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GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
REMEDATION AND REDEVELOPMENT DIVISION



PHILLIP D. ROOS
DIRECTOR

July 28, 2025

VIA EMAIL

Demian Wincele, PFAS Project Manager
Army National Guard
111 South George Mason Drive,
Arlington, Virginia 22204-1373

SUBJECT: **NONCONCURRENCE** - Comments on the Predesign Investigation Workplan;
Grayling Army Airfield (GAAF) – Camp Grayling; Grayling, Crawford County,
Michigan

Dear Demian Wincele:

Michigan Department of Environment Great Lakes, and Energy (EGLE) staff has reviewed the "*Predesign Investigation Workplan*," (Workplan) for the Permeable Adsorptive Barrier (PAB) pilot study (Pilot Study) at GAAF. This Workplan was received via email by EGLE staff on May 9, 2025. After providing initial comments on May 27, 2025, and receiving Army National Guard's (ARNG) Response to Comments on June 10, 2025, EGLE staff and ARNG participated in a Comment Resolution meeting on June 23, 2025, and comments were returned to ARNG on June 27, 2025. Additional clarifications were added by ARNG, with comments returned to EGLE staff on July 22, 2025.

After reviewing the information presented in this Workplan and relevant supporting documentation, EGLE staff consider this Workplan insufficient for concurrence. EGLE staff request this letter is attached to the final workplan and included in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record. EGLE staff concur with the completion of the Pilot Study at GAAF; however, EGLE staff have identified issues with the future removal action, which warrant further discussion.

The following outlines comments and overall topics, which EGLE staff consider unresolved:

Project Funding:

As EGLE staff notes in comment 26, funding for performance monitoring of the Pilot Study after August 2025 is contingent on finalization and award of Fiscal Year 2025 funding; however, funding is expected by September 30, 2025. If funding is not secured, post-injection monitoring of the Pilot Study scheduled through July 2026 will be impacted. Based on the response to comments on July 22, 2025, EGLE staff understand ARNG has received funding and anticipates completing a contracting action in time to implement the monitoring through June 2026 as described in this Workplan.

Given that funding for the potential full-scale implementation of the Pilot Study was not awarded in Fiscal Year 2025, EGLE staff have concerns regarding funding uncertainty and ARNG's priority level of this project. Additionally, EGLE staff have concerns relative to the injection of colloidal activated carbon (CAC), and calcium chloride into an aquifer used for drinking water without funding for continued monitoring.

Designation of the Proposed Future Time Critical Removal Action:

As EGLE staff notes in comment 1, EGLE staff agree with ARNG and the Office of the Deputy Assistant Secretary of the Army (ODASA) Counsel that prompt action is warranted at the southeastern portion of GAAF in response to the release and transport of Per- and Polyfluoroalkyl Substances (PFAS) in groundwater. ARNG monitoring well data has shown a plume migrating southeast off-base into the City of Grayling since 2021, and more recent plume data presented in Restoration Advisory Board (RAB) meetings show PFAS near the City of Grayling municipal wells in the shallow aquifer at concentrations exceeding Department of Defense (DoD) Regional Screening Levels, three times the Environmental Protection Agency maximum contaminant levels, and groundwater criteria outlined in Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Planning for a response action at GAAF has been ongoing since the December 2023 RAB meeting, when ARNG first announced a Non-Time Critical Removal Action (NTCRA) was to be conducted, and an Engineering Evaluation/Cost Analysis (EE/CA) was to be awarded in Summer 2024. In February 2024, EGLE staff sent a letter to ARNG requesting an Interim Action be executed at GAAF, and stated: the Interim Action *“must explore all feasible options at the site, including hydraulic control using extraction wells and hotspot removal, in addition to the proposed PAB,”* as typically completed in an EE/CA. However, in the May 2024 RAB meeting, the response action changed to a Time-Critical Removal Action (TCRA), which does not require the completion of an EE/CA.

As of July 2025, commencement of the TCRA has not yet occurred, nor is scheduled to occur in the next year, due to lack of funding. However, additional time and funding have been allotted towards planning and engineering of the "potential future TCRA" through the Pilot Study and additional pre-design investigation activities, as would typically be completed as part of an NTCRA or Interim Remedial Action. This is extending the implementation of a removal action at least another year and a half. Per DoDM 4715.20(4)(b)(4)¹: *“If a period of at least 6 months is available before the commencement of on-site removal actions, the DoD Component shall complete an EE/CA.”* Further, September 3, 2024, Assistant Secretary of Defense memo states: *“a TCRA is used, when after an evaluation of the site, the lead agency determines there is less than six months of planning time available for removal activities.”*

Therefore, EGLE staff do not agree that the Pilot Study falls under planning for a *“potential future TCRA”* given the significant time that has passed since GAAF was evaluated for a removal action, as well as additional funds and time which have been allotted for the Pilot Study and planning of the future removal action. EGLE staff request ARNG to complete an EE/CA that explores all feasible options at GAAF, including hydraulic control using extraction wells and hotspot soil excavation, in addition to the proposed PAB, concurrently with the Pilot Study as part of the originally planned NTCRA to ensure the removal action is consistent with CERCLA, as required by the Defense Environmental Restoration Program (DERP). EGLE staff also request a written response demonstrating ODASA Counsel's review of the regulatory requirements and concurrence with the designation of this effort as a TCRA.

