability
 - Why is it good for the uranium mining industry and stakeholders?
- IFSOUP
- IFSOUP Outcomes





SUSTAINABLE



Sustainability

"Meeting the needs of the present without compromising the ability of future generations to meet their needs."

World Commission on Environment and
Development

"Our Common Future"

1987



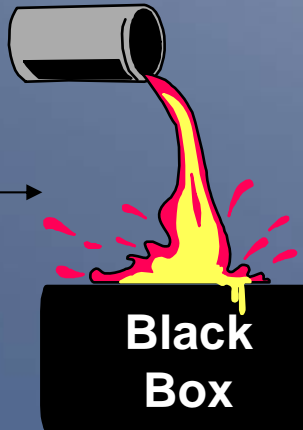
Evolution of Environmental Management

No Action

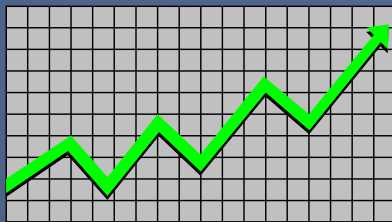


“See no evil,
Hear no evil,
Speak no evil”
Pre-1950

Control



EMS/ISO 14001

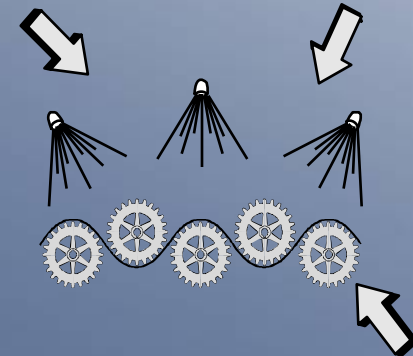


“Continuous
Improvement”
1997 - present

“The Technology Fix”
1950 - 1990

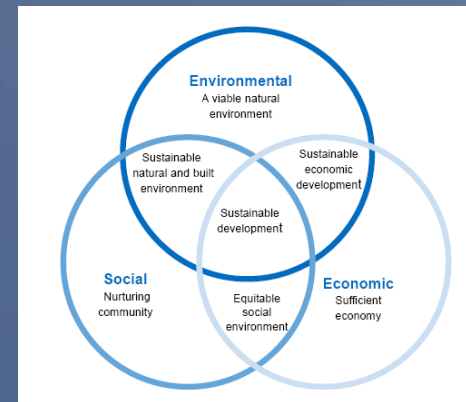
Sustainability

Prevention



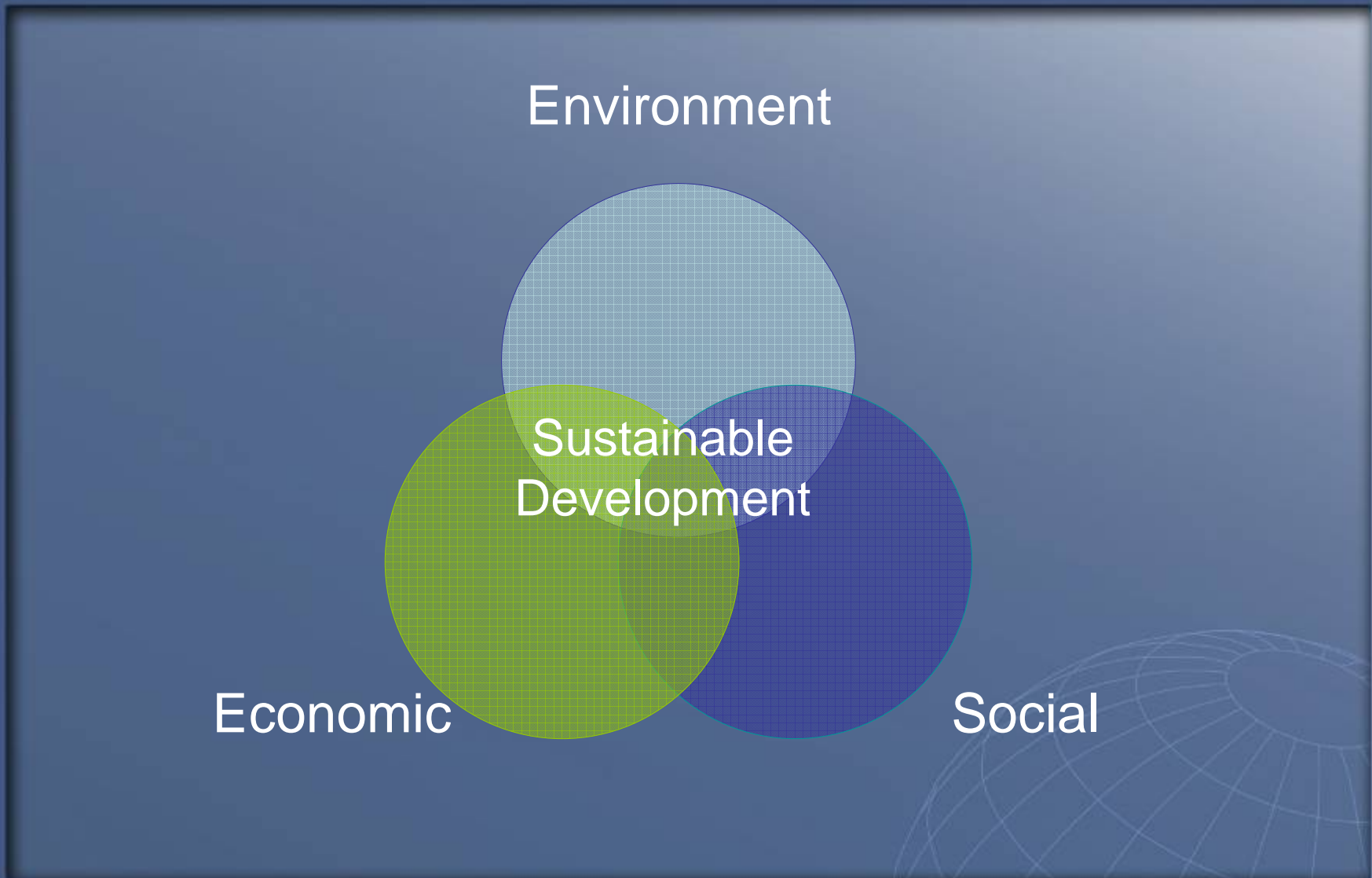
“Attacking the Source”

1990 - 1998



2000 - present

The Triple Bottom Line



Sustainable Development

“One of the slipperiest pieces of soap you are ever likely to find in the shower.”



Peter Woodward
Shell Expo SD Workshop
March 2000

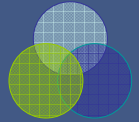
Operating in a Fishbowl



Implementing Sustainability...

depends on your perspective





Common Principles

- Transparency
- Valuation
- Integration
- Community
- Conservation
- Equity
- Global Integration
- Best Practice
- Human and Natural Capital
- Continual Improvement
- Governance



Relevant Initiatives

- National Mining Association



- Global Mining Initiative

- Mining, Minerals, and Sustainable Development Initiative



- International Council on Mining and Metals



- Global Reporting Initiative



Taking the Next Step

- **MMSD**

- 7 Questions to Sustainability
- 9 Key Sustainable Development Challenges for Mining

