

Final Annotated Outline

RI/FS Work Plan Addendum No. 7

1. Background/Introduction
 - a. Discussion of Upland Area RI/FS process including summary of investigations completed to date and preparation of the draft Upland Area RI/FS
 - b. Discussion of need to refine the conceptual model for contamination related to the groundwater hydrogen sulfide exceedance identified near the point of compliance south of the South Terminal.
2. Conceptual Site Model for Contamination Data Gaps
 - a. Confirmation of the presence of hydrogen sulfide at the shoreline south of the South Terminal
 - b. Further confirmation of hydrogen sulfide in groundwater in the area at the south end of South Terminal
 - c. Investigation of groundwater pathways at the south end of the South Terminal
 - Investigation of historical bulkhead and potential breaches
 - Supplemental hydrological study
3. Data Gaps Investigation Field and Laboratory Methodology

Step 1

- a. Confirmation of the presence of hydrogen sulfide at the shoreline south of the South Terminal
 - Repeat sampling PW 01 with a SiRem SPeeper sampler installed to below the 10cm biologically active zone in sediments.
 - Collect a surface water sample from the prior SW02 sampling location using the same SiRem SPeeper sampler and collection of a discrete sample coinciding with the deployment of the SiRem SPeeper sampler.
 - Collect a discrete seep sample directly from the shoreline during a low tide coinciding with the deployment of the SiRem SPeeper samplers.
 - Identify and utilize analytical methodology or instrument detection to make sure that we meet detection limits for un-ionized H₂S
 - Use SM 4500-S²⁻ - Sulfide
- b. If sampling does not indicate the presence of hydrogen sulfide above the screening level at the PW01 location, a repeat sampling will occur 6-months

from the first event to confirm concentrations continue to be below the screening level.

Step 2

- c. If sampling performed in Step 1 confirms an exceedance of the hydrogen sulfide screening level, additional assessment in locations upgradient should be assessed. Locations of additional assessment would be discussed with and agreed upon with Ecology prior to collection of additional samples. Additional assessment is assumed to be phased, allowing the data to drive Ecology decision making process.
 - Groundwater sampling, upgradient of the seep, PW01, and SW02 locations, if deemed necessary, should be analyzed for the following constituents to support potentially applicable treatment technology assessment.
 - TOC (EPA 9060A), TDS (EPA 160.1)
 - EPA 300.0 (Anions – Nitrate, Nitrite, Sulfate, Chloride, Bicarbonate)
 - EPA 300.7 (Anions – Sodium, Potassium, Calcium, Iron, Manganese)
 - Initial upgradient location would require reinstallation of EST18

Step 3

- d. Determine location and features of historical bulkhead to evaluate potential for preferential pathways
 - Complete survey using ground penetrating radar within the South Terminal Fill located west of the historical bulkhead
- e. Supplemental hydrological study
 - Scope of study may be adjusted based on results of the hydrogen sulfide testing.
 - Existing wells: EST06, EST07, EST08, EST08D, EST10, EST10D, EST11, EST11D, EST12, EST13, EST21C
 - New Shallow wells
 - one west of PW01
 - one north of EST 12
 - New Deep wells
 - EST12D
 - EST06D
 - Slug Testing

- Test Conductivity of the semi-confining layer at new well adjacent to EST06D screened only in woody material.
- 72-hour Tidal Study
- Vertical Gradients (High and Low Tide – Single Day)
 - EST06 and new well EST06D
 - EST08 and EST08D
 - EST10 and EST10D
 - EST11 and EST11D
 - EST12 and new well EST12D

4. Reporting

- a. To include: field implementation, deviations, results.
- b. Provide timeline in accordance with approval letter.