

Weihemuller, Wendy - DNR

From: Ales, Stephen M -DNR
Sent: Wednesday, October 20, 2021 1:05 PM
To: HINMAN, MICHAEL T GS-12 USAF ANG 115 CES/Architect
Cc: Ales, Stephen M -DNR; Silver, Matthew H - DNR
Subject: PFAS Biodegradation Study

Mike:

Thanks for the conversations regarding the pilot study. The DNR is very interested to see this project move forward and the results that will come from the research. My understanding is that the goal of this study is to gather defensible data to show whether PFAS concentrations in groundwater can be decreased by promoting biodegradation of PFAS compounds with bacteria versus the decrease in PFAS concentrations being primarily due to sorbing to the BAM. Please note that long lasting sorption of PFAS without degradation would be a positive step towards BAM material possibly being a component of the future overall remedy at this site.

On October 12, 2021 you sent me an email containing a plan prepared by ORIN Technologies to study the potential of bacteria to breakdown PFAS compounds. The study area is to be located on the Wisconsin Air National Guard base located at the Dane County Airport. More specifically the area will be located adjacent (south) of the fire station in an area that previous sampling has shown to contain high levels of PFAS in soil and in groundwater. This location was conveyed to me from you in a conversation. I understand this location was selected after ORIN prepared its proposal as the location identified in the proposal will be affected by construction activities related to F-35 modifications of the base. The plan submitted to me on October 12, 2021 indicates the study area to be adjacent building 414.

The DNR will need additional information and requirements to approve the proposed PFAS bioremediation study.

1. WANG needs to submit a letter to DNR indicating their intent to complete this study and requesting approval from DNR for this in-situ study. The cover letter will need to be signed by a Professional Engineer per NR 712 and NR 722.
2. The letter needs to request: a temporary exemption under NR 140.28(5), Wis. Adm Code, and a request to inject materials into the subsurface under NR 812.05, Wis. Adm. Code. I will coordinate with the Drinking Water and Groundwater Program for these exemptions.
3. WANG needs to request an approval to discharge to groundwater under Wisconsin Statutes 283.31(1). The project will need a Wastewater General Permit, specifically the Contaminated Groundwater from Remedial Action Operations permit (WI-0046566-7). Here is a link to the General Permits page. <https://dnr.wisconsin.gov/topic/Wastewater/GeneralPermits.html> I am guessing that ORIN has completed this form on other projects where BAM has been placed into the subsurface. But if they have questions about this form, they can reach out to Maya Welch at 414-897-5715.
4. Here is a link to a fact sheet that outlines the steps involved where material is going to be injected into the subsurface. <https://dnr.wi.gov/files/PDF/pubs/rr/RR935.pdf> I am the project manager, and I can coordinate with the Wastewater Program.
5. The proposal would be strengthened by adding a few sentences with a summary of the bioremediation process, the relationship between BAM and bacteria, and why you think it is of value to pursue bioremediation at this site. Included with this should be a summary of the known PFAS data from this location and why this location adjacent the fire station was selected.
6. The proposal needs a map showing: the location of the proposed study area on the base, the location of monitoring wells, the location of vacuum extraction points, the location of injection points. The location of previously collected soil and groundwater samples should also be displayed on the map.

7. All monitoring wells installed for this project must be in accordance with NR 141, Wis. Adm. Code. Injection points and vacuum extraction points don't need to be constructed per NR 141 as I think these will be temporary and will be used only at the beginning of the project and thus can be properly filled and sealed once they are no longer used. If injection and vacuum extraction points are going to remain for the life of the project, then please provide construction details for those devices.
8. The proposal needs a list of the monitoring that will take place in soil and groundwater. Field parameters (DO, pH, ORP, conductivity, alkalinity)? PFAS? Please note WNDR expects that the WNDR approved method for analyzing PFAS in water should be used. Metals? Total organic fluorine? Non-targeted analysis for possible PFAS degradation intermediates? The monitoring plan should include the parameters and expected frequency of both soil and groundwater analyses.
9. As mentioned above in 2, the proposal needs to specifically request a temporary exemption under NR 140.28(5), and approval to inject materials into the subsurface under NR 812.05(2)(a)3, Wis. Adm. Code for the purpose of aquifer remediation. This request must also include a list of any materials (e.g. - BAM, bacteria, food source for the bacteria, calcium peroxide) that will be injected and their volumes. Safety data sheets, if they exist, must be provided for any materials that are to be injected. There needs to be a statement as to where the bacteria originate (native to site or from another site). Injection wells/borings must be approved by DNR prior to their use.
10. The proposal should include statements as to the disposition of soil cuttings from wells/borings and for well development water. Well construction reports should be submitted on DNR Form 4400-89.
11. The DNR requests a more detailed explanation of the use of the EKOGRID and the potential effects on water quality. It appears the technology generates hydrogen and oxygen from water so these compounds can be utilized by aerobic bacteria. Is there potential this process may change redox and pH conditions and cause other compounds, namely metals, to either precipitate into the aquifer, or dissolve from the aquifer? Could you provide, if available, references to field studies involving the EKOGRID?
12. Are there plans to test aquifer materials below the water table (i.e. – within the injection zone) for PFAS and total organic fluorine? An opportunity to collect this is during monitoring well installation. The reason for asking is to generate this data as a baseline or comparison point for soil samples that could be collected and analyzed for PFAS and total organic fluorine once the pilot test is complete. This would be an essential measure of the occurrence of any PFAS biodegradation process. DNR recommends that, as a minimum, one aquifer material sample from or near each monitoring well be analyzed for PFAS and total organic fluorine to characterize the sorbed mass present prior to remediation. Additional samples (triplicate) could be collected due reflect variation from natural soil heterogeneity.

Please look through this list and discuss with ORIN and Fixed Earth as needed. As needed, you/ORIN/Fixed Earth can reach out to me to discuss details in this email, or the process.

Steve

We are committed to service excellence.

Visit our survey at <http://dnr.wi.gov/customersurvey> to evaluate how I did.

Stephen M. Ales, P.G.

Hydrogeologist Program Coordinator – Remediation and Redevelopment Bureau, Division of Environmental Management
Wisconsin Department of Natural Resources
Phone: 608-400-9187
Stephenm.Ales@wisconsin.gov



