Quarterly Public Meeting[1]

Ashford Office Complex
9030 Route 219
West Valley, New York
Wednesday, November 20, 2013

Meeting

6:30 pm	Welcome and Introductions	Bill Logue
6:35 pm	Project Update	Dan Coyne, CHBWV
6:50 pm	Erosion Working Group - Uncertainty Considerations and Prioritization of Recommended Phase 1 Erosion Studies	Sean Bennett; Greg Tucker, ECS
7:30 pm	Exhumation Working Group - Recommended Phase 1 Exhumation Studies	Bill Thomas; Steve Marschke, ECS
8:15 pm	Adjourn	

Next Meeting Tentatively Scheduled
Wednesday, February 26, 2014
6:30 p.m.
Ashford Office Complex

[1] To view presentations from the meeting and participate via WebEx please email Bill@LogueGroup.com by 5:00 pm November 19, 2013 and an electronic meeting invitation will be sent to you. When possible please use the WebEx chat feature to post questions or comments. The facilitator will read these to all present.

GROUND RULES

For Quarterly Public Meetings

West Valley Demonstration Project (WVDP) and
Western New York Nuclear Service Center (WNYNSC)

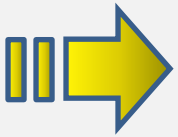
- *Please turn cell phones off, or to vibrate.*
- *Please respect the time limitations of the meeting.*
- *One person will speak at a time.*
- *Please do not interrupt anyone who is speaking.*
- *Please avoid side conversations in the room.*
- *Please hold all questions and comments until the presentation is completed and the moderator begins the question/comment period.*
- *Please clearly state your name before asking a question or making a comment.*
- *It is the moderator's job to manage the order of stakeholder participation (questions/comments) during the meeting.*
- *Stakeholders at the meeting will be recognized first.*
- *Stakeholders at the meeting should raise hands to be recognized before speaking.*
- *Stakeholders on the telephone or participating in a web-based meeting will be recognized after all questions/comments from stakeholders at the meeting are processed.*
- *Stakeholders on the phone please place your telephones on mute unless you are recognized by the moderator to speak.*
- *Meeting notes will be taken; meeting summaries will be prepared and posted on the website following review and approval by DOE/NYSERDA. The meeting summaries will include a general summary of questions and responses, but will not include individual comments and responses.*

Uncertainty Considerations and Prioritization of Recommended Phase 1 Erosion Studies

Presented By

Erosion Working Group (EWG) Subject Matter Experts (SMEs))
Sean Bennett, Ph.D.
Greg Tucker, Ph.D.

Quarterly Public Meeting
November 20, 2013



- Background
- Uncertainty in Erosion Prediction
- Prioritization of Studies
- Conclusion

Background

Timeline:

- ***EWG Recommended Phase 1 Erosion Studies (report submitted July 2012)***
  - Study area 1 - Terrain Analysis
  - Study area 2 - Age Dating and Paleoclimate
  - Study area 3 - Recent Erosion and Deposition Processes
  - Study area 4 - Model Refinement, Validation, and Improved Erosion Projections
- ***Stakeholder agency and public feedback received by September 2012***
- ***Independent Scientific Panel (ISP) review received January 2013***

Background *(cont.)*

***Timeline* (cont.):**

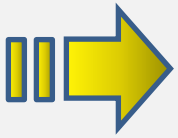
- ***Agencies requested that EWG address uncertainty in erosion prediction and prioritization of studies to reduce uncertainty – June 2013***
- ***EWG report on uncertainty and prioritization submitted September 2013***

Background *(cont.)*

The agencies requested additional input from the EWG in the form of two tasks:

- TASK 1: Prepare a report on uncertainty estimates for a broad range of erosion prediction methodologies applied over a range of space scales (hillslope to watershed) and timescales (decadal to multi-millennial scale)
- TASK 2: Conduct an assessment of study recommendations 1, 2, and 3 in the July 2012 report. The analysis should focus on identification and prioritization of studies/study components likely to reduce uncertainties in erosion predictions (as identified in Task 1) regardless of the type(s) of erosion prediction application(s) (e.g. landscape evolution model, hillslope gully model, etc.) or the analysis framework (i.e. probabilistic vs. deterministic) that may be applied at the site in the future.

