Introductions
Greg Adams – VP Development
Doug Beahm – BRS Engineering
Toby Wright – Wright Env. Services
AGENDA

Introductions
• Greg Adams/Titan Uranium, VP Development
• Deborah Lebow-Aal/EPA Region 8 Air Program

Introduction to Titan Uranium USA

Project Overview:
• Doug Beahm/BRS Engineering
• Toby Wright/Wright Env. Services

Issues for Discussion
• Status of 40 CFR 192 GW standards update
• Status of Active Heaps & Inactive Heaps
• Status of Process Ponds & Waste Storage Tanks
PROJECT OVERVIEW

• Location

• Project Scope
  • Mining
  • Milling
Sheep Mountain Project Location
PROJECT OVERVIEW

• Site Location
  • Fremont, Wyoming
  • Existing Uranium Mine Permit 381C

• Historical Operation
  • Western Nuclear Crooks Gap Project
    • Mined 1956 – 1988, processed at Split Rock Mill
  • US Energy
    • 1988 Sheep Mountain Underground
    • Partial reclamation since 1988, no new operation
Titan Sheep Mountain Project:

• Mine
  • Underground and Open Pit Mining
  • Current Mine Permit (381C)
    • Updating POO, Reclamation Plan & Bond
• Uranium Recovery
  • Heap Leach with Central Processing Plant
  • Within existing WDEQ Mine Permit (381C)
Project Scope:

• **Mine**
  
  • **15 Year Mine Lifecycle**, may be extended
  
  • **Congo Pit Area**
    
    • Mine waste trucked to South and West waste piles
    
    • All mine waste to be returned to pit or used in reclamation
  
  • **Sheep Mountain Underground**
    
    • To extent possible all wastes reclaimed in old mine workings
    
    • Ore transported to the heap from underground via conveyors
Project Scope:
• Mill
  • 15 year operational lifecycle, may be extended
• Heap Leach Pads
  • Double lined pads with leak detection, clay underliner
  • Five 16 acre cells planned (approx. 80 acre footprint)
  • Up to 50 ft lifts being evaluated
  • Sulfuric acid lixiviant
• Double lined process ponds with leak detection, clay underliner
  • Barren/Pregnant
  • Liquid waste in evaporation ponds
• Central Processing Plant
  • Solvent Extraction with IX Polishing
  • Vacuum Driers
  • Final Product is drummed yellow cake
• Existing Mine Permit 381C
  • 3,625 acres total area
• Proposed Disturbance (667 acres)
  • Mine: 457 acres (258 Disturbed)
    • Congo/North Gap Pits
    • Sheep Mtn. Underground
    • Waste Rock/Topsoil Storage
    • Buildings & Infrastructure
    • All proposed mine disturbance on previously disturbed land
• Licensed Area: 210 acres (161 Disturbed)
  • Heap Leach Pads
  • Process/Waste Ponds
  • Central Processing Plant
3D View Mining and Monitor Wells
Status of Baseline Studies
Pre-Operational Baseline Studies Status

