

BOARD OF WATER SUPPLY

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November 2, 2016

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Dear Messrs. Pallarino and Chang:

Subject: Board of Water Supply (BWS) Comments to the United States Environmental Protection Agency (EPA) and Hawaii Department of Health (DOH) on the October 5, 2016 Meeting to Discuss Sections 6 and 7 of the Red Hill Fuel Facility Administrative Order on Consent (AOC)

On October 5, 2016, the BWS met with the EPA, DOH and the United States Navy (Navy) and their consultants to discuss the status of developing the work plan under Sections 6 and 7 of the AOC. Section 6 pertains to environmental investigation activities and Section 7 pertains to the groundwater modeling work.

The BWS applauds the decision by EPA and DOH to disapprove the Navy's Section 6 and 7 draft work plan. However, the disapproval is only a small first step. The regulatory agencies should have directed the Navy and their contractors to incorporate many more of the concerns and criticisms the BWS has offered since December 2015, such as those in our letters dated December 3, 2015, December 14, 2015, and April 25, 2016. The continued participation by BWS in a process that fails to use our suggestions is a waste of our time and resources. The disapproval letter falls short of addressing our most important concerns, which tells us that the Parties do not take our

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letter was attached to the EPA and DOH disapproval letter and the Navy has been told that they must address detailed comments from subject matter experts including the BWS (EPA, 2016). Until we are satisfied that all our previous comments (from all previous BWS letters on this subject) are addressed in the Section 6 and 7 work plan, BWS will continue to be critical of the AOC process, particularly with regard to the Section 6 and 7 work plan.

As repeatedly stated previously, the regulatory agencies should direct the Navy to change the work plan so that it relies on conservative assumptions and stop using the same set of untested assumptions that the Navy continues to want to use. Also, the work plan should use all available soil vapor and groundwater data; should physically study fuel movement in the subsurface rocks around the facility; should describe how monitoring well data will be used in selecting other monitoring well sites, and should conduct a detailed risk assessment. The regulatory agencies should also direct the Navy to develop a much more comprehensive Groundwater Protection Plan (GWPP) than the one in use now, so that the new plan addresses large and small fuel releases and the impact on other drinking water sources in the area including the BWS Halawa Shaft and BWS Moanalua wells. The number of contaminants for testing and reporting is also still too small and should report the entire constituent list for EPA Methods 8015, 8260B, and 8270C and increased to include fuel additives past and present. The new sentinel monitoring well network should also be designed to provide an early warning for the BWS and Navy water supplies. Finally, the plan should take a much more holistic and conservative approach to collecting more data to prove the presence of subsurface features called valley fill sediments (rather than assume they exist) and extensively analyze the direction groundwater and fuel leaks are moving underground.

The BWS continues to provide the same recommendations while seeing no changes in the work plans being developed. This lack of change appears to indicate the Parties have already decided on the outcome for AOC Sections 6 and 7. If so, do the Parties want BWS input or not? Absent a decision, continuation in this manner is unproductive and a waste of resources. Please advise. Until then, we offer the detailed comments below as we have done repeatedly in the past in good faith.

Detailed Comments

The Navy indicated it was concerned about the BWS sending comment letters regarding the Section 6 and 7 draft Work Plan. The regulatory agencies apparently still find much of the draft work plan acceptable despite our letters to the contrary. Our experience is that all Parties to the AOC have consistently ignored constructive input from the BWS and other stakeholders. The Parties did not revise any of their task scoping despite BWS inputs provided at the December 3, 2015 meeting and our letters dated December 3, 2015, December 14, 2015, and April 25, 2016. The regulatory

agencies did not see fit to direct the contractors developing the draft work plans to incorporate any BWS comments, questions, or constructive criticisms provided in the following BWS letters:

- J. Blumenfeld, EPA, and Dr. Pressler, DOH, dated December 3, 2015;
- S. Chang, DOH, B. Pallarino, EPA, and J. Miyamoto, Navy, dated December 3, 2015;
- B. Pallarino, EPA, and S. Chang, DOH, dated December 14, 2015;
- B. Pallarino, EPA, S. Chang, DOH, and J. Miyamoto, Navy, dated April 25, 2016; and,
- B. Pallarino, EPA, and S. Chang, DOH, dated June 3, 2016.

