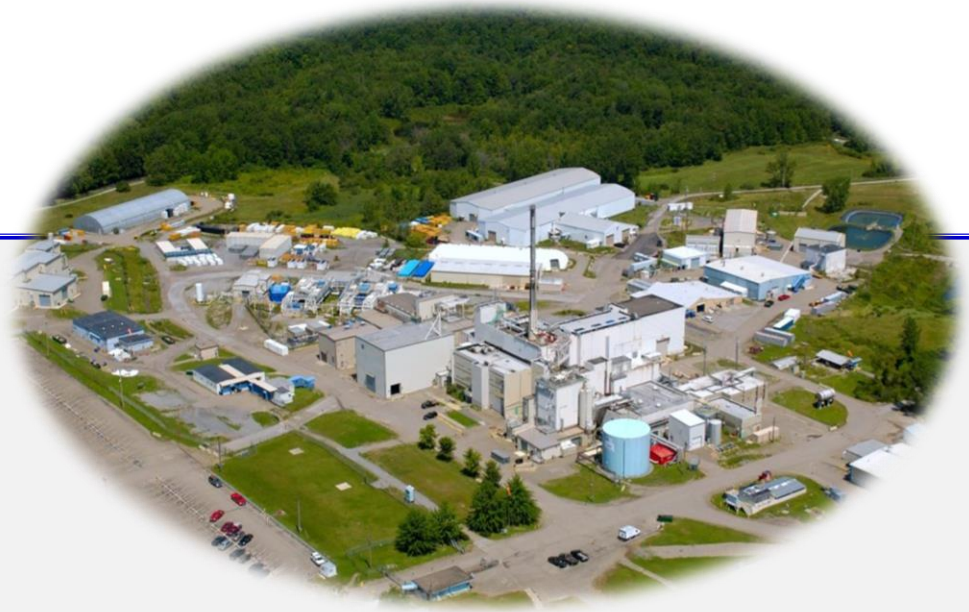

Exhumation Working Group (EXWG) Recommendations for Phase 1 Studies

Presented By

EXWG Subject Matter Experts (SMEs)
Bill Thomas, CHP, CIH
Steve Marschke

Quarterly Public Meeting
November 20, 2013

AGENDA

1. Introductions
2. EXWG Mission and Study Overview
3. Study 1: Waste Inventory Analysis
   i. Update Radionuclide Inventories
   ii. Process and Apply Updated Inventories
4. Study 2: Evaluate Methods To Reduce Inventory Uncertainty
   i. Statistical Evaluation of Inventory Source Data
   ii. Review of Previous Surveys
   iii. Evaluation of Potential Investigation Methods
5. Study 3: Review of Precedent Projects
6. Questions and Answers

SME PRESENTERS

Bill Thomas, CHP, CIH

- Over 31 years of practice as both a Certified Health Physicist (CHP) and a Certified Industrial Hygienist (CIH)
- Emphasis on systems to minimize and monitor personnel exposure to radiological and hazardous materials during remedial activities at DOE's Fernald, Oak Ridge, Los Alamos, Nevada, and Rocky Flats Plants and other DOE National Laboratories

SME PRESENTERS

Stephen Marschke

- Senior Nuclear Engineer and Radiological Assessment Analyst with expertise in technology assessment, radiological risk assessment, nuclear licensing, and regulation development
- Authored the Residual Inventory Supplemental Report for the four high level waste tanks at WNYNSC

OTHER EXWG MEMBERS

Dr. Frank Parker (SME): Internationally recognized expert in nuclear remediation and former head of Radioactive Waste Disposal Research at Oak Ridge National Laboratory. Professor Emeritus at Vanderbilt University.

Dr. Ralph Wild (SME): Radiological Consultant in the areas of integrated safety assessments and radiological waste management; Principal Investigator for development of radionuclide inventories for SDA and NDA.

Mr. Jay Pride (SME): 36 Years of experience and national recognition in developing and implementing innovative waste management solutions for both DOE and the commercial industry.

Mr. Michael Travaglini (SME): 30 Years of experience in site remediation activities for the DOE, Oak Ridge Operations; Served as Senior Project Manager for four waste removal projects at Oak Ridge.

Dr. Joseph Yeasted (ECS Study Manager): 30 Years of experience managing environmental projects involving radiological and hazardous wastes, including Contractor Program Manager at DOE's Fernald Facility and Nevada Test Site.

EXWG MISSION

EXWG Mission: To develop and execute studies that address key issues and related uncertainties pertaining to the following Phase 1 Potential Areas of Study (PASs):

- Alternate approaches for, costs of, and risks associated with complete waste and tank exhumation
- Viability, cost, and benefit of partial exhumation of waste and removal of contamination
- Exhumation uncertainties and benefit of pilot exhumation activities

Seven Focus Questions: DOE and NYSERDA prepared seven topical questions to help focus the EXWG's efforts on the PASs listed above