• Cultural Resources
• Wildlife
• Vegetation & Soils
• Surface Water
• Groundwater
• Radiological Characterization
<table>
<thead>
<tr>
<th>Topic Area</th>
<th>Status</th>
<th>Actions Pending</th>
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<tbody>
<tr>
<td>Cultural Resources</td>
<td>• Reviewed existing surveys</td>
<td>• BLM Review</td>
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<tr>
<td></td>
<td>• Consulted with BLM on scope of additional surveys</td>
<td>• SHPO Review</td>
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<tr>
<td></td>
<td>• Completed additional surveys</td>
<td>• Incorporate results into ER</td>
</tr>
<tr>
<td></td>
<td>• Submitted findings to BLM</td>
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<tr>
<td>Wild Life</td>
<td>• Raptor surveys complete</td>
<td>• Incorporate results into ER</td>
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<tr>
<td></td>
<td>• Songbird surveys complete</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Waterfowl surveys complete</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Small mammal surveys complete</td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td>• Vegetation surveys complete</td>
<td>• Incorporate results into ER</td>
</tr>
<tr>
<td></td>
<td>• No T&amp;E Species present</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• One BLM sensitive species found</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Limber Pine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o No impacted by proposed disturbance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Completed 3 rounds of veg. sampling as per Reg Guide 4.14</td>
<td></td>
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<tr>
<td>Soils &amp; Sediment</td>
<td>• Collected soil samples as per Reg. Guide 4.14 (surface &amp; subsurface)</td>
<td>• Incorporate results into ER</td>
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<tr>
<td></td>
<td>• Collected sediment samples as per Reg. Guide 4.14 @ SW sampling</td>
<td></td>
</tr>
<tr>
<td></td>
<td>locations</td>
<td></td>
</tr>
<tr>
<td>Surface Water</td>
<td>• Quarterly SW flow measurements</td>
<td>• Data analysis</td>
</tr>
<tr>
<td></td>
<td>• Monthly flowing SW quality sampling</td>
<td>• Incorporate results into ER</td>
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<tr>
<td></td>
<td>• Quarterly Pit Lake quality sampling</td>
<td></td>
</tr>
<tr>
<td>Groundwater</td>
<td>• Quarterly Sampling</td>
<td>• Data analysis</td>
</tr>
<tr>
<td></td>
<td>Reg. Guide 4.14 and WDEQ parameters</td>
<td>• Incorporate results into ER</td>
</tr>
<tr>
<td>Meteorological</td>
<td>• Continuous data since July 2010</td>
<td>• MILDOSE Modeling</td>
</tr>
<tr>
<td></td>
<td>• 2 m &amp; 10 m instrumentation</td>
<td>• Update with 4 quarters of data</td>
</tr>
<tr>
<td></td>
<td>Instrumentation meets most Reg. Guide 3.36 requirements</td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td>• Quarterly sampling from 5 locations since July 2010</td>
<td>• Data analysis</td>
</tr>
<tr>
<td></td>
<td>• All parameters and reporting limits as per Reg. Guide 4.14</td>
<td>• Incorporate results into ER</td>
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<tr>
<td>Socio\Env. Justice</td>
<td>• Ongoing</td>
<td>• Complete analysis</td>
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<tr>
<td></td>
<td></td>
<td>• Incorporate results into ER</td>
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</table>
**Air sampler locations:**
Additional monitoring locations once radiation control boundary location is finalized

Site wind rose
Aug 2010 through Jan 2011
Groundwater Hydrogeology

• Historical Conceptual model
  • Battle Spring Fm. host upper most aquifer
    • Fine to coarse grained sandstone with discontinuous siltstone and claystone lenses
    • Unconfined aquifer
  • Recharge from north
  • Regional discharge to south

• New Studies Ongoing
  • Sampling existing wells in place since 1988
  • Replacing historical wells abandoned in 2001
  • Evaluating aquifer properties
Status of NRC/BLM/State Permit Applications & NEPA
Coordinating Permitting & Licensing

• NRC & BLM will develop separate EIS Documents
• Titan is planning on parallel WDEQ, BLM & NRC submittals
  • Q3 2011
  • WDEQ-LQD/BLM
    • Plan of Ops, Rec. Plan & Bond Est., Env. Report
  • NRC
    • Application with Technical Report & Env. Report
• Coordinating communications w/ NRC, BLM and WDEQ
NRC Licensing & NEPA

• Scope of NRC EIS Encompasses:
  • Milling: Heap Leach & Central Processing Plant
  • Mining is a **Connected Action**
  • BLM would be a Cooperating Agency

Separate or combined NEPA processes require coordination and communication

• Planning Application to NRC Submittal in Q3, 2011
BLM Permitting & NEPA

• Scope of BLM EIS Encompasses:
  • Mine: open pit and underground, mine dewatering, operations, reclamation
  • Milling: Heap Leach & Central Processing Plant
    • Includes long-term disposal of 11e.(2) byproduct material, land transfer
    • BLM has indicated that they will reference rather than duplicate NEPA analyses for impacts addressed in the NRC NEPA process as much as possible
  • NRC would be Cooperating Agency

• Planning WDEQ\BLM Submittal in Q3, 2011

Separate or combined NEPA processes require coordination and communication
BLM Permitting & NEPA

• BLM anticipates publication in Q2 or Q3 2011
• Titan has submitted to BLM a draft cost recovery MOU for 3rd Party NEPA Contractor
• RFP for procurement of 3rd Party NEPA Contractor in process
  • Anticipate NEPA Contractor for bLM selection in Q2 2011
Heap Leach Process
Heap Leach Schematic
Conceptual Recovery System Layout

- **From Heap Leach Pads**
- **To Heap Leach Pads**

**Systems:**
- **High Grade Pond**
- **Low Grade Pond**
- **Plant Effluent & Leachate Make-up**
- **Evaporation Pond**
- **Processing Plant**