Background



Uncertainty in Erosion Prediction

Prioritization of Studies

Conclusion

Sources of Uncertainty

Erosion working group identified six sources of uncertainty:

1. **Experimental:** uncertainty in measurement
   - Example: error in measuring stream flow
2. **Estimation:** uncertainty in mathematical prediction
   - Example: estimating stream flow velocity with an equation
3. **Temporal:** uncertainty in future conditions
   - Example: uncertainty in future climate

Sources of Uncertainty *(continued)*

4. **Theoretical:** uncertainty due to limitations in theory
   - Example: estimating long-term average hillslope erosion with a diffusion equation
5. **Geologic:** uncertainty in interpretation of geologic features
   - Example: uncertainty in dating stream terraces
6. **Cognitive:** uncertainty in documentation / communication
   - Example: uncertainty arising from published descriptions of site stratigraphy

Uncertainty and Sensitivity

Parameters used in erosion models can be characterized in terms of *uncertainty* and *sensitivity:*

- Uncertainty: what is the range of possible or likely values?
  - Example: gravitational acceleration varies slightly across earth but is known to very high precision
  - Example: permeability of natural sediments can vary by orders of magnitude
- Sensitivity: how much does the parameter matter?
  - Example: 10% uncertainty in stream slope leads to about 3% uncertainty in flow depth
  - Example: 10% uncertainty in flow depth translates into >15% uncertainty in sediment transport

Uncertainty in Erosion Prediction

TASK 1: Uncertainty Evaluation Methodology

Rank erosion model parameters and inputs in terms of both sensitivity and (current) uncertainty:

1. LOW:
   - Well known and/or limited range of natural variation — Weak sensitivity
2. MODERATE:
   - Moderate range of possible values — Linear sensitivity
3. HIGH:
   - Values poorly known and/or have wide potential range — Strong sensitivity

Uncertainty and Sensitivity

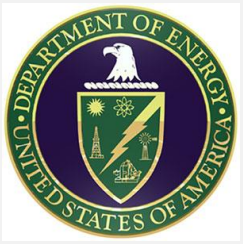
Gully erosion and landscape evolution model parameters with greatest potential for uncertainty reduction:

- Parameters describing material resistance to erosion and transport
  - Hydraulic detachment threshold and rate coefficient; particle size; bulk density
- Precipitation parameters
  - Frequency, depth, intensity, duration
- Morphologic parameters
  - Headcut height; channel geometry
- Soil hydrologic properties
  - Infiltration capacity

Uncertainty and Sensitivity

Site geologic and geomorphic characteristics with greatest potential for uncertainty reduction:

- Influence of documented postglacial climate events in the area
  - Example: Younger Dryas cold period, c. 12.8-11.5 ka
- Average rates of erosion since the last glacial maximum
  - Example: average rate of lowering on Buttermilk Creek near Frank's Creek confluence
- Overall geologic and geomorphic history of the site
  - Example: when did ice retreat and channel incision begin?



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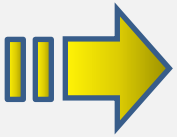
Background

Uncertainty in Erosion Prediction



Prioritization of Studies

Conclusion

Prioritization of Studies

Study areas 1 and 2

TASK 2 – Prioritization:

Focus of study areas 1 (Terrain Analysis) and 2 (Age Dating):

The following three tasks were identified for additional study (ranked in order of relative importance):

1. Relate postglacial climate events to stratigraphy or erosion and deposition, and their discrete history with time;
2. Calculate average rates of erosion since the last glacial maximum; and
3. Construct a geologic and geomorphic history of the WVDP.