SEVEN FOCUS QUESTIONS

1. Can the long-lived inventory in the State Licensed Disposal Area (SDA), NRC Licensed Disposal Area (NDA), and Waste Tank Farm (WTF) be selectively removed to reduce the time that these facilities will pose a hazard? If so, at what cost?
2. Can the waste be exhumed out of the SDA and NDA while leaving a majority of the surrounding soil in place? If so, at what cost?
3. Can portions of the high-level waste tanks be removed while leaving surrounding tank material, or just the vaults, in place? If so, at what cost?
4. Are the robust facilities shown in the Final Environmental Impact Statement (FEIS) for conducting tank and disposal area removals necessary, or can removals be done using less robust, yet still protective methods, at lower cost?
5. Would answers to any of the above questions change if one waited for 30, 60, 90, or 120 years before undertaking the action?
6. What are the uncertainties associated with estimations of changes in source term and cost given currently available information? Would additional studies likely better quantify and/or reduce these uncertainties? If so, what are these additional studies?
7. Are there exhumation uncertainties or data needs that can be addressed only through a pilot exhumation? Would such a pilot exhumation action be feasible and reasonable considering health and safety, worker exposure, waste generation, and costs versus benefits?

OVERVIEW OF RECOMMENDED STUDIES

- In order to evaluate the various exhumation scenarios and criteria posed by the focus questions, the EXWG believes additional information is required with respect to the existing inventory, the state of exhumation practice, and inventory/exhumation uncertainties
- Studies are being recommended to:
  - Provide quantitative information on waste inventories to support the evaluation of approaches to complete and partial exhumation
  - Review precedent projects for evidence of technologies that may be applied at West Valley and what the various exhumation scenarios may cost
  - Produce information that can be used directly in the evaluation and quantification of inventory and exhumation uncertainty

STUDY 1
WASTE INVENTORY ANALYSIS

Objectives

- Update the radionuclide inventories for the NDA, SDA, and WTF
- Support EXWG studies related to full and selective waste exhumation scenarios and radiation protection requirements by providing information about locations, radionuclide activities, and volumes of materials that would be exhumed

Rationale

- Available waste inventories were completed between 2000 and 2005; need to update to new reference year (2020) to account for radiological decay, new data, and actions completed in the interim
- To evaluate the range of waste removal scenarios posed in the focus questions, a better understanding is required of the specific waste volume that would need to be removed in order to remove a certain percentage of key radionuclides, the associated benefits of that removal, radiation protection requirements, and the costs associated with such removals

STUDY 1
WASTE INVENTORY ANALYSIS

Components of Work: Update Radionuclide Inventories

- Update the radionuclide inventories for the SDA, NDA, and WTF for the new reference year (2020), as well as for 30, 60, 90, and 120 years thereafter

Components of Work: Process Waste Inventories

- Quantify the inventory of a given radionuclide that would be removed under a range of exhumation scenarios
- Determine the percentage of the total waste inventory removed under a range of exhumation scenarios

STUDY 2: EVALUATION OF METHODS TO REDUCE UNCERTAINTY

Objective

- Evaluate approaches that could be potentially implemented to better understand and reduce the level of uncertainty associated with the radionuclide inventories and locations for the NDA, SDA, and WTF

Rationale

- Work to develop these inventories was thorough, and further mining of the raw inventory records would not improve the reliability of the estimates
- Evaluation of uncertainty in the estimated inventories and locations of waste takes on increased significance for the exhumation scenarios and criteria posed by the focus questions

STUDY 2: EVALUATION OF METHODS TO REDUCE UNCERTAINTY

Components of Work

1. Evaluate how conducive the SDA and NDA waste inventory process is to a statistical evaluation of uncertainty, as well as the level of effort that would be required for full implementation
2. Evaluate the results from previous radiation studies completed at the West Valley Site to determine if they provide an independent source of information to corroborate the waste inventories
3. Evaluate intrusive and non-intrusive field characterization methods and technologies as a means to further corroborate the waste inventories and to help achieve the study objective of uncertainty reduction

STUDY 3:
REVIEW OF PRECEDENT PROJECTS

Objective

- Apply the experiences in exhuming or treating waste disposal areas and tanks at DOE, commercial, and international sites to determine:
  - The state-of-practice and state-of-the-art in exhumation and treatment technologies
  - Methods for worker, public, and environmental protection
  - Lessons learned
  - Key uncertainties and how they were addressed.

Rationale

- Experiences at other sites may provide a line of direct evidence that:
  - Selective waste removal or in-situ treatment can be an acceptable option
  - Lower-priced removal or treatment technologies may exist
  - Less robust protective measures may be sufficient
  - Key uncertainties can be reduced

STUDY 3:
REVIEW OF PRECEDENT PROJECTS

Components of Work

1. Conduct a literature search to determine approaches, problems encountered, and how uncertainties were addressed at other completed, ongoing, and planned waste removal and treatment projects
   i. Preliminary list of selected sites/projects included in companion document: "*Recommendations For Phase 1 Exhumation Studies*"
2. If warranted, expand to interviews of personnel directly involved in selective projects

SUMMARY

- The three studies being recommended herein are intended to develop information on the waste inventory, exhumation state of practice, and exhumation/inventory uncertainty necessary to answer the focus questions
- Based upon an assessment of the information produced in the three recommended studies, the EXWG may recommend additional work needed to answer the focus questions, to answer them more completely, or to answer them with a greater degree of certainty

Questions and Answers