**Connections:**
- Water Supply Well

**Pathways:**
- Water and effluent flows through the system, indicated by arrows.
- Connections between different ponds and the processing plant.
Key Points
• Active heap leach pad is part of the “mill” and the active leaching is milling
• Process Ponds are parts of the mill and will not contain any waste streams
• Milling begins with the stacking of the ore on the pad
• Milling ends when uranium recovery is complete
<table>
<thead>
<tr>
<th>Constituent</th>
<th>Initial Grade</th>
<th>Tails</th>
<th>Recovery</th>
<th>Leachate</th>
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<tr>
<td></td>
<td>mg/Kg</td>
<td>mg/Kg</td>
<td></td>
<td>mg/L or pCi/L</td>
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<tr>
<td>Aluminum</td>
<td>2,920</td>
<td>2,810</td>
<td>4%</td>
<td>203</td>
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<tr>
<td>Arsenic</td>
<td>3.0</td>
<td>1.8</td>
<td>40%</td>
<td>1.1</td>
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<td>Barium</td>
<td>10.0</td>
<td>10.4</td>
<td>-4%</td>
<td>0.1</td>
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<td>Boron</td>
<td>4.0</td>
<td>3.6</td>
<td>10%</td>
<td>0.9</td>
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<tr>
<td>Cadmium</td>
<td>0.2</td>
<td>0.2</td>
<td>30%</td>
<td>0.3</td>
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<td>Calcium</td>
<td>499.0</td>
<td>275.0</td>
<td>45%</td>
<td>445</td>
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<td>Chromium</td>
<td>3.5</td>
<td>3.0</td>
<td>14%</td>
<td>1.1</td>
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<tr>
<td>Copper</td>
<td>6.0</td>
<td>3.4</td>
<td>43%</td>
<td>3.9</td>
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<td>Iron</td>
<td>5,010</td>
<td>3,910</td>
<td>22%</td>
<td>498</td>
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<td>Lead</td>
<td>15.0</td>
<td>10.9</td>
<td>27%</td>
<td>2.8</td>
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<td>Magnesium</td>
<td>533</td>
<td>420</td>
<td>21%</td>
<td>250</td>
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<td>Manganese</td>
<td>31.4</td>
<td>19.1</td>
<td>39%</td>
<td>10.5</td>
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<td>Molybdenum</td>
<td>2.7</td>
<td>2.0</td>
<td>26%</td>
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<td>Nickel</td>
<td>1.1</td>
<td>0.2</td>
<td>82%</td>
<td>0.8</td>
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<td>Potassium</td>
<td>857</td>
<td>783</td>
<td>0%</td>
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<td>Selenium</td>
<td>6.2</td>
<td>5.4</td>
<td>13%</td>
<td>0.0</td>
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<tr>
<td>Uranium</td>
<td>894</td>
<td>21</td>
<td>98%</td>
<td>1,047</td>
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<td>Vanadium</td>
<td>4.8</td>
<td>3.6</td>
<td>25%</td>
<td>3</td>
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<td>Zinc</td>
<td>11.3</td>
<td>8.6</td>
<td>24%</td>
<td>5</td>
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<td>226Radium</td>
<td>237</td>
<td>233</td>
<td>2%</td>
<td>6,700</td>
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<td>230Thorium</td>
<td>570</td>
<td>37</td>
<td>94%</td>
<td>587,290</td>
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<tr>
<td>210Lead</td>
<td>169</td>
<td>114</td>
<td>33%</td>
<td>29,400</td>
</tr>
</tbody>
</table>
Heap/ISR Comparison

• ISR
  • Processing brings Formation Ground Water with elevated Radon into CPP.
  • Flow rates 3,500 – 7,000 gpm

• HEAP LEACH
  • 98% of radium remains in the heap
  • Short lixiviant residence time in heap
  • Average Flow Rate @ Sheep 350 gpm
  • Low radon levels expected in leachate sent to plant
Heap/Conventional Comparison

• CONVENTIONAL MILLING PHYSICALLY ALTERS ORE
  • Processing brings ore and associated radium into Mill
  • Grinding reduces grain size
  • Milling process separates sands and slimes
  • Slimes concentrate radium, retain moisture, have low strength
  • Resulting in lengthy process (decades) to stabilize and reclaim

