



January 24, 2017

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Tina M. O'Rourke, Business Manager
Horsham Water & Sewer Authority
617 Horsham Road
Horsham, PA 19044

Reference: Perfluoroalkyl Substances; Review of Draft Remedial Investigation Data Summary Report

Dear Ms. O'Rourke:

On behalf of the Horsham Water and Sewer Authority (HWSA), we provide this letter with comments based on our review as discussed. G&A reviewed the following report:

- Remedial Investigation Data Summary Report, Perfluorinated Compound Investigation Activities, NAS JRB Willow Grove, PA, Draft Version 1, prepared by Resolution Consultants for Naval Facilities Engineering Command, Mid-Atlantic (Navy), dated November 11, 2016.

This letter provides a summary of the scope of this report and technical comments. The report addresses remedial investigation activities, and is abbreviated as "RIDSR" below. The term PFAS is used in the RIDSR and is considered a better description than perfluorinated compounds (PFCs). Thus we use the acronym PFAS in our review below.

RIDSR Overview:

The remedial investigation follows the Navy's previous investigations of PFAS as noted below:

- Evaluation of Potential Sources of Perfluorinated Compounds, prepared by Resolution Consultants, final report dated March 2016 (initial draft was provided for HWSA review in April 2015).
- Sampling and Analysis Plan, Perfluorinated Compound Investigation Activities, prepared by Resolution Consultants, final report dated April 25, 2016 (initial draft was provided for HWSA review in June 2015).

The stated objective of the RIDSR is to determine the extent of the PFAS impacts associated with NAS JRB Willow Grove in groundwater, surface water, soil, and sediment. The report presents the results of sampling with comparison to screening levels. The results of the study will reportedly be used for further investigation.

The RIDSR evaluates sampling performed in 2014 (groundwater sampling and public supply well sampling), 2015 (surface water and sediment sampling), and new sampling not previously reported. The recent sampling includes 154 ground water samples, 108 soil samples, 53 sediment samples, and 54 surface water samples.

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The RIDSR compares the sample results to project-specific screening levels. The project-specific screening levels were reportedly prepared based on health information associated with the EPA's May 2016 health advisory level (HAL) and current research.

The RIDSR provides an updated Conceptual Site Model (CSM) that provides the framework for the investigation. The RIDSR provides interpretation of geology and hydrogeology based on soil borings and monitoring well installations, which was used to inform the development of the CSM. The CSM identifies source areas, source media, release mechanisms, exposure media, potential pathways for contaminant travel, and potential human and ecological receptors to the contamination. The CSM is presented in tabular form in Figure 4-1 of the RIDSR.

The RIDSR reports the following impacts based on the sampling and comparison to screening levels:

- Groundwater was found to be impacted throughout the Navy site, where sampling was performed. Limited sampling was reported beyond the Navy site.
- Surface water was found to be impacted primarily to the northwest of the Navy site. Some impact to surface water was identified southeast of the Navy site.
- Soil was found to be impacted in concentrated areas near the central portion of the site, as well as specific areas that involved fire training and disposal.

The results of this study will reportedly be used to inform further focused sampling, which will then inform risk assessment and selection of remedial actions. The selected remedial actions will ultimately be detailed in a Record of Decision (ROD).

Previously the timeline to prepare the remedial investigation was November 2016. The RIDSR, however, identifies several areas that require further study, and an updated timeline for the CERCLA process was not provided.

G&A Comments on the Draft RIDSR (provided for consideration by the Navy):

1. The conceptual site model presented in the RIDSR indicates that offsite residents are not potential receptors to groundwater contaminated with PFAS because offsite drinking water is provided to the area by municipal water, and contamination will be addressed through the cooperative agreement. While it is true that the cooperative agreement provides a mechanism to treat HWSA public water supply wells, as well as connect properties with private wells to public water, the cooperative agreement does not require that such treatment be considered the final remedy of all groundwater outside of the Willow Grove NAS JRB. The installation of treatment systems is in essence an interim remedial measure to protect the public and is not considered the final remedy for offsite groundwater. We continue to recommend that the Navy's investigation consider evaluating the source material, how contamination may spread from the source material into area drinking water supplies, and how the contamination may ultimately be mitigated at the source.
2. The RIDSR reports that screening levels were developed in accordance with EPA methodology. We defer to EPA for review of the calculations of the screening levels.
3. The RIDSR indicates that data gaps in the report include evaluation of the soil-to-groundwater pathway, and the connection between surface water and groundwater. These pathways appear to be significant and warrant further investigation given the exposure of area residents and workers to groundwater and surface water.

4. The RIDSR provides conclusions that the aquifer is interconnected, and there do not appear to be confining barriers to groundwater flow. However the report also indicates that aquifer testing was not performed. This data gap appears significant, since the primary route of exposure to PFAS to date appears to be through groundwater.
5. The RIDSR indicates that geologic correlations could not be made between sampling locations, even with the use of geophysics. However, past USGS studies reported correlation between multiple boreholes, both at Willow Grove and Warminster investigations. We recommend consideration of the new reporting by USGS in order to aid in evaluation of groundwater flow.
6. We recommend that an updated schedule be provided regarding the ongoing CERCLA process.

Should you have any questions, please do not hesitate to contact me.

Sincerely,



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Hydrogeologist
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