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MEMORANDUM

To: Rob Hanson, Idaho DEQ
Bill Adams, U.S. EPA

FROM: Don Carpenter, Idaho DEQ *Donald Carpenter*
Craig Cameron, U.S. EPA *Craig Cameron*

DATE: January 13, 2015

SUBJECT: Final Repository Cap Design Standards at the East Mission Flats and Big Creek
Repositories

Purpose

Implementation of the remedy selected for the Bunker Hill Mining and Metallurgical Complex Superfund Facility requires design and construction of repositories for disposal of metals contaminated soils, sediments, debris, and treatment residuals. One component required for the design and construction of repositories is a final cap that will prevent human health or ecological impacts and additional groundwater or surface water contamination. The purpose of this memorandum is to summarize the technical evaluations and resulting decisions for the final cap designs at the East Mission Flats (EMFR) and Big Creek Repositories (BCR). Documentation of this process will provide information for future repository cap designs at Bunker Hill.

Introduction

During development of the initial repository designs for EMFR and BCR the specifications for the final cap construction were included. The BCR cap was originally designed in 2004 by the U.S. Army Corps of Engineers and modified in 2007 by the Idaho Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA). The EMFR cap design was originally developed in 2009. Both repository designs included an evapotranspiration (ET) cap for final closure.

Based on the unique characteristics of the yards' soils, the historical groundwater monitoring results, the unavailability of the cover material specified in the ET designs and a combined cost estimate of more than seven million dollars (TerraGraphics 2011); the final capping decision was re-evaluated starting in late 2011. This evaluation determined that there was insufficient

information on the in-situ permeability of the waste mass to fully evaluate the full range of capping alternatives available. In addition, the evaluation determined that the benefit of constructing a cap that further limited infiltration of precipitation into the repository waste had not been fully quantified.

To address the data gaps identified, a number of follow up evaluations were conducted. During November and December of 2012 field permeability testing of the EMFR and BCR waste material was conducted using a double-ring infiltrometer (TerraGraphics 2013). The results of the permeability testing were used as inputs to EPA's Hydrologic Evaluation of Landfill Performance (HELP) computer model. The HELP model results provided the estimated leachate volume generated by each repository assuming average annual precipitation and a one foot thick vegetated clean soil cap (TerraGraphics 2014a). The estimated leachate volumes derived from the HELP model were used as inputs into site specific fate and transport models developed for each repository (Golder Associates Inc. 2014; TerraGraphics 2014b). The fate and transport models estimated the potential for downgradient groundwater and surface water impacts at the property boundary of each respective repository.

Conclusions

The modeling conservatively estimates that there is very little risk to human health and the environment within the 1,000 year time period from the infiltration of precipitation through the repository wastes. Considering the results of modeling, historical water quality, and the future CERCLA monitoring requirements, DEQ and EPA concluded that no additional risk reduction will be achieved with the inclusion of a low permeability layer in the repository cap design. DEQ and EPA's efforts to prevent unacceptable exposure of human and biological receptors to repository contaminants will focus on the design of a clean soil cap with a minimum thickness of 12 inches that will limit the potential for intrusion, erosion, and transport of contaminated sediments.

References

- EPA (U.S. Environmental Protection Agency). 2002. The Bunker Hill Mining and Metallurgical Complex Operable Unit 3 Record of Decision.
- Golder Associates Inc. 2014. East Mission Flats Repository Fate and Transport Model Results.
- TerraGraphics. 2011. Repository Cover alternatives Analysis.
- TerraGraphics. 2013. Waste Mass Permeability Field Assessment Results.
- TerraGraphics. 2014a. Big Creek and East Mission Flats Repositories Leachate and Metals Loading.
- TerraGraphics. 2014b. Big Creek Repository Fate and Transport Model.