



U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

Subsurface Disposal Area Cleanup *From Characterization to Cap*

Nolan Jensen
Project Manager
Feb. 23, 2017

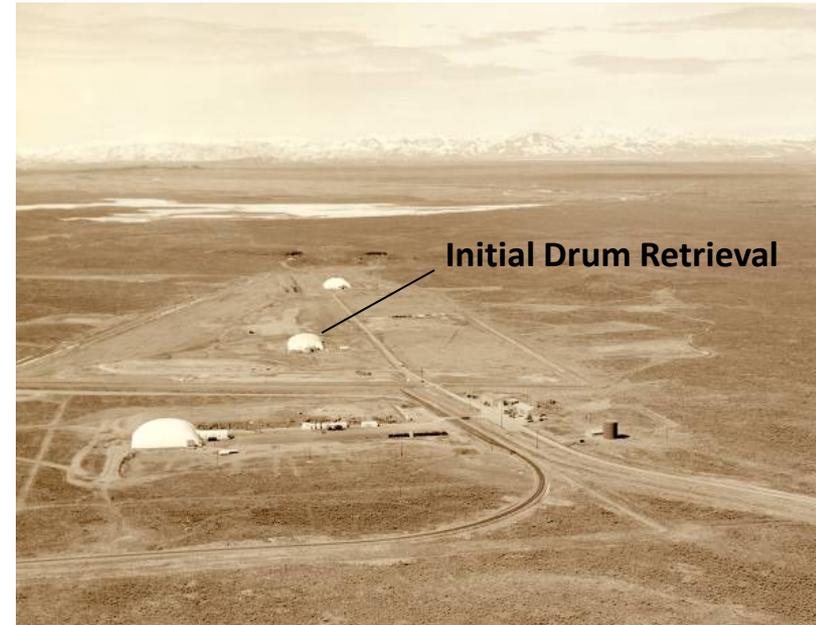
Background

- Established in 1952 for the buried disposal of Site-generated wastes.
 - Originally 13 acres in size.
- Beginning in 1954, the RWMC began receiving wastes from the Rocky Flats Plant and other off-site generators.
- Landfill was expanded to 97 acres.
- Approximately 241,000 cubic meters of waste were disposed in 21 pits, 58 trenches, and 21 soil vault rows (totaling approximately 35 acres).
- Burial of transuranic wastes ended in 1970.



Early waste retrievals

- 1971 – Probe tests of buried waste.
- 1974 to 1978 – Initial Drum Retrieval (IDR) Project. A total of 20,262 drums were removed from Pits 11 and 12, repackaged, and stored at the Transuranic Storage Area Retrieval Enclosure.
 - The last of the cargo containers containing Pits 11 and 12 waste drums were emptied in late November and the waste was repackaged.



Emptying cargo container (right)

Early waste retrievals (cont'd)

- 1976 – Early Waste Retrieval (EWR) Project. Total waste removed was about 819 drums.
- 1979 – Transuranic Disposal Area Penetration and Inspection. Drums and wooden boxes were deteriorated sufficiently to preclude easy retrieval of any containers.



