EROSION STUDY PLAN

Presented By
MICHAEL WOLFF

Erosion Study Area Manager

West Valley Demonstration Project
Quarterly Public Meeting
August 26, 2015

OUTLINE

WVDP Erosion Working Group

Erosion Study Plan Overview

- *Background and Purpose*
- *Problem Statement*
- *Three Main Study Components*

Study 1 – Terrain Analysis, Age Dating, and Paleoclimate

- *Purpose and Goal*
- *Study 1 Tasks*

Study 2 – Recent Erosion and Deposition Processes

- *Purpose and Goal*
- *Study 2 Tasks*

Study 3 – Preliminary Erosion Modeling

- *Purpose and Goals*
- *Study 3 Tasks*

Summary and Conclusions

Questions and Answers

EROSION WORKING GROUP

Sean Bennett, Ph.D.	*Dept. of Geography, State University of New York at Buffalo*
Sandra Doty, M.S., P.E.	*Consulting Geological Engineer*
Robert Fakundiny, Ph.D.	*New York State Geologist, Emeritus*
Greg Tucker, Ph.D.	*Dept. of Geological Sciences, University of Colorado*
Michael Wilson, Ph.D.	*Dept. of Geosciences, State University of New York at Fredonia*
Richard Young, Ph.D.	*Dept. of Geological Sciences, State University of New York at Geneseo*

Background and Purposes of the Phase 1 Erosion Studies

- The FEIS presented predictions of future erosion at the facility
- DOE and NYSERDA differed in their views of the degree of uncertainty associated with the FEIS erosion analysis.
- The purpose of the Phase 1 erosion studies is to:
  - Provide improved forecasts of future erosion at the WVDP,
  - Reduce the uncertainty associated with erosion prediction, and
  - Assist the agencies in reaching consensus on the likely effects of future erosion.

Erosion Problem Statement

The main study problem can be stated as:

Future erosion processes across various temporal and spatial scales need to be predicted with sufficient confidence that, when combined with other factors, enable the agencies to make informed Phase 2 decommissioning or long-term stewardship decisions about the WVDP.

EROSION STUDY PLAN OVERVIEW

Three Main Study Components

The three main study components are:	Each component contributes to resolving the main study problem by:
• Study 1 - Terrain Analysis, Age Dating, and Paleoclimate	✓ Improving understanding and quantification of past erosion processes
• Study 2 - Recent Erosion and Deposition Processes	✓ Improving quantification of present erosion processes
• Study 3 - Model Refinement, Validation, and Improved Erosion Projections	✓ Combining past and present data to enable more confident prediction of future erosion

STUDY 1 – TERRAIN ANALYSIS, AGE DATING, AND PALEOCLIMATE

Purpose:

- Build on previous studies to provide better definition of:
  - Locations, ages, thicknesses, and shapes of sediment and rock layers;
  - Past erosion and deposition history, rates, and rates of change.
  - Relation of paleoclimate to historical erosion processes

Goal:

- Provide a sound context and perspective for calibrating predictive erosion models (i.e. a good predictive model should be able to reproduce the present given a past baseline set of conditions)

STUDY 1 – TERRAIN ANALYSIS, AGE DATING, AND PALEOCLIMATE

Tasks:

1.1 Mapping

1.2 Field Reconnaissance

1.3 Site Prioritization

1.4 Site Walkover

1.5 Site Sampling

1.6 Sample Preparation and Selection for Dating

1.7 Sample Age Analysis, Geologic Interpretation

1.8 Report

STUDY 2 – RECENT EROSION AND DEPOSITION PROCESSES

Purpose:

- Quantify and characterize recent rates of surface and near-surface erosion and temporary sediment storage occurring in or on:
  - Hillslopes,
  - Regions of concentrated flow, and
  - Stream channels
- Provide better characterization of uncertainty in relation to
  - Hydrologic parameters,
  - Erodibility parameters, and
  - Gully geomorphic parameters

Goal:

- Provide a sound quantitative context and understanding of recent processes for designing and calibrating predictive erosion models (i.e. a good predictive model should start with a sound understanding of current processes)

STUDY 2 – RECENT EROSION AND DEPOSITION PROCESSES

Tasks:

2.1 Quantify Rainfall Rates and Snow Depths

2.2 Quantify Infiltration Capacity or Rate and Soil Moisture for All Surficial Materials

2.3 Quantify the Flow Rates and Total Suspended Solids in Select Gullies

2.4 Quantify the Flow Rates and Total Suspended Solids at Select Stream Locations

2.5 Quantify the Erodibility of the Surficial Materials

2.6 Quantify the Entrainment Thresholds for All Bed and Bank Materials within Select Gullies and Stream Channels

2.7 Quantify the Topographic Characteristics of Select Gullies

2.8 Reports

STUDY 3 – PRELIMINARY EROSION MODELING

Purpose:

- Estimate present-day uncertainty in erosion predictions to baseline uncertainty reduction
- Establish the most appropriate erosion modeling program(s)
- Identify justifiable ranges for the input parameters
- Identify potential “erosion hot spots”
- Perform calculations of potential future erosion across various time and space scales under alternative parameter sets and scenarios
- Provide quantitative estimates of confidence level in predictive erosion model results

Goals:

- Provide improved model predictions of future erosion at the WVDP,
- Reduce the uncertainty associated with erosion prediction,
- Provide recommendations for future studies, and
- Assist the agencies in reaching consensus on the likely effects of future erosion.

STUDY 3 – PRELIMINARY EROSION MODELING

Tasks:

3.1 Support Data Collection Studies and Evaluate Results

3.2 Conduct Preparatory Work for Model Selection and Component Testing

3.3 Design Model Calibration and Testing Strategy

3.4 Select, Extract, and Analyze Topographic Metrics

3.5 Generate Model Grids

3.6 Design Strategy and Select Site for Model Validation

3.7 Report Progress to Agencies and Stakeholders

3.8 Identify, Obtain, and Become Familiar with Computing Resources

SUMMARY AND CONCLUSIONS

- Together, the three studies are designed to:
  - Produce converging lines of evidence enabling improved prediction of future landscape evolution at the WVDP,
  - Improve the scientific defensibility of the results obtained,
  - Strengthen the confidence in short- and long-term forecasts of erosion processes, and
  - Provide a meaningful reduction in uncertainty

ANY QUESTIONS?