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James A. K. Miyamoto, P.E.
Deputy Operations Officer
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
Joint Base Pearl Harbor Hickam, HI 96860

Re: Approval in part of Red Hill AOC SOW Deliverable under Sections 6 & 7 - Monitoring Well Installation Work Plan

Dear Mr. Miyamoto:

The U.S. Environmental Protection Agency ("EPA") and Hawaii Department of Health ("DOH"), collectively the "Regulatory Agencies", have reviewed the *Monitoring Well Installation Work Plan, Red Hill Bulk Fuel Storage Facility* ("MWIWP") submitted by the U.S. Navy ("Navy") and Defense Logistics Agency ("DLA") on April 26, 2016. The Regulatory Agencies are approving the MWIWP in part, pursuant to AOC Sections 7(b)(a) and 7(b)(b) and under the conditions as detailed below. The attachment to this letter provides details on those portions of the MWIWP that are disapproved. The Navy is required to resubmit the MWIWP with corrections within 30 days of their receipt of this letter as per AOC Section 7(b).

The Regulatory Agencies approve Sections 3, Monitoring Well Network Expansion Design and Rationale, and Section 4, Field Project Implementation, of the MWIWP subject to the Navy's addressing the following items;

1. The MWIWP includes the collection of soil samples for analysis. Section 2.2 of the MWIWP states that the secondary objective of the MWIWP is to evaluate the nature of petroleum product and constituent chemicals in the soil, if present in the vadose and saturated zones underlying and downgradient of the tanks. It further states that the scope of the sampling and analysis program in the MWIWP is limited to the collection of subsurface **soil** and which will only be conducted if soil is encountered at depths below the bottom of the tanks or if contaminated soil is encountered. The Regulatory Agencies require the Navy and DLA to broaden the scope of their sampling and analysis to include any material that is coarse grained or smaller in size, e.g. clay, sands, fine gravels, ash, cinder, and clinker zone sand. Any contaminated material of this type will be sampled and analyzed if it is encountered at depths below the bottom of the tanks or if contaminated materials of this type are encountered while drilling. The collection of samples is referenced in Sections 3.1, 3.2.1, 3.3, 4.3.1, 4.3.2, 4.3.4, 4.3.9 and 4.5 of the MWIWP.

2. The MWIWP is unclear on how often the drilling operator and site geologist will check for perched water zones. Sections 3 and 4 address the possibility of encountering perched zones and

what steps the Navy and DLA will take to prevent perched water from migrating to the basal aquifer. However in Sections 3.2.2, 3.2.3, 4.3.1, and 4.3.2 the MWIWP states "To facilitate the identification of perched groundwater, water levels in the borehole, if present, will be measured at the beginning and end of each work day". The Regulatory Agencies require, and the MWIWP seems to imply, more frequent checks for perched water zones while drilling. The Navy and DLA need to provide more specific information on how and at what frequency they will check for perched water zones while drilling.

3. Section 3.5 of the MWIWP states that the monitoring wells and other pertinent site features will be surveyed and located with respect to an established control point in accordance with NAVFAC procedures. The Regulatory Agencies want to emphasize the importance of accurately surveying the top of casing for these new monitoring locations as well as the existing monitoring locations. The groundwater flow gradient is a regional problem involving the possibility of groundwater flow from the Honolulu Aquifer to the Pearl Harbor Aquifer. It is important that top of casing elevations for all observation wells from the Moanualua Ridge to west of North Halawa Valley be referenced to a consistent elevation datum.

All other aspects of Sections 3 and 4 are approved. Additional comments on the MWIWP, which mainly address errors or details which were not clear to the Regulatory Agencies, are presented in the attachment to this letter.

Our purpose in approving this deliverable in part, rather than disapproving it under AOC Section 7(b)(d), is to allow the Navy to move forward in preparing for the new monitoring well installations. We approve the monitoring well locations, drilling methodology, and well construction details as presented in Sections 3 and 4 but need the Navy and DLA to address the deficiencies stated above and in the attachment before we can fully approve the MWIWP. However, as discussed in our meeting on May 10, 2016 in Honolulu, we are aware that moving forward on the installation of these new wells is of the upmost importance. Therefore we wanted to approve those portions of the MWIWP and trust that this partial approval allows you to begin work as soon as possible.

We suggest a conference call be set up to discuss our required changes and comments in more detail. We can be available anytime beginning May 31, 2016.

Sincerely,

Bob Pallarino
EPA Red Hill Project Coordinator

Steven Chang, P.E.
DOH Red Hill Project Coordinator

Enclosure

cc: Mr. Stephen Turnbull, U.S. Navy

Regulatory Agency Comments on April 29 2016 Monitoring Well Installation Plan, Red Hill Bulk Fuel Storage Facility

Section 1. Background

Section 1.2.1.3 – Geology and Soils, Page 1-5

Lines 34 - 37:

- This paragraph describes the lava beds in the area of Red Hill as "near horizontal". The Regulatory Agencies believe an acknowledgement of potential of these beds to dip is important. This paragraph should end with a sentence stating that characterizing the strike and dip of the lava flows is important for understanding any product migration in the vadose zone outside of the concrete cocoon of the tanks and will be conducted as part of the overall hydrologic investigation required under Sections 6 & 7 of the AOC SOW.

Page 1-6

Lines 1 to 11:

- There is much discussion on soils but an incomplete introduction of basalt (clinkers Aa, Pahoehoe, fractures) (Mark Frazier**[Question for MF from BP: Last 2 paragraphs on page 1-5 seem to address this, is it insufficient?]** {MF: Yes}
- The geology and soils section does not mention late stage volcanics (Salt Lake), caprock formation and deep stream sediments which could act as barriers. (Mark Frazier)

Section 1.2.1.4 – Groundwater, Page 1-6

Lines 13-17:

- This section should include a discussion of basal waters. This section should also note that there is an