



# U.S. DEPARTMENT OF ENERGY

2012 Congressional Nuclear Cleanup Caucus

## **Idaho Cleanup Project**

March 28, 2012

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**EM** *Environmental Management*

safety ♦ performance ♦ cleanup ♦ closure

[www.em.doe.gov](http://www.em.doe.gov)

# The Idaho Site

**Originally established in 1949** as a national reactor testing base; 52 "first-of-a-kind" test reactors have been constructed at the site.

- **890 square miles**
- **Cleanup workforce of ~1,700**
- **The Idaho Site mission is divided into three contracts**
  - **Idaho Cleanup Project** – managed by the Office of Environmental Management
  - **Advanced Mixed Waste Treatment Project** – managed by the Office of Environmental Management
  - **Idaho National Laboratory** – managed by the Office of Nuclear Energy



# The EM Mission & Idaho's Priorities

“ Complete the safe cleanup of the environmental legacy brought about from five decades of nuclear weapons development, production, and Government-sponsored nuclear energy research”

## Idaho's priorities-

- Maintain a safe, secure, and compliant posture in the EM complex
- Complete radioactive tank waste treatment and tank closure
- Disposition of remote and contact handled transuranic waste
- Complete excess facility deactivation and decommissioning
- Continue soil and groundwater remediation
- Continue safe fuel storage
- Continue progress on the Calcine Disposition Project



Accelerated Retrieval Project VIII Facility Construction



A radiological control technician surveys stored transuranic waste drums at the Advanced Mixed Waste Treatment Project



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# EM's Components of the Idaho Site

Cleanup is focused on six major geographic areas:

- Idaho Nuclear Technology and Engineering Center (INTEC)
- Radioactive Waste Management Complex (RWMC)
- Material and Fuels Complex (MFC)
- ✓ Advanced Test Reactor Complex (ATRC) – **cleanup completed**
- ✓ Test Area North (TAN) – **cleanup completed**
- ✓ Power Burst Facility (PBF) – **cleanup completed**

## Idaho Nuclear Technology & Engineering Center

- Complete the Resource Conservation and Recovery Act (RCRA) closure of the final four High Level Waste Tanks resulting in all 15 tanks RCRA closed
- ✓ Deactivate & Demolish (D&D) of all facilities and structures that have no future mission
- Complete treatment and disposition of remaining RH – TRU waste containers
- Transfer EBR II Spent Nuclear Fuel bottles to MFC

## Test Area North (Completed)

- ✓ Completed D&D of all EM facilities and structures

## Advanced Test Reactor Complex (Completed)

- ✓ Complete D&D of all EM facilities and structures

## Radioactive Waste Management Complex (location of the Advanced Mixed Waste Treatment Project)

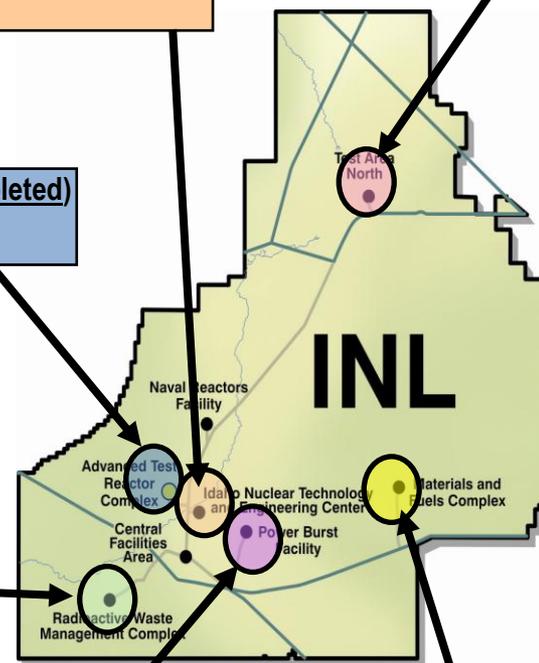
- Complete Disposition of 65,000 m<sup>3</sup> of stored TRU waste
- Complete 5.69 acres of targeted buried waste exhumation
- Complete packaging and offsite shipping of 7,785 m<sup>3</sup> of targeted TRU waste

## Power Burst Facility (Completed)

- ✓ Completed D&D of EM facilities

## Materials and Fuels Complex

- Continue retrieval of RH – TRU waste for transfer to INTEC
- Complete receipt of EBR II Spent (Used) Nuclear Fuel for the Office of Nuclear Energy



**EM** Environmental Management

safety ♦ performance ♦ cleanup ♦ closure

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# Idaho Site Funding

Dollars in thousands

| Appropriation                     | FY 2012 Current Enacted | FY 2013 Cong. Request |
|-----------------------------------|-------------------------|-----------------------|
| Defense Environmental Cleanup     | 384,669                 | 399,607               |
| Non-Defense Environmental Cleanup | 5,131                   | 5,790                 |
| <b>Total, Idaho</b>               | <b>389,800</b>          | <b>405,397</b>        |

## Transuranic and Mixed / Low-Level Waste Disposition

\$163,859

- Process and ship 4,500 cubic meters of contact-handled TRU Waste and 5 cubic meters of remote-handled TRU waste to the Waste Isolation Pilot Plant
- Continue disposition of mixed low-level and low-level waste