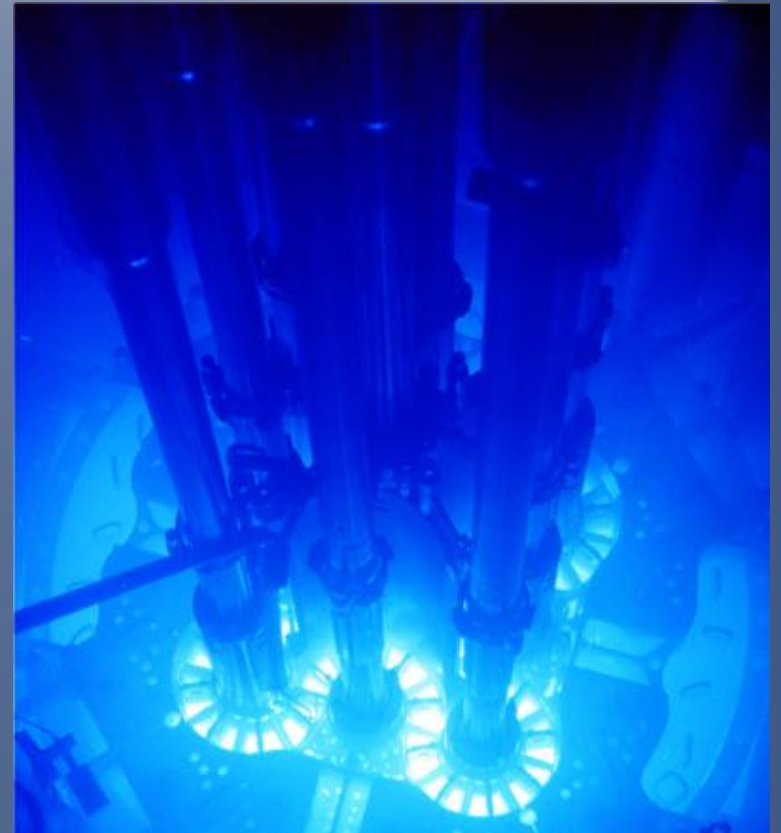
- **ICMM**

1. 10 Principles for Sustainable Development Performance
2. GRI Reporting
3. Independent Verification



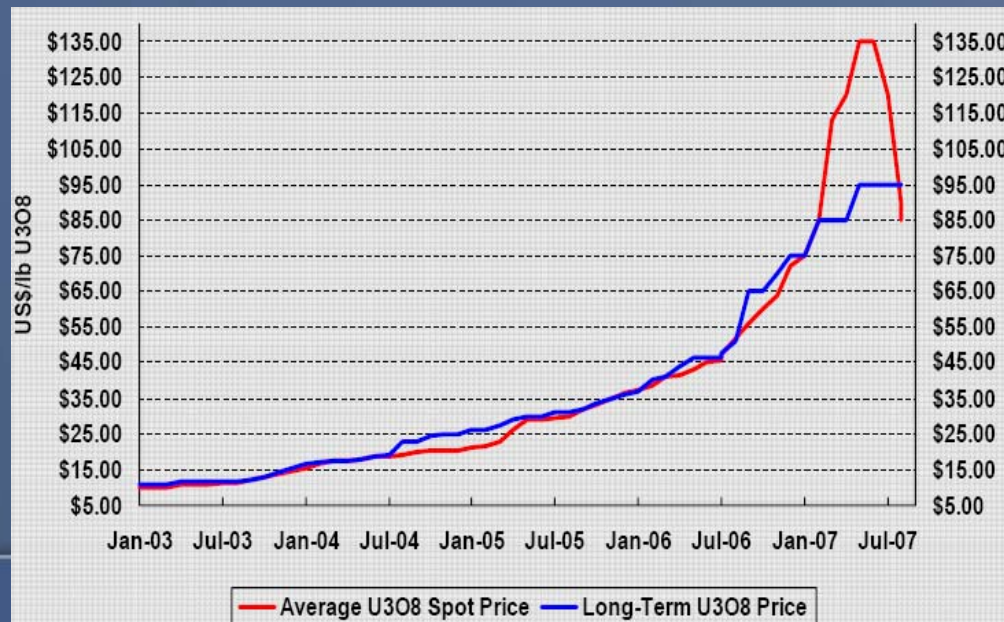
Nuclear Demand

- 16% of worlds electricity and 18% of US electricity
- 103 nuclear reactors in US
- 30 new nuclear reactors over next 15 years
- 74 million pound annual shortfall anticipated



Driving the Demand for Uranium – a global “Nuclear Renaissance”

- Domestic Uranium Production 2 – 3 million pounds
- 104 Power Reactors in United States – with 31 more planned by 2015
 - Annual Requirements 51 – 52 million pounds
 - 71% of US carbon-free electricity
 - New reactor requirements
- Energy Security/Dependence on Foreign Sources of Energy



Sustainability Contacts

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International Forum on Sustainable Options for Uranium Production IFSOU

IFSOUP

- Originated during ICEM 07 Conference in Bruges-Belgium
- Concept: adopt sustainability practices to avoid legacy sites
- Means to organize:
 - Workshops
 - Training courses
 - Forums for debate
 - Information dissemination



IFSOUP

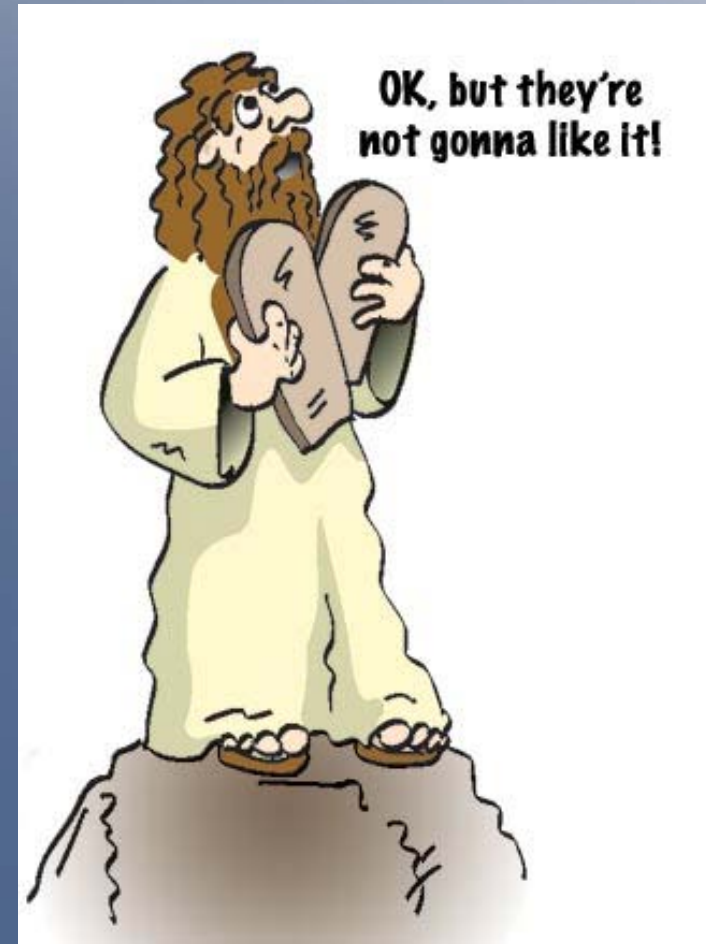
- Independent think tank entity developed to bring together:
 - Industry
 - Regulators
 - NGOs
- Purpose: foster and implement sustainable options for uranium production
- Inaugural meeting held as a separate forum during WM Symposium 2008 in Phoenix in February
 - Hosted by Tetra Tech
 - Participant support of industry, regulators, and NGOs

IFSOUP Inaugural Meeting Participants

- IAEA
- US NRC
- International Institute for Indigenous Resource Management
- WNA
- CETEM, Brazil
- CNEA, Argentina
- BLM
- Saskatchewan Environmental Assessment Branch
- CAMECO
- WM Mining Inc.
- Virginia Uranium Inc.
- University of Texas El Paso
- Tetra Tech
- Talisman

IFSOUP Objectives

- International forum to discuss and exchange experience on sustainable uranium mining
- Solution holders ↔ problem holders
- Technology transfer
- Promote stakeholder participation
- Mining company assistance



IFSOUP Objectives Continued

- Multi-sector, forum for workshops, panels, and short courses
- Globally driven
- Aid junior operators, state-owned enterprises, regulators and other stakeholders
- Cooperate with IAEA's efforts



Topics

- Define sustainability in context
- Coordination of worldwide initiatives
- Indigenous peoples
- Principles of Code of Practice
- Cameco Sustainability Approach
- ISL – technical and environmental issues
- Uranium mining in previously unmined countries
- Success stories



Results

- Good examples exist
- Challenge to disseminate
- Further discussion of ISL technical issues
- Communication constraint
- Further discussion of specific needs of indigenous peoples



Tribal Member Delegation

- Coordinated with the International Institute of Indigenous Resource Management
- Tribal Member Participants
 - Navajo
 - Spokane
 - Oglala Sioux
 - Acoma
- Industry Donors
 - Black Range Minerals
 - Uranium Energy Corp.
 - Uranium Resources Inc.
 - Strathmore Minerals Corp.
- Pre-Workshop Sustainability Discussion and Attendance at NMA/NRC 2008 Uranium Recovery Workshop



Thank You!