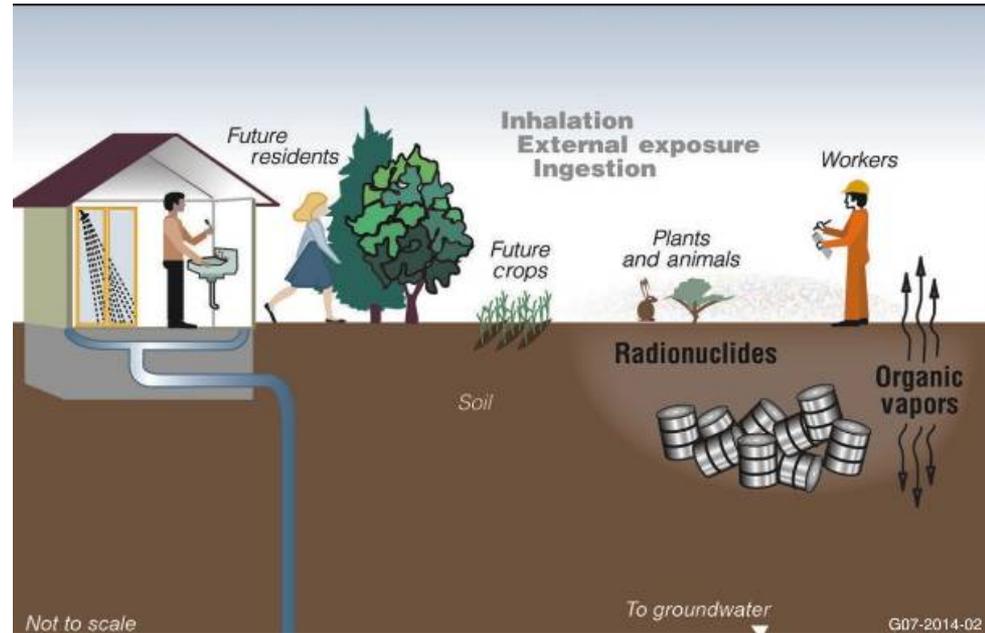
Remedial Investigation/Feasibility Study

- In 1995, the agencies began the Remedial Investigation/Feasibility Study for the Subsurface Disposal Area.
 - It would become the most detailed, extensive environmental investigation in the Site's history, examining more than 30 years of accumulated data.