## Soil and Groundwater Remediation

\$155,648

- Continue shipments of retrieved buried targeted waste

## Radioactive Tank Waste Stabilization and Disposition

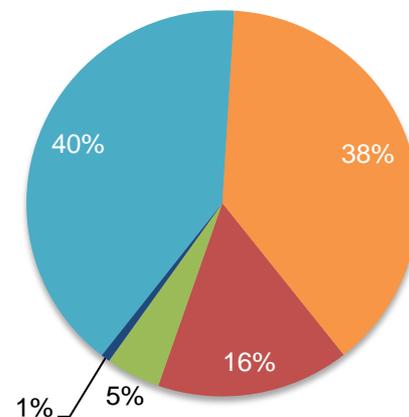
\$64,600

- Continue sodium-bearing waste operations toward December 2012 completion date

## Spent Nuclear Fuel

\$18,290

- Continue retrieval of Domestic Research Reactor and Foreign Research Reactor Fuel and retrieval of Experimental Breeder Reactor II fuel from storage



Site Infrastructure / Program Support  
(Community and Regulatory  
activities) - \$3,000

# Safety in Idaho

## Idaho Cleanup Project

- Reduced recordable injuries by 50 percent since contract inception (May 2005)
- Awarded the Voluntary Protection Program (VPP) Star of Excellence
- Awarded the VPP Legacy of Stars

## Advanced Mixed Waste Treatment Project

- Zero Accidents, Zero Injuries since December 7, 2003
- Designated VPP Star Site Status

A radiological control technician helps a fellow co-worker with their personnel protective equipment (PPE)



# Accomplishments at the Idaho Site

## Buried Waste Retrieval

- Exhumed 2.95 acres of 5.69 acres– including the completion of Pit 9
- One year ahead of schedule

## Transuranic (TRU) Waste Disposition

- Remote-handled (RH) TRU
  - Single largest RH-TRU shipper to the Waste Isolation Pilot Plant (WIPP)
  - Averaging two shipments per week
- Contact-Handled (CH) TRU
  - Primary shipper of CH-TRU waste to WIPP
  - Idaho has shipped over 43,000 cubic meters to WIPP
  - 5,087 Idaho shipments out of a total Complex-wide 10,284

**Top:** The Principal Deputy Assistant Secretary for Environmental Management (4<sup>th</sup> from left) tours the Accelerated Retrieval Project

**Middle:** RH-TRU Container being positioned for placement within the hot cell located below grade

**Bottom:** Manipulator work on an RH-TRU container inside of the hot cell



# Accomplishments at the Idaho Site

## Deactivation & Demolition

- Demolished 218 of 221 facilities and structures
- Over 2 million square feet of EM facilities removed
- Currently one year ahead of schedule
- Completed cleanup activities at three major complex areas
  - Power Burst Facility
  - Test Area North
  - Advanced Test Reactor Complex



D&D work on the Test Area North Hot Shop



The Engineering Test Reactor Core loaded and prepared for ultimate disposal at the Idaho CERCLA Disposal Facility

# The Advanced Test Reactor Complex



Advanced Test Reactor Complex



# Test Area North



Test Area North



# Power Burst Facility



Power Burst Reactor and Facilities before D&D



D&D completed on Support Facilities



Power Burst Facility area after D&D Completion

# American Recovery & Reinvestment Act Accomplishments in Idaho

| ARRA Cumulative Status – Through February 2012 |                |                |               |             |
|--|----------------|----------------|---------------|-------------|
|  | Planned        | Actual         | Remaining     | % Completed |
| Targeted Waste Exhumations (acres)             | 0.91           | 2.05           | 0             | 225%        |
| ARP In-Situ Grouting (Holes Grouted)           | 2,168          | 2,168          | 0             | 100%        |
| MLLW Disposed (cubic meters)                   | 1,195          | 1,237          | 0             | 103%        |
| LLW Disposed (cubic meters)                    | 2,000          | 2,300          | 0             | 115%        |
| RH-TRU Disposed (cubic meters)                 | 21.6           | 21.6           | 0             | 100%        |
| D&D: Target (BASE) - Reduction (ft2)           | 258,222        | 258,222        | 0             | 100%        |
| Target – Quantity of Facilities                | 40             | 40             | 0             | 100%        |
| D&D: Non-Target (New) Reduction (ft2)          | 554,593        | 502,017        | 52,576        | 91%         |
| Non-Target – Quantity of Facilities            | 48             | 45             | 3             | 92%         |
| <b>Total (ft2):</b>                            | <b>812,277</b> | <b>762,106</b> | <b>50,171</b> | <b>94%</b>  |
| <b>Total Quantity:</b>                         | <b>88</b>      | <b>85</b>      | <b>3</b>      | <b>97%</b>  |
| D&D: Retention Basins Qty                      | 2              | 2              | 0             | 100%        |
| ft2  | 3,058          | 3,058          | 0             | 100%        |
| <b>Total (ft2):</b>                            | <b>815,335</b> | <b>765,164</b> | <b>50,171</b> | <b>94%</b>  |
| <b>Total Quantity:</b>                         | <b>90</b>      | <b>87</b>      | <b>3</b>      | <b>97%</b>  |