Next Steps

- IAEA's Network of Centers of Excellence on Environment Remediation
- UMREG September 2008 meeting in Germany
- Present results at NMA/NRC 2008 Uranium Recovery Workshop
- International Journal of Mining and Mineral Engineering
- Secretariat
- SME 2009 Annual Meeting and Exhibit:
22 – 25 Feb 2009



IFSOUP Contact

www.wmsym.org/html/ifsoup.cfm

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Review

- Sustainability in Uranium Mining
- IFSOUP
- IFSOUP Outcomes





QUESTION PERIOD

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DOE-LM Uranium Leasing Program Overview

April 29, 2008

Steven R. Schiesswohl, Realty Officer
U.S. Department of Energy
Office of Legacy Management
Office of Site Operations

2008 U.S. Nuclear Regulatory Commission/
National Mining Association Workshop

April 29–30, 2008
Denver, Colorado



Uranium Leasing Program

Background

- The Uranium Leasing Program (ULP) began in the late 1940s when the U.S. Atomic Energy Commission (AEC) was authorized to withdraw lands from public use to ensure an adequate reserve of uranium and vanadium ores and associated minerals for the nation's defense program.
 - Original leasing program ended in 1962, yielding more than 1.2 million pounds of uranium and 6.8 million pounds of vanadium, which generated \$5.9 million in royalties to the federal government.
- In the early 1970s, the emphasis for the ULP switched from national defense to that of preserving the domestic uranium industry and infrastructure in support of commercial nuclear power.
 - Current leasing program initiated in 1974, with two 10-year lease periods that yielded approximately 6.5 million pounds of uranium and 33.4 million pounds of vanadium, which generated \$53 million in royalties to the federal government.



Uranium Leasing Program

Background (continued)

- All leases expired in 1994, allowing the U.S. Department of Energy (DOE) to conduct a Programmatic Environmental Assessment (PEA) for the ULP.
- The PEA was completed in July 1995. A Finding of No Significant Impact was issued in August 1995 for the proposed action, which called for continued leasing of DOE-managed lands for exploration and production of uranium and vanadium ores.
- DOE subsequently (1996–1997) executed new 10-year lease agreements with previous lessees that wanted to continue with the ULP.
 - During that lease period, 4 of the active lease tracts resumed mining operations and produced over 65 thousand tons of ore, which resulted in production royalty payments of approximately \$5 million to the federal government.



Uranium Leasing Program

Background (continued)

- A second PEA was completed in June 2007 and a Finding of No Significant Impact was issued in July 2007 for DOE's preferred (Expanded Program) alternative. This alternative included continuing the leasing program for an additional 10-year period, extending the current leases for that same period, and expanding the program to include the competitive offering of DOE's inactive lease tracts to the domestic uranium industry.
- The 2007 PEA put the ULP in perspective:
 - ULP ore reserves are estimated at 13.5 million pounds of uranium (approximately 1.5 percent of the known reserves in the U.S.).
 - Known ore reserves in the U.S. are purported to be nearly 900 million pounds of uranium (approximately 8.5 percent of the known reserves in the world).
 - Known ore reserves in the world are reported to be 10.5 billion pounds of uranium.



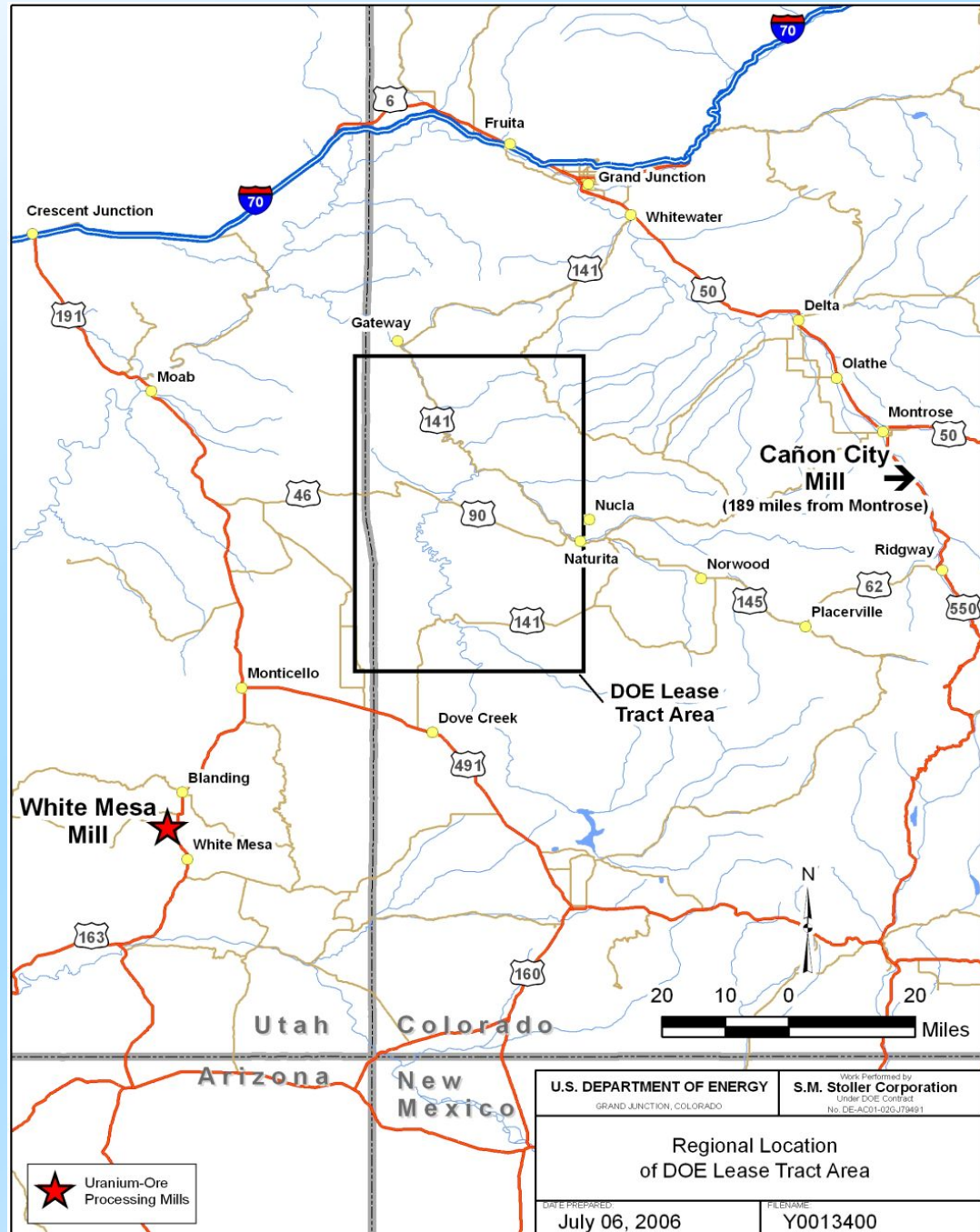
Uranium Leasing Program

Current Status

- The DOE Office of Legacy Management (LM) currently manages 32 lease tracts (25,000 acres), all located within the Uravan Mineral Belt in southwestern Colorado (see lease-tract location maps).
- There are 13 lease tracts actively held under lease. In April 2008, DOE will extend those leases for an additional 10-year period.
- There are 19 remaining lease tracts that are currently inactive. In March 2008, DOE offered these inactive lease tracts to the domestic uranium industry through a web-based competitive bid solicitation.
 - Bids must be submitted to DOE by May 9, 2008.
 - Ten-year leases will be executed with the successful bidders.
 - New leases will be executed by mid-July, 2008.