• HEAP LEACH DOES NOT PHYSICALLY ALTER ORE
  • 98% of radium remains in the Heap
  • Heap remains comingled
    • No grinding; no sand slime separation; no concentration of radium
  • Built on a liner with a positive drain
  • Reclamation can proceed efficiently
Mill Details

Heap & Pond Liner Details

Heap Cap and Cover
Heap Leach Facility

Heap Leach Pad

- Double lined, leak detection, clay amended subgrade
- Loading up to 2,600 tons/day, roughly 1,800 cy/day
- 25 ft lifts, maximum height 50 ft
- 200 ft wide by 1,600 ft long lifts installed via continuous stacker
- Stacking and leaching of lifts is phased to minimize amount of uncovered spent heap (tailings)
- Lixiviant is 1 normal H$_2$SO$_4$
  - applied at 0.005 gpm/sq ft
- Approx. 1.6 acres under primary leach at any one time
  - 360 gpm of leachate in process
Mobile Grasshopper / Radial Stacking

Courtesy: Terra Nova Technologies, Inc.
Sedroo, CA
www.tntinc.com
Ore Stacker
Heap Leach Facility (con’t)
Active milling cycle includes:
  • Stacking
  • Primary leach
  • “Resting” heap to enhance recovery
  • Secondary leach
  • Rinse
  • Draindown

Once active leaching and uranium recovery is complete, heap becomes *inactive* tailings
Heap Leach Facility (con’t)

• Up to 45 acres of heap open at any one time
  • < 40 acres would be spent heap (tailings)
• A single heap leach pad (one continuous liner) may at any one time contain:
  • Open and unloaded pad
  • Un-leached ore
  • Ore under active leaching (milling)
  • Ore being “rested” between leach cycles (milling)
  • Ore being rinsed for final value recovery and heap detoxification (milling)
  • Spent ore (tailings) waiting to be covered
  • Spent ore (tailings) being covered
  • Covered spent ore (tailings)
Conceptual Heap Sequencing
Stacking and Leaching Sequence

- Placement of Ore (milling)
- Leaching of Ore (milling)
- Resting Ore (milling)
- Spent Ore (Tailings)

Stacker loads ore on to pad

1.6 acres

1,600 ft

200 ft
Stacking and Leaching Sequence

Ore Leaching follows stacking in 1.6 acre increments 
0.005 gpm/sq ft x 1.6 acres = 360 gpm

Stacker retreats as it stacks ore
Stacking and Leaching Sequence

Stacker retreats as it stacks ore

Ore Leaching follows stacking in 1.6 acre increments
0.005 gpm/sq ft x 1.6 acres = 350 gpm

Ore is rested to allow additional oxidation

- Placement of Ore (milling)
- Leaching of Ore (milling)
- Resting Ore (milling)
- Spent Ore (Tailings)
200 ft

1.6 acres

1,600 ft

Placement of Ore (milling)
Leaching of Ore (milling)
Resting Ore (milling)
Spent Ore (Tailings)
Stacking and Leaching Sequence

- **200 ft**
  - **Row 1**
    - **1,600 ft**
      - **5a**
      - **4**
      - **3**
      - **2**
      - **1**

Legend:
- Blue: Placement of Ore (milling)
- Green: Leaching of Ore (milling)
- Light Green: Resting Ore (milling)
- Orange: Spent Ore (Tailings)
Stacking and Leaching Sequence

- **Row 1**
  - 1.0 acres
  - Placement of Ore (milling)
  - Leaching of Ore (milling)
  - Resting Ore (milling)
  - Spent Ore (Tailings)

- **Row 2**
  - 200 ft

- **1,600 ft**
Stacking and Leaching Sequence

- Placement of Ore (milling)
- Leaching of Ore (milling)
- Resting Ore (milling)
- Spent Ore (Tailings)
Stacking and Leaching Sequence

200 ft

Row 2

Row 1

1,600 ft

1.6 acres

1.6 acres

Row 1

1 5b

2 6

3 7

4 8

5a 9

1.6 acres

1,600 ft

Row 2

200 ft

Placement of Ore (milling)
Leaching of Ore (milling)
Resting Ore (milling)
Spent Ore (Tailings)
Stacking and Leaching Sequence

- Placement of Ore (milling)
- Leaching of Ore (milling)
- Resting Ore (milling)
- Spent Ore (Tailings)