Insufficient Monitoring:

In comment 9, in response to EGLE staff's request for additional monitoring wells to study the change in transmissive properties of the aquifer, this Workplan states: *“Regenesis has not*

¹ Department of Defense Manual; NUMBER 4715.20; March 9, 2012; Incorporating Change 1, August 31, 2018; <https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodm/471520m.pdf>

observed a significant change in transmissivity due to injection of CAC over many hundreds of sites.” EGLE staff notes, the Grayling aquifer consists of sands and gravels, with discontinuous seams of lower permeability silty sands (Quinnan, et al. 2021). A Regenes study shows, in coarse sands treated with 1 percent CAC, a negative change to hydraulic conductivity of 21 percent was observed in the aquifer without application of calcium chloride, and a decrease of 52 percent is observed when calcium chloride is applied downgradient the CAC barrier (Bents, et al. 2025). The Navy Environmental Sustainability Development to Integration study completed by APTIM Corp indicated an average groundwater velocity decrease of 24 percent two years after a 4 percent CAC injection without the application of calcium chloride. In the Pilot Study, calcium chloride will be applied downgradient of half of the CAC barrier to evaluate the need for a parking agent in the full-scale implementation. As EGLE staff stated above, this configuration shows the largest decrease in hydraulic conductivity. EGLE staff are concerned a decrease in hydraulic conductivity of this magnitude may cause the plume boundaries to expand and potentially migrate towards additional residential properties, as well as the City of Grayling municipal well #2, which currently appears outside of the known area of the plume.

Additionally, in comment 9, EGLE staff’s request for the installation of side-gradient monitoring wells to monitor the dynamics of the post injection plume migration pathways was denied, stating: *“the pilot study PAB location is in the core of a relatively large plume, side gradient monitoring wells would not provide a good control for understanding migration pathways resulting from PlumeStop® application.”* Per August 6, 2024, RAB meeting minutes, Regenes indicated the barrier will act hydraulically like *“a big rock sitting in a river,”* and as expected the untreated groundwater along the sides of the barrier will merge back together with the treated groundwater somewhere downgradient. In addition to the side-gradient monitoring wells, EGLE staff request a complete model of potential plume migration be included in the Pilot Study to understand potential changes, however minimal, in the plume migration pathway for the full-scale implementation.

The theoretical longevity of in-situ CAC for PFAS is based on modeling completed in 2019 and 2024, and no long-term in-situ studies have been conducted to confirm a longevity of 30 years. Long-term mass loading to the in-situ CAC barrier over time will exhaust the adsorption capacity and result in breakthrough of PFAS (McGregor, Rick. 2018, McGregor, Rick. 2021). EGLE staff also understand that in-situ CAC application does not degrade or remove PFAS from the aquifer. It sequesters PFAS in the aquifer matrix with the carbon, where it cannot be easily removed. If full-scale implementation occurs and this removal action becomes part of the final remedial action, EGLE staff will look toward ARNG to monitor the groundwater for PFAS and reapply CAC in perpetuity due to the creation of a secondary source, which poses a risk to downgradient residential and municipal wells. This may hinder ARNG’s ability to achieve site closeout at GAAF.

Applicable or Relevant and Appropriate Requirements (ARAR):

Per 40 CFR 300.415(j)², *“Fund-financed removal actions under CERCLA section 104 and removal actions pursuant to CERCLA section 106 shall, to the extent practicable considering the exigencies of the situation, attain applicable or relevant and appropriate requirements ARARs...”* Going on to say *“In determining whether compliance with ARARs is practicable, the lead agency may consider appropriate factors, including: the urgency of the situation; and the*

² National Archives; Code of Federal Regulations; Title 40; Updated July 23, 2025;
<https://www.ecfr.gov/current/title-40/chapter-I/subchapter-J/part-300/subpart-E/section-300.415>

scope of the removal action to be conducted.” December 22, 2021, Assistant Secretary of Defense memo states: “DoD is adopting [the 40 CFR 300.415(j)] approach for its DoD-funded removal actions,” in groundwater used for drinking water where DoD is responsible for a confirmed release of PFAS above drinking water criteria.