# Recovery Act Funded Cleanup at the Materials Test Reactor



Reactor Floor  
Before



Exterior Before



Reactor Floor  
After



Exterior After

# Recovery Act Funded Cleanup at the Hot Cell Facility

Before



Movement of Material Test  
Reactor Hot Cell



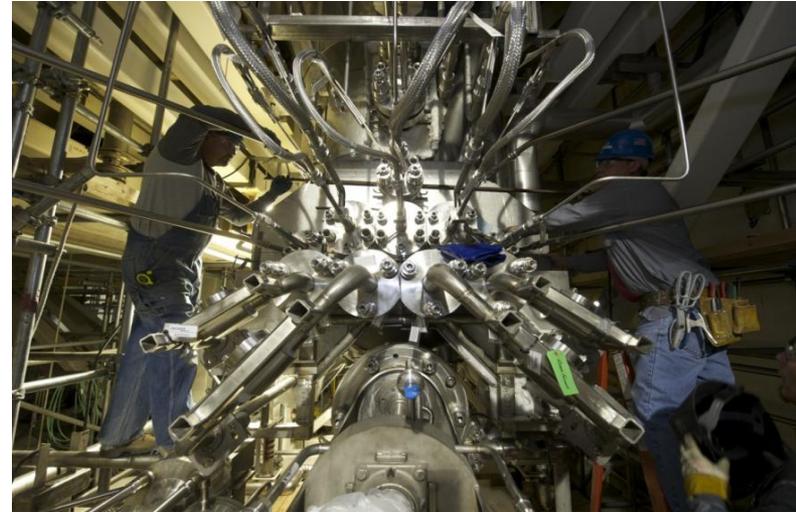
After



# In Support of the Secretary's Cleanup Mission

- Complete processing of approximately 900,000 gallons of highly-radioactive liquid tank waste by 12/31/2012.
- Continue shipping stored contact-handled and remote-handled transuranic waste to WIPP.
- Continue to receive domestic and foreign research reactor spent (used) nuclear fuel for placement into dry storage.
- Submit the RCRA Part B Permit Modification to the State of Idaho in support of calcine disposition.
- Continue the retrieval, processing, and shipment of targeted buried waste from the Subsurface Disposal Area.
- Continue the transfer of spent (used) nuclear fuel from INTEC to MFC.

Process pipe installation inside of the Sodium Bearing Waste Treatment Facility



Used (spent) nuclear fuel in dry storage

# Idaho is a Sound Investment

- ✓ We continue to maintain excellent rapport with our Regulators through successful completion of regulatory milestones.
- ✓ We receive outstanding support from Tribal Nations and local stakeholders through up front communications and involvement.
- ✓ Idaho's performance has proven that substantial cleanup progress can be achieved within cost and ahead of schedule.
- ✓ Idaho provides successful results with a priority on safety and a value to the taxpayer.
- ✓ Idaho's work is urgent and essential for the health of our local communities and for the protection of the environment.



Stored waste is retrieved at the Advanced Mixed Waste Treatment Project



Contact-handled transuranic waste sorting at the Accelerated Retrieval Project



**Idaho Treatment Group**



2012 Congressional Nuclear Cleanup Caucus

**Advanced Mixed Waste Treatment Project**

March 28, 2012

Richard D. Raaz  
President and Project Manager  
Idaho Treatment Group

# Idaho Treatment Group Scope of Work

*ITG manages and operates the  
Advanced Mixed Waste Treatment Project  
at the U.S. Department of Energy's Idaho Operations site*



Workers at AMWTP focus on the safe and compliant retrieval, characterization, treatment and shipment of 65,000 m<sup>3</sup> of legacy stored contact handled transuranic contaminated waste for permanent disposal at sites outside of Idaho, and to support the receipt and processing of transuranic waste from other DOE sites for shipment to the Department's Waste Isolation Pilot Plant (WIPP).

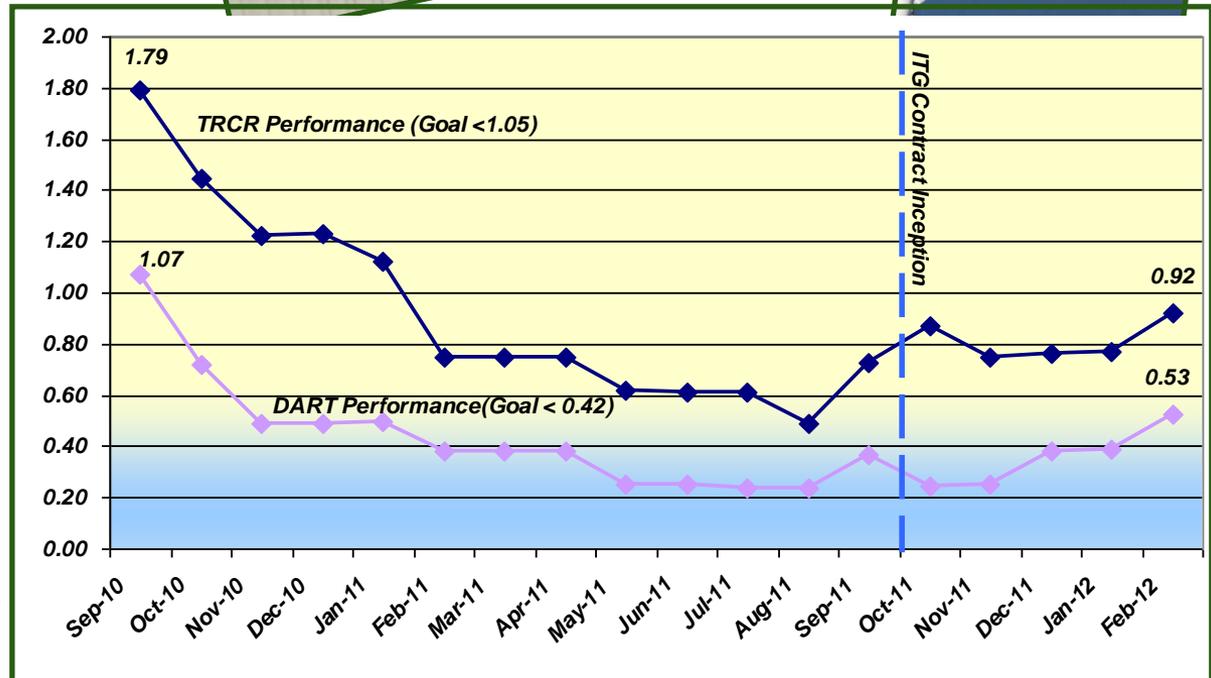
*The DOE Complex's 10,000<sup>th</sup> shipment of transuranic waste leaves AMWTP on its one way trip to the Waste Isolation Pilot Plant, Sept. 23, 2011.*

