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Overview of Region IV Uranium Recovery Inspection Program

National Mining Association Uranium Recovery Workshop

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Topics to be discussed

- Status of inspection program
- Lessons learned from previous preoperational inspections
- Implementation of Decommissioning Planning Rule at operating facilities
- Revision of NRC Information Notice 99-03

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Inspection highlights

- Calendar year 2013 inspections completed
  - 7 operating sites
  - 4 facilities in decommissioning
  - 2 site visits
  - 1 preoperational inspection
  - 7 observational site visits at DOE Title I and II sites
- Calendar year 2014 inspections completed (to date)
  - 4 operating sites
  - 0 facilities in decommissioning
  - 1 site visit
  - 1 preoperational inspection
  - 1 observational site visit at a DOE Title I site

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Inspection highlights

- Since last NMA meeting, NRC has issued two authorization to operate letters:
  - Lost Creek ISR LLC, Aug 2013 (except dryer) & Oct 2013 (dryer)
  - Uranerz Energy Corp., April 2014 (up to IX columns)
- Recently identified violations:
  - Failure to conduct DOT function specific training (a recurring problem in the industry)
  - Failure to issue RWP for clean up of yellowcake spill, resulting in uranium uptakes
  - Improper disposal of permeate generated from reverse osmosis system
  - Failure to have RSO on staff
  - Failures to submit required reports to NRC in timely manner

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Lessons Learned from Preoperational Inspections

- NRC has conducted three preoperational team inspections since 2010
- Possible licensee misunderstandings:
  - What is the focus of this inspection?
  - What does NRC look at during inspection?
  - What happens after the inspection?

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What is a pre-op inspection?

- The pre-op inspection ensures that licensee is ready to operate and to handle uranium
- Team will look at status of plant, programs, procedures, and people
- The team will focus on whether licensee has established and implemented programs in compliance with license, application, and regulatory requirements (compliance-based inspection)
- Team consists of regional inspectors, hydrogeologist, geotechnical engineer, and project manager

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Results of pre-op inspection

- These inspections are conducted, in part, to fulfill a specific license requirement
- In addition, there are other preoperational license conditions that must be fulfilled prior to NRC approval to operate; the status of each condition will be reviewed during the inspection
- To date, no licensee was prepared to begin operations after the first week of inspection

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Follow up activities

- In the past, the team has created an informal list of missing information or incomplete programs
- When licensee manager has verified that the site has updated its programs, the team will return for second week of inspection
- The team will document its inspection findings in an inspection report
- Inspection findings are used by NRC to determine whether licensee is ready for operations and to handle radioactive material

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Follow up activities

- NRC will then issue a letter authorizing licensee to operate up to the current plant status
  - NRC has authorized limited facility operations if all portions of the plant (e.g., dryer or remediation circuits) have not been constructed or tested
  - NRC generally would conduct additional pre-operational inspections to review the areas that were not ready for operation during the first team inspection

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A common misunderstanding

- The pre-operational inspection findings are only a part of NRC's decision to allow a facility to operate
- The licensee must also fulfill remainder of the preoperational license conditions to the satisfaction of the NRC
  - Ideally, the license should be amended as necessary prior to scheduling of preoperational inspection
  - It is incumbent for the licensee to start working on these preoperational license conditions as soon as possible and not wait until the preoperational inspection starts

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Decommissioning Planning Rule

- Requirements of Decommissioning Planning Rule (DPR) were published in *Federal Register* on June 17, 2011 (76 FR 35512)
- DPR became effective on December 17, 2012
- In conjunction with DPR, 4 documents were issued by the NRC:
  - Temporary Instruction 2600/017
  - Regulatory Guide 4.22
  - NUREG-1757, Vol. 3, Rev. 1
  - EGM-12-002

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What is the DPR?

- DPR requires licensees to:
  - Minimize contamination released into site
  - Identify location and amount of significant residual radioactivity throughout the site, including subsurface areas
- The results of surveys should be maintained in records important to decommissioning
- The next required update to the financial assurance report should include cost estimates for subsurface remediation

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What is the DPR?

- In simple terms, the DPR requires licensees to plan for the decommissioning process
  - How much contamination do you have at the site?
  - Minimize making it
  - Look for it
  - Record it
- How big a bill?
  - Is there an extra cost to remediate? If so, update your financial assurance
- DPR does not require remedial action

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Why issue DPR?

- Some licensees were unaware of how much contamination existed at their sites, especially subsurface contamination
- At time of decommissioning, they didn't have enough money to remediate the site; typically there are little to no revenue streams after shutdown to help fund decommissioning
- As a result, some licensees were unable to afford decommissioning to meet the release criteria

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Does DPR apply to UR sites?

- Because UR sites must comply with decommissioning requirements of 10 CFR Part 40, Appendix A, they are not obligated to meet the requirements of §20.1406(c)
- However, UR sites are required to meet the survey and recordkeeping requirements of §20.1501(a-b)
- See pages 35515 and 35539 of *FRN* (76 FR 35512) for explanation of applicability to UR sites

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How does DPR apply to UR?

