

January 15, 2004

Timothy J. Jackson  
Acting Director  
U.S. Department of Energy  
West Valley Demonstration Project  
10282 Rock Springs Road  
West Valley, NY 14171

SUBJECT: COMMENTS ON DRAFT EVALUATION OF ESTIMATED DOSES TO HUMANS  
AND BIOTA POTENTIALLY AFFECTED BY THE STRONTIUM-90  
GROUNDWATER PLUME ON THE NORTH PLATEAU OF THE WEST VALLEY  
DEMONSTRATION PROJECT

Dear Mr. Jackson:

The U.S. Nuclear Regulatory Commission (NRC) has reviewed the Department of Energy's draft report titled "Evaluation of Estimated Doses to Humans and Biota Potentially Affected by the Strontium-90 Groundwater Plume on the North Plateau of the West Valley Demonstration Project," dated June 2003. The report is clear and well written. However, it has several deficiencies that should be addressed. Specific comments on the report are enclosed.

Thank you for providing the opportunity to review this document. If you have any questions regarding the comments provided, please contact Anna Bradford at 301-415-5228.

Sincerely,

/RA/

Daniel M. Gillen, Chief  
Decommissioning Branch  
Division of Waste Management

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Distribution: DWM r/f DCB r/f WCreamer

\* See previous concurrence

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**U.S. NUCLEAR REGULATORY COMMISSION (NRC) STAFF COMMENTS ON  
“EVALUATION OF ESTIMATED DOSES TO HUMANS AND BIOTA POTENTIALLY  
AFFECTED BY THE STRONTIUM-90 GROUNDWATER PLUME ON THE NORTH  
PLATEAU OF THE WEST VALLEY DEMONSTRATION PROJECT”**

The report titled “*Evaluation of Estimated Doses to Humans and Biota Potentially Affected by the Strontium-90 Groundwater Plume on the North Plateau of the West Valley Demonstration Project*,” dated June 2003, was reviewed by NRC staff. The purpose of the report is to provide an evaluation of estimated doses to humans and biota resulting from the Sr-90 groundwater plume on the North Plateau. The resultant comments are presented in the following paragraphs.

After DOE has addressed the issues raised below, which will mainly impact dose modeling, the NRC may have more detailed questions on aspects of the groundwater modeling. Because of the offsite exposure scenarios, estimation of the peak expected dose to offsite receptors is not strongly dependent on many of the details of the groundwater model as long as the flux of Sr-90 to the surface water body has been reasonably estimated.

**Comment 1:**

The assumption that all the Sr-90 activity from the North Plateau in the surface water comes from the surface water at sampling point WNSWAMP needs additional justification.

**Basis:**

The Sr-90 plume has two northern lobes, a northwest lobe where groundwater seeps into the surface water drain that is measured at gage WNSWAMP, and a northeast lobe where the groundwater will eventually seep into the same tributary of Frank’s Creek that is gaged upstream at WNSWAMP. The groundwater that seeps into the tributary down stream from WNSWAMP is not included in the Sr-90 fluxes reaching Frank’s Creek.

**Recommendation:**

The Department of Energy (DOE) needs to justify the use of groundwater seepage from only the northwest lobe of the Sr-90 plume. If this is not possible, DOE needs to re-evaluate the groundwater seepage into the tributary above Frank’s Creek based upon groundwater seepage from both the northwest and northeast lobes of the Sr-90 plume.

**Comment 2:**

The calibration of the groundwater flow and transport models needs additional justification and documentation.

Basis:

The human dose from Sr-90 from the surface water pathway is dependent upon the concentration of Sr-90 in the groundwater that seeps into the surface water. Therefore, additional information and documentation of the groundwater flow and transport modeling is necessary to provide confidence that the dose calculations are meaningful.

Recommendation:

DOE needs to provide additional documentation that the groundwater flow and transport models are adequately calibrated.

**Comment 3:**

The use of different stream flow measurement periods for the surface water needs to be justified.

