

# 2025-08-14\_Gasco: DEQ Comments on TSWP

Meeting Title:	Gasco: DEQ Comments on Treatability Study Work Plan
Date/Time:	August 14, 2025 / 11:30 am - 1:00 pm
Attendees:	AQ: Halah Voges, Matt Davis, Billie-Jo Gauley, Ryan Barth, Kendra Skellenger, Cole Bales EE: Rob Ede Sevenson Environmental Services: Gary Rose, Mike Crystal Chris Ryan PE, Inc: Chris Ryan DEQ: Wes Thomas GEI: Dave Terry, Paul Jensen, Matt O'Neil, Tom Daigle
Location:	DEQ NW Region Office

## Meeting Notes:

- DEQ's Preliminary Comments on the IRAM Treatability Study Work Plan
  - The IRAM TSWP proposes using the Phase I (grout composition) results from the Gasco Sediments Site. DEQ's comments question whether treatability testing on sediments is representative of upland soils, and requires Phase I testing on upland soils.
    - EE/AQ understand DEQ's comment and will add Phase I testing to the IRAM TSWP.
  - The IRAM TSWP does not clearly describe/explain the sample homogenization strategy or the criteria that would be used to identify samples that should advance into Phase I testing (and subsequent phases).
    - EE explains that the program proposes starting with 18 samples, one from each water bearing zone at each of the 6 borings. Then six representative samples would be selected for treatability testing. EE notes that they plan to collect discrete data for all 18 samples, including grain size and chemistry.
    - EE explains that the criteria for selecting the 6 samples for treatability testing will be based on the contamination observed in the samples. EE/AQ plan to prioritize samples with notable or unique MGP residuals. For example, EE/AQ plan to include one sample from ISSTS-002 that will likely include spent oxides. EE/AQ will also look for DNAPL and tar content to choose the best samples across all three water bearing zones. Each water bearing zone will be represented.
    - GEI asks if AQ/EE consider samples collected from ISSTS-003 through -005 to be representative of other upland areas that contain DNAPL.
      - EE replies that they were not necessarily planning to extrapolate the treatability study results to other areas of the site, but there is no reason why the results of the study couldn't apply to future ISS work.
    - GEI asks if the spent oxides near ISSTS-002 are seams or layers of spent oxides mixed with soil or if it is a buried spent oxide pile.
      - EE clarifies that they are layers of spent oxides mixed with soil
      - GEI discusses challenges with ISS and spent oxides.
  - The IRAM TSWP proposes a unconfined compressive strength (UCS) performance target of 20 psi.
    - DEQ does not have enough information to approve such a low UCS performance target. Our comment will note the need to support the UCS performance criteria with engineering analysis. Our experience at similar nearby sites have required higher strengths for smaller equipment and shallower treatment depths. Our comment requests that the design revisit the design criteria as the design progresses.
    - AQ has completed geotechnical evaluations already to support the 20 psi performance target.
    - DEQ has not seen or reviewed those.
    - EE/AQ will consider how to best address DEQ's comments related to UCS performance criteria.
  - The IRAM TSWP does not include measurable or quantifiable leaching reduction goals. DEQ comments include leaching reduction goals for key COCs.
    - EE notes that they are not opposed to evaluating grout mix designs against leaching

reduction goals. NW Natural proposes to evaluate leaching reduction using LEAF testing results.

- However, AQ and their laboratory are not able to develop a method that would allow testing for TPH. The issue is that the PBMS liner used for the testing has not been validated for TPH, so the lab has concerns about interference during the extraction process.
- GEI asks if AQ has considered alternatives to the process. Even if an alternative approach would not allow for data to be validated, the data could still be useful.
- AQ has looked into alternative materials (LDPE, etc.) to allow for the TPH analysis, but have not found an alternative approach that they would be comfortable with.
- DEQ will discuss the preliminary leaching reduction comments internally before we transmit final comments.

