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Sent: Tuesday, April 01, 2014 1:39 PM
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Subject: RED HILL STATUS REPORT - APRIL 01, 2014
Importance: High

Hi Richard/Roxanne:

Attached are the updated information for the weekly progress report from Navy Region Hawaii, and the Fleet Logistic Center Pearl Harbor for the week of April 01, 2014.

1. Preliminary Work Plan (due Friday 14 March 2014)

The Preliminary Work Plan was submitted as required in your letter of February 26, 2014. A contract vehicle was identified to contract these efforts. The performance work statement was provided to you for review/endorsement and the request for funding package submitted to Naval Supply Systems Command (NAVSUP)/Defense Logistics Agency (DLA) Resource sponsor on March 14, 2014.

a. Item 1- Models to estimate downward vertical migration of free product.

There is a lack of models for investigating pure petroleum liquid. However, we will continue to evaluate the availability of transport models in basalt. This is included in the contract mentioned above.

NO CHANGE.

b. Item 2 - Methods or options for non-invasive scanning of basalt to determine area and volume of contaminant mass prior to any drilling investigation.

From our preliminary research, there are no remote sensing (geophysical) applications for non-invasive scanning of basalt to determine area and volume of contaminant mass. There is too much noise and obstructions for approaches such as seismic, ground penetrating radar (GPR), time-domain reflectometry (TDR), thermal, etc. The best quick and dirty approach available for near surface contamination would be to use something like laser induced fluorescence (LIF) with a direct push rig, but since basalt (competent or fractured) is the media, that approach won't work. The usual approach for differentiating/delineating the extent of contaminant plumes for saturated and unsaturated is by way of intrusive methods. It is likely that the only methods available to determine approximate area and volume of contaminant mass are soil borings for soil and groundwater sampling.

NEW: The Navy's remediation consultant has identified a potential geophysical technology that can confirm the presence or absence of free product. Under the right conditions, the technology can provide a subsurface image that can assist in guiding the placement of borings to delineate the extent of contamination. The technology involves placing a linear array of 56 probes up to 12-inches below the ground or tunnel surface and collecting electrical resistivity measurements. The measurements can provide a 2D image of the subsurface that can better direct the sample locations. The remediation consultant will research this technology further and advise the Navy if geologic conditions at Red Hill are amenable to using the technology.

c. Item 3 - Methods and locations for borings to most efficiently characterize the extent of contamination.

This is included in the contract mentioned above. The tank inspection may yield some information of the location of the release. The tank inspection will commence after Tank 5 has been vented.

NO CHANGE.

2. Release Response Action Items (initiate immediately, complete as soon as practicable)

a. Action 1 - Provide a schedule for the ventilation of Tank 5 and an estimated date to commence the investigation of release point(s) within Tank 5.

The most current schedule is as follows:

- . Contractor work plan approved by EXWC IOT commence preparation, venting, and equipment installation - COMPLETED
- . Contractor commenced mobilization - COMPLETED
- . Contractor commenced venting preparations IOT stage and install venting equipment - COMPLETED
- . Venting commenced - March 20, 2014
- . Detailed visual inspection - estimated dates April 24 to May 22, 2014

NO CHANGE.

b. Action 2 - The rate of vertical migration for the released JP-8 free product is unknown. Information from the previously collected basalt cores could be used for initial modeling of vertical migration. This information is necessary to protect drinking water resources from petroleum contamination. Prepare models for petroleum JP-8 releases of 10,000, 20,000 and 30,000 gallons from points at 25% intervals from the bottom to the top of Tank 5. Progress in developing these models should be included in the preliminary work plan.

Previous borings and monitoring wells were installed in the lower access tunnel, which is located below the tank bottoms. In the interest of time, initial models for vertical migration of contaminant mass will assume the geology around the tanks is similar to the geology below the tanks.

As indicated in Item 1 above, contracted efforts are being pursued to characterize the situation.

NO CHANGE.

c. Action 3 - Removal of petroleum free product from the area outside the tank will reduce downward migration of the released JP-8 free product. Characterization of the free product plume and recovery of free product with increased monitoring are required to address this plume.

As indicated in item 1.c above, contracted efforts are being pursued to characterize the situation. During this contracted effort, an assessment of the feasibility of product recovery will be accomplished and coordinated with the State Department of Health.

Preliminary indications suggest free product removal from this type of environment (fractured basalt) may be impractical and unfeasible. Attempts to recover significant portions of free product may inadvertently create additional problems by possibly accelerating vertical transport of petroleum product. However, we will continue to evaluate all viable options.

Although we are evaluating all options, we have had some success in similar projects using a bioventing process. Bioventing has shown to be a cost-effective remediation option at several petroleum-contaminated sites underlain by fractured basalt. The Navy is pursuing this method as a potential treatment technology to apply at Red Hill, depending on results of the site characterization (Item 1 above).

NO CHANGE.

d. Action 4 - Additional studies and procedures are required to address the potential and impact of any future releases from the USTs within the Complex. This will require new financial and personnel resources to complete. Funding for the preliminary work plan and all necessary following work is critical.

The Navy has received funds from the Defense Logistics Agency Installation Support Energy Environmental Division (DS-FEE) to cover updating the Red Hill Groundwater Protection Plan and to develop models estimating groundwater flow and capture zones. DLA and NAVSUP Energy have been included in discussions to facilitate funding commitment and future processing of funding requests.

NEW: The Navy awarded a contract on 3/28/2014 to update the Red Hill Groundwater Protection Plan and identify data requirements to improve groundwater and fate and transport models.

Please call me if you have any further questions.

Vr,

Aaron