Basis:

The peak annual waterway concentrations of Sr-90 in creeks down stream of the West Valley Demonstration Project are based upon the peak annual flux of Sr-90 and the average stream flow rates. The average stream flow rates for WNSWAMP, Frank's Creek, and Buttermilk Creek are based upon data from 1999 through 2001, while the average stream flow for Cattaraugus Creek at the Felton Bridge is based upon data from 1967 through 1998. The peak annual waterway concentrations of Sr-90 should be based upon similar time periods for all creeks in the analysis.

Recommendation:

DOE should justify the use of different time periods in its surface water calculations, or it should use the same time periods for all creeks.

**Comment 4:**

The report provides the justification that public health and safety is protected; however, only impacts to an offsite receptor are considered. For site decommissioning, impacts to inadvertent intruders must also be considered.

Basis:

While the analysis may support the decision to ensure protection of public health and safety within the context of the current site usage and boundaries, the decision-making process should consider long-term impacts to offsite receptors as well as inadvertent intruders. The concentrations of contaminants within the plume on the current site are many orders of magnitude larger than the concentrations that an offsite receptor may be exposed to. The offsite receptor is only exposed to contaminants after significant dilution in the surface water bodies.

Recommendation:

Clarify the purpose of the current report. Include an analysis of impacts to inadvertent intruders that can be considered by decision makers when evaluating possible remediation or control methods for the plume. Regardless of responsibility for the contamination, the decision making should be appropriately holistic.

**Comment 5:**

The exposure modeling does not appear to consider the pathway of consuming contaminated game.

Basis:

Contamination is reduced significantly to the offsite member of the public via dilution in the surface water bodies prior to exposure. Hunting is a fairly significant practice in the area. Game (e.g., deer) can drink contaminated water and ingest contaminated vegetation which then would be passed on to human receptors when they are harvested by hunters. The levels of contamination that game are exposed to may be much larger than the contamination that offsite fish are exposed to.

Recommendation:

Provide an evaluation of the exposure to humans via the pathway of the harvesting of game.

**Comment 6:**

The groundwater analysis provides a deterministic analysis of the peak Sr-90 flux entering the surface water bodies. Details of the calibration and sensitivity analyses are not provided. It is not clear that the prediction represents a reasonably conservative bound to Sr-90 fluxes.

Basis:

The report mentions a calibration process; however, a comparison between present day predicted Sr-90 concentrations with observed concentrations is not provided. The estimation of contaminant flux rates can be sensitive to assigned values of dispersivity, distribution coefficients, and groundwater flux rates, among other variables. Modeling from 1996 used a source which is roughly 5 times less and resulted in a Sr-90 flux that is roughly 3 times higher than the current modeling result, an overall difference of roughly 15 times. For long-term predictions, it is important to have confidence in the modeling.

Recommendation:

Provide a comparison of predicted concentrations to observed concentrations. Perform a sensitivity analysis of the Sr-90 flux rates to key variables. If possible, use the current capture rates of the Sr-90 pump and treat system to constrain Sr-90 flux rates.

**Comment 7:**

The technical basis for the source term assumed in the modeling is lacking, including a description of other contaminants.

**Basis:**

The report provides the numerical values assigned in the modeling, but little detail as to why the source magnitude is appropriate. In addition, if the source of the Sr-90 was from a leak of waste during operations, it would be expected that other contaminants may have been released but are not migrating as quickly as the Sr-90.

**Recommendation:**

Provide a description and basis for the Sr-90 source term magnitude. Include a description of the potential other contaminants and their migration rates.

**Comment 8:**

Although the NRC does not have explicit regulatory requirements for the protection of aquatic and terrestrial biota, it is not clear why the biota exposure is estimated by considering exposure over the whole length of the stream.

**Basis:**

Portions of the site are contaminated by releases, including the Sr-90 plume, while other portions of the site are relatively undisturbed. The average dose to the average biota is estimated by taking the total length of streams on the site. This would only appear to be appropriate if the biota had natural ranges that covered or exceeded the total site area. Otherwise, biota in some of the contaminated streams may be greatly overexposed, but on average for the site as a whole the contamination levels are believed to be acceptable.

**Recommendation:**

Provide a clarification and basis for the averaging of biota doses over surface water bodies and soils. Provide a description of the natural habitat ranges of the biota and how they compare to the stream lengths and site areas.