# ITG: Zero Accidents and Injuries

## Target Zero Injury Performance

Maintaining the AMWTP as a zero accident-zero injuries project through:

- Achieving VPP Star Site
- Integrated Safety Management System Phase I verification review completed February 2012; Phase II verification review scheduled for June 2012
- Emphasizing Line Management's responsibility for safe, compliant work



### TRCR = Total Recordable Case Rate

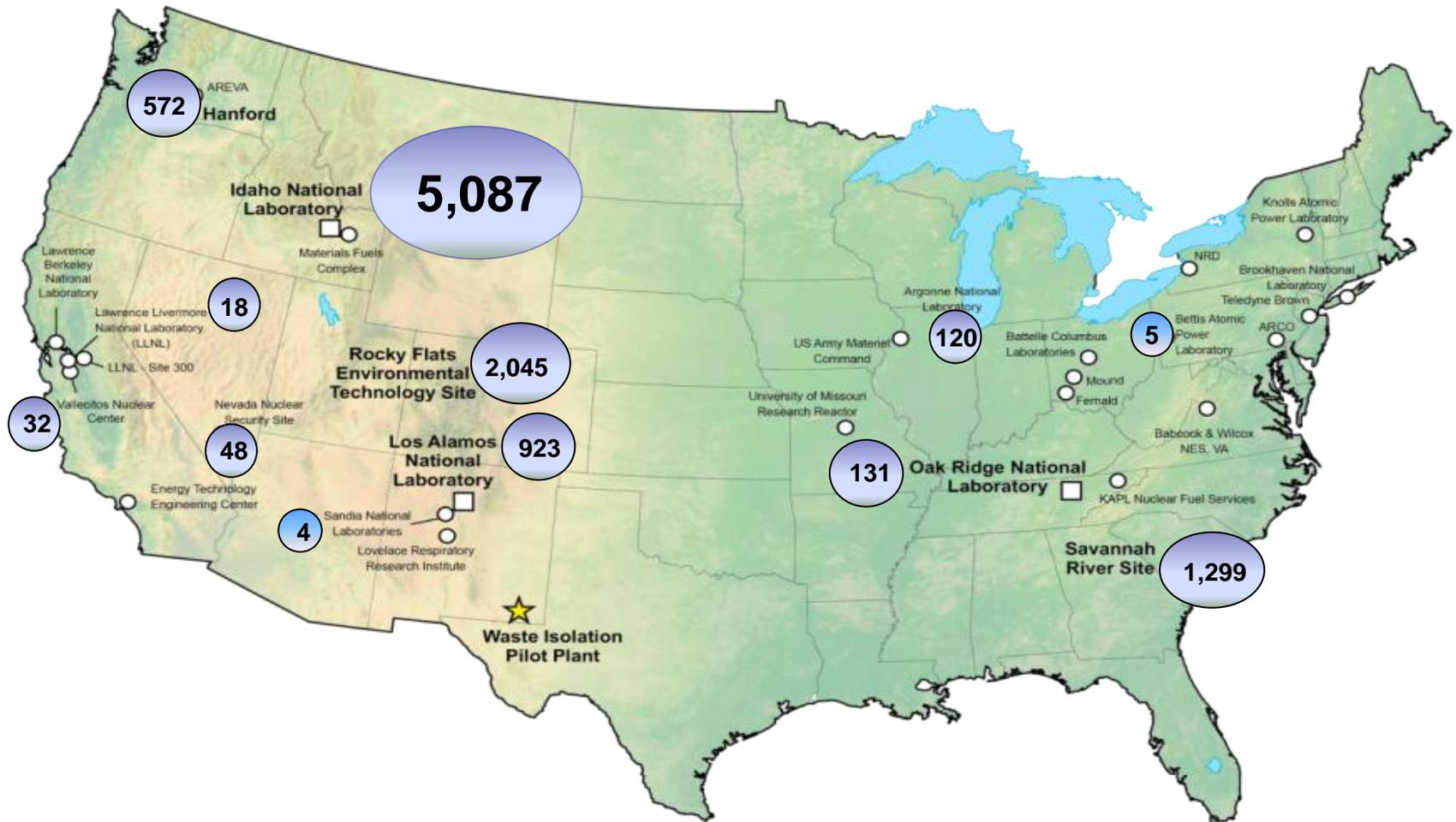
The TRCR measures the rate of occurrence of injuries and illnesses that are recordable per OSHA criteria. The rate is calculated on the total number of injuries and illnesses X 200,000 / Number of hours worked by all employees

### DART = Day Away Restricted and Transferred Rate

The DART measures the rate of occurrence of day away injuries, plus the number of restricted injuries and injuries involving transfers. The rate is calculated on the total number of day away/restricted/transferred injuries X 200,000 / Number of hours worked by all employees

Rate of occurrence per 200,000 man hours worked (12-month rolling average)

# WIPP'S #1 Supplier



Transuranic waste shipments from DOE sites to WIPP as of Jan. 23, 2012. AMWTP has made close to 50 percent of all shipments to WIPP.

