May 10, 2013

NOTE TO: File PROJ0734

FROM: James Shaffner, Project Manager **/RA/**
Low-Level Waste Branch
Environmental Protection
and Performance Assessment Directorate
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Program

SUBJECT: SUMMARY OF CLARIFICATION DISCUSSION BETWEEN U.S. NUCLEAR REGULATORY COMMISSION STAFF AND U.S DEPARTMENT OF ENERGY AND SAVANNAH RIVER REMEDIATION STAFF CONCERNING FLOW AND TRANSPORT OF WATER AND CONTAMINANTS RELATED TO H AREA TANK FARM AT THE SAVANNAH RIVER SITE

On April 17, 2013, U.S. Nuclear Regulatory Commission (NRC) staff and contractors convened a discussion with U.S. Department of Energy (DOE) technical staff and contractors to pose some clarifying questions related to flow and transport of water and contaminants from H Tank Farm at the Savannah River Site. The questions were based on NRC staff review of DOE's performance assessment and related reference material. The discussions were conducted as part of NRC's consultation responsibility per Section 3116 of the Ronald W. Reagan National Defense Authorization Act of 2005. The discussions were for clarification related to specific technical areas highlighted in the summary and no decisions or conclusions resulted from the meeting.

Meeting participants are included in Enclosure 1; summary of discussion is included in Enclosure 2.

Docket No.: PROJ0734

Enclosures:
1. Meeting Participants
2. Summary

CONTACT: James Shaffner, FSME/DWMEP
(301) 415-5496

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ML13126A127

OFC	DWMEP	DWMEP	DWMEP	DWMEP	DWMEP
NAME	JShaffner	TMoon	CMcKenney	JJessie	JShaffner
DATE	05/1/13	05/2/13	05/3 /13	05/9/13	05/10/13

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List of Participants
Teleconference with U.S. Department of Energy Staff Re: Savannah River Site, H-Area Tank Farm regarding Flow and Transport Issues

April 17, 2013

Participant	Affiliation
Sherri Ross	U.S. Department of Energy (DOE) Savannah River (DOE-SR)
Larry Romanowski	Savannah River Remediation (SRR)
Kent Rosenberger	SRR
Mark Layton	SRR
Ben Dean	SRR
Maggie Millings	Savannah River National Laboratory (SRNL)
Gregory Flach	SRNL
Christopher Grossman	U.S. Nuclear Regulatory Commission (NRC)/Division of Waste Management and Environmental Protection (DWMEP)
Cynthia Barr	NRC/DWMEP
Leah Parks	NRC/DWMEP
George Alexander	NRC/DWMEP
Mark Fuhrmann	NRC/ORES
James Shaffner	NRC/DWMEP
Osvaldo Pensado-Rodriguez	Center for Nuclear Waste Regulatory Analysis (CNWRA)
Cynthia Dinwiddie	CNWRA
David Pickett	CNWRA

Meeting Summary

Teleconference Between U.S. Nuclear Regulatory Commission and U.S. Department of Energy Staff Regarding H-Area Tank Farm Section 3116 Consultation NRC Staff Request for Clarification Regarding Water and Contaminant Flow and Transport Issues

April 17, 2013

Based on its continuing review of the Performance Assessment (PA) related to the draft basis for H Area-Tank Farm (HTF) waste determination, the U.S. Nuclear Regulatory Commission (NRC) staff requested a follow-up discussion on several topics that arose during waste release discussions on April 4, 2013. This was followed by a discussion of specific clarifying questions related to water and contaminant flow and transport issues.

NOTE: Herein, the use of the term NRC staff refers collectively to NRC staff and its contractors; the use of the term U.S. Department of Energy (DOE) staff refers collectively to DOE staff and its contractors.

Topic: *Follow-up from Waste Release Exchange*

Discussion:

- Discussions continued about the potential impact of a clay layer on Dissolved Oxygen (DO) levels in well P27D. NRC shared its concern about whether P27D was representative of the DO in groundwater that contacts the HTF tanks and whether the well might be impacted given its observed variation in DO from other Savannah River Site (SRS) wells. DOE pointed out that clay layers can affect DO levels and that the P27D data appears to be valid. The relative depth of well P27D in the Upper Three Runs aquifer was also discussed. DOE stated that it believes that the low DO concentration used for calculation of the degradation of the grout in Type I tanks is likely reasonable. However, DO levels would be expected to be higher (more similar to oxygen levels in the vadose zone) in water adjacent to higher elevation tanks (Type II tanks).

- Regarding the estimated 26 gallons DOE utilized in the HTF Performance Assessment inventory for the Tank 16 secondary sandpad, DOE stated that it was based on the estimated 16 gallons from DP-1358 that entered the environment and was considered conservative. NRC also questioned how the inventory in the Tank 16 annulus duct, estimated at approximately 1200 gallons was estimated. DOE indicated that the appropriate subject matter experts to address this question were not participating in the call and DOE would follow-up on how this estimate was made.

- Regarding flow through the grout matrix and its impact on reducing capability, DOE tried to quantify both ends of the spectrum and apply a sensitivity analysis to inform the positive and negative impacts of each circumstance. DOE indicated it would follow-up on the alternative cases in its probabilistic analysis.