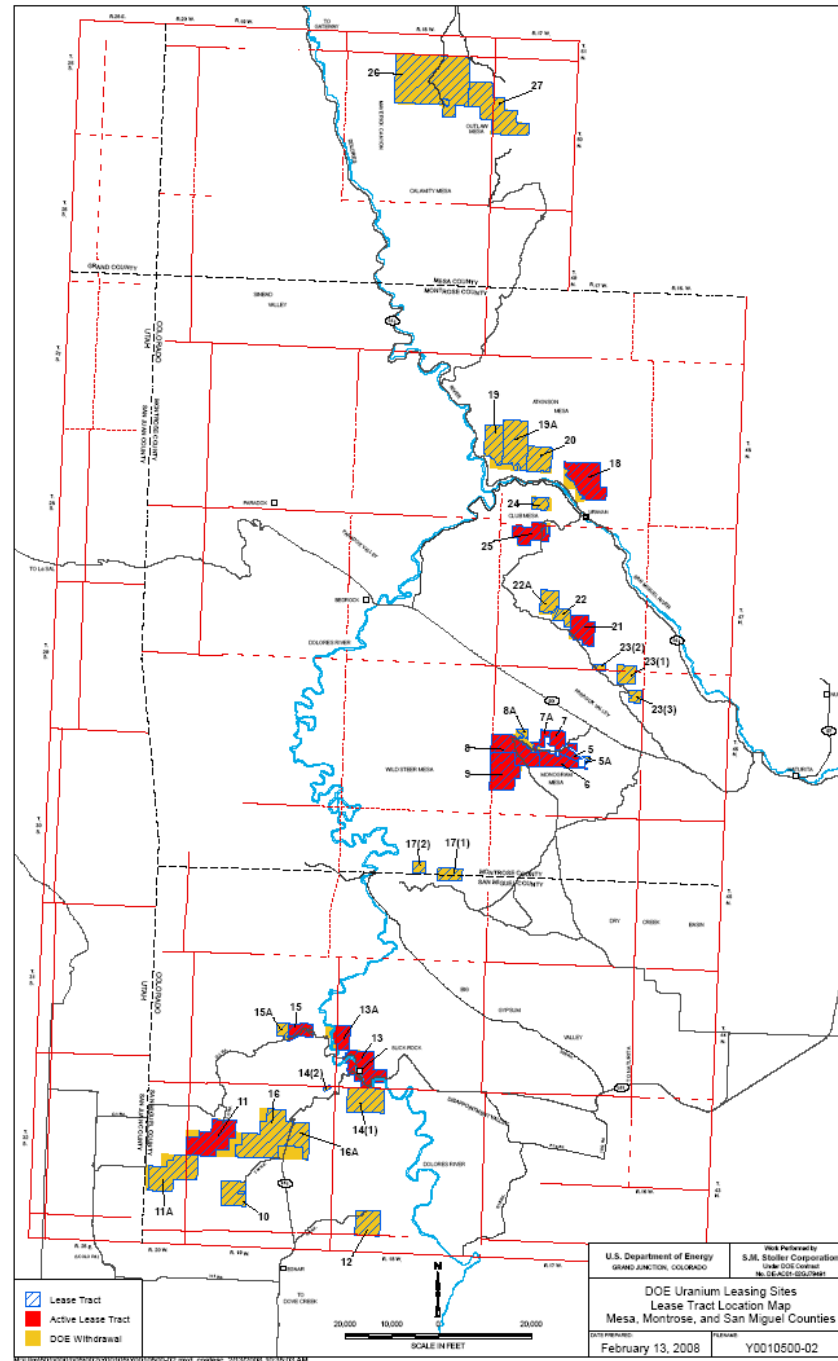
Uranium Leasing Program



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Uranium Leasing Program





Uranium Leasing Program

Royalties

- The Atomic Energy Act of 1954, as amended, authorized the AEC (predecessor agency to DOE) to collect royalties on the production of uranium and associated minerals extracted from lands under its administrative control.
- That authorization was brought forward into the 1974 leasing period by AEC Circular 8, Revised, which was subsequently codified for DOE as Title 10 *Code of Federal Regulations* Part 760 (10 CFR 760).
- In the future, DOE will receive \$500,000 per year from its lessees in the form of minimum annual royalty payments.
- DOE will receive production royalties from its lessees for all ores produced from the lease tracts. The 2007 PEA estimated that these future production royalties could total \$10 million annually once lease operations reach previous production levels (estimated at 150,000 tons of ore at prices equitable to those seen in the first quarter of 2007—\$80 per pound of uranium and \$6.60 per pound of vanadium).



Uranium Leasing Program

Agency Roles and Responsibilities

- DOE-LM is the managing federal agency for the ULP and is responsible for administering the program, including the National Environmental Policy Act and other environmental requirements.
- The Bureau of Land Management (BLM), as the federal surface-management agency, is responsible for managing all non-DOE lease-related activities (oil and gas, grazing, recreation, etc.) that occur on these public lands.
 - DOE and BLM are developing a Memorandum of Understanding to define these roles and responsibilities.
 - DOE coordinates with BLM to review all lessee-proposed plans to minimize the potential impacts to the various resources.



Uranium Leasing Program

Agency Roles and Responsibilities (continued)

- The Colorado Division of Reclamation, Mining and Safety (CDRMS) is the lead state agency involved in ULP lessee-proposed activities.
 - CDRMS requires and issues permits for all mineral exploration, mining, and reclamation activities conducted in Colorado.
 - DOE coordinates with CDRMS to review all lessee-proposed plans (and subsequent activities) to ensure compliance with applicable statutes, rules, and regulations.
 - CDRMS regulations include applicable reviews by all local agencies.



Uranium Leasing Program

Reclamation Requirements


- DOE's lease agreements require each lessee to post a reclamation-performance bond (payable to DOE) in an amount adequate to cover the final reclamation of all lessee operations, should the lessee default on its responsibilities.
 - DOE establishes the required bond amounts on a site-by-site basis.
 - The bond amounts are calculated such that DOE could subcontract all final mine-site reclamation activities at no cost to the government.
 - The bond amounts are revised as the lessee's operations change.
- CDRMS also requires a reclamation-performance bond be posted for all mineral exploration or mining activities conducted in Colorado.
 - If CDRMS determines that DOE's bond is sufficient to cover all necessary reclamation costs for the lessee's operations, then CDRMS can establish its bonding amount at a minimal level.
- DOE and CDRMS coordinate the oversight of reclamation activities to ensure that both agencies are satisfied once final reclamation is complete.

http://www.LM.doe.gov/land/sites/uranium_leasing/uranium_leasing.htm

Office of Legacy Management -- Uranium Leasing Sites DOE Leasing Program - Microsoft Internet Explorer provid...

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| LM Home | DOE Website |






Uranium Leasing Sites DOE Leasing Program

Search


The U.S. Department of Energy Office of Legacy Management is pleased to announce that the *Uranium Leasing Program Programmatic Environmental Assessment* has been finalized and that a Finding of No Significant Impact has been issued for the preferred "Expanded Program" alternative. Links to the documents are listed below.