# ITG's AMWTP Facts

- **Term: Oct. 1, 2011 through Sept. 30, 2015; \$415.7 million including fee (\$28 million)**
- **Paid only when waste leaves Idaho**
- **Significant penalties for underperformance**

|         |          |
|---------|----------|
| Safety  | Schedule |
| Quality | Cost     |
- **Project baseline with an Earned Value Management System**
- **New approaches to waste processing**
- **Employee Count: 600 (Plant, 537; Town, 63), operating 24 X 7 X 365**
- **Remaining waste: ~26,600 cubic meters (RFP)**
- **Offsite waste: AMWTP has processed 605 cubic meters of waste from 11 DOE sites**



1 = Retrieval, 36 employees (22 support)

2 = Characterization, 101 employees (44 support)

3 = Storage, 36 employees

4 = Treatment, 105 employees (45 support)

5 = Payload & Shipping, 119 employees (29 support)

Employees only = 390 Employees with support = 537

# ITG 2012 Milestones

- Renewal of VPP Star Application
- Submission of ISMS Phase II verification
- Facility upgrades and improvements initiated
- Retrieval operations resumed
- MLLW shipments initiated



Top: A BROKK robotic arm operating inside a boxline at the AMWTP Treatment Facility

Middle: A shipment of low-level waste from AMWTP leaves the DOE's Idaho site

Bottom: A shipment of transuranic waste on its way to DOE's Waste Isolation Pilot Plant near Carlsbad, NM

# Low Level Waste/Mixed Low Level Waste Program

- Estimate 50% of remaining stored waste is LLW/MLLW
- Restructured LLW/MLLW to develop a more efficient organizational process
- Completed evaluation and revision of all LLW/MLLW program documents
- Updated characterization documents to support new process
- First ITG shipment of LLW to Nevada National Security Site made Feb. 29, 2012



Low Level Waste/Mixed Low Level Waste operations at AMWTP. Clockwise from top left, storage of legacy waste; employees checking low level waste box; employees verifying shipping manifest; first shipment of low level waste made by ITG.

# Retrieval Improvements



*Transuranic Storage Area-Retrieval Enclosure, Pad 1, March 2010*



*New Retrieval Contamination Enclosure Wall  
Transuranic Storage Area-Retrieval Enclosure, Pad 1, March 2012*

# Retrieval Restart

**Preparations are taking place to resume suspended retrieval operations to complete work and achieve contract goals.**

## **Improvements included:**

- Robust airborne contamination controls
- Upgraded retrieval equipment
- Structured operational sequences to feed downstream disposition

## **Key start-up dates**

- Issued recovery plan to DOE-ID in Nov. 2011
- Management Self Assessment completed March 9, 2012
- DOE Readiness Assessment completed March 23, 2012
- Retrieval operations startup expected in 3<sup>rd</sup> quarter of 2012

Top: View of stored legacy waste inside the Transuranic Storage Area-Retrieval Enclosure.

Bottom: Inside the Transuranic Storage Area-Retrieval Enclosure looking at the yellow Inner Contamination Enclosure.



# Continued Production

## Sludge

- Improving existing sludge treatment process efficiency and optimum use of AMWTP capabilities
- Completed demobilization of Polychlorinated Biphenyls (PCB) prior to PCB clean-up
- Remobilized debris box line processing
- Implement alternative treatment option
  - Accelerated Retrieval Project processing capability
  - Container Repackaging Enclosure (CRE)

## Total Inventory

Identifying the specific waste stream for “unknowns” and selecting appropriate treatment options.



Drums and boxes containing stored legacy waste at AMWTP.

# Process Improvements

## Accelerating Production To Expedite Completion

### Streamlining Process of Drums In Boxlines

- Current rules require that each drum in the Six Drum Overpack (SDOP) be fully characterized, and loaded into SDOP, and that the SDOP be recharacterized
- Streamlining process to allow drums with debris waste to be loaded in SDOP configuration and SDOP will be characterized
- Streamlining decreases characterization and drum handling movements, while increasing production



*Six Drum Overpack of Hanford waste being processed through Treatment Facility boxline*



# Process Improvements

## Accelerating Production To Expedite Completion

### Automating Processing of Mixed Low-Level Waste Shipments



Manual recording and verifying drums

- Approximately 50 percent of remaining ~26,600 m<sup>3</sup> historically managed transuranic waste is actually mixed low-level waste (MLLW)
- Currently, each MLLW container data is manually transferred from Waste Tracking System to required MLLW shipping software

- Now in the process of automating the data transfer, which will reduce data entry time and increase number of MLLW shipments

Another shipment of mixed low-level waste leaves AMWTP and the state of Idaho



# AMWTP: Meeting Its Mission

- Safely and compliantly removing waste from Idaho while meeting the Settlement Agreement ahead of schedule
- Delivering value to taxpayers by completing disposal of final oldest, most difficult ~26,600 cubic meters of waste for less cost than first ~36,000 cubic meters of waste
- Continuing to be DOE's primary shipper to WIPP
- Remaining an essential DOE asset for processing transuranic waste



*Following inspection by the Idaho State Police, the DOE Complex's 10,000<sup>th</sup> shipment of transuranic waste leaves the AMWTP gates, Sept. 23, 2011.*



*ITG's first low-level waste shipment to the Nevada National Security Site, Feb. 29, 2012*