- Regarding hydraulic conductivity through degraded cementitious material, DOE summarized the impacts of different degrees of fracture and different levels of saturation. DOE staff also noted that fast pathways are treated independently in alternative cases.

- Regarding inconsistency in values for reducing grout samples, DOE indicated that because the grout fractures quickly in the model the initial (intact) hydraulic property values have a small impact on contaminant release.

Status: NRC staff appreciated the clarifications. There may be need for additional clarification on these topics as consultation continues, especially to address the points that DOE was going to provide future information on.

Topic: *GSA (General Separations Area)/PORFLOW*

Discussion: NRC staff had questions regarding inconsistencies between path lines produced by the GSA and HTF PORFLOW models. DOE indicated that although the source locations appeared to be similar, differences in starting point elevations might explain the differences in particle tracks.

Status: DOE will confirm elevations of model starting points.

Topic: *Flow Model Calibration*

Discussion: NRC staff had several questions related to calibration statistics and residuals. DOE staff noted potential issues with calibration targets that led to the highest residuals in the northern portion of the GSA. NRC staff noted potentially high residuals across HTF in the lower zone of the Upper Three Runs aquifer and requested information on calibration statistics and residuals in the area of concern (i.e., HTF).

NRC staff also requested clarification on the types of adjustments that were made in the FACT and PORFLOW model calibration process including changes to recharge rates at HTF. NRC and DOE discussed a number of other issues related to the complexity of H-Area stratigraphy. NRC noted its primary concern at this point is the magnitude of lateral dispersion due to head gradients and changing flow directions and its impact on model results. NRC also noted the potential impact of the closure cap on flow directions.

Status: The complexity of this topic warrants further discussion as NRC continues its review.

Topic: *Model Validation*

Discussion: NRC staff had questions related to model validation based on previous leaks and the use of environmental monitoring data from a specific well. DOE noted the construction of a water injection system under Type II tanks to mitigate anticipated drought conditions. Instead the system was used in reverse to extract water from beneath tank pads. NRC staff noted that non-volatile detections in the Gordon aquifer may help with model validation if the detections could be tied to a source. For example, DOE might perform backwards particle tracking to determine a source location for Gordon aquifer contamination.

Status: NRC is seeking additional well reports to analyze data trends.

Topic: *Hydrology Representation in PORFLOW model*

Discussion: NRC staff noted differences between the descriptions of hydrogeologic unit information for H Area and that in the H Area model layer information. DOE indicated that the descriptions of the hydrogeology were general in nature and intended to reflect a range. DOE stated that model information is consistent with its understanding of the stratigraphy at the site. NRC stated that additional H-Area specific physical data for comparison with model representations would be appreciated. DOE, previously, has divided the vadose zone into an upper vadose zone (UVZ) and a Lower Vadose Zone (LVZ). In some areas for HTF, the LVZ is below the water table. DOE indicated that this has resulted in conservative sorption coefficient assignments in the LVZ. DOE indicated it would confirm the properties used for the vadose zone.

There was a discussion on the possible impact of closure cap on the water table, as well as the apparent dramatic change in water table in some areas in the 1985-1987 timeframe. DOE indicated that the change in 1985-1987 could not be entirely explained by precipitation changes and may be a result of diminution of perched water during drought conditions. There is also anecdotal information that early construction practices sometimes called for water removal wells upgradient of construction sites.

Status: The complexity of this topic warrants further discussion as NRC continues its review.

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Topic: *Boundaries*

Discussion: NRC staff indicated that it is still evaluating the reasonableness of the compliance boundary. NRC staff noted that additional information regarding the reasonableness of the boundary or the risk-significance of the boundary will facilitate resolution of this issue. For example, DOE could show that only significant sources were considered in drawing the boundary (e.g., the boundary would not change significantly considering 95 versus 99 percent of the inventory) or that the dose would not change significantly for a more conservative boundary. NRC staff expressed concern about establishing a precedent for the artificial

extension of the compliance boundary through inclusion of non-risk-significant sources. DOE indicated that the boundary determination was predicated on including both the waste tanks and ancillary equipment (e.g., transfer lines) as inventory sources. DOE indicated that the boundary determination did not pre-emptively exclude locations as potential inventory sources based on their relative inventory contributions.

Status: Additional explanation of DOE's rationale for inclusion of outlying ancillary equipment in establishing the basis for the 1 meter and 100 meter compliance points would be helpful.

Topic: *Sorption Coefficients*

Discussion: NRC inquired regarding DOE's basis for sorption coefficients (Kds) for certain radionuclides under certain conditions. DOE stated that in some cases Kds were derived from off site (Hanford) information. As part of its annual PA maintenance, DOE will acquire site and radionuclide specific data for a range of soil and material conditions.

Status: Follow-up discussions regarding Kds are anticipated.

The respective technical staffs agreed that near term follow-up discussions on the following topics are warranted:

- Model Calibration
- Sorption Coefficients
- Residual waste inventory and removal to the maximum extent practical.