Based on discussion in the Comment Resolution meeting, ARNG will not be requesting ARARs from EGLE staff for the proposed future TCRA. Given the significant time that has passed since GAAF was evaluated for a removal action, the additional funds, and time which has been allotted for the Pilot Study, EGLE staff believe it is practicable for ARNG to use the available time to design the removal action to attain ARARs. Additionally, as EGLE staff has stated above, EGLE staff do not agree with the designation of this removal action as a TCRA. Should this removal action become part of the final remedial action, it will be expected to meet ARARs, as this is one of the nine remedy selection criteria required by CERCLA and DERP.

Removal Action Objective (RAO):

The RAO of the full-scale removal action listed in the Pilot Study Workplan is to reduce the impact of the southeastern PFAS groundwater plume originating from Area of Interest 1 on the wellhead protection area and the wastewater lines in the City of Grayling. While the placement of the full-scale PAB should disconnect the plume at the site boundary, a large portion of the plume has already migrated off-site. This area of the plume will continue to impact the wellhead protection area and the wastewater lines in the City of Grayling.

EGLE staff acknowledge that many of these concerns pertain to future work, and EGLE staff welcome additional discussions with ARNG to address these concerns and establish a collaborative path forward for full-scale implementation. EGLE staff appreciates the opportunity to review and provide comments on this Workplan.

If you have any questions or concerns, please contact Summer Cox, Project Manager, Superfund Section, Remediation and Redevelopment Division (RRD), at CoxS12@Michigan.gov; 517-275-2805; or EGLE, RRD, P.O. Box 30473, Lansing, Michigan 78909-7973.

Sincerely,



Summer Cox, Project Manager
Remediation and Redevelopment Division
Defense and State Memorandum of
Agreement Unit
517-275-2805

cc: Walter Gee, ARNG
Kalan Briggs, EGLE
John Bradley, EGLE
Beth Place, EGLE
Nicholas Shorkey, EGLE
Summer Cox, EGLE
Lisa Kruse, EGLE
Jacob Palinsky, EGLE

#	Page	Worksheet/ Section	Additional Details	Lines	Agency	Comments
1	Throughout				EGLE Comments	<p>As written on page 1, lines 52-54, "PAB implementation is the selected removal action for the Time Critical Removal Action (TCRA), which is an interim action being conducted under CERCLA". The September 3, 2024 OSD memo states "a TCRA is used, when after an evaluation of the site, the lead agency determines there is less than six months of planning time available for removal activities."</p> <p>EGLE does not agree that this action falls under a TCRA. By definition, the proposed action would fall under an NTCRA or an interim remedial action. EGLE sent a letter to ARNG in February 2024 requesting that the interim action explore "all feasible options at the site, including hydraulic control using extraction wells and hotspot removal, in addition to the proposed PRB". Until May 2025, ARNG indicated the removal action would be completed under an NTCRA, with an EE/CA contract to be awarded in Summer/Fall 2024. EGLE considers the PAB pilot study as an option that's efficacy is being evaluated and will be compared against additional interim action technologies in the future.</p> <p>EGLE requests that the language in regard to the TCRA is removed as further discussion, documentation by way of an action memo, and data collection is necessary prior to making this determination.</p>

	<p>DOD Response</p>	<p>Army and ODASA Counsel have reviewed this site's TCRA status as part of the CERCLA process and have determined that prompt action via a TCRA is warranted. However, since the full-scale PAB being described for the TCRA is not yet awarded, we agree with removing some language of the TCRA to allow flexibility for consideration of alternative interim action technologies.</p> <p>The language in the first paragraph of the introduction has been adjusted to read as follows: <i>"The purpose of the pilot study and additional pre-design investigation activities is to confirm the efficacy of the treatment technology and obtain additional Site data for the design of a potential future Time-Critical Removal Action (TCRA). The TCRA will be conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) under a separate contract action in response to the release and transport of Per- and Polyfluoroalkyl Substances (PFAS) in groundwater at the southeastern portion of GAAF."</i></p> <p>With the exception of the first paragraph, mention of the TCRA has been removed throughout the work plan.</p>
	<p>EGLE Backcheck</p>	<p>Comment unresolved.</p> <p>EGLE agrees with Army and ODASA Counsel that prompt action is warranted at the southeastern portion of GAAF in response to the release and transport of PFAS in groundwater. ARNG indicated in December 2023 that GAAF meets the criteria for an NTCRA. In May 2024, ARNG changed the designation of this removal action to a TCRA. As of June 2025, commencement of the TCRA has not yet occurred, nor is it scheduled to occur in the next year. Additional time and funding have been allotted towards planning and engineering of a "potential future TCRA" via a pilot study and additional pre-design investigation activities, as would typically be completed as part of an NTCRA. This is extending the implementation of a removal action at least another 1.5 years. Per DoDM 4715.20(4)(b)(4), "If a period of at least 6 months is</p>