- Inactive Lease Tracts Bid Solicitation**
- Program Summary
- Current Status
- Programmatic Environmental Assessment 
- Finding of No Significant Impact 
- Uranium Lease Tracts Location Map 
- Contact Information

Contact Us | Site Map | Privacy and Security Notice | Plug-Ins | Document Request | USA.gov

LM Navigation Bar | LM Home | DOE Website |



Uranium Leasing Sites DOE Leasing Program

Inactive Lease Tracts Bid Solicitation

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is hereby offering specific parcels (tracts) of land for lease to the private sector for the exploration, development, and production of uranium and vanadium ores. These parcels are located in the Uranium Mineral Belt in southwestern Colorado, between the communities of Gateway and Egnar, Colorado. This solicitation is authorized by, and is being issued in accordance with, Title 10 *Code of Federal Regulations* Part 760, Domestic Uranium Program (10 CFR 760). This solicitation is web-based and all information available to DOE-LM for each of the ninety (99) lease tracts being offered are provided herein, thus meeting the requirement outlined in 10 CFR 760, paragraph (e).

It is the intent of DOE-LM that the tracts be leased for active production of ore reserves rather than for speculation purposes. DOE-LM requires that due diligence be performed by all successful bidders to achieve this objective. Tasks deemed by the Realty Officer as valid due diligence include, but are not limited to, feasibility studies, cultural and historical investigations, threatened or endangered species investigations, development of exploration and mining plans, surface and underground development operations, exploration operations, and mining production.

The term of each lease shall be for a period of ten (10) years from the effective date of the lease, except as it may be sooner relinquished or cancelled pursuant to the provisions of the lease.

A deposit, in the form of a certified check, cashier's check, or bank draft must accompany each bid for the amount specified in the "Introduction" narrative as the minimum annual royalty for that particular lease tract.

The successful bidder shall not have the option of assignment of said lease to a third party for the first thirty (30) months of the lease term.

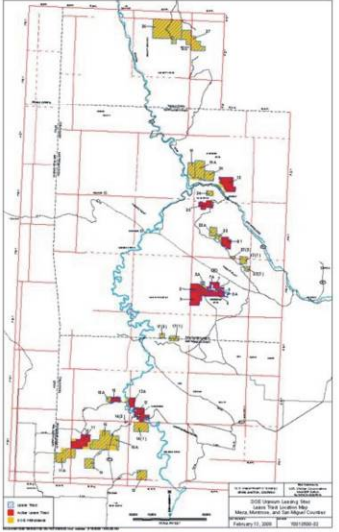
Prospective bidders must be: (1) citizens of the United States; (2) associations of such citizens; or (3) corporations organized under the laws of the United States or territories thereof. Persons less than 21 years of age, DOE employees, and DOE-LM contractor employees (S.M. Stoller Corporation and its teaming partners) are not eligible.

Subject leases will be awarded to the highest qualifying bidders with an effective date of thirty (30) working days following the bid opening, subject to the following evaluation criteria approval:

- Confirmation of financial ability/surety to perform
- Confirmation of ore production capabilities
- Confirmation of U.S. based entity status
- Payment (U.S. dollars) of the minimum annual royalty for said lease tract
- Receipt of a letter of intent from the person or entity committing to perform as required and identifying the authorized representative

Sixty (60) calendar days are allowed for bid submittal, following notice on the DOE-LM website that bidder information is available. The apparent successful bidder will then be notified in writing of their status and will have ten (10) working days (from the date of the notification letter) to provide responses to the aforementioned evaluation criteria. Bidders failing to meet the criteria within that time frame shall be considered nonresponsive. Twenty (20) working days will follow for evaluation of the information prior to final award.

Any lease relinquished or terminated by DOE-LM for cause, subsequent to award, shall then be offered to the next highest qualified bidder in the original bid process, at the amount of their original bid, regardless of time elapsed. In the event that the next highest bidder declines the offer, the offer shall be made to the next highest bidder in succession (Next-Right-of-Refusal), and this process shall continue until the offer is accepted.



High-Resolution Map

Select a Lease Tract

Questions Board

Questions submitted by prospective bidders and responses from the Uranium Leasing Program will be posted as they are received.

Contact the Uranium Leasing Program

Maps and other information provided as part of this solicitation represent the best available data to the U.S. Department of Energy and are for visual aids only. They are not represented as to their accuracy. Any and all prospective bidders are hereby advised that they are obligated to verify that the information contained herein is accurate and the most currently available.

Site Map | Privacy and Security Notice | Plug-Ins | USA.gov

MINING LAW REFORM UPDATE

Katie Sweeney
National Mining Association
April 30, 2008

Uranium Boom Fueling Reform Initiatives

- Increase in uranium claims on public lands
- Uranium claims near Grand Canyon
- Uranium unique among hardrock minerals
- DOE Uranium Leasing Program

NMA Objectives

Targeted amendments to the Mining Law that provide:

- Security of Tenure
- Fair Return to Public
- Abandoned Mined Land Fund
- No Unsuitability, Mine Veto or Environmental Provisions -- these issues are adequately addressed by current laws and regulations

House Action

- Nick J. Rahall (D-W.V.), chair of the House Natural Resources Committee, introduced HR 2262 in May 2007
- The House passed H.R. 2262 on November 1, 2007
- Uranium is not singled out for special treatment

Onerous Provisions of HR 2262

■ Gross Royalty

- Existing claims: 4 % gross income from mining
- New claims: 8 % gross income from mining
- Only claims with an operations permit (similar to plan of operations) and producing valuable locatable minerals in commercial quantities on the date of enactment will be considered existing claims subject to a 4 percent gross royalty

Onerous Provisions of HR 2262

- Mine Veto – Denial of Permit Allowed for a Variety of Reasons Even if Operations Would Meet Environmental Standards
 - past/existing violations of an affiliate of the applicant (affiliate is broadly defined -- could be board member, officer etc.)
 - need for water treatment longer than 10 years following mine closure

Onerous Provisions of HR 2262

- Unsuitability Provisions
 - Places WSAs, ACECs, designated Wild and Scenic River areas, and Clinton roadless areas off limits to mining
 - Allows states and tribes to petition for withdrawals and presumes such petitions will be granted

NMA Position on HR 2262

- NMA secured a strong VETO recommendation
- NMA mobilized grassroots assets in key states and enlisted business allies to oppose the legislation including the Chamber of Commerce and the National Association of Manufacturers

These efforts resulted in a vote margin that is sufficient to sustain the threatened presidential veto, should one become necessary.

Senate Consideration

- Key Senate Leaders have expressed a desire to pass a narrow bill that would address:
 - Security of tenure
 - Royalty
 - AML fund
- Others are interested in a comprehensive bill that would also address unsuitability, mine veto and environmental standards

Senate Consideration

- Despite efforts by Bingaman and Domenici, no bipartisan legislation has been introduced in the Senate
- NMA testified at several Senate Mining Law oversight hearing over the past six months
 - One hearing focused on uranium mining

Senate Status

- Bingaman staff acted as the primary drafters of what was intended to be bipartisan consensus bill
- Current staff draft goes far beyond industry's objectives
- Comprehensive bill with controversial provisions is unlikely to be allocated floor time during the remainder of this session

Possible Senate Bill Treatment of Uranium

- May be more of a push on Senate side to single uranium out for special treatment
 - Leasing?
 - Moratorium?
 - NAS Study?
- Domenici (and others) unwilling to accept removing uranium mining from operation of the Mining Law

Conclusion

- Narrow window of time available to achieve reasonable reform this Congress
- New challenges next Congress – new faces in Congress, retirement of Domenici
- Uranium mining likely to continue to be focal point for reform