Prioritization of Studies

Study areas 3 and 4

TASK 2 – Prioritization *(continued):*

Focus of study area 3 (Recent Erosion and Deposition Processes):

Focus data collection on refining estimates and quantifying uncertainty for parameters related to:

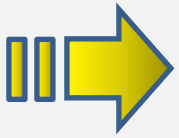
1. Material resistance to erosion and transport;
2. Precipitation
3. Morphology; and
4. Soil hydrologic properties.

Study area 4 (Modeling) would make use of refined geologic, material, and process data. Study area could include sensitivity analysis and uncertainty analysis.

Background

Uncertainty in Erosion Prediction

Prioritization of Studies



Conclusion

Conclusion

- ***The EWG has evaluated uncertainty in the context of erosion prediction technology over a range of space scales and time scales. This evaluation allowed the EWG to characterize and rank erosion model parameters in terms of uncertainty and sensitivity***
- ***The EWG revisited the recommended Phase 1 erosion studies and prioritized those activities that have the greatest potential for reducing uncertainty, regardless of the type of erosion prediction application or analysis framework that may be applied at the site in the future***

We Welcome Your Questions . . .

Reserve Slides

Background *(cont.)*

ISP Recommendations:

- The Main Objective of the Studies Should be Clearly Articulated
- Emphasis Should be Placed on Basing the Studies on Sound Science
- The Erosion Recommendations Should Address Uncertainty in More Detail
- The Erosion Studies Should Include Consideration of Natural Analogs
- Collaboration With Other Working Groups is Important
- The Agencies Should Provide Guidance to the EWG on Needed Data Quality Objectives so that the EWG Can Opine on Whether Additional Studies Can Meet the Objectives

Uncertainty in Erosion Prediction *(cont.)*

Uncertainty Index Ranking– Landscape Evolution Model Parameters

	Current				Potential			Current-to-
Parameter	**On-site**			**Uncertainty**	**Uncertainty**	**Revised**	**Revised**	**Revised**
	Data Availability	**Uncertainty**	**Sensitivity**	**Index**	**Reduction**	**Uncertainty**	**Uncertainty Index**	**Uncertainty Index Ratio**
Soil/till detachability	None	3.0	2.0	6.0	Calibration of model to inferred long- to medium-term landscape evolution; field and/or laboratory tests on site materials; estimation of 3D material distribution in subsurface	2.0	4.0	**1.5**
Bedrock detachability	None	3.0	1.5	4.5	Calibration of model to inferred long- to medium-term landscape evolution; estimation of 3D material distribution in subsurface	2.5	3.8	**1.2**
Soil/till detachment threshold	Limited	2.5	3.0	7.5	Calibration of model to inferred long- to medium-term landscape evolution; field and/or laboratory tests on site materials; estimation of 3D material distribution in subsurface	1.5	4.5	**1.7**
Rock detachment threshold	None	3.0	2.0	6.0	Calibration of model to inferred long- to medium-term landscape evolution; estimation of 3D material distribution in subsurface	2.5	5.0	**1.2**
Bed sediment entrainment threshold	Limited measurements on Buttermilk Creek	3.0	3.0	9.0	Field and/or laboratory tests on site materials	1.5	4.5	**2.0**
Fluvial sediment transport coefficient	None	1.5	2.0	3.0		1.5	3.0	**1.0**
Channel width coefficient and exponent	Regional hydraulic geometry data	1.5	2.5	3.8	Field measurements	1.0	2.5	**1.5**
Hydraulic roughness factor	None	1.5	1.0	1.5	Field measurements	1.0	1.0	**1.5**
Soil infiltration capacity	Little to none	2.5	3.0	7.5	Field measurements; calibration to rainfall data and streamflow hydrographs on Buttermilk Creek and tributaries	2.0	6.0	**1.3**
Storm depth, duration, and frequency parameters	Estimates from FEIS analysis	2.0	3.0	6.0	Field measurements and analysis of current data; use modified storm generation model	1.0	3.0	**2.0**
Elevation, slope, and topography	Lidar	1.0	3.0	3.0	Use newly available Lidar	1.0	3.0	**1.0**
Effective angle of repose for till material	Some	1.0	2.5	2.5		1.0	2.5	**1.0**
Hillslope creep coefficient	None	2.0	1.0	2.0		2.0	2.0	**1.0**

