



PHIL-27993

August 13, 2024

Project Number 08005-WE04

Ms. Sarah Kloss (3SD11)  
U.S. Environmental Protection Agency Region 3  
Four Penn Center  
1600 John F. Kennedy Boulevard  
Philadelphia, Pennsylvania 19103

Mr. Nate Doyle  
U.S. Environmental Protection Agency Region 3  
Four Penn Center  
1600 John F. Kennedy Boulevard  
Philadelphia, Pennsylvania 19103

Reference: Contract No. N6247016D9008  
Contract Task Order (CTO) No. WE04

Subject: Technical Memorandum, Anaerobic Bioremediation Injection Alternative  
Former Naval Air Station Joint Reserve Base Willow Grove  
Horsham Township, Pennsylvania

Dear Ms. Kloss and Mr. Doyle:

On behalf of the Navy, Tetra Tech is pleased to provide the following response to comments on the subject Naval Air Station Joint Reserve Base (NASJRB) Willow Grove Site 5 technical memorandum.

**Comments received from Nate Doyle (EPA), received on July 18, 2024:**

1. **COMMENT, General concurrence:** I do not have any concern with the proposed adjustment to amendment injection for Site 5. Due to the past issues with injections made under pressure, I would concur that the use of a gravity feed system should be the most effective way to introduce the necessary volume of amendment into the target area of the aquifer without the potential issues previously seen during targeted injections (daylighting).

***Response:*** Acknowledged.

2. **COMMENT, Monitoring Wells as Injection Points:** The proposed approach includes utilizing current monitoring wells as injection points. The use of monitoring wells as injection points is generally discouraged as it will negatively impact the usefulness of these locations as representative monitoring points of the aquifer conditions in this area. This would be a near term concern as the aquifer would be expected to return to a baseline, pre-injection condition over time. The installation of additional injection wells would be preferred. If injection wells cannot be installed, geochemical data should be collected to provide lines of evidence for future analysis and interpretation of groundwater sample representativeness.

***Response:*** Two monitoring wells (05MW01S and 05MW21) are proposed to be permanently converted to injection wells. These wells are within 30 feet of six other monitoring wells located within the treatment area screened within the shallow aquifer zone. In addition, one of the wells proposed to be converted to an injection well (05MW01S) is screened across the water table, which reduces the viability of its use for monitoring volatile organic compounds (VOCs). However, based on the existing

*monitoring well layout, the sample density within the treatment area remains sufficient to evaluate remedy performance, even without the use of the two wells proposed to be converted to injection wells.*

*Both wells (05MW01S and 05MW21) are currently sampled quarterly for VOCs, total organic carbon (TOC) and field parameters, and annually for the remaining parameters associated with the sampling program. Thirty-three years of data are available for monitoring well 05MW01S and eleven years of data are available for monitoring well 05MW21. This historic data set provides a baseline data set which can be used to evaluate the representativeness of future groundwater samples if the wells are ever decommissioned as injection wells and returned to service as monitoring wells.*

3. **COMMENT, Recirculation:** The proposed gravity feed injection will be followed by a period of groundwater recirculation. The need and purpose for the recirculation is not clear. Is it thought that the recirculation will better distribute the injectate through the targeted treatment area, or is the period of recirculation only for compliance with the ROD? The injections completed in 2023 were meant to target this same portion of the aquifer, however it did not appear to have any success in increasing TOC concentrations in the target area. It is unclear that the recirculation proposed during the gravity feed would aid in treating this portion of the aquifer.

**Response:** *Use of the groundwater recirculation system is a requirement of the ROD. In addition, enhancing the movement of groundwater in the treatment cell during injection is expected to enhance the distribution of carbon substrate from the two gravity feed injection wells, screened in the shallow zone, to the broader treatment area. Although the highest concentrations remaining in the treatment area are present in the shallow aquifer zone immediately adjacent to the proposed gravity feed injection wells, exceedances of the RGs are present throughout the recirculation cell. Distribution of carbon substrate throughout the treatment cell will help to enhance biodegradation throughout the entire target treatment area.*

4. **COMMENT, PFAS pilot system interference:** Is it known why the previous injections did not access this portion of the aquifer as intended? Interference from the PFAS pilot system and/or poor connection with either the injection or extraction wells (or both)? During recirculation, if the extraction well is hydraulically connected to the target area, but the injection wells are not, there is the potential to inadvertently remove the injectate from the target area and redistribute it to unintended areas.

**Response:** *The exact cause is unknown; however it is likely the result of fracture locations and angles within the fractured rock and their relation to the recirculation system injection well screens. The proposed injection plan includes direct application of a relatively high concentration low volume carbon substrate to the areas with the highest residual concentrations from the top down. Assuming the converted monitoring wells will accept the injectant, it is very unlikely the carbon substrate will not reach its targeted area. Any additional distribution provided by operation of the recirculation system is unlikely to remove the carbon substrate from the direct application area, but could enhance distribution through the remainder of the treatment area.*

5. **COMMENT, Figure 3 – Cross Section B-B':** The injection and extraction well labels are reversed in this figure.

**Response:** *The cross-section has been revised.*



A Final Technical Memorandum, Anaerobic Bioremediation Injection Alternative, Former Naval Air Station Joint Reserve Base Willow Grove, Horsham Township, Pennsylvania is attached, reflecting the comment responses above. The comments have been considered as part of our proposed Site 5 bioremediation injection alternative described in the subject document. Therefore, the Navy plans to move forward with the next injection during the week of August 19, 2024 in order to keep the annual injection approach on schedule.

Sincerely,

A handwritten signature in blue ink, reading 'Stephen J. Mitchell'.

Stephen J. Mitchell, PG  
Senior Project Manager

SJM/nfs

Attachment

- c: Brian Helland (Navy BRAC PMOE)
- Dawn DeFreitas (Navy BRAC PMOE)
- Jonathan Harris (Navy BRAC PMOE)
- Navy Caretaker Office
- Tom Ames (HLRA)
- William Gildea-Walker (Horsham Township Manager)
- Larry Burns (HLRA)
- Michael Shinton (HLRA)
- Horsham Library
- NIRIS RDM
- File

This page intentionally left blank