		<p>available before the commencement of on-site removal actions, the DoD Component shall complete an EE/CA." Further, the September 3, 2024 OSD memo states "a TCRA is used, when after an evaluation of the site, the lead agency determines there is less than six months of planning time available for removal activities."</p> <p>Therefore, EGLE does not agree that this pilot study falls under planning for a "potential future TCRA" given the significant time that has passed since the site was evaluated for a removal action and the additional time that has been allotted for planning of the removal action. EGLE requests that ARNG complete an EE/CA concurrently with the pilot study as part of an NTCRA to ensure the removal action is consistent with CERCLA, the NCP, and DERP.</p>
	DOD Response	<p>While EGLE's position regarding the NTCRA criteria is acknowledged, Army and ODASA Counsel have reviewed the regulatory requirements and continue to support the designation of this effort as a TCRA. This designation enables ARNG to prioritize and expedite funding and implementation of the removal action in alignment with the need for prompt action in the southeastern portion of GAAF.</p> <p>Although the pilot study is still in progress, it includes installation of a portion of the proposed full-scale PAB and is scheduled to occur within six months from the determination that a removal action is necessary, consistent with the criteria outlined in CERCLA and DoDM 4715.20.</p> <p>The pilot study is not delaying the action; rather, it is serving as an initial phase of removal activity that informs and advances the design of the full-scale PAB while collecting necessary performance data. The full-scale PAB will follow in a subsequent phase, and ARNG remains committed to timely and effective action to address PFAS migration.</p>

9	3	2.3 Removal Action Approach		145-146	EGLE Comments	EGLE is concerned that the proposed monitoring well network will not be sufficient to adequately characterize the migration pathways resulting from the injection of the PAB. EGLE requests additional downgradient and side gradient monitoring wells from those that are currently proposed in order to provide a data set capable of monitoring the dynamics of the post injection PAB/plume migration pathways. The transmissive properties of the soils downgradient of the treatment are expected to change during post injection, resulting in potential deviations of plume migration pathways. The additional wells would be useful in anticipating potential issues that result during full scale implementation.
					DOD Response	<p>An additional monitoring well cluster (CG-GAAF-MW-43) has been added ~50 feet downgradient from the PAB and monitoring well cluster CG-GAAF-MW-42 has been shifted southwest. This revised monitoring well layout will assist in additional characterization of migration pathways, providing a comparison between the half of the PAB with parking agent vs. without parking agent. Additionally, downgradient piezometers will aid in determining CAC migration during placement validation testing. Figure 10 has been updated to show the revised monitoring well and piezometer layout. If the current proposed monitoring well network is determined insufficient to characterize migration pathways, the option to install further downgradient monitoring wells will be considered.</p> <p>Given that the pilot study PAB location is in the core of a relatively large plume, side gradient monitoring wells would not provide a good control for understanding migration pathways resulting from PlumeStop® application.</p> <p>Regenesis has not observed a significant change in transmissivity due to injection of CAC over many hundreds of sites. To support these claims, the following items have been included in Appendix B: a Regenesis research technical memorandum on changes of aquifer characteristics, Aptim</p>

						ESTCP presentation slides, and Camp Grayling GAAF slug test data (pre- and post-CAC application) from the previous 2018 pilot study.
					EGLE Backcheck	Comment resolved.
26	15	4.1 Projected Schedule		622-624	EGLE Comments	Based on related verbal discussions, and the reference in the report that details the full scope of the work is not completely under a contract award, EGLE requests ARNG provide additional assurance that the pilot study will be funded in its entirety and recommends that funding and contracting is secure prior to proceeding with implementing the full scope of work outlined in the workplan.
					DOD Response	The funding for the remainder of the performance monitoring after Month 1 has been requested and is considered high priority.

	EGLE Backcheck	<p>Comment unresolved.</p> <p>Per the comment resolution meeting on June 23, 2025, the pilot study is not funded in its entirety. Funding for additional monitoring past August 2025 has been requested, but it is contingent on finalization and award of FY25 funding, which is expected to occur by September 30, 2025. EGLE does not recommend proceeding with the pilot study until the funding can be secured to fully monitor the study's impacts and ensure the study meets the decision criteria or metrics that will be used to evaluate the success of the pilot study. EGLE recommends that funding and contracting for the pilot study is fully secure prior to proceeding with injection of CAC and calcium chloride into an aquifer used for drinking water.</p>
	DOD Response	<p>ARNG has received the funding and anticipates completing a contracting action in time to implement the monitoring as described in the Work Plan. While the contracting action is still pending, delaying the implementation of the Pilot Study at this point would likely result in delaying the start of the project until 2026. A delay of this duration would be counter to previous requests made by both EGLE and the RAB for ARNG to expeditiously implement interim actions to address PFAS at Camp Grayling.</p>