Uncertainty in Erosion Prediction *(cont.)*

Uncertainty Index Ranking– Gully Erosion Model Parameters

	Current				Potential			Current-to-
Parameter	On-site			Uncertainty	Uncertainty	Revised	Revised	Revised
	Data Availability	Uncertainty	Sensitivity	Index	Reduction	Uncertainty	Uncertainty Index	Uncertainty Index Ratio
Soil/till detachability	None	3.0	2.0	6.0	Calibration of model to inferred short-term landscape evolution; field and/or laboratory tests on site materials; estimation of 3D material distribution in subsurface	2.0	4.0	**1.5**
Soil/till detachment threshold	Limited	2.5	3.0	7.5	Calibration of model to inferred short-term landscape evolution; field and/or laboratory tests on site materials; estimation of 3D material distribution in subsurface	1.5	4.5	**1.7**
Gully sediment transport coefficient	None	1.5	2.0	3.0		1.5	3.0	**1.0**
Soil particle size and bulk density	Limited	2.5	3.0	7.5	Field and/or laboratory tests on site materials	1.5	4.5	**1.7**
Gully width coefficient and exponent	Regional gully hydraulic geometry data	1.5	2.5	3.8	Field measurements	1.0	2.5	**1.5**
Overland flow hydraulic roughness factor	None	1.5	1.0	1.5	Field measurements	1.0	1.0	**1.5**
Storm depth, duration, and frequency parameters	Estimates from FEIS analysis	2.0	3.0	6.0	Field measurements and analysis of current data; use modified storm generation model	1.0	3.0	**2.0**
Elevation, slope, and topography	Lidar	1.0	3.0	3.0	Use newly available Lidar	1.0	3.0	**1.0**
Soil infiltration capacity	Little to none	2.5	3.0	7.5	Field measurements	2.0	6.0	**1.3**
Headcut height (if applicable)	None	3.0	3.0	9.0	Field measurements	2.0	6.0	**1.5**

Uncertainty in Erosion Prediction *(cont.)*

Uncertainty Index Ranking– Terrain Analysis and Age Dating Parameters

				Uncertainty				Uncertainty
Tasks	**Methods; Tools**	**Data Availability**	**Examples and Potential Outcomes**	**Empirical**	**Cognitive**	**Conceptual**	**Sensitivity**	**Index**
Geomorphic mapping; landform identification	Lidar; aerial photographs; fieldwork; LaFleur geologic maps	Yes; need additional fieldwork	Moraines, terraces, old channels, landslides, alluvial fans, floodplain, modern channel	1	1	1	NA	1
Assign glacial vs postglacial categories	Lidar; aerial photographs; field; LaFleur geologic maps	Yes	Self explanatory as above	1	1	1	NA	1
Assign glacial substages, stadials, interstadials	Literature; OSL; regional correlation	Yes	Literature defined; regional correlations; Heinrich chronology relationships	1	1	2	2	2 to 4
Field confirmation for sampling activities, accessibility	Expert judgement and opinion	Existing reports; update as necessary	Evaluate site accessibility, suitability	1	1	1	NA	1
Rank potential sites for priority sampling	Expert judgement and opinion	Expert judgement and opinion	Liklihood of suitable organic material and OSL site.	1	1	2	2	2 to 4
Sampling phase	Augering; drilling. digital images	Needs discussion	Auger rather than trenching. Greater sample density than previously for selected sites	1	1	2	2	2 to 4
List potential climatic episodes	Literature from Finger Lakes; Great Lakes; northern hemisphere	Yes, especially Seneca Lake studies	See text	1	1	2 or 3	2	2 to 4
Relate postglacial climate events to stratigraphy or erosion/deposition and discrete history	Expert judgement and opinion; tree-ring analysis	Literature studies; especially Seneca Lake studies	Depends upon sample dating results	2	2	3	3	6 to 9
Construct geologic and geomorphic history	Expert judgement and opinion.	Expert judgement and opinion	Depends upon sample dating results	1	1	2	2	2 to 4
Calculate average rates of erosion	Sites to be selected	To be obtained	Depends on sampling and dating results	1	1	2	3	6 to 9