While the BWS has made it clear that it would continue to evaluate the Navy Work Plan and provide comments as the BWS feels necessary, the regulatory agencies have made it clear that our contributions are not valued. There has been a consistent lack of written responses to our letters. Very few of our important concerns have been incorporated into the regulatory agencies directions to the Navy to make specific revisions to the draft work plan. Until the BWS is satisfied concerning the number of wells installed by the Navy, the location of the wells both on and off the Red Hill Bulk Fuel Storage Facility (RHBFSF), the quality of the laboratory testing conducted, the number of contaminants reported during each groundwater monitoring event, a groundwater treatment system is adequately designed and installed, and the pace of the AOC work is accelerated, the Parties can expect to receive numerous critical letters from the BWS concerning Sections 6 and 7 of the AOC process.

The BWS is very concerned about statements made by the Navy during the meeting that the Navy is unclear about the expectations for the Section 6 and 7 Work Plan by EPA and DOH. The questioning statements made by the Navy and their contractor indicate that the process of developing a Work Plan that will lead to a defensible conceptual site model (CSM) and numerical groundwater flow and transport model is not fully understood by the Navy and/or their contractor. The work to develop the Section 6 and 7 work plan has been underway for nearly a year. Why is it taking so long? The time has come for the regulatory agencies to enforce the Navy to prepare a transparent, collaborative, and iterative work plan that includes accommodating input from the BWS for the work plan, the CSM itself, and the numerical flow and transport models. Recent test results appear to indicate a change in the Navy's groundwater chemistry reporting limits. The regulatory agencies should also review the recent lab analyses for any reporting concerns and begin to collect and analyze split samples.

We heard numerous statements about the importance of addressing uncertainty during the meeting on October 5, 2016, and while the BWS has previously stated this must be

done for the CSM and the numerical flow and transport models, the regulatory agencies have ignored many of our important concerns that have been raised in our letters dated December 3, 2015, December 14, 2015, April 25, 2016, and June 3, 2016. We are disappointed that the regulatory agencies did not provide the Navy with clear guidance about how to use conservative assumptions to address uncertainty in important features of the Red Hill groundwater flow system. The BWS requests that the regulatory agencies should be more prescriptive and direct the Navy and its contractor to commit to adopting conservative assumptions about valley fill sediments in Halawa and Moanalua valleys and regional groundwater flow direction and rates in the CSM and in the numerical flow and transport models. The regulatory agencies should also direct the Navy and its contractor to continue to assess the risk of contaminant migration from Red Hill to Oahu water supplies until the agencies and the BWS agree there is sufficient data to relax the conservative assumptions.

The BWS would like to see the regulatory agencies be more prescriptive about how the Navy should incorporate the BWS' important concerns. The regulatory agencies should prescribe the steps the Navy and its contractor must take to develop the CSM and numerical flow and transport models so that they are acceptable to the BWS and other major stakeholders. The regulatory agencies should direct the Navy in how they want these steps to be spelled out in the next draft work plan.

The BWS believes that the draft Work Plan should be revised to include the following steps:

- List all data available for use in the analysis of Red Hill contaminant migration
- Assess data quality
- Evaluate the suitability of the data for the analysis and identification of data gaps
- Develop approaches for collecting additional data to fill data gaps
- Identify parameter values and model components (e.g., boundary conditions) in the model that will be assigned based on assumptions, and the basis for the conservativeness of those assumptions

Based on its review of the draft work plan and the disapproval letter, the BWS offers the following comments:

Process for Updating the Groundwater Protection Plan (GWPP)

Our review of the existing GWPP reveals that the DOH has not directed the Navy to implement required prescriptive actions in accordance with the GWPP, and we request immediate clarification on how the DOH will ensure the Navy meets its obligations to this

plan. If DOH does not intend to enforce the requirements of the GWPP, we request a full explanation of this inaction and what will be the Navy's requirements going forward. We remind the DOH of their obligation under the State Constitution to "protect, control and regulate the use of Hawaii's water resources for the benefit of its people."