# *Idaho Cleanup Project*

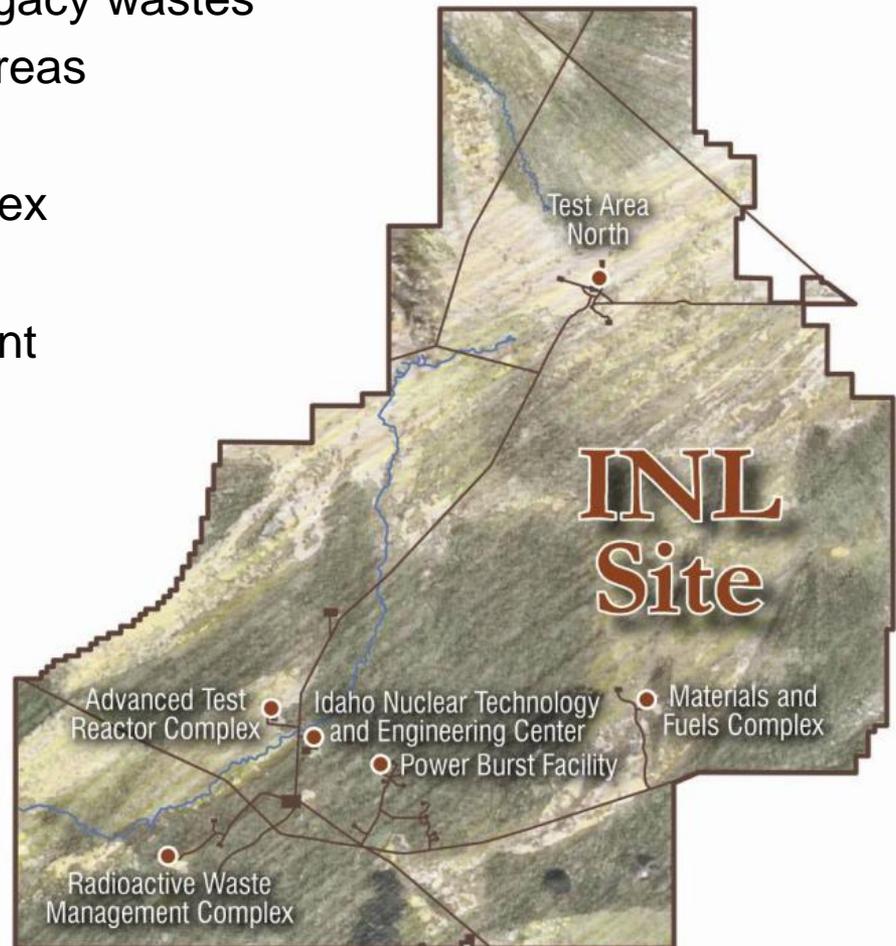
CH2M-WG Idaho (CWI)

**March 28, 2012**

Presented by  
**Tom Dieter**  
**President and CEO**

# Idaho Cleanup Project Mission

- Cleanup of the Department of Energy's Idaho Site, which is contaminated with legacy wastes
- Centers around six major project areas
  - Test Area North
  - Advanced Test Reactor Complex
  - Materials and Fuels Complex
  - Radioactive Waste Management Complex
  - Idaho Nuclear Technology and Engineering Center
  - Power Burst Facility



# *Cleanup Scope*

- Treat 900,000 gallons of sodium-bearing waste
- Prepare high-level waste tanks for closure
- Dispose of hazardous, low-level/mixed low-level radioactive, and transuranic wastes
- Remove targeted waste from the Subsurface Disposal Area
- Demolish or otherwise disposition more than 200 facilities including reactors, spent (used) fuel basins, and hot cells
- Remediate environmental release sites
- Transfer spent (used) nuclear fuel from wet to dry storage
- Developed calcine technology

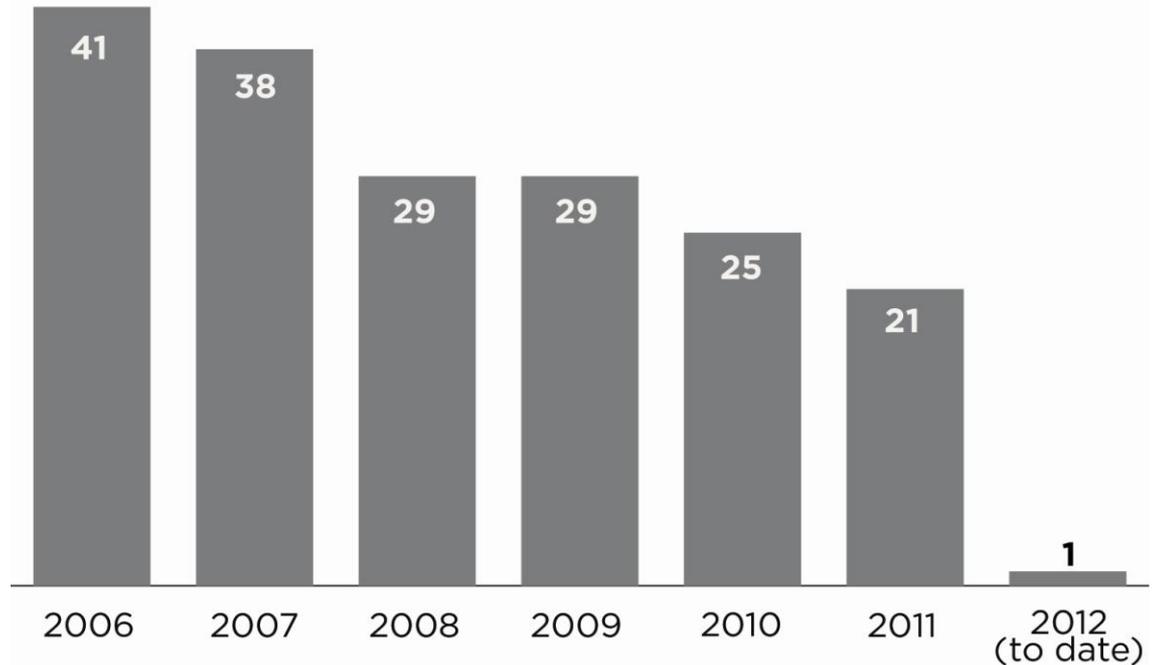
# Cleanup Risks/Mitigations

| Daily Risks   | Mitigations  |
|---|--|
| <ul style="list-style-type: none"><li>• Radiological</li><li>• Chemical</li><li>• Explosives (for demolition)</li><li>• Heavy equipment</li><li>• Lifting and handling</li><li>• Natural elements (wind, snow, ice)</li><li>• Human factors</li></ul> | <ul style="list-style-type: none"><li>• Employee-owned safety program</li><li>• Peer observation program to identify at-risk behaviors</li><li>• 43,600 observations submitted</li><li>• Leadership expectations and training</li><li>• Safety culture imbedded in processes</li><li>• Extreme focus on relationships built on mutual respect, trust, and openness<ul style="list-style-type: none"><li>- Workforce</li><li>- Union leadership</li><li>- Regulators</li><li>- Client</li></ul></li></ul> |