Prioritization of Studies

TASK 2 – Prioritization:

The uncertainty and sensitivity rankings for each parameter evaluated in Task 1 were used to prioritize the parameters with the greatest uncertainty indices and the greatest opportunities for uncertainty reduction through additional studies.

Landscape Evolution Modeling:

The following five parameters were identified for additional study for the LEM (ranked in order of relative importance):

1. Bed sediment entrainment threshold;
2. Soil/till detachment threshold;
3. Storm depth, duration, and frequency parameters;
4. Soil/till detachability; and
5. Soil infiltration capacity.

Prioritization of Studies
(cont.)

TASK 2 – Prioritization (cont.):

Gully Erosion Modeling:

The following six parameters were identified for additional study (ranked in order of relative importance):

1. Soil/till detachment threshold;
2. Soil particle size and bulk density;
3. Headcut height (if applicable);
4. Storm depth, duration, and frequency parameters;
5. Soil/till detachability; and
6. Soil infiltration capacity.

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

West Valley Demonstration Project
Summary of Quarterly Public Meeting – November 20, 2013

Members of the Public and Others Present

Diane D'Arrigo, Barbara Frackiewicz, Joanne Hameister, Lee Lambert, Kathy McGoldrick, Barry Miller, Orlando Monaco, Joe Patti, Paul Sapierski, Ray Vaughan, Barbara Warren.

Agency and Contractor Participants

Department of Energy (DOE): Bryan Bower, David Cook, Marty Krentz, Moira Maloney, Sandy Szalinski, Ben Underwood, Zintars Zadins.
New York State Energy Research and Development Authority (NYSERDA): Paul Bembia, Douglas Coble, Lee Gordon, Elizabeth Lowes, Andrea Mellon, Allyson Zipp*.
CH2M Hill B&W West Valley, Inc. (CHBWV): Charles Biedermann, Dan Coyne, Cindy Dayton, Mike Furner (American DND), David Kleule, John Rendall, Bill Schaab.
Enviro Compliance Solutions Inc. (ECS): Dhananjay Rawal*, Joe Yeasted*, Presenters: Sean Bennett, Steve Marschke, Bill Thomas, Greg Tucker.
New York Department of Environmental Conservation: Patrick Concannon, Ken Martin, Tim Rice.
Nuclear Regulatory Commission: Chad Glenn*.

Introductions and Announcements

The facilitator Bill Logue welcomed all present and reviewed the meeting protocols and documents and noted that the Phase 1 Studies website was currently down[1]. He briefly reviewed the process for the formation of the Phase 1 Studies Subject Matter Expert working groups and Independent Scientific Panel (ISP), submission of recommended studies and feedback process. Lee Gordon of NYSERDA announced that feedback on the Exhumation Working Group (EXWG) recommendations should be provided to the DOE and NYSERDA by January 15. The Agencies will then provide the EXWG recommendations and any associated feedback to the ISP.

Project Update

Dan Coyne of CHBWV provided project updates for the four contract milestones.