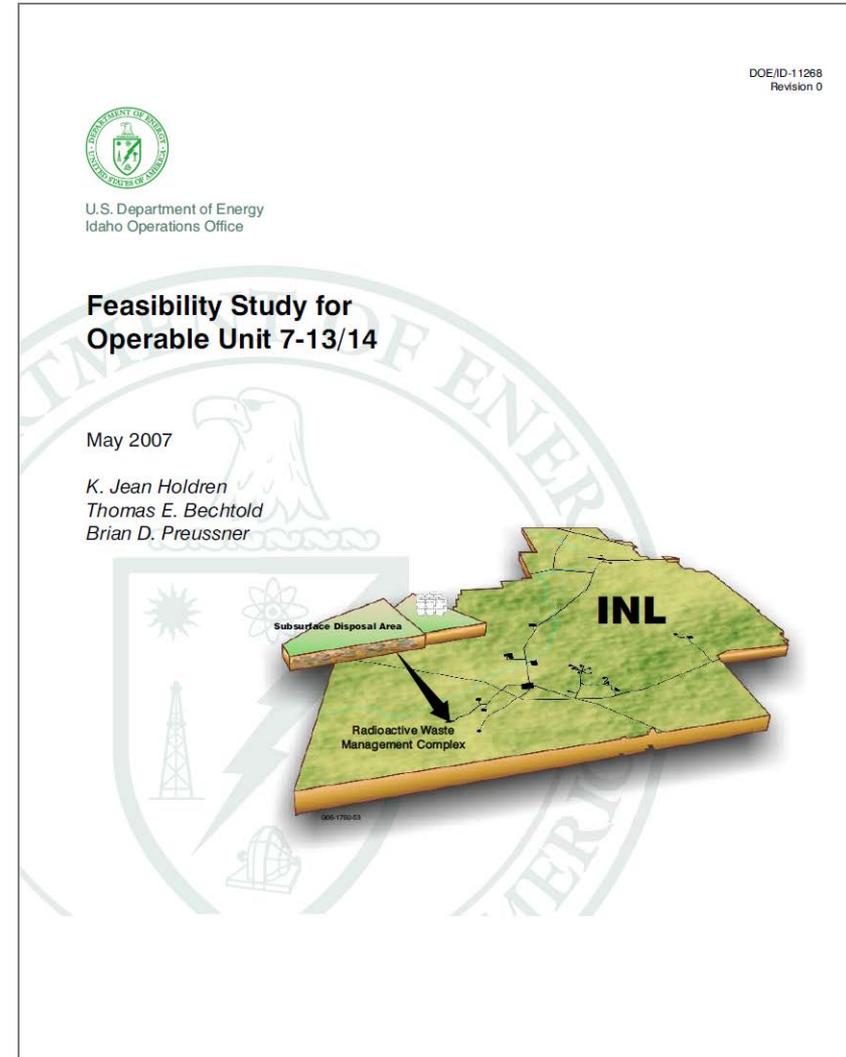
Scope of the Investigation

- The remedial investigation/baseline risk assessment represented more than 12 years of characterization and assessment of hazards, and literally millions of data points.
- Twelve radionuclides and six non-radionuclides posed unacceptable risk to human health and the environment based on a 1,000-year simulation period.



Scope of the Investigation (cont'd)

- The accompanying feasibility study:
 - Outlined objectives and remediation goals.
 - Identified cleanup technologies.
 - Developed and analyzed alternatives based on nine standard Superfund criteria.
 - Compared relative advantages and disadvantages of the alternatives.

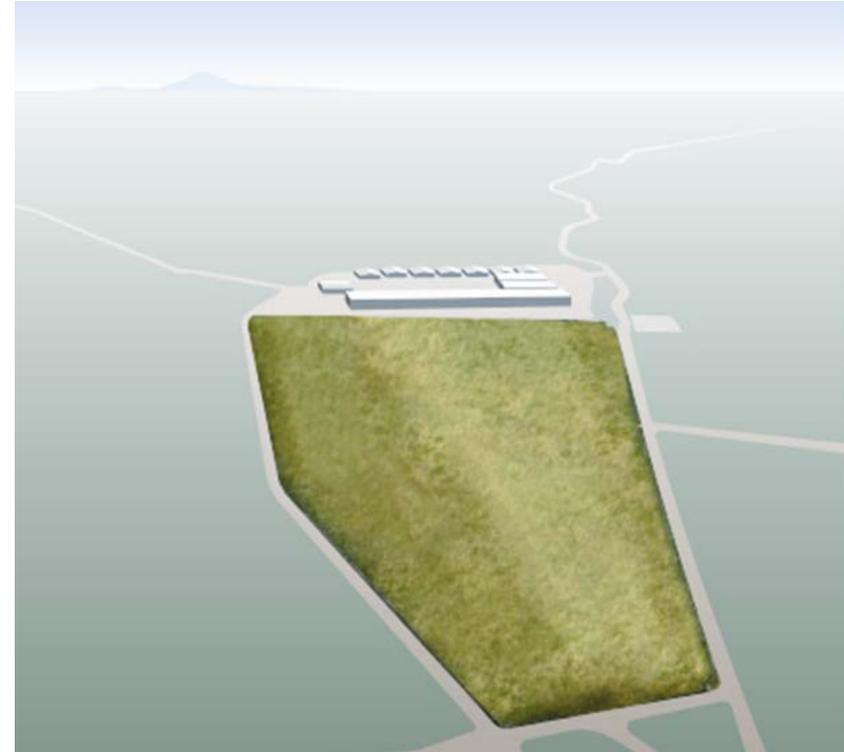


Alternatives Evaluated

- No action
- Surface barrier
- In situ grouting
- Partial retrieval, treatment, and disposal
- Full retrieval, treatment, and disposal

Each alternative included a surface barrier or cap.

A surface barrier will inhibit transport of contaminants to the surface by plants and animals. It will also inhibit migration of contaminants from buried waste by reducing infiltrating moisture that would move through the SDA downward toward the Snake River Plain Aquifer. It will also direct moisture away from the buried waste and store excess moisture until it evaporates, or is absorbed by plants and transpired to the atmosphere.



- Released for 30-day public comment period during the week of October 1, 2007.
- Electronic copy posted on Idaho Cleanup Project website.
- Comment period extended based on request from public.
- The Preferred Alternative, consisting of five major components, proposed targeted retrievals of waste from approximately 4.8 acres of waste in the Subsurface Disposal Area.
- Ultimately, the agencies agreed in the Record of Decision (signed by DOE, EPA, and the state of Idaho September 2008) to remediate a minimum of 7,485 cubic meters (packaged) of targeted waste from a combined 5.69 acres, consistent with the Agreement to Implement court order.