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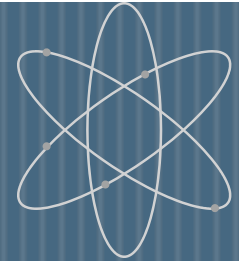
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Decommissioning Developments: Implications for Uranium Recovery Facilities

Tyson R. Smith
Uranium Recovery Workshop
April 29-30, 2008

Overview

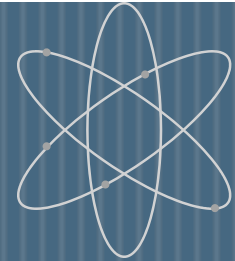


“Decommissioning Planning; Proposed Rule”

73 Fed. Reg. 3812 (Jan. 22, 2008)

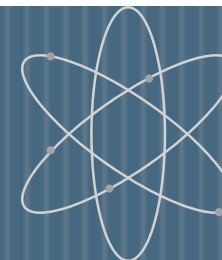
- Objective: to “reduce the likelihood that any current operating facility will become a legacy site.”
- Applies to power reactor and materials licensees (e.g., all Part 40 licensees).
- Comments currently due May 8, 2008

Rulemaking Documentation



- PRM Supporting Analyses
 - Draft Regulatory Analysis (December 2007)
 - Draft Environmental Assessment (December 2007)
 - Draft OMB Paperwork Reduction Act Supportive Statement (Comments Feb. 21, 2008)
- Draft Guidance
 - Implementing Survey and Monitoring Requirements Guidance (January 2008)
 - Financial Assurance Guidance (January 2008)
 - Comments on Draft Guidance (May 8, 2008)

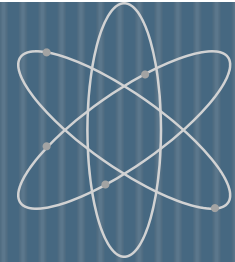
Decommissioning Planning: Proposed Rule



- History

- 2003 Commission approves development of proposed rule
- 2003 to 2004 NRC Integrated Decommissioning Improvement Plan
- 2005 to 2006 Inadvertent liquid releases (e.g., tritium)
- January 2007 NRC workshop on decommissioning funding
- October 2007 Draft proposed rule sent to Commission
- December 2007 Commission approves proposed rule and guidance
- January 2008 Proposed rule published in Federal Register

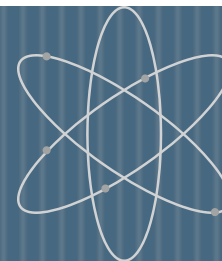
Decommissioning Planning: Proposed Rule



- **Overview**

- New operational requirements designed to minimize the introduction of contamination into subsurface soils
- New site and subsurface survey obligations during operation
- New records and records retention requirements
- Elimination of certain decommissioning funding assurance options
- New reporting obligations regarding decommissioning costs

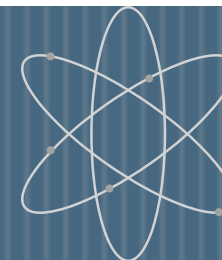
Decommissioning Planning: Proposed Rule



- **Statements of Consideration & Regulatory Analysis**
 - Backfit Analysis: NRC asserts that rulemaking is only a clarification of existing requirements or reporting of information using *existing* equipment and procedures
 - NRC asserts that rule will not impact conversion facilities, uranium mills, or solution mining facilities
- **Reality**
 - New survey and monitoring requirements
 - New reporting and recordkeeping requirements
 - Creates significant cost and regulatory uncertainty

Controls on Current Operations

10 C.F.R. § 20.1406(c)

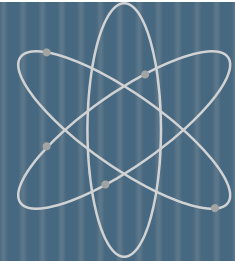


Licensees shall, to the extent practical, conduct operations to minimize the introduction of residual radioactivity into the site, including the subsurface, in accordance with the existing radiation protection requirements in Subpart B and radiological criteria for license termination in Subpart E of this part.

- Operational Restrictions
 - Applies to current licensees
 - Adds controls during operation
- Proposed Guidance
 - Evaluate systems, structures and components' processes, barriers, configurations, especially those not visible, for leak potential
 - Provide for leak detection, install sumps and berms, identify areas of potential concentration, and establish operating procedures

Survey Requirements

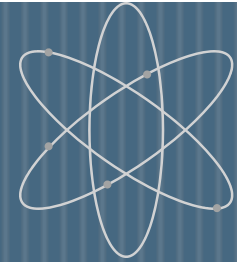
10 C.F.R. §§ 20.1501(a) and (b)



- (a) *Each licensee shall make . . . surveys of areas, including the subsurface, that (2) are reasonable under the circumstances to evaluate . . . (ii) concentrations or quantities of residual radioactivity; and (iii) the potential radiological hazards of the radiation levels and residual radioactivity detected.*
- (b) *Records from surveys describing the location and amount of subsurface residual radioactivity identified at the site must be kept with records important for decommissioning*

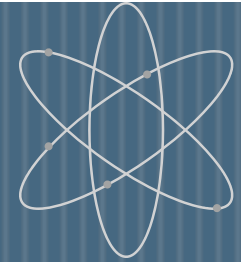
- **Subsurface Investigation**

- Adds more controls during operation (e.g., spill monitoring and response where potential migration outside of process buildings)
- Records relating to location and amount of subsurface contamination
 - New definition of "residual radioactivity" includes any material that has been introduced to the site as a result of licensee activities
 - Defines subsurface as depths greater than 15 cm



Scope of Survey Obligations

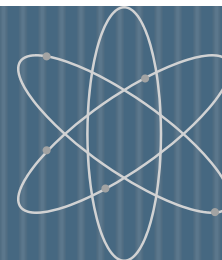
- Subsurface Investigations – Surveys
 - “Reasonable under the circumstances...”
 - Licensees would need to defend “reasonable”
 - Mechanism and timing for NRC review not clear
 - Site physical characterization
 - Subsurface structure and properties
 - Updated for site changes
 - Guidance suggests an evaluation that is more onerous than needed to determine scope/significance of residual radioactivity
 - Support decommissioning cost estimate
 - Estimate volume of on-site subsurface material containing residual activity that will require remediation to meet (unrestricted) decommissioning criteria



Monitoring Programs

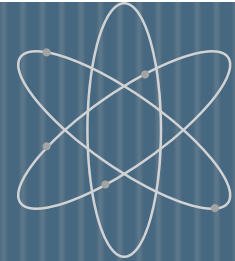
- Subsurface Investigations - Monitoring
 - Groundwater monitoring
 - Baseline conditions
 - Site conceptual model
 - Demonstrate future compliance with regulations
 - Identify and locate contaminants of interest
 - QA/QC program
 - Soil monitoring and characterization based on existing decommissioning guidance (e.g., MARSSIM)
 - Guidance suggests "routine monitoring" that is more onerous than needed to assess potential groundwater implications
 - Develop response plan for events (e.g., increased monitoring)

Key Uncertainties for Part 40 Facilities



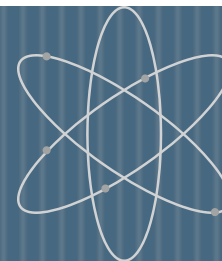
- Fails to take into account special considerations associated with Part 40 licensees:
 - Near-surface release mode
 - Low residual radionuclide concentrations
 - Favorable chemical properties of uranium (low solubility of U308, strong retention in near surface soils, low potential for subsurface migration)
 - No discussion of ISR implications
- Rule does not recognize distinction between practices (activities going forward) and interventions (addressing consequence of past operations)

Decommissioning Planning: Proposed Rule

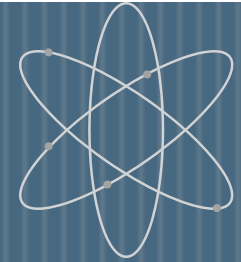


- Decommissioning Funding Assurance
 - Changes for materials licensees
 - Require triennial updates to decommissioning cost estimate
 - Must demonstrate ability to meet restricted release criteria *before* relying on that option when providing funding assurance
 - Estimate volume of on-site subsurface material containing residual activity that will require remediation to meet decommissioning criteria
 - Standards for reviewing "demonstration" are unclear
 - Must consider operational events when establishing decommissioning funding
 - Cost estimate must specifically include contractor overhead, profit, and contingency factor (at least 25%)

Decommissioning Funding Assurance



- Affects both reactors and materials licensees
- Key modifications to funding requirements include:
 - Only trusts for restricted release and limited to 1% rate of return
 - Only trusts for prepayment option
 - Immediate payment into standby trust if fail financial tests
 - Joint/several liability for decommissioning costs (not just guaranty amount)
 - Permits consideration of intangible assets for parent/self guarantees
 - Coupled with increased bond assurance (investment grade, and uninsured, uncollateralized, unencumbered)
 - Parent company must use CPA certifications rather than company certifications



What is next...