Milestone 1 – High Level Waste (HLW) Canister Relocation & Storage System. Status: The High-Level Waste (HLW) Storage Pad has been poured and is curing. The pad dimensions are 110 x 144 ft. A fabrication pad was built in the parking area to construct the vertical storage casks. Eight are complete, and potentially more casks will be fabricated in the spring and summer. In total there will be 56 vertical storage casks, and each will contain a multipurpose canister which will hold five HLW canisters.

Milestone 2 – Shipment of Legacy Waste. Status: To date, 70,751 ft^3 of low-level legacy waste and 4,992 ft^3 of mixed Low-level Waste (LLW) have been shipped. In addition, shipment of newly generated waste under the current contract includes; 472 ft^3 of hazardous/universal waste, 114,379 ft^3 LLW, 737 ft^3 of mixed LLW and 100,000 ft^3 industrial waste from the buildings that have been demolished. There is now room in the waste buildings to bring more inside. Efforts are continuing to remove the high-dose transuranic waste from the Chemical Process Cell (CPC) in order to demolish the Main Plant Process Building (MPPB). Grouting was completed on the Melter, and is now ready to ship pending final details. Rail and truck shipment is anticipated and bids are being solicited, but shipment may not happen until next year due to the current funding situation.

[1] Documents and materials relating to the Phase 1 Studies and West Valley Demonstration Project updates are available in the public meetings section of www.wv.doe.gov.
* Participated by telephone.

Milestone 3 – Demolition and removal of the MPPB and the Vitrification Facility. Status: Efforts are currently underway in preparing the MPPB for decommissioning and demolition, including completion of tank sampling in the Liquid Waste Cell, characterization of high hazards areas, asbestos abatement in the 3rd floor office area, and continuing deactivation of the Upper Warm Aisle and Hot Cells. In the Vitrification Facility, efforts continue to clean out equipment, materials and debris from the Vit Cell.

Milestone 4 – Complete all work described in the Performance Work Statement. Status: Continued deactivation, demolition and waste load out of the Vitrification Diesel Fuel Oil Tank Storage Pad, New Cooling Tower, Vit Hill Trailers, and Expanded Environmental Lab.

Questions

Questions were raised regarding the Vertical Storage Casks. Mr. Coyne explained that the anticipated contact dose from the casks will be less than 5 mR per hour. They are built for a 50-year lifespan. In response to a question regarding ventilation of the casks, Mr. Coyne explained that these casks differ from those for spent nuclear fuel (SNF) in that they do not have passive ventilation. The reason for that is that unlike SNF, the vitrified HLW in these casks will not have decay heat, and therefore do not need that kind of ventilation.

An additional question was asked regarding the rail shipment of the Melter. Mr. Coyne explained that there are currently two pinch points (points where the load is too large to pass by rail) preventing shipment directly from the site. Therefore, the Melter will be trucked to a rail site (potentially West Seneca) for shipment to a disposal facility.

Erosion Working Group – Uncertainty Considerations & Prioritization of Recommended Phase 1 Erosion Studies

Erosion Working Group Members Dr. Sean Bennett and Dr. Greg Tucker presented an update on the latest report of the Erosion Working Group (EWG). Following the July 2012 submission of the EWG study recommendations to the ISP, the EWG was asked in January 2013 to look at the issue of uncertainty in erosion predictions and to make recommendations on how to reduce uncertainties and to prioritize the EWG's recommended studies.

Dr. Tucker explained that six sources of uncertainty were identified: experimental, estimation, temporal, theoretical, geologic, and cognitive. Further, the EWG identified that the parameters used within erosion models can be characterized in terms of both uncertainty and sensitivity. Uncertainty refers to the range of possible or likely values, and sensitivity refers to how much the parameter matters. For some parameters, smaller degrees of uncertainty will have a greater impact on model results as a result of the parameters higher degree of sensitivity. Dr. Bennett then explained the uncertainty evaluation methodology, through which erosion model parameters and inputs were ranked in terms of sensitivity and current uncertainty. Parameters and inputs were evaluated for low, moderate, or high uncertainty based on the degree to which values are known or the degree to which possible values may vary. The degree of uncertainty then corresponds to a ranking of weak, linear, or strong sensitivity. From there, the EWG identified parameters that require greater attention as they had the greatest potential for uncertainty reduction.

