WIPP Town Hall Meeting

Sponsored by the U.S. Department of Energy and the City of Carlsbad, NM

June 2, 2016
Agenda

• Introductory Comments – John Heaton (Moderator)
• Update on CBFO and WIPP – Todd Shrader
• Documented Safety Analysis, Revision 5 – Jeff Carswell
• Preparations for Restart – Jim Blankenhorn
• Questions and Answers – John Heaton
  • In house
  • Internet
Update on CBFO and WIPP Activities
Todd Shrader, CBFO Manager
Update on CBFO and WIPP

- Documented Safety Analysis (DSA)
- Cold Operations
- National TRU Program
- Annual Emergency Response Exercise
Documented Safety Analysis, Rev. 5
Jeff Carswell, CBFO Nuclear Safety Sr. Technical Advisor
Safety Basis Process

- Understand the Facility
  - Layout
  - Equipment
- What is the Process?
  - How does the Facility operate?
- What type of accidents can happen?
- How can the accidents hurt a Worker or the Public?
  - Hazards Analysis
- What equipment/controls will protect the Worker/Public?
Understand the Facility

- A nuclear facility that is also a mine
  - Nuclear Safety
  - Mine Safety
  - Other regulations apply as well (e.g., OSHA)
- Some contamination – due to events of February 2014
- Diesel powered equipment – fuel source for fire
- Ventilation Systems already in place
What is the Process?

- Review documentation from Generators
  - Ensure waste is correctly characterized and packaged
- Authorize Generator to ship waste
- Verify that the waste we receive is correct
- Remove waste from shipping containers
- Emplace waste in underground
What kind of Accidents can happen?

• Fires involving waste containers
  • Pool fires from vehicle collision, damage, leaks
  • Combustible fires
  • Fires from within waste container
• Explosion/energetic events from within waste container
  • Deflagration, Over-pressurization from within waste container
  • Hydrogen explosion from battery charging
  • Flammable gas explosion from within a filled panel
• Loss of confinement/containment of waste container
  • Puncture/Crushing
  • Drop down waste shaft
  • Pressurized container impacting waste container
What kind of Accidents can happen?

- Direct exposure to radiation from waste
- Externally initiated events
  - Wildfire
  - Plane crash
  - Vehicle crash
  - Gas pipeline explosion
- Natural Phenomenon Hazard (NPH)
  - Tornado/Hurricane
  - Lightning strike
  - Seismic event
  - Flooding
  - Snow Loading
• 641 Total events evaluated.
• Both man-made and natural
• Not all events require equipment/controls
  • **Low consequences** to all receptors (workers and public)
  • Radiation Exposure – We have shielding
  • Event is **not plausible** (not physically possible)
  • Large Propagating fire in the underground – We are made of salt and will not burn
• Event frequency is **less than 1x10^{-6}/year**
  • Aircraft crash – There are no large airports nearby
  • Wildfire – There is limited brush to burn
How can the Accidents hurt the Worker or Public?

- Extremely conservative estimates
- Potential radiation exposure
- Potential chemical exposure considered as well
- Potential industrial hazard or accidents
Potential Accidents Above Ground

Contamination Release from Ventilation System due to events in the Underground

Contamination Release from Building due to:
- Fires
- Deflagration
- Puncture
- Vehicle Crash
- Seismic Event
- Lightning Strike
Potential Accidents in the Underground

Contamination Release from Waste due to:
- Fires
- Deflagration
- Puncture
- Drop down waste shaft
• Hierarchy of Controls
  • Preventers before Mitigators
    • Preventers keep an accident from happening
    • Mitigators make an accident less severe IF it does happen
• Passive Controls before Active Controls
  • #1 – Passive Controls – Design Features
  • #2 – Engineered Controls – Automatic Equipment
  • #3 – Administrative Controls
• Safety Management Programs
  • Key Elements (KE)
What equipment or controls will protect the Worker and the Public

• #1 – Passive Controls – Design Features
  • Robust
  • Difficult to be removed/changed
  • No action required by the operator/facility
    ➢ Building Structures
    ➢ Radiation Shielding
    ➢ Shipping Containers
• #2 – Engineered Controls
  • Less robust than Passive Controls
  • Electronic/Mechanical Equipment with Alarms/Interlocks
  • Needs to be regularly tested
  • Can fail – BUT we have actions to keep safe
    ➢ Ventilation
    ➢ Hoist Brakes
    ➢ Fire Suppression
What equipment or controls will protect the Worker and the Public

- #3 – Administrative Controls
  - Less robust than Engineered Controls
  - Action of the Operator
  - Steps in Procedures
  - Susceptible to Human Error – this is why we have a mix of control types.