- IRAM Implementability Concerns

- GEI asks what the ISS mixing depth will be. The IRAM BODR presents a range of depths that appear to approach or exceed the maximum depth capabilities of the equipment.
  - AQ clarifies that the maximum depth is approximately 150 feet below the current ground surface, but the actual mixing depth will be less than that after the work platform excavation is completed. The work platform excavation will reduce the ground surface to +22 feet COP (ground surface is currently ~+38 feet COP on the Siltronic property), resulting in a grade about 16 feet below the current grade on the Siltronic property, which is where the deepest mixing will occur.
- GEI comments that the cutter soil mixing (CSM) technology does not work well for debris, such as bricks and concrete, which are known to be present in the fill. GEI asks for more information about the plan for debris.
  - EE states that they have been working with the ISS contractor (Drill Tech) about debris concerns, and they are confident that they can overcome debris limitations.
  - SES notes that they are currently working with Drill Tech to implement ISS at the Wycoff Superfund site, where there is a lot of debris. During a pilot study, they were able to cut through 8,000+ psi concrete, timbers, and other debris without issue. SES states that they will be starting full-scale construction with the CSM equipment in at Wycoff in September and could host a site visit for DEQ to observe the work. SES believes that the debris Wycoff represent a "worst-case" scenario for the kinds of debris that could be encountered at Gasco.
  - SES indicates that Drill Tech has reviewed relevant soil profiles for Gasco, and they believe that they have a range of CSM tooling configurations that can address different forms of debris or obstructions. They can change out the CSM cutting blades/edges/teeth as needed to match the needs of the project.
- GEI expresses that the discontinuous nature of the lower silt unit presents the biggest concern for the overall success of the IRAM.
  - EE acknowledges that there are portions of the barrier wall alignment where the lower silt unit is very thin or potentially absent. The IRAM design will target an elevation that is consistent with where we understand the lower silt unit to be, and then the IRAM will include pumping wells on the upland side of the wall to control hydraulic gradients and groundwater mounding.
  - GEI also notes the changes in hydraulics after the IRAM is completed, particularly where ISS channels groundwater between two areas of treatment.
  - AQ is using the groundwater model to look at groundwater flow between ISS monoliths to inform the design of the hydraulic controls.
  - AQ asks if GEI can clarify their concern
  - GEI clarifies that where there is no confining layer to key the wall into, it will be imperative to prevent DNAPL and groundwater from migrating downward.
  - EE plans to evaluate that condition in the design. AQ is evaluating the critical NAPL pool height to prevent movement and to evaluate what the design needs to accomplish.
  - GEI asks how the IRAM design elements will be sequenced. Will the design be iterative as each design element is advanced so that changes in site conditions can be evaluated and/or the design of related elements can be adjusted? GEI believes that the hydraulic control design will need go to further than just evaluating changes in groundwater flow paths or DNAPL pool heights. The design will need to recognize that the IRAM will result in a hydraulically dynamic system. It will increase groundwater flow velocities where we have constrained flow paths. Ultimately, the

- IRAM design must ensure that the bottom of the wall is closed. That could mean keying into a low permeability material and/or increased hydraulic controls.
- EE clarifies that the IRAM design is evaluating that condition. With respect to sequencing, the existing HC&C system will be removed when the work platform is excavated. The design will include installation of the new HC&C system first, followed by the barrier wall. NW Natural will construct the barrier wall concurrent with the in-water remedy. More upland work will follow as part of DEQ's selected remedial action. With respect to hydraulic controls, where the lower silt unit is thin or absent, the IRAM design will ensure that the HC&C system is designed appropriately, that wells will be put in the right locations and screened at the necessary depths. The IRAM will include plans to remove DNAPL too. The Deep Lower Alluvium is clean, and NW Natural must prevent contamination from migrating to that water-bearing zone.
  - GEI agrees that is key issue. The IRAM must not create an increase in contamination at depth due to a "slip stream" effect.
  - AQ is planning to include all of the necessary calculations in the design. The goal of the HC&C system will be to prevent DNAPL from migrating into untreated zones and to prevent groundwater contamination from migrating to uncontaminated areas.
  - DEQ notes that the IRAM BODR does not lay out the work AQ is planning to ensure that the hydraulic controls are designed correctly and consider the hydraulic effects of the barrier wall and ISS work.
- GEI asks about the rationale for injecting bentonite slurry on the downstroke and grout on the upstroke.
    - SES explains that since the mixing will occur at significant depths, they will need a way to prevent the tooling from locking into the ground. The bentonite will be used like a drilling fluid to keep the boring open so that tooling doesn't get locked in.
  - GEI asks about the grout mix doses planned in the IRAM TSWP, noting that the highest proposed dose is 7%. GEI notes that higher doses are commonly needed at other sites, and that NW Natural should include higher doses to make sure the treatability study accomplishes the stated objectives efficiently. It would be unfortunate if NW Natural did the testing only to discover that they needed to repeat the testing with higher grout doses. GEI notes that a 10% dose was the lowest dose tested for the Gasco sediments.
    - SES notes that the sediments were much softer and finer materials and warranted a higher dose. The treatability study will do what is needed to correctly identify the right grout dose.
    - DEQ plans on requiring the IRAM TSWP to include higher doses in the Phase II testing.