- During the meeting, the EPA discussed the following:
 - The date of the anticipated release of the updated GWPP was not provided by the Parties. EPA simply stated that the GWPP would be updated as part of the work associated with the AOC but no other details were provided.
 - The GWPP is currently only for protection of Red Hill Shaft and The Parties are currently evaluating whether the GWPP needs to be expanded to include Halawa Shaft, Moanalua wells, etc.
- The Navy commented that Halawa Shaft should not be included as a receptor in the GWPP unless modeling clearly shows risk. The BWS argued that the current GWPP is based on the unjustified assumption that the nearby valley fill are effective barriers to groundwater flow from the Red Hill facility and since the depth and extent of the valley fill is not known, the GWPP needs to re-evaluate the risk to BWS wells to the north and south.
- Due to the current significant uncertainty in the risk to Halawa Shaft resulting from Red Hill fuel contamination, and potential for Red Hill contaminants to reach Halawa Shaft based on previous modeling efforts (Oki, 2005), the BWS views the risk to Halawa Shaft as significant and that Halawa Shaft should be included as a receptor in the GWPP, as should the Moanalua wells.
- The BWS also recommends using Environmental Action Levels (EALs) as the Site Specific Risk-Based Levels (SSRBLs) to require immediate remediation.
- Due to exceedances of the current SSRBL at MW02, a Category 4 action level has been triggered per the GWPP. Category 4 action levels include development of a groundwater treatment plan for Red Hill Shaft. A groundwater treatment system plan was initiated in 2010, however it never moved past the planning stage according to the Navy and the regulatory agencies. The Navy pointed out that funding for a treatment system would only become available in Fiscal Year 2019 (taking approximately three years from current date) unless emergency funding was made available through Congress. Should pumping at Red Hill Shaft cease due to increased contamination, the risk to Halawa Shaft from Red Hill Tank releases increases significantly. As a result, the BWS believes that a treatment system should be designed and implemented at Red

Hill Shaft immediately in accordance with the GWPP. We are concerned that Red Hill Shaft has been pumping very little since March 2016 and thereby allowing fuel contaminants to migrate off site in new directions. The Navy should immediately construct new monitoring wells between Red Hill and Halawa Shaft and between Red Hill and Moanalua Wells to track the new plume direction and rate of migration. It would be best if the Navy returns Red Hill Shaft to normal pumping levels of at least 3 to 4 million gallons per day (MGD), but if that is not possible, the Navy must monitor groundwater head and chemistry changes (via sampling and laboratory analysis) on a frequent basis (monthly) at existing and new wells.

- The Navy stated that they did not have any immediate plans for the design and/or construction of a groundwater treatment system for which they have already conducted a planning study in 2010. EPA and DOH did not respond specifically to our questions about groundwater treatment. The DOH did add that if SSRBLs are exceeded in the future, the Navy would be requested to continue monitoring or increasing the frequency of monitoring. This is totally unacceptable. EPA and DOH should require the Navy to take immediate actions to remediate fuel contamination in the groundwater to below the DOH environmental action limit (EAL) for TPH of 100 parts per billion (ppb).
- The regulatory agencies should direct the Navy to revise the draft work plan to describe how the GWPP will be revised to incorporate releases across the range of potential release volumes such as 10,000 gallons up to the volume from failure of multiple tanks. The current GWPP is unacceptable because it deals with fairly small fuel releases compared to historical releases or potential future releases.
- The regulatory agencies must make it clear when and how the GWPP will be updated and how it will be implemented during the AOC process.

Process for Evaluating the Adequacy of the Sentinel Monitoring Network

- EPA comments indicated that the work plan should evaluate a sentinel monitoring network that focuses on Halawa shaft, Moanalua wells, and Red Hill shaft at a minimum (EPA, 2016).
- The work plan should also require that the monitoring network include migration toward other environmentally sensitive receptors such as streams and Pearl Harbor (EPA, 2016).
- The discussion was limited concerning the installation of the sentinel monitoring

network. The EPA stated the need for new monitoring wells will be evaluated as work continues, but specific locations and the criteria for evaluating the need for additional monitoring wells was not discussed.

