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Sent: Thursday, September 13, 2012 5:22 PM
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Cc: Persinko, Andrew; Michalak, Paul; McKenney, Christepher; Hayes, John; Chang, Lydia; Roberts, Mark; Barr, Cynthia; Cruz, Zahira; Esh, David; Gross, Allen
Subject: NRC Staff Comments on EWG Recommendations for Phase 1 Erosion Studies

NRC staff has reviewed the Phase 1 Studies Erosion Working Group (EWG) Recommendations for Phase 1 Erosion Studies and offer the attached comments. Based on information from the August 22nd West Valley Quarterly Public Meeting, we understand that DOE and NYSERDA are gathering input from public stakeholders and regulatory agencies on these recommendations and will provide this input to the EWG and the Independent Scientific Panel (ISP) for consideration.

It is our understanding that DOE and NYSERDA will make decisions with regard to conducting the studies following a detailed review of the recommendations and considering input received from stakeholders, regulatory agencies, and the ISP. We also understand that DOE and NYSERDA will respond in writing to written comments received on the Recommendations for Phase 1 Erosion Studies.

NRC staff would be interested in meeting to discuss the studies in more detail, after DOE and NYSERDA make their decisions on the studies to pursue.

Thanks for the opportunity to comment.

U.S. Nuclear Regulatory Commission Comments on: "Recommendations for Phase 1 Erosion Studies West Valley Demonstration Project (WVDP) and Western New York Nuclear Service Center (WNYNSC)," Prepared by WVDP Erosion Working Group, Enviro Compliance Solutions, Inc., (ECS) Contract Number DE-EM0001602/0920/11/105680, July 20, 2012

General:

1. Phase 1 studies appear to cover a nice range of activities from longer-term historical, to recent observations, and numerical modeling. Overall, the plan presented for obtaining additional information that could be used to improve and update the input used in the CHILD model and support long-term erosion projections appears adequate.
2. A stated objective of the assessment of recent observations is to cover a broader temporal and spatial scale. NRC staff considers this a key issue. Performance of a pure validation test will be very important to lending credence to the erosion predictions.
3. The additional observational data should be integrated with the unknowns of the models, or stated differently, a more direct tie between the results of the FEIS analysis (sensitivity and uncertainty analyses) and the proposed Phase 1 studies should be made. All of the proposed activities appear supported; the linkage could be made more clear.
4. More details would be helpful to ensure that the observational data that is collected provides unbiased information to develop the site conceptual and numerical models. A table of what the key issues are associated with the previous numerical model estimates and how the studies are addressing those issues would be helpful.
5. NRC staff note that reducing uncertainty in calibrating numerical models will not necessarily reduce uncertainty in erosion predictions. Numerical models are commonly over-fit and a better calibration does not improve the prediction.

Specific Comments:

1. With respect to Study 3, "Recent Erosion and Deposition Processes", information to improve simulation of knickpoint migration is important because it will affect the integrity of the slopes; however, it is also a difficult phenomena to predict.
2. With respect to Study 4, "Improved Erosion Projections", additional details on the parameters to be varied in the sensitivity analysis would be helpful.
3. The studies and modeling should include features that represent periods of post-glacial deposition as well as erosion.
4. With respect to terrain analysis studies, more focus should be placed on obtaining data on the locations, elevations and thicknesses of the deposits in the immediate vicinity of the WVDP site. Likewise, age dating studies should focus on determining when WVDP materials were deposited and when they began to erode.
5. Further studies and modeling should include the process of lateral stream migration and address the potential for stream capture in more detail than was previously done.
6. Several uncertainties in CHILD model construction and parameterization are noted in Appendix F to the FEIS and should be addressed during data collection, as appropriate. Many of the proposed studies address these key uncertainties; however, a clear linkage

between data collection efforts and key modeling uncertainties should be made. The following key parameter and modeling uncertainties were identified during previous evaluations:

a. Initial topography—The initial topography in the calibration model is based on the higher value of two elevations: (i) elevation from a DEM created based on an assumed Buttermilk Creek outlet elevation and slope of the remnant plateau surface and (ii) DEM created based on current topography. Additional studies could improve the pre-incision Buttermilk Creek watershed surface.
b. Base-level of Cattaraugus Creek—Three discrete base-level elevations are used in the FEIS CHILD modeling based on currently available data; additional measurements are needed to more accurately reconstruct the base-level history. Predictive modeling should also consider uncertainty in base-level of Buttermilk Creek that drives WVDP erosion.
c. Discretization and spatial distribution of materials—Three materials of varying erodability and a single infiltration capacity are used in the FEIS CHILD modeling. Additional complexity may be needed to reflect variability in material properties that may have a significant impact on the modeling results (e.g., infiltration capacity of WVDP materials may be lower than Buttermilk Creek materials considering higher observed run-off rates to Franks Creek). The need for differentiation of burial mounds and tumuli materials should also be considered. Additional characterization and collection of data to construct and parameterize the model to add additional material/distribution complexity may be beneficial to the overall decision-making process.
d. Climate—A constant climate state was assumed in the calibration model. Assumptions regarding climatic conditions in the CHILD modeling could lead to an over- or under-prediction of future erosion rates. Issues could arise in two areas: (i) calibrated parameters used in the predictive modeling may not be optimal due to uncertainty in the climate assumptions (e.g., calibrated parameters may be biased to compensate for climates that are drier or wetter than they actually were), and (ii) lack of consideration of future climate change may also compromise the usefulness of predictive modeling.
e. Lateral Channel Migration—Although the CHILD model has the capability of simulating lateral channel migration, this feature of the CHILD model was not used in FEIS modeling due to limited data. Lack of consideration of important processes such as lateral channel migration may limit the usefulness of the modeling to simulate processes that may be important to decommissioning decision-making. If found to be risk-significant in sensitivity analysis, resources should be spent to obtain additional data or to perform additional modeling to better assess the potential risks associated with lateral channel migration.

7. Confidence in the ability of erosion predictions to inform decommissioning decisions could be increased through execution of a comprehensive probabilistic sensitivity and uncertainty analysis focused on (i) the local WVDP site and (ii) future modeling predictions. Sensitivity analysis focused on the WVDP site could be conducted to

identify those parameters and processes most important to decommissioning decisions. Results of sensitivity analysis can help to identify and prioritize Phase 1 erosion studies.

While the modeling conducted to support the FEIS for WVDP used probabilistic approaches, the analysis was focused on calibration of a larger-scale model to larger-scale features. While the FEIS modeling is very useful in helping to constrain parameter values for use in the predictive modeling and is encouraged, over-emphasizing the utility of the Buttermilk Creek-scale model may lead to the over-expenditure of resources to obtain information and data to improve the calibration model but that may not be optimal for obtaining a better understanding of erosion processes important to the WVDP site. For example, Appendix F of the FEIS concludes that gully advance is the most important erosion process affecting WVDP decommissioning. However, predictions of smaller-scale phenomena such as gully migration at the WVDP site may not benefit from better calibration of the Buttermilk Creek model using the current set of calibration metrics. In fact, the highest ranked realizations used for predictive modeling may have under-predicted erosion at WVDP due to a relatively low infiltration capacity (only a single infiltration capacity is used) that is more reflective of the larger Buttermilk Creek watershed area. Sensitivity analysis was also conducted to study the impact of the creep coefficient in the FEIS modeling because of a concern that the relatively low creep coefficients reflected in the highest ranked realizations may not be reflective of actual or future site conditions (i.e., calibration metrics may not be sensitive to creep, although creep may be important to modeling erosion at WVDP).

8. Development of calibration metrics relevant to important WVDP erosion mechanisms should be considered. Collection of data to support evaluation of these additional calibration metrics should also be considered. The five calibration metrics used to gauge the relative goodness of fit of 1000 Monte Carlo realizations to help parameterize the predictive model are biased towards identifying parameter sets that can recreate larger-scale features. Parameters important to the calibration model may not be as important to predicting WVDP erosion and making decommissioning decisions.