Row 1
- 1
- 5b
- 6
- 7
- 8
- 3
- 4
- 5a

Row 2
- 9

200 ft

1,600 ft

1.6 acres

1.6 acres
Stacking and Leaching Sequence

- Placement of Ore (milling)
- Leaching of Ore (milling)
- Resting Ore (milling)
- Spent Ore (Tailings)
Placement of Ore (milling)
Leaching of Ore (milling)
Resting Ore (milling)
Spent Ore (Tailings)

Edge Berm
Double Liner with Leak Detection

200 feet
25 feet
Placement of Ore (milling)
Leaching of Ore (milling)
Resting Ore (milling)
Spent Ore (Tailings)

50 feet
Heap Leach Facility (con’t)
• Start reclamation of spent heap surface after uranium recovery (milling) of heap section is complete on individual stacking rows:
  • Compaction and minor grading of heap surface
  • Placement of final radon barrier
  • Biointrusion layer
  • Freeze/thaw protection
  • Radon flux verification measurements
  • Erosion protection (rip rap)
Heap Cap and Cover Detail

- Erosion Protection
- Unclassified Bio Intrusion Protection Zone
- Capillary Break
- Radon Barrier
- Compacted Spent Heap
Heap Leach Facility (con’t)

Process Ponds
• Double lined, leak detection, clay amended sub-grade
• Barren Pond (raffinate, lixiviant make up)
  • acid addition
  • make up water
• Pregnant Pond (collection)
  • Loaded raffinate
  • Blending of leachates for grade control
• Analogous to mill leach process tanks
• Will not contain any wastes or “tailings”
• Active leach pads as well as process ponds are part of the mill, no wastes ever present
• Only after uranium recovery is complete are tailings present
HEAP LINER DETAIL

PERFORATED COLLECTION PIPE

ORE SAND

60 MIL SMOOTH HDPE GEOMEMBRANE

HDPE GEONET

40 MIL SMOOTH HDPE GEOMEMBRANE

CLAY-AMENDED SUBGRADE

SUBGRADE

12"
Status of Active Heaps and 10 CFR Part 61, subpart W

• Active heap is active “milling”

• Heap material during active milling is not 11e.(2) byproduct material

• Have rad. monitoring and rad. protection programs to ensure public and occupational exposures remain ALARA

• “Resting” a heap is part of active milling

• Heap becomes 11e.(2) when drain down and recovery of values is completed and the heap is inactive
Central Processing Plant

- SX
- IX Polishing
- Precipitation
- Vacuum Drying & Drumming
- Process Bleed to Tanks

Operations
- Process flow rates approx. 360gpm,
  - low anticipated Rn-222 levels
- Process bleed rates of 5% to 10%
  - 18 to 35 gpm
- 10 gpm waste stream from precipitation circuit
- Liquid wastes will be managed in double lined evaporation ponds with leak detection and clay subliner
Mine and Reclamation Planning
Items for Discussion

Issues for Discussion

• Status of 40 CFR 192 GW standards update
• Status of Active Heaps & Inactive Heaps
• Status of Process Ponds
• Other?
Our Understanding

• There are no size limits on the size of active heaps
• Heap pad designs are approved solely by NRC
• Process ponds that will never contain wastes are part of the mill
• Process Pond designs are approved solely by NRC
• Heap material only become tailings (11e.(2) byproduct material) once active uranium recovery is complete
Our Understanding (con’t)

• Part 61, subpart W applies only to spent heap material (tailings)
• We are practicing *phased disposal* of tailings
• We are allowed no more than two 40 acre cells in area of exposed tailings
• We will have appropriate environmental monitoring and radiation programs in place to ensure compliance with 10 CFR Part 20 subpart B and subpart C requirements
40 CFR Part 61.250 (subpart W)

- (b) Continuous disposal means a method of tailings management and disposal in which tailings are dewatered by mechanical methods immediately after generation. The dried tailings are then placed in trenches or other disposal areas and immediately covered to limit emissions consistent with applicable Federal standards.

- (c) Dewatered means to remove the water from recently produced tailings by mechanical or evaporative methods such that the water content of the tailings does not exceed 30 percent by weight.

- (e) Operational means that an impoundment is being used for the continued placement of new tailings [emphasis added] or is in standby status for such placement. An impoundment is in operation from the day that tailings are first placed in the impoundment until the day that final closure begins [emphasis added].

- (f) Phased disposal means a method of tailings management and disposal which uses lined impoundments which are filled and then immediately dried and covered to meet all applicable Federal standards.

  “Tailings" means the remaining portion of a metal-bearing ore after some or all of such metal, such as uranium, has been extracted.