**Proposed Plan for
Radioactive Waste Management Complex
Operable Unit 7-13/14**

October 2007

Idaho Cleanup Project at the U.S. Department of Energy Idaho National Laboratory Site



U.S. Department of Energy
Idaho Department of Environmental Quality
U.S. Environmental Protection Agency



Figure 1. Aerial view of the SDA within RWMC.

INTRODUCTION

The U.S. Department of Energy (DOE) has completed its investigation of Operable Unit (OU) 7-13/14, the comprehensive *remedial investigation and feasibility study* (RI/FS) for Waste Area Group 7, the Radioactive Waste Management Complex (RWMC) (see Figure 1) at the Idaho National Laboratory (INL) Site in southeastern Idaho (see Figure 2). This plan highlights key information from RI/FS reports¹ that address RWMC. Analysis focuses on the Subsurface Disposal Area (SDA), a radioactive waste landfill within RWMC (see Figure 3).

The Remedial Investigation¹ concluded that—without remedial action—contaminants in waste buried in the SDA would exceed *risk threshold values* for hypothetical residents living adjacent to the landfill in the future and for people or animals intruding into the buried waste. Future contaminant concentrations could exceed allowable *exposure rates* at the surface and *maximum concentration levels* (MCLs) in the Snake River Plain Aquifer. The Feasibility Study² develops alternatives for remedial action and evaluates how well each alternative would perform.

**Public Comment Period
October 22 to November 21, 2007**

How You Can Participate

Read this Proposed Plan and review related documents in the Comprehensive Environmental Response, Compensation, and Liability Act Administrative Record for the Idaho Cleanup Project at the Idaho National Laboratory.

Call the U.S. Department of Energy Idaho Department of Environmental Quality, or U.S. Environmental Protection Agency to get more information.

Attend a public meeting to hear more, ask questions, and tell us what you think.

Comment on this Proposed Plan by using the postage-paid comment card on the back cover.

See page 49 for more information about public involvement and contact information.

Inside this Plan

Introduction	1
Site History	4
Site Background	4
Scope and Role of the Action	5
Site Risks	12
Remedial Action Objectives	16
CEQEA Evaluation Process	18
Description and Evaluation of Alternatives	19
<input checked="" type="checkbox"/> Supplemental Analysis	25
Evaluation and Comparison of Alternatives	30
<input checked="" type="checkbox"/> Preferred Alternative	36
No Action and No Further Action Sites	40
References and Acronyms	45
Public Involvement	49
Postage-paid comment card	back cover

Proposed Plan for Radioactive Waste Management Complex Operable Unit 7-13/14 1

Remedy Components

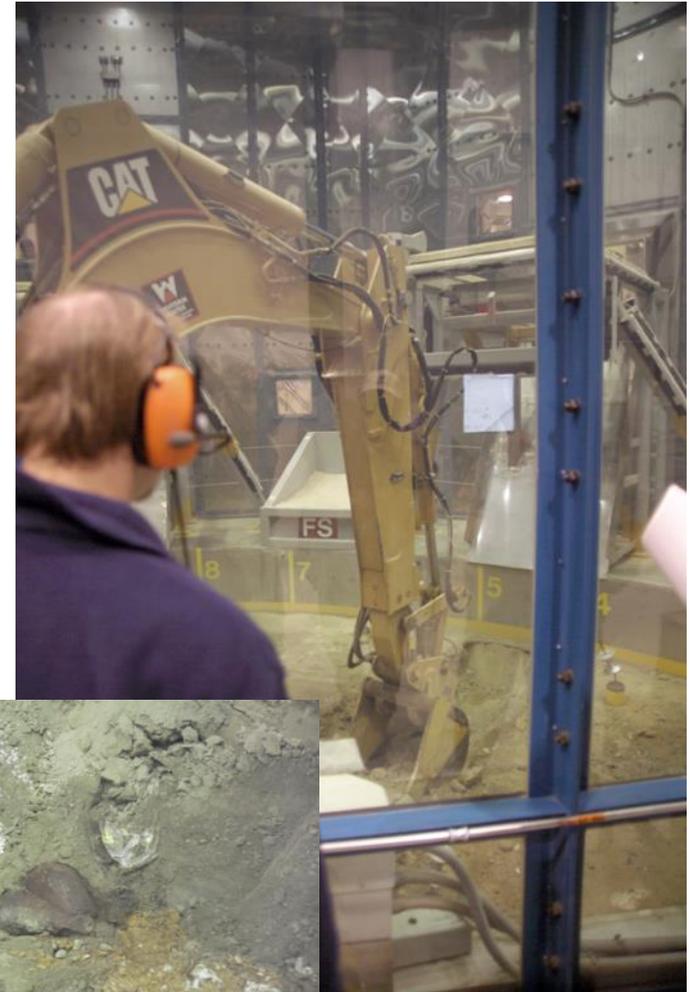
The major components of the selected remedy are as follows:

1. Targeted waste retrieval removes targeted waste, reduces risk and dependence on the surface barrier and institutional controls.
2. In situ grouting in specific areas (0.2 acres) reduces mobility of technetium-99 and Iodine-129 in the near-term to reduce future threats to the aquifer.
3. Vadose zone vapor vacuum extraction and treatment, which removes and treats organic solvent vapors from the vadose zone, coupled with targeted waste retrieval, addresses the greatest and most imminent threat to ground water.
4. Evapotranspiration surface barrier inhibits contaminant migration.
5. Long-term institutional controls (surveillance, monitoring, maintenance, limited access, land-use restrictions) will ensure continued effectiveness.

The combination of elements in the Selected Remedy provides the best balance of trade-offs among all the alternatives, striking a balance among waste retrieval, expedited installation of a surface barrier, worker safety, and cost.

Targeted Waste Approach

- Based on experience from Glovebox Excavator Method excavation in Pit 9, where about 900 drums of material were removed.
- Visually identify certain waste types.
- Maximizes removal of transuranic waste and other waste forms that contain contaminants of concern:
 - Organic compounds (sludges)
 - Uranium (roaster oxides)
 - Plutonium (from filters and graphite molds).
- Produces manageable waste.
- Minimizes worker risk.



Targeted Waste Approach (cont'd)

- Disposal forms told us where and when waste was disposed.
- Detailed inventory evaluations or load lists for each generator told us how much.
- GIS tools allowed us to map disposals and generate concentrations for risk evaluations and remediation.

SECTION II DESCRIPTION OF WASTE Trlr. No. 200108 Dow S.N. 66-109-B
Seal No. RF-1340

1. TOTAL NO. OF PACKAGES 76 VOLUME IN FT.³ 559 WEIGHT 32,697

2. COMPLETE DESCRIPTION OF CONTENTS AND PACKAGING
12 55 gal. drums containing metal, paper, glass, rags, etc.
64 55 gal. drums of 74 series sludge

3. CLASSIFICATION: SECRET _____ CONFIDENTIAL _____ CATEGORY: Unclassified
SS MATERIAL TYPE * _____ AMOUNT: NET * _____ ISOTOPE *

4. PROPOSED MEANS OF TRANSPORTATION D&RGW & UP railroad SHIPPING DATE 10-31-66

5. RADIOISOTOPES CONTAINED plutonium and uranium

6. MAXIMUM RADIATION AT SURFACE OF Trailer 1.2 mr/hr TOTAL CURIES not feasible

7. ASSOCIATED HAZARDS: None

* These amounts and material types are estimated and provided at the end of the calendar year.