- DPR applies to UR sites where the potential for subsurface contamination exists
- Surveys (including subsurface surveys) that are reasonable under the circumstances must be performed if there is a potential radiological hazard at a site
- DPR only applies to site contamination, does not apply to offsite contamination identified during decommissioning
- What/where are potential hazards at your site?

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Temporary Instruction 2600/017

- NRC plans to implement TI 2600/017 at all operating UR sites
- In accordance with TI, NRC verifies that licensees:
  - Minimize introduction of radiological contamination into site environment
  - Implement a program to ensure that releases of radioactivity are promptly identified and characterized
  - Record radiological survey data which identifies location and concentrations or quantities of contamination that may require remediation at license termination
  - Report updated financial assurance as required by DPR

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TI 2600/017

- What inspectors will be looking for at UR sites:
  - Has licensee implemented DPR (for example, updated its survey procedures)?
  - What areas may have subsurface contamination?
  - Has licensee considered subsurface sampling; if so, when do they plan to sample?
  - If there is subsurface contamination, has licensee quantified amount of volume to be remediated?
  - Is licensee maintaining these records?
  - What's the impact on financial assurance?

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Other documents of interest

- RG 4.22, "Decommissioning Planning During Operations," provides guidance to licensees
  - Figure 1 is misleading, implies that DPR is not applicable to UR sites
- Enforcement Guidance Memorandum EGM 12-002 provides discretion for one year
  - Expired December 2013
- NUREG-1757, Vol. 3, Rev. 1
  - For UR sites, applicable guidance includes recordkeeping and timeliness for decommissioning

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NRC Information Notice 99-03

- IN 99-03, “Exothermic Reactions Involving Dried Uranium Oxide Powder (Yellowcake),” was revised and reissued in March 2014
- Original IN 99-03 was issued in response to uranium uptake event that occurred in 1998 involving a pressurized drum of yellowcake. A similar event occurred in 2012.
- The NRC formed a working group in January 2013 to review and revise the IN

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Revised IN 99-03

Working group consisted of:

- NRC staff – Rob Evans (team lead), Ron Burrows, Tom McLaughlin, Linda Gersey and Marilyn Diaz (NMSS)
- Industry representatives – Bill Kearney, Dennis Stover, Donna Wichers, Kirk Lamont, Erich Tiepel and Kari Krueckl Lamont
- Other agencies – Jim Stewart/Chris Bajwa (IAEA), Gary Smith (Texas) and Craig Holvey (Canada)

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Revised IN 99-03

- Working group was tasked to:
  - Review generic implications of most recent pressurized drum incident (2012) including reasons why drums continue to become pressurized
  - Identify industry experience with pressurized drums
  - Ascertain whether there were any related trends across the industry

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Revised IN 99-03

- Working group developed a questionnaire
- 14 sites responded
  - Included both national and international sites
  - Some sites were shut down; responders relied on institutional memory versus documentation
  - Two types of sites–either ammonia or hydrogen peroxide precipitated circuits
- Overall, 9 of 14 sites reported problems with pressurized drums

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IN 99-03 Summary

- 2 events (2006 and 2012) were analyzed
- Both involved uptakes of uranium by workers
- Fundamental cause of pressurized drums was build-up of oxygen gas in sealed containers
- Oxygen gas originated from decomposition of residual uranyl peroxide hydrates or hydrogen peroxide in dried yellowcake product
- Drum lids may have been sealed prior to completion of decomposition process resulting in pressure buildup
- Both sites used minimum 3-hour time delay as mentioned in original IN 99-03; however, this time delay was insufficient

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IN 99-03 Summary

- Facility operators have implemented 2 basic corrective actions:
  - Increasing cooling/venting time before lid is sealed (at least 12 hours)
  - Conducting visual inspections of drums for signs of pressurization prior to shipment
- Facility operators should also evaluate for organic-based exothermic reactions and minimize the potential for oils and greases from entering yellowcake process circuits
- As a reminder - shipments of pressurized drums of uranium yellowcake are prohibited by U.S. Department of Transportation regulations (pressure reduces the effectiveness of packages)

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Beyond the Revised IN 99-03

- Although not specifically addressed in the IN, the working group informally concluded that:
  - Industry should consider additional studies, to further our understanding of the decomposition process
  - Working group did not clearly identify a reliable test for hydrogen peroxide in yellowcake product
  - Working group identified difficulties in measuring temperature, pressure, and adequate cooling time of yellowcake product in drums
  - Impact of moisture content in yellowcake and its relationship to decomposition process was not clear

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RIV Personnel Changes

- New Branch Chief
  - Ray Kellar replaced Blair Spitzberg who retired in March 2014
- New Director, Division of Nuclear Materials Safety
  - Anton (Tony) Vegel transferred to the RIV power reactor group
  - Linda Howell is acting division director until late-July 2014
  - Mark Shaffer will become the permanent division director about August 1st

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Questions?