- NEI Decommissioning Taskforce
 - Comments to OMB on Proposed Rule Information Collection Requirements (February 21, 2008)
 - Argue new unjustified information collection requirements
 - Failure to satisfy Paperwork Reduction Act
 - Comments to NRC due on May 8, 2008
- Other Comments
 - Prepared comment template specific to Part 40 licensees
 - Looking for support from other Part 40 licensees
 - If interested, contact trsmith@winston.com

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NEW YORK NEWARK PARIS SAN FRANCISCO WASHINGTON, D.C.



Questions or Comments?

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(202) 282-5756



URANIUM RECOVERY PROGRAM ENSURING PUBLIC SAFETY AND PROTECTION OF THE ENVIRONMENT

William von Till, Chief
Uranium Recovery Licensing Branch
NRC

Overview

- Safety reviews
- Environmental reviews
- Inspections
- Reclamation and decommissioning
- Public/Stakeholder involvement

General

- NRC has regulatory mandate, not promotional
- Safety and environmental focus
- Staff review in accordance with regulation and guidance
- Consistency (standard review plans, reg guides)
- Public process
- Stakeholder interest – meetings, opportunity for hearing, comments

Key Safety Aspects (General)

- Full safety review of license applications –multi-discipline (Hydrogeologists, Health Physicists, Geotechnical Engineers, Surface Water Hydrologists)
- Use of Standard Review Plans - Guidance
- Site characterization
- Radon emissions
- Radiation safety program
- Operations
- Environmental monitoring
- Groundwater protection
- Effects of accidents
- Financial assurance

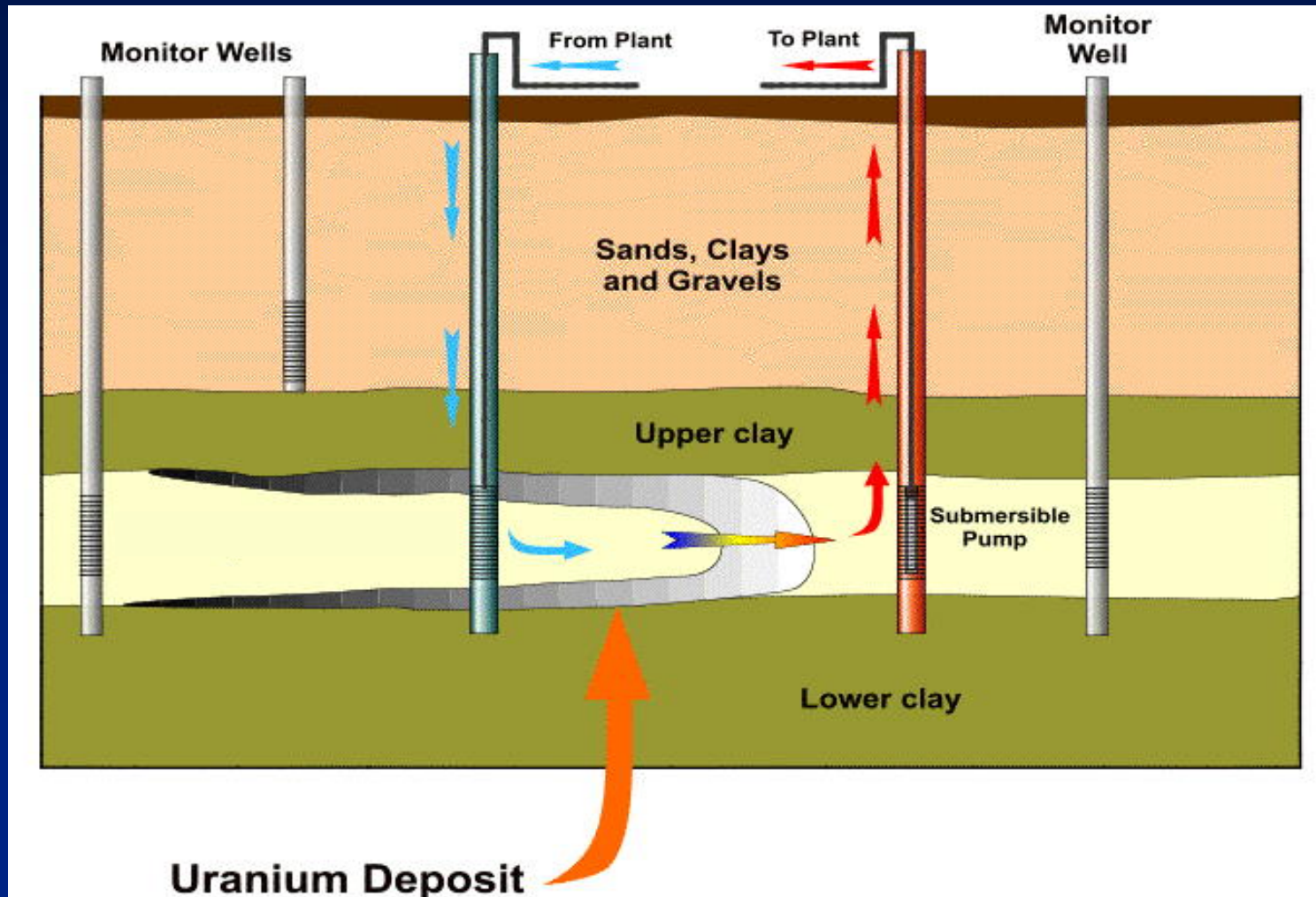
Key Safety Aspects (Conventional Mills)

- Siting/site characteristics
- Radioactive safety controls and monitoring
- Protecting water resources
- Radioactive waste management systems
- Decommissioning and reclamation
- Geotechnical stability
- Surface water and erosion protection