SECTION III (TO BE COMPLETED BY PERSON WITNESSING DISPOSAL)

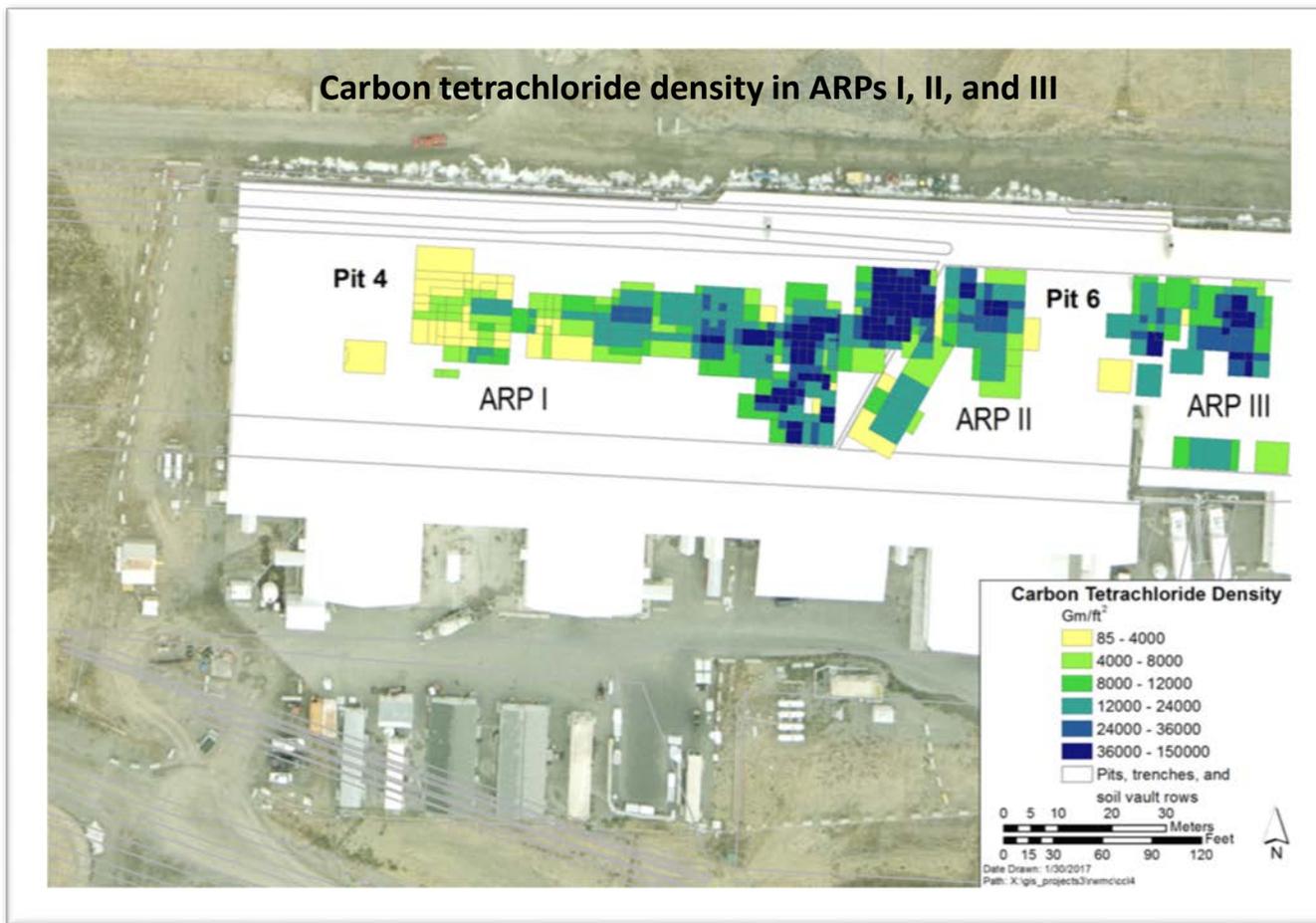
DISPOSAL WAS MADE BY MEANS OF Burial in Pit # 4

AT 240' - 270' West & 20' - 80' North of S/E Monument ON 11-4-66
(LOCATION) (DATE)

L.P. Stoddard 11-4-66
(SIGNATURE) (DATE)

Targeted waste approach (cont'd)

With shipping and receipt manifests, as well as waste inventory records, we mapped where the highest concentrations of contaminants were located.