# Safety

Maintain a safe, secure, and compliant posture

RECORDABLE INJURIES BY YEAR



- 50 percent reduction in recordable injuries since contract inception (May 2005)
- ~22,000 entries (FY11) into radiological/contamination areas at the Accelerated Retrieval Project without a ORPS reportable radiological incident
- Worked 13.1 million hours since last reportable skin contamination event

# Sodium-bearing Waste Treatment

## Complete radioactive waste treatment and closure

### Treatment

- 53,000 square foot, first-of-a-kind facility built to stringent seismic standards (2,500 year event)
- Uses steam reforming technology to treat 900,000 gallons of sodium-bearing waste stored in three underground tanks
- Completed
  - Construction (June 3, 2011)
  - Milestone test (October 20, 2011)
  - Corporate Operational Readiness Review (ORR) (March 9, 2012)
    - Passed review; strengths noted
    - Nine pre-start findings
    - No hardware issues, primarily paper/documentation
- Federal ORR commenced on March 26, 2012
- Operations to begin in April 2012

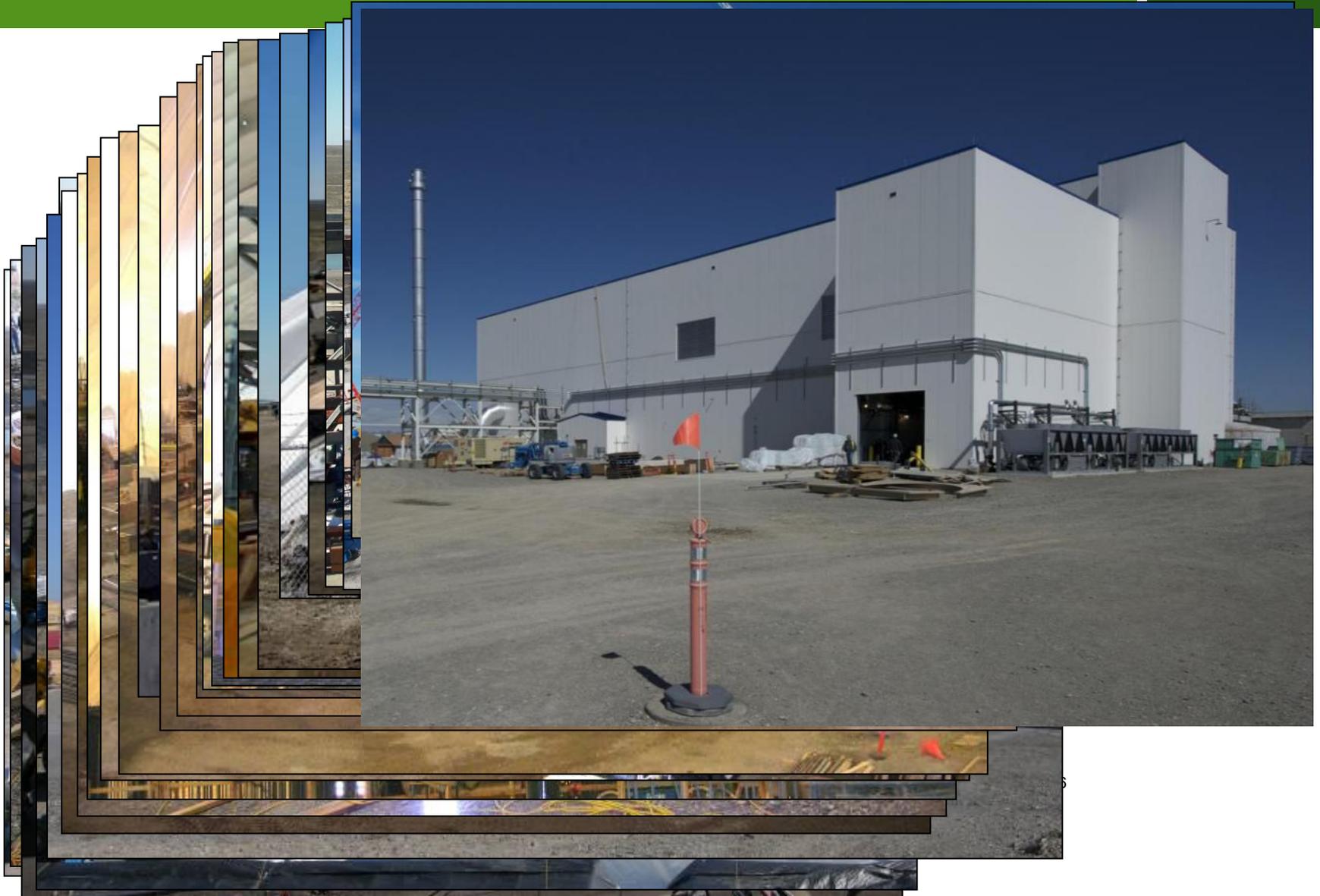
### Tank Farm closure

- 11 liquid waste tanks grouted
- Grouting prep for remaining tanks



Liquid waste tanks are grouted

# Integrated Waste Treatment Unit



# Waste Disposition

## Disposition remote-handled transuranic waste

- Shipped all contract scope remote-handled transuranic waste to the Waste Isolation Pilot Plant (216 shipments)
  - Delivered nine months ahead of schedule with \$4 million in cost savings
- Completed an additional 44 shipments of remote-handled transuranic waste made possible by Recovery Act dollars



