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NRC Region IV Update

2013 National Mining Association/NRC Uranium Recovery Workshop
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Tony Vegel, Director, Division of Nuclear Materials Safety, NRC Region IV

D. Blair Spitzberg, Ph.D., Chief, Fuels Safety & Decommissioning Branch, NRC Region IV

Rob Evans, Senior Inspector, Fuels Safety & Decommissioning Branch ,NRC Region IV

Linda Gersey, Uranium Recovery Inspector, Fuels Safety & Decommissioning Branch NRC Region IV

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Discussion Topics

- **Blair Spitzberg**
  - **Overview of NRC's Inspection Program**
- **Linda Gersey**
  - **Inspection Findings and Trends**
  - **Pre-operational Inspections**
- **Rob Evans**
  - **Revision to NRC Information Notice 99-03 EXOTHERMIC REACTIONS INVOLVING URANIUM OXIDE POWDER (YELLOWCAKE)**
  - **New Decommissioning Planning Rule as it applies to Uranium Recovery operations**
  - **NRC Observational Site Visits of DOE Uranium Mill Tailings Radiation Control Act (UMTRCA) Disposal Sites**

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Inspection Program Notes

- **No significant changes to the program over the past year**
- **Inspection Process - Inspections are planned and led by Region IV inspectors with support as needed from technical staff from FSME**
- **The Region continues to follow-up on reports and incidents in the office. When needed, follow-up can continue during routine or reactive inspections. Often, follow-up begins and ends with an in-office review.**
- **In the last year, we learned of 2 circumstances requiring additional inspection follow-up. One is still under review. The other will be discussed in Ms. Gersey's presentation.**
- **Follow-up to one event led NRC to initiate an update and revision to NRC Information Notice 99-03 EXOTHERMIC REACTIONS INVOLVING URANIUM OXIDE POWDER (YELLOWCAKE). This will be discussed in Rob Evans's presentation.**

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Organizational Responsibility
Inspection of Uranium Recovery

- **Program Lead - Office of Federal and State Materials and Environmental Management Programs (FSME) (NRC Headquarters, Rockville, MD)**
  - **Decommissioning and Uranium Recovery Licensing Directorate (DURLD)**
    Develops, implements and oversees the regulatory framework for uranium recovery activities and the decommissioning of former uranium recovery sites
  - **Within DURLD is the Uranium Recovery Licensing Branch**
    (Bill VonTill, Chief)
  - **Under DURLD are the Project Managers and other licensing review staff for each site**

- **Inspection and Response Lead - Region IV Arlington, Texas, Division of Nuclear Materials Safety (DNMS)**
  - **Within DNMS is the Fuels Safety and Decommissioning Branch (FSDB)**
    (Blair Spitzberg, Chief)
  - **Under FSDB are the lead inspectors for each site**
  - **Can draw on other inspectors to assist according to technical expertise needed**

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Types of Inspections

- Routine – programmatic inspections conducted at a risk-informed frequency
  - Annual or semi-annual frequency for operational facilities
  - Every two years at facilities in reclamation and standby, unless operating conditions or performance indicates otherwise
  - Every three years at inactive facilities
- Non-routine – inspections focused on a particular area or concern which cannot await the routine schedule. Includes reactive inspections.
- Incident investigations
- Pre-operational – for new or restarted operations
  - This year we project conducting pre-operational inspections at UR Energy Lost Creek, and Uranerz Energy Corp Nichols Ranch

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Inspection Guidance

NRC INSPECTION Manual Chapter 2641 IN-SITU LEACH FACILITIES INSPECTION PROGRAM
NRC INSPECTION Manual Chapter 2801 URANIUM MILL AND 11e.(2) BYPRODUCT MATERIAL DISPOSAL SITE AND FACILITY INSPECTION PROGRAM

Inspection Procedures (IPs) generally conducted during all routine inspections		Inspection Procedures conducted as needed	
IP 83822	Radiation Protection	IP 83890	Closeout Inspection & Survey
IP 88045	Effluent Control and Environmental Protection	IP 92701	Follow-up
IP 89001	In-Situ Leach Facilities	IP 92703	Follow-up of confirmatory Action Letters
IP 86740	Inspection of Transportation Activities	IP 93001	OSHA Interface Activities
IP 88035	Radioactive Waste Management	IP 88065	Incident Investigation
IP 88005	Management Organization and Controls	IP 87654	Uranium Mill Site Decommissioning Inspections
IP 87102	Maintaining Effluents from Materials Facilities ALARA	IP 87104	Decommissioning Procedure for Materials Licensees
IP 88050	Emergency Preparedness		
IP 88064	Emergency Response Procedures		
IP 88055	Fire Protection		

NRC Manual Chapters and Inspections Procedures can be found at:
http://www.nrc.gov/reading-rm/doc-collections/insp-manual/manual-chapter

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Inspection Planning and Communications

- **Routine inspection schedule**
  - **Planned about a year in advance**
  - **Coordinated with the program office in FSME**
  - **Adjustments to schedule made throughout the year as needed**
- **Inspection planning and execution**
  - **Inspection may be announced or unannounced**
  - **Inspection plan approved by Region IV management - Identifies scope, IPs, follow-up issues, participating personnel**
  - **State officials informed. State representatives may accompany NRC inspectors as observers with agreement from licensee.**
  - **Exit Meetings - Any significant changes in findings from those communicated in the final exit will require re-exiting with licensee management**
- **Post inspection debrief of NRC management and staff (Generally the week of return to office)**
- **Coordinate any enforcement - NRC enforcement policy**
  http://pbadupws.nrc.gov/docs/ML0934/ML093480037.pdf
- **Issue Inspection Report**
  - **30 day goal for normal inspection reports (post exit)**
  - **45 day goal for team inspections (post exit)**
- **Determine need for any follow-up**

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Highlights from 2012 Uranium Recovery Inspections

- 8 inspections conducted
  - 4 at operating facilities
  - 2 at facilities in decommissioning
  - 1 status visit for new licensee
  - 1 non-routine for incident follow-up
- 3 violations issued
  - Failure of DOT packaging during transport (49 CFR 173.410(f))
  - Failure to perform surveys in CPP and header houses (10 CFR 20.1501(a)(2)(i))
  - Failure to maintain doses in unrestricted areas ≤ 2 millirems in any one hour (10 CFR 20.1301(a)(2))

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Reactive Inspection
June 23, 2012 uptake event

- Drum of yellowcake shipped to Blind River Refinery, Ontario from Wyoming
- Blind River operator was routinely sampling drums
- While loosening the seal ring clamp, drum lid partially popped off from pressure inside the drum
- 26 kg of uranium powder was expelled from drum into the work environment
- 3 Blind River operators received uptakes of uranium
- One worker's uptake exceeded Canada's kidney burden limit, equivalent to NRC's chemical toxicity limit

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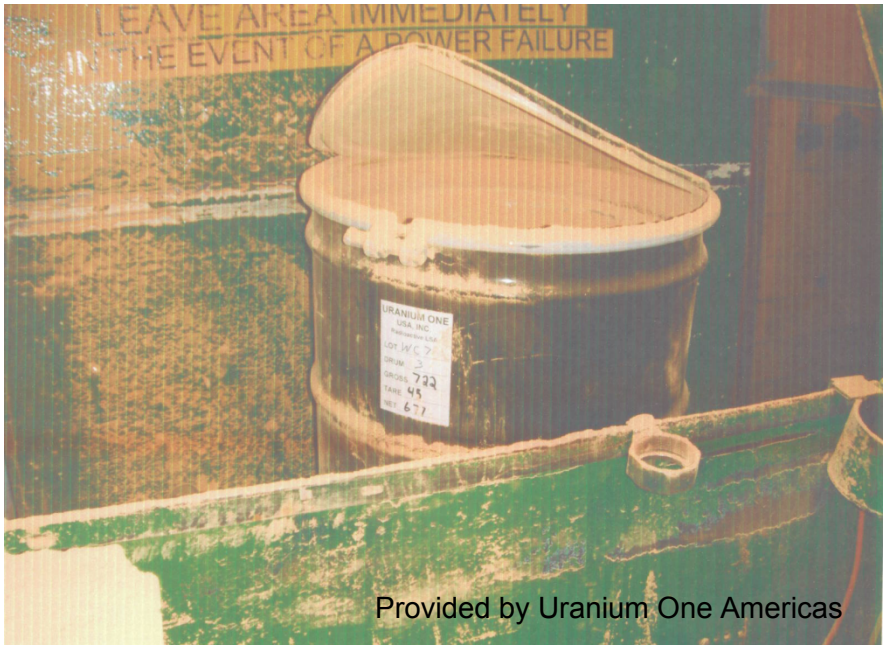
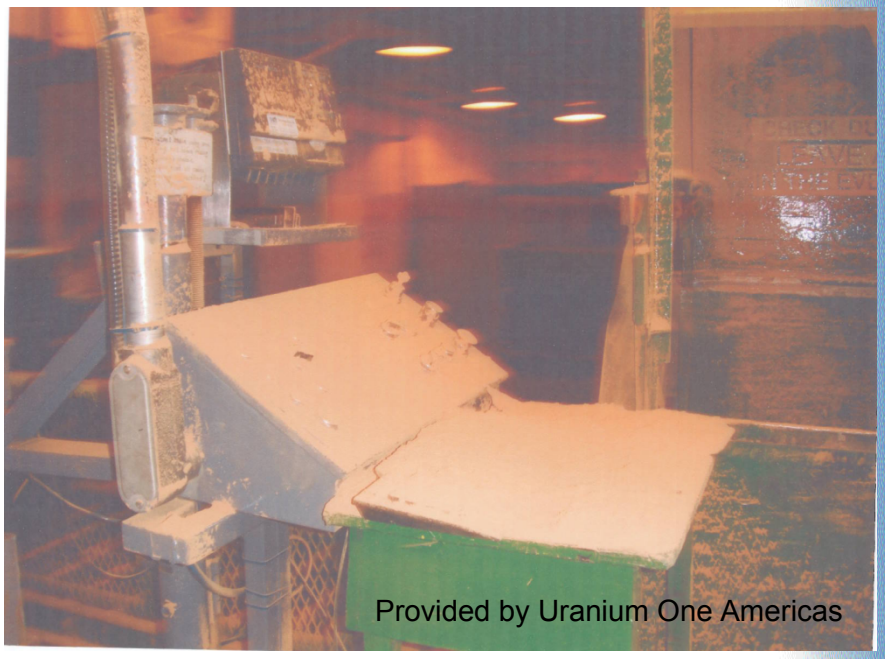
Yellowcake Drum Release



Pressurized drum breach



Deposited yellowcake powder residue

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How NRC learned of Event

- Uranium One voluntarily notified NRC two days after event in Canada involving their yellowcake drum
- Uranium One identified several immediate corrective actions including
  - Suspension of shipments to Blind River Refinery
  - Revision of site procedure
  - Inspection of drums awaiting shipment

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NRC Confirmatory Action Letter (CAL)

- NRC issued CAL to Uranium One on July 5, 2012 (CAL 4-12-003)
- The CAL stipulated four actions prior to Uranium One resuming shipments
- NRC issued a Preliminary Notification and press release simultaneously with CAL

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Major causes of pressurized drum

Pressurization of drum was result of two operational conditions:

- Inadequate time period for cooling and venting dried yellowcake product in drums prior to lid closure
- Inadequate time period that yellowcake remained in dryer

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Corrective Actions Taken

- Licensee extended time before drum lidding from 3 to 24 hours
- Licensee extended drying time to >4.5 hours
  - Licensee had previously reduced drying time from 5 to 3.5 hours
  - Moisture content was criteria for dryness

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Two NRC Followup Inspections

- Conducted Sept-Oct 2012 (ADAMS No. ML12340A473)
- A contributing cause identified was inadequate procedures
  - Procedures didn't specify hearth temperature, rake speed, feed rate
  - Not a violation – licensee had established and followed procedures, although procedures were inadequate

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Pre-operational Inspections

- NRC plans to conduct 2 pre-operational inspections of new licensees this year
- Pre-operational Inspection Procedure in development
- Using experience from Uranium One's Re-start inspection (ADAMS accession number ML110590753)

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Pre-operational Inspections

- NRC will request certain items 90 days prior to inspection including:
  - Operation and radiation protection procedures
  - SERPs and change pages; a complete and accurate copy of the license application would be best
  - Valid contract for 11e.(2) waste disposal
  - Information filled out in provided table

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Pre-operational Inspections

- Will involve health physicists, hydrogeologist, geotechnical engineer, project manager
- Number of team members depends on size of facility, complexity of operations
- Initially one week inspection
- Licensee should have all equipment, personnel, and procedures identified in the license application in place prior to the inspection

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Decommissioning Planning Rule (DPR)

- DPR was meant to improve decommissioning planning ***during operations*** to reduce possibility that facility will become legacy site
  - Final rule published in *Federal Register* on June 17, 2011(76 FR 35512)
  - NRC subsequently issued Regulatory Guide 4.22 to provide guidance for implementing the DPR
  - DPR *is* applicable to UR licensees

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New or revised regulations from DPR

- Licensees shall conduct subsurface surveys and maintain records of these surveys (20.1501)
- Licensees shall report additional details in decommissioning cost estimates, and update decommissioning funding plans within one year if necessary (40.36)
- Regulation 20.1406 is not applicable because UR sites are expected to comply with Part 40, Appendix A requirements, specifically Criterions 6(6), 7, and 7A

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Impact on Uranium Recovery licensees

- Operating UR sites are required to comply with the subsurface survey and monitoring requirements of 20.1501
  - In most situations, compliance with Appendix A might preclude need for additional subsurface sampling
  - However, surveys are required if there is a potential subsurface radiological hazard at the site
- Do you have to survey and sample soil under a central processing plant?
  - Surveys have to be reasonable under the circumstances
  - Will surveys jeopardize safe facility operation?
  - Groundwater monitoring may be reasonable under site-specific conditions in lieu of soil sampling

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Temporary Instruction (TI) 2600/017 and Enforcement Guidance Memorandum (EGM)

- TI 2600/017 was issued in February 2013
  - provides guidance to NRC inspectors during review of DPR implementation
  - will be conducted at all **operating** UR facilities during next routine inspection
- EGM 12-002 was issued in December 2012
  - NRC is aware that some licensees may be temporarily out of compliance with DPR requirements
  - Enforcement discretion will be given in certain situations until December 2013 to give licensees time to fully implement the DPR

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Information Notice 99-03 update

- IN 99-03, “Exothermic Reactions Involving Dried Uranium (Yellowcake)”
- Issued in 1999 to alert licensees of incidents involving exothermic reactions of packaged yellowcake due to…
  - Decomposition of uranyl peroxide hydrate product
  - Exothermic oxidation reaction of hydrocarbon contaminants with yellowcake product

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IN 99-03 update, cont.

- A similar event occurred in June 2012 at a refinery in Canada
- The 2012 event was most likely caused by continued decomposition of uranyl peroxide hydrate product in sealed drum
- As one of several responses, NRC established a working group to update the IN, based on events that may have occurred since 1999

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IN 99-03 update, cont.

- Working group consists of diverse team of regulators, industry representatives, and subject matter experts
- Preliminary focus – the dryer plays major role
  - Dryer temperature
  - Drying time, holdup time
  - Need time to allow drum contents to cool and vent
  - Need to establish time delay prior to sealing drum
- Exothermic reactions may still be a concern

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IN 99-03 update, cont.

- Some licensees have been contacted to provide information via questionnaires
- The updated IN should be issued later this year
- If you have any information that the working group should consider, please send an email to robert.evans@nrc.gov

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DOE UMTRCA Title I and II Observational Site Visits

- U.S. Department of Energy/Office of Legacy Management is responsible for long-term care and maintenance of sites that have been transferred to DOE pursuant to Title I or Title II of UMTRCA
- DOE conducts annual inspections and/or routine groundwater sampling or cleanup at each site
- During 2012, NRC started conducting observational site visits at Title I/II sites

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DOE observational site visits

- NRC started conducting observational site visits, in part, to ensure DOE is conducting its inspections and sampling in accordance with long-term surveillance plans and procedures
- NRC inspectors also observe site conditions including
  - Physical condition of tailings cell covers
  - Groundwater trends
  - Off-tailings erosion that may impact covered tailings
- NRC observations are documented trip reports (memo to docket file)
- Trip reports are publicly available from NRC's ADAMS

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Region IV Contacts

- Blair Spitzberg, Chief, Fuels Safety and Decommissioning Branch
  - Blair.Spitzberg@nrc.gov
  - (817) 200-1191
- Rob Evans, Sr. Health Physicist, FCDB
  - Robert.Evans@nrc.gov
  - (817) 200-1234
- Linda Gersey, Health Physicist, FCDB
  - Linda.Gersey@nrc.gov
  - (817) 200-1299
- Send correspondence to:

  Tony Vegal, Director, Division of Nuclear Materials Safety
  U.S. Nuclear Regulatory Commission, Region IV
  1600 East Lamar Blvd.
  Arlington, TX 76011-4511
- Region IV main switchboard (817) 860-8100