- Delwyn Oki of the USGS stated that the presence of new monitoring wells has helped the understanding of the Halawa Valley so the installation of additional monitoring wells will only further the understanding of the subsurface conditions in the area. The cost of drilling these wells is insignificant when compared to the cost of treatment systems or replacement drinking water wells. Costs should not be used as an excuse for not drilling more wells or remediating the contamination that has been present in the groundwater and subsurface under and around the tanks.

Review of Contaminants of Potential Concern (COPC)

- EPA provided information on fuel additives and agreed that phenol would be added to the list of COPCs; phenol would be an acceptable surrogate for other phenolic compounds in fuel found at the Facility; this approach will be subject to review by Dr. Patrick Wilson, EPA. The BWS agrees with adding testing for phenol.
- The BWS requests that the fuel system icing inhibitors ethylene glycol monomethyl ether (EGME) and diethylene glycol monomethyl ether (diEGME) to the COPC list because they are one of the largest additives by volume, are known to be toxic, are not regulated, and would assist in determining whether observed fuel contaminants originated in jet fuel.

Quality Assurance Criteria Review of Laboratory Analytical Results

- The BWS urges the regulatory agencies to conduct a careful review of quality assurance criteria for laboratory analytical results, especially to evaluate the adequacy of the laboratory's stated detection limits; the EPA acknowledges that they too have seen some issues with groundwater analytical results and are looking into this.
- The regulatory agencies should immediately prepare to collect and analyze split samples during the next quarterly sampling period to provide a consistency check on the Navy's laboratory analyses and validation process. EPA stated that they will collect split samples.

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- The regulatory agencies should immediately prepare to collect and analyze split samples during the next quarterly sampling period to provide a consistency check on the Navy's laboratory analyses and validation process.

Evaluation of Leaked-Fuel Distribution and Fuel Migration in the Subsurface

- The EPA stated during the meeting that flow of the leaked-fuel, or non-aqueous phase liquid (NAPL) would not be numerically modeled, but that scenarios representing the extent of the NAPL in the subsurface following a release from the tanks would be addressed as part of the CSM. The BWS feels that the current characterization of both the vadose zone and the aquifer adjacent to and underlying the tanks is seriously inadequate for purposes of conceptually evaluating scenarios of NAPL distributions. Instead, the regulatory agencies should direct the Navy to make very conservative assumptions about the locations where fuel contamination could reach the water table aquifer. For example, the contaminant sources should be located at distances of 500 feet or 1,000 feet from the Red Hill tanks.
- The BWS proposes that as part of the Work Plan the Navy provide a detailed approach and methodology for further characterization of the vadose zone and aquifer in the vicinity of the tanks, the results of which will inform the CSM for purposes of assigning NAPL distribution scenarios. It is anticipated that numerous vadose zone and aquifer borings and wells will be required to fulfill the requirements of this aspect of the CSM.

If you have any questions, please feel free to contact me at 808-748-5061.

Very truly yours,



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References

EPA. 2016. Letter to Mr. James A.K. Miyamoto, PE, Deputy Operation Officer, Naval Facilities Engineering Command, Hawaii. *Disapproval of Red Hill Administrative Order on Consent ("AOC") – Attachment A Statement of Work ("SOW) Deliverable for Sections 6 and 7 – Work Plan/Scope of Work, Investigation and Remediation of Releases and Groundwater Protection and Evaluation, Red Hill Bulk Fuel Storage Facility ("Facility"), May 4, 2016.* Letter from Mr. Bob Pallarino, USEPA, and Mr. Steven Chang, PE, Hawaii Department of Health (DOH). September 15.

Oki, D. 2005. Numerical Simulation of the Effects of Low-Permeability Valley-Fill Barriers and the Redistribution of Ground-Water Withdrawals in the Pearl Harbor Area, Oahu, Hawaii. USGS Scientific Investigations Report 2005-5223.