The first Recovery Act shipment leaves the Idaho Site

# Waste Disposition (continued)

## Disposition contact-handled transuranic waste

- Exhumed 2.95 acres – completed contract scope of 2.55 acres, one year ahead of schedule with \$22 million in cost savings
  - Completed Pit 9 one year ahead of schedule and \$10 million under budget
- Shipped 99 %\* of exhumed targeted waste (contact-handled transuranic) to the Waste Isolation Pilot Plant



*\*CWI contract*

Pit 9 exhumation

# Facility Demolition

## Complete facility deactivation and decommissioning

- Demolition of 218 (of 221) facilities and structures
  - Over two million square feet of footprint reduction
  - Delivered one year ahead of schedule with \$307 million in cost savings
- Includes four reactor facilities – Loss-of-Fluid Test, Power Burst Facility, Materials Test Reactor, and Engineering Test Reactor
- Developed technology to treat passivated sodium



One-million pound hot cell en route to Idaho CERCLA Disposal Facility

# Site Remediation

## Soil and groundwater remediation

- 120 contaminated sites remediated
  - Completed contract scope ahead of schedule with \$67.5 million in cost savings
- 68 hazardous tank systems closed
  - Completed contract scope ahead of schedule with \$4.3 million in cost savings



A technician gathers samples at the Radioactive Waste Management Complex

# Spent Nuclear Fuel Disposition

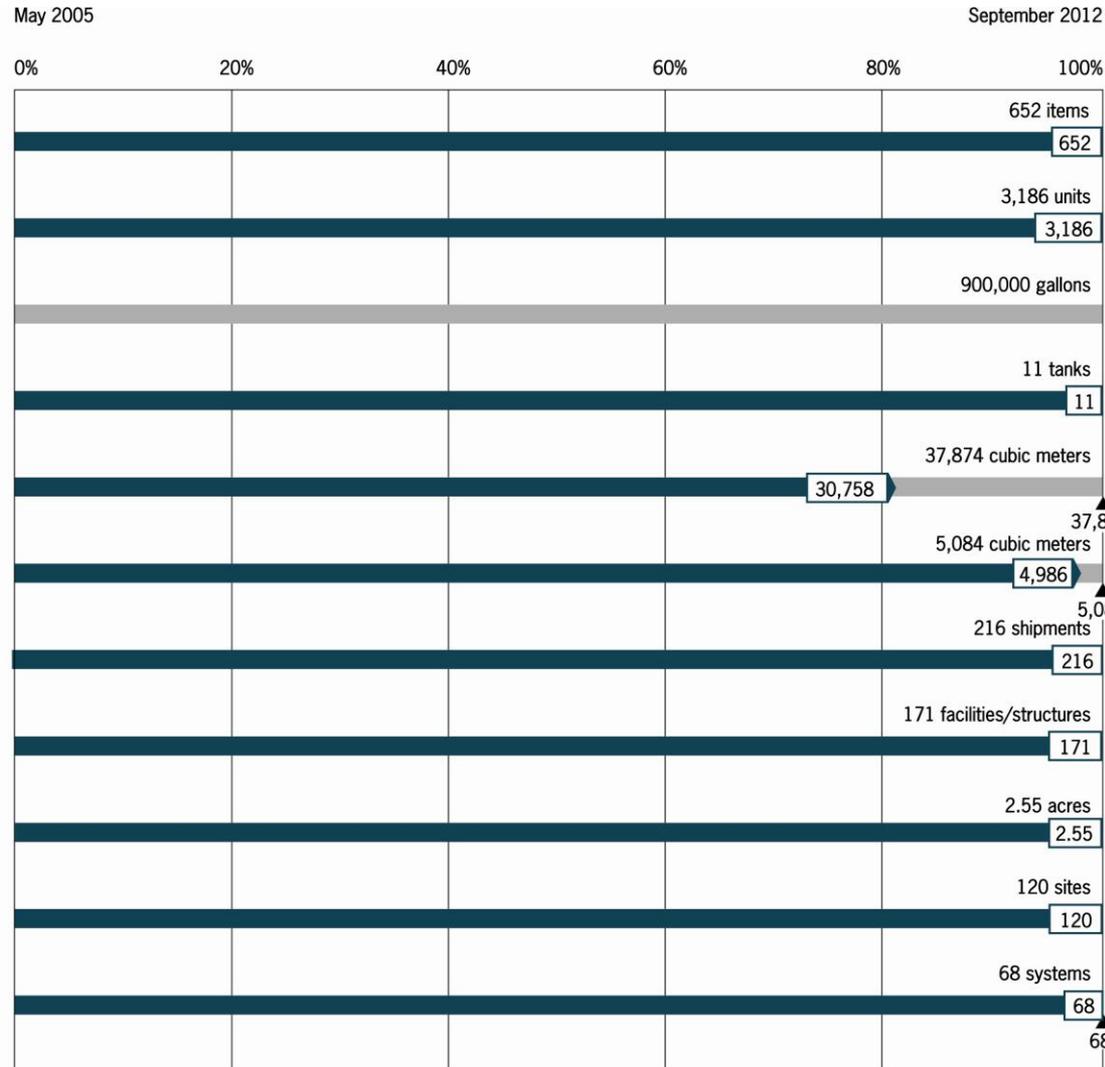
Continue safe fuel storage

- Transferred 3,186 units of spent (used) nuclear fuel from wet to dry storage
  - Completed contract scope ahead of schedule



Fuel operators bag a canister containing Tory-II fuel prior to moving it to dry storage

# Reducing risks, honoring commitments, delivering value



December 2012