Dr. Bennett continued to explain that the EWG then revisited their previously recommended studies to prioritize activities that would result in the most efficient use of resources. Under the focus of study areas 1 (terrain analysis) and 2 (age dating), the EWG identified three tasks for additional study in order to reduce uncertainty:

1. Relate postglacial climate events to stratigraphy or erosion and deposition, and their discrete history with time;
2. Calculate average rates of erosion since the last glacial maximum; and
3. Construct a geologic and geomorphic history of the WVDP.

For study area 3 (recent erosion and deposition processes), the EWG recommends focusing data collection on refining estimates and quantifying uncertainty for parameters related to material resistance to erosion and transport;

precipitation; morphology; and soil hydrologic properties. They did not recommend changes to study area 4 (modeling), but noted that it would make use of the refined data from the other study areas.

Questions

Several questions were raised following the presentation. In response to a question regarding worst-case scenarios for erosion during which several recent events in Western New York and Colorado were cited, Dr. Tucker explained the EWG is interested in examining a spectrum of future scenarios, including worst-case. Questions were also raised regarding climate change data predictions and data sources. Dr. Tucker explained that this is a level of detail not approached by the EWG yet, but that their efforts would seek to include data on climate change and precipitation. Dr. Bennett confirmed for those inquiring that the EWG is aware of the need for precipitation data, and specifically data that accurately reflects the region encompassing the site. In response to another question Dr. Bennett noted that they hope to look at depth to bedrock as it will impact erodibility under a variety of hydrologic conditions.

An additional question was asked regarding the degree to which judgments were made in assessing parameter uncertainties. Dr. Bennett confirmed that some professional judgment was used, but that the EWG examined all parameters in a model as well as multiple models, and then aggregated a score to arrive at their evaluation of uncertainty and sensitivity. Further questions regarding models to be used were raised and Dr. Tucker responded that looking at and deciding on a model(s) would be part of further discussions, and has not been decided yet. Future reports and findings of the EWG will be made available to the public.

Exhumation Working Group – Recommended Phase 1 Exhumation Studies

Exhumation Working Group members Bill Thomas and Steve Marschke presented the recommendations for Phase 1 Exhumation Studies from the Exhumation Working Group (EXWG). The EXWG consists of six members: Dr. Frank Parker, Dr. Ralph Wild, Mr. Jay Pride, Mr. Michael Travaglini, Mr. Bill Thomas, and Mr. Steve Marschke. Dr. Joseph Yeasted serves as Study Manager for the EXWG on behalf of ECS. The mission of the EXWG is to develop and execute studies that address key issues and related uncertainties pertaining to Phase 1 Potential Areas of Study, including:

- 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

The work of the EXWG was focused by seven topical questions prepared by DOE and NYSERDA related to the potential areas of study. From these questions, the EXWG recommends three studies that will help answer each of these questions.

Study 1 – Waste Inventory Analysis – updating the radionuclide inventories for the Nuclear Regulatory Commission-Licensed Disposal Area (NDA), State-Licensed Disposal Area (SDA) and Waste Tank Farm (WTF), and processing waste inventories. The last radionuclide inventories were completed between 2000-2005, and the EXWG recommends updating inventories to a new reference year (2020) and for 30, 60, 90, and 120 years thereafter. The updating is needed to account for radioactive decay with time. Regarding the waste inventories, the work would include quantifying the inventory of a given radionuclide that could be removed in a range of exhumation scenarios, and to determine the percentage of total waste inventory removed under a range of partial exhumation scenarios. This will inform decisions regarding various removal scenarios because the volumes and types radionuclides will be better known, as will the associated protection requirements and costs of the removal options.