- The agencies and cleanup contractor conducted the most extensive public involvement campaign in the history of Site cleanup:
 - More than 35 briefings were held on the feasibility study results alone.
 - A citizens focus group reviewed all draft documents and presentation materials in preparation for public meetings.
 - Documents were translated into Spanish.
 - A Spanish-speaking interpreter attended all meetings.
 - More than 190 people attended three public workshops/meetings.



Workshops and public meetings were held to explain the buried waste cleanup process, and to get input from the public on the final remedy.

Public Involvement (cont'd)

- The Environmental Protection Agency awarded a Technical Assistance Grant to the Snake River Alliance to hire a technical expert to review plans and help provide input.
- DOE directly involved the Shoshone-Bannock Tribes:
 - August 2006 cleanup briefing, including WAG 7, with Fort Hall Tribal Council.
 - June 2007 briefing with Tribal Business Council on WAG 7 feasibility study.
 - October 2007, briefing with Tribal Business Council on WAG 7 proposed plan.
 - February 2008 briefed Tribal Business Council on Record of Decision.
- Approximately 190 people provided written or oral comments on proposed plan.
 - More than 30 anonymous comments were also received.
- Approximately 71 percent of commenters supported the preferred alternative.
 - Approximately 29 percent supported either more or less cleanup.



More than 190 people attended workshops and meetings on the buried waste project.

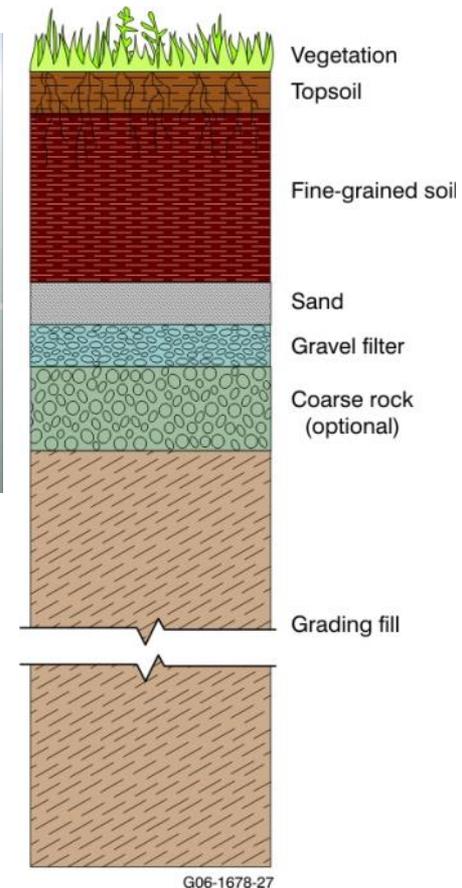
Status of Targeted Buried Waste Remediation

- Crews completed exhumation of the 7,485 cubic meter Record of Decision requirement in November 2016.
- Construction of the final Accelerated Retrieval Project structure will be completed in spring/summer of 2017.
 - Waste exhumation will begin this year.
- As of late January, crews have exhumed 4.47 acres of the 5.69 acres of waste required by the 2008 Record of Decision.
- The project is about two years ahead of its initial projected completion date.
- Vapor vacuum extraction units continue to remove solvent vapors from beneath the landfill. To date nearly 246,000 pounds of solvent vapors have been removed and destroyed.



Surface Barrier – “Cap”

- The design of the final cap is in the early stages.
- Potential borrow areas for the cap exist on site.
- A more detailed presentation about the cap design will be given at the June CAB meeting.



Conceptual cross section of cap.

Summary

- After more than 12 years of remediation, the targeted buried waste approach has been extremely successful. Monitoring, both off-site and on-site, continue to show the Snake River Plain Aquifer is protected.
- We will begin waste exhumation in the last enclosure later this year.
 - Remediation will likely be under way in two separate enclosures simultaneously.
- Waste exhumation will be completed under Fluor Idaho's contract.
- More information is forthcoming on the cap design as this phase progresses.