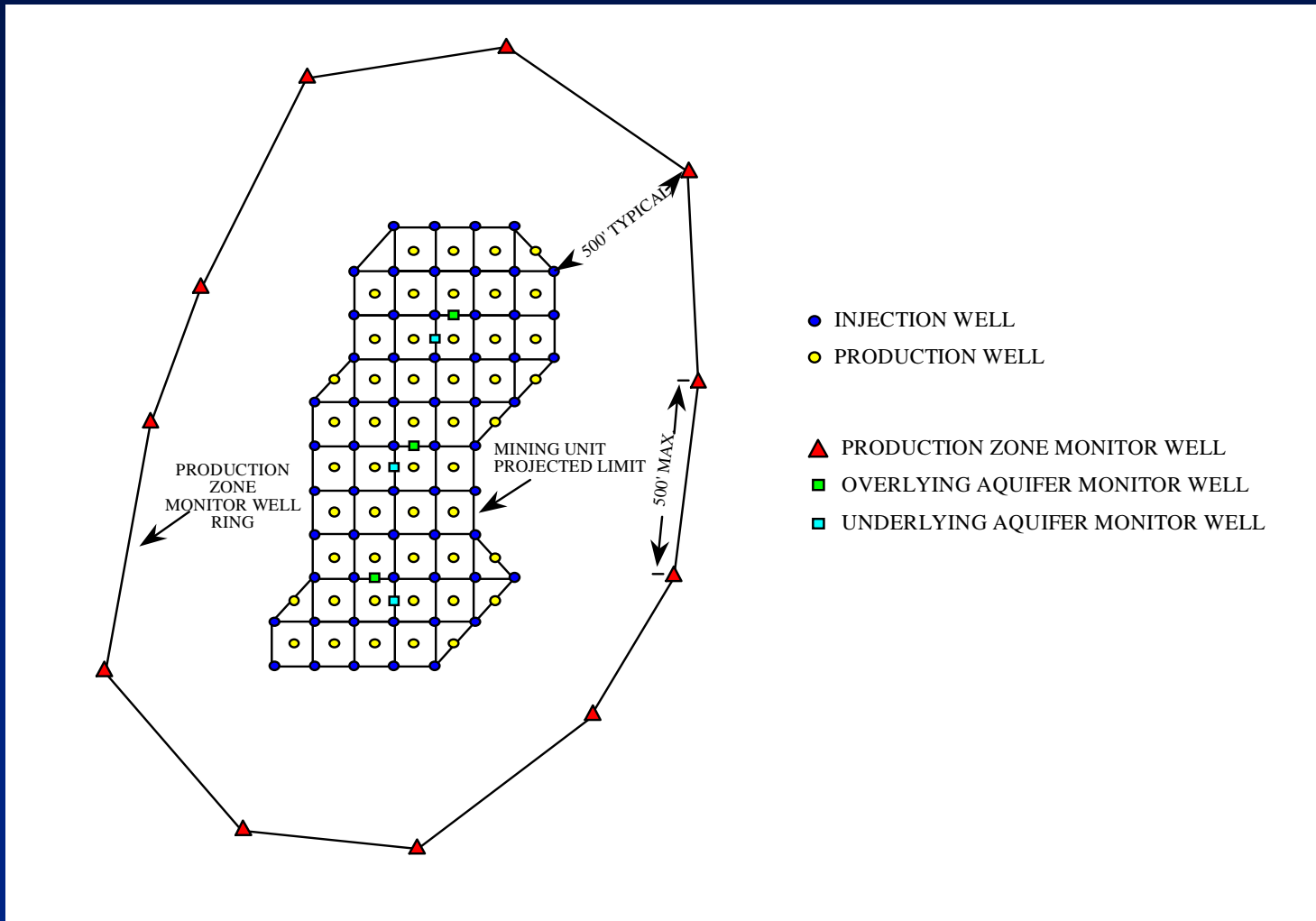
Key Safety Aspects (In-situ Leach)

- Site characterization
- Hydraulic confinement
- Groundwater monitoring
- Hydraulic control of recovery zones
- Groundwater restoration
- Liquid effluent control
- Spills
- Radon emissions
- Radiation safety program

The ISL process



Typical ISL Wellfield Layout



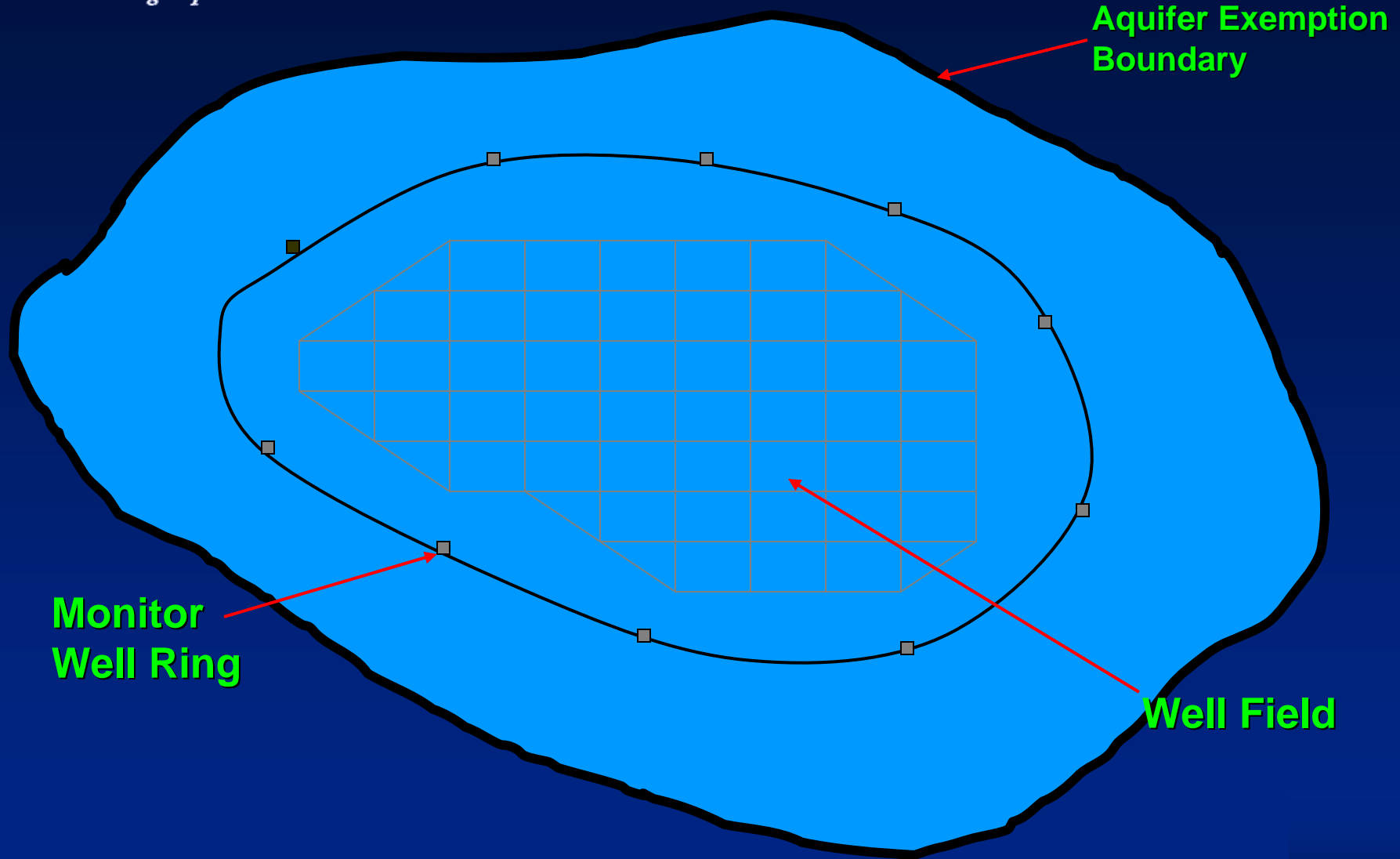


U.S. NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment

Typical ISR Wellfield Layout



Key Environmental Aspects

- Land Use
- Geology and Soils
- Water Resources
- Ecological Resources
- Air Quality
- Waste Management
- Environmental Justice
- Historic and Cultural Resources
- Transportation
- Socioeconomics
- Cumulative impacts
- Wildlife

Inspection Aspects

- Radiation safety program
- Area radiation and contamination control
- Protective clothing and equipment
- Assessing personnel radiation exposure
- Equipment and instrumentation
- Posting and labeling
- Effluent monitoring
- Environmental protection
- Groundwater protection

Addressing Stakeholder Concerns

- Public process
- Notice of opportunity for hearing
- Environmental reviews – Endangered Species Act, National Historic Preservation Act
- Indian Tribe outreach
- Public meetings
- State and other Federal Agencies

Conclusion

- NRC focused on safety and environmental protection with uranium recovery facilities
- Public process