Study 2 – Evaluation of Methods to Reduce Uncertainty – evaluating the approaches that could be implemented to better understand and reduce the level of uncertainty associated with radionuclide inventories and locations of waste within the NDA, SDA and WTF. Work components would include evaluating how conducive the SDA and NDA waste

inventory process is to a statistical evaluation of uncertainty; evaluating the results from previous radiation studies completed at the site; and evaluating the field characterization methods and technologies. There was a discussion of both intrusive and non-intrusive methods that may be used in the disposal areas.

Study 3 – Review of Precedent Projects – evaluating the experiences in exhuming or treating waste disposal areas and tanks at DOE, commercial, and international sites to determine state-of-practice and state-of-the-art in exhumation and treatment technologies; methods for worker, public and environmental protection; lessons learned; and key uncertainties and how they were addressed. Work components would include a literature search and, if warranted, interviews with personnel directly involved in selective projects.

Questions

A question was raised regarding structural integrity of the Waste Tank Farm, and whether that would be examined prior to looking at other sites. Mr. Thomas responded that these may be looked at in parallel, and that changes that have occurred since 2005 would need to be taken into account. Paul Bembia of NYSERDA also responded that the agencies are aware of the need to address the longevity of the tanks and are keeping that in mind as they make decisions. Another question was asked regarding the need to build facilities for exhumation. Mr. Marschke confirmed that as there are no facilities over the tanks, a facility may need to be built in order to conduct exhumation. Part of the studies will be to look at whether exhumation of the tanks and NDA and SDA wastes can be performed safely with shields and controls different from the robust concrete structures described in the FEIS. In response to another question, Mr. Marschke confirmed that options such as a mobile exhumation facility will be considered in the studies. A question was asked regarding the use of a tunneling approach for exhuming the SDA and NDA. Mr. Marschke indicated that tunneling would be considered.

A question was asked about a paper by Edward Esko in 2012 regarding Low Energy Nuclear Reactions (LENR) in order to reduce the concentration of uranium and plutonium in the disposal areas. A copy of the paper was provided by a member of the public.[2] The EXWG agreed to review the article and consider the technology as it may apply to their studies.

A member of the public noted that Ralph Wild was not credited as the author of the most recent waste inventory reports for the NDA, published in 2000, and SDA, published in 2002, and asked if Dr. Wild had authored or assisted in the earlier waste inventory reports. This member of the public strongly disagreed with the EXWG conclusion that these inventory reports were the most accurate, and asked that the EXWG review the previous waste inventory reports and assign probabilities for the total waste inventory based on all of the waste inventory reports generated to date. Similar comments were also provided during the public comment period on the Final Environmental Impact Statement (see public comments 110,111 and 112), and the example given noted the differences in the Plutonium-239 inventories in several studies. The EXWG agreed to review and consider the earlier inventory reports in the context of their proposed studies. Another individual stated the best use of resources would be to exhume all wastes. A member of the public suggested that both the EWG and EXWG address unexpected risk, such as through erosion, through the use of moving averages.

Topics for Next QPM

Before the conclusion of the meeting, Mr. Logue asked for suggestions of topics for future QPMs. Suggestions were received, including presentation of the contamination of the northeast corner of the HLW pad, information regarding the controlled release of contaminated water into Buttermilk Creek, and clarification regarding the Phase 1 Studies

[2] Esko, E. (2012). LENR-Induced Transmutation of Nuclear Waste. *Infinite Energy*, Issue 104, pages 9-15.

work and timeline. A request was made that the public be informed prior to any controlled release into Buttermilk Creek.

Documents Distributed

Document Description	Generated by; Date
Meeting Agenda	ECS; 11/20/13
CHBWV Presentation – Project Update	CHBWV; 11/20/13
Erosion Working Group Presentation	ECS; 11/20/13
Exhumation Working Group Presentation	ECS; 11/20/13