  - Liquid Fueled Vehicle Checks/Controls
  - Conveyance Control
  - No TRU waste allowed outside (unless in a closed Type B)
  - Constant Air Monitors
What equipment or controls will protect the Worker and the Public

- Safety Management Programs
  - Lowest Level of Control
  - Broad but just as important
  - Larger programs
  - Key Elements (KE)
    - Waste Acceptance Criteria
    - RADCON
    - Emergency Planning
    - Non-Radiological Hazards (VOCs)
    - Quality Assurance
    - Procedures – Training
Safety Basis Documents

- Documented Safety Basis (DSA)
  - Chapter 2 (Facility Description)
  - Chapter 3 (Hazard/Accident Analysis)
  - Chapter 4 (Control Selection - Evaluation)
    - Design Features
    - Engineered Controls
    - Administrative Controls
  - Chapter 5 (Derivation of Technical Safety Requirements)
  - Chapter 6 (Criticality) – Not Applicable for WIPP
  - Chapters 7-18 (Safety Management Programs)
• Technical Safety Requirements (TSR)

• Design Features (DF)

• Engineered Controls
  • Limiting Conditions of Operation (LCO)
    • What additional safety things we do when equipment is inoperable
    • Surveillance Requirements (SR)
    • Tests we do to make sure the equipment is operating correctly

• Specific Administrative Controls (SAC)
  • Detailed/critical administrative actions by Operators
  • Key Elements (KE) from Safety Management Programs
HAZARDS ANALYSIS

SOME ACCIDENTS
High Risk to Worker and Public

Documented Safety Analysis

Technical Safety Requirements

DFs
LCOs
SACs

Low Risk Accidents

Safety Envelope
Safety Basis Process

• DSA Workshop
  • We will use recently upgraded DOE Standards for Safety Basis development
  • We will use an In-Process review method

• Create Safety Basis Review Team
  • Select members – Experts in the DOE Complex
  • Created formal review procedure
  • Reviewed all Accident Investigation Board Reports

• Weekly Telephone Conference

• Final approval via “first-in-complex” Safety Review Committee
Participants – Input

Safety Basis

- DOE-HQ
- DOE-EA
- DNFSB
- CBFO
- NWP
- NTP
Accident Investigation Board Issues

• Preventative/Corrective Maintenance Program
• Training and Qualification Program
• Emergency Response Program
• Radiation Protection Program
• Critical equipment and components degraded
• Fire Protection Program
• Failure of Generator Site to implement Waste Acceptance Criteria (WAC) requirements
• Ineffective Nuclear Safety Program in accordance with 10 CFR 830
Waste Handling Building Fire Suppression System
Vehicle Barricades
Interim Ventilation System

- Two new fan/filter units and ductwork
- Ties into prior Ventilation System
Facility Pallet
Type B Shipping Container
Conveyance Controls
Underground Schematic

- Fuel Storage
- Underground Ventilation
- Vehicle Fire Suppression System
- Vehicle Exclusion Zone
- Lube Truck Prohibition
- Vehicle Pre-Op Checks
- Vehicle Attendant
- Closure Bulkheads
- Constant Air Monitors

DF
LCO
SAC
Bulkhead Closure
Vehicle Fire Suppression System –
Attendants – Vehicle Checks

- Detect and suppress fire in vehicle
- Attendant for vehicles
  - Prevent collision, Respond to fire, Notify Control Room
Vehicle Exclusion Zone–Lube Truck Prohibition

- No fuel truck present when waste present
- Limit of two liquid fueled vehicles near waste
## Accident Investigation Board
### Cause Cross Walk

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<thead>
<tr>
<th>AIB finding</th>
<th>Cause</th>
<th>Key Elements from DSA</th>
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| Preventative and Corrective Maintenance Program did not prevent or correct   | Distinct difference between the way waste-handling and non-waste-handling vehicles were maintained | KE 11-1 - Maintenance and Inspection of non-waste vehicles in underground  
KE 11-5  Fire Safety Systems on diesel powered vehicles                       |
| the buildup of combustible fluids on the salt truck                         |                                                                      |                                                                                       |
| Fire Protection Program less than adequate                                  | Accumulation of combustible materials in the underground in quantities that exceeded the limits specified in the Fire Hazard Analysis (FHA) | KE 11-2 - Formal combustible control inspections by Fire Protection Engineering  
KE-11-5 - Automatic Fire Suppression in UG in some areas  
- Combustible material controls                                                 |
| Ineffective Radiation Protection Program in accordance with 10 CFR 835,    | Radiological control technician training, qualification, equipment and instrumentation | KE 7-1 - placement and operation of contunious air monitors  
KE 7-3 - contamination control, including upcasting  
KE-17-1 - configure management of SSCs                                          |
| Occupational Radiation Protection                                             |                                                                      |                                                                                       |
| Ineffective implementation of Comprehensive Emergency Management System     | Personnel did not recognize, categorize or classify the emergency  
Personnel did not implement corrective actions                               | KE 15-1 predetermined corrective actions  
KE15-2 emergency plans and procedures  
KE 15-3 emergency operations center and incident command center  
KE 15-4 emergency drills and exercisescommand center                            |
| Failure of Generator Site to implement WAC requirements.                    | Procedures and process control                                      | KE 18-1/2 waste stream approved  
KE-18-3 confirmation of certified waste  
KE 18-4 Independent generator site technical reviews                           |
Safety Basis Improvements

- Completely revised Hazards Analysis
- Significant upgrades to Safety System Evaluations
- Waste Acceptance Criteria Safety Management Program (SMP) – first in complex
- More robust SMP Key Elements incorporated into TSR
- Mining safety requirements incorporated into DSA
- In-Process review concept with DOE complex experts
- Transparent to outside reviewers (DNFSB, DOE-EA)
- WIPP Operator/Engineer input
Safety Basis Improvements

• Living Document.
• Continues to be Improved.

• Fire like February 2014 WILL not happen again.
• Radiological release like February 2014 WILL not happen again.

⭐ • New/upgraded Design Features
⭐ • New/Upgraded equipment
⭐ • New administrative requirements
  • New Safety Management Programs – Key Elements
Preparations for Restart
Jim Blankenhorn, NWP Recovery Manager

An AECOM-led partnership with BWXT and AREVA
• DSA implementation declared on May 29. As of today:
  • All Independent Verification Review issues are closed
  • Necessary signs/postings required for implementation are in place
  • Procedures have been reviewed, approved
  • Scheduling of required surveillances and inspections is in place to support implementation
Interim Ventilation System

• Interim Ventilation System will:
  • Provide adequate air flow at the waste face – for resumption of waste placement
  • Increase airflow for ground control and maintenance operations

• CRA Field Observations Complete 5-24
  • Closeout 5-26

• Issues Identified
  • Postings Not In Place
    • Rad, Noise protection, confined spaces
  • RWP not approved for use
  • Pre-fire plan walk downs
    • Required every 30 days during construction were not evident
Path to Success

- Close out CRA Findings
  - The majority are being closed as they are identified
- Install Fire Detection System—mid June
- Pull the 700 blank
  - Perform hot testing and mine balancing
- Turn over to Operations early during Cold Operations
- Perform Lessons Learned on Contractor Readiness Assessment
Demonstrate the Plant, People and Processes are ready:

**Plant**
- Equipment necessary for receipt, processing and downloading of waste is available and properly functioning
- Underground Notification System, Localized Fire Suppression Systems in underground

**People**
- Demonstrate Nuclear Safety Culture and Conduct of Operations Standards
- Proficiency with new DSA controls (surveillances, operator rounds)
- Waste emplacement activities utilizing empty containers
- Maintenance evolutions

**Process**
- Safety Management Program pre-start improvements are demonstrated
  - Examples: Fire Protection, Radiological Controls, Emergency Management
- Conduct drills (Radiological event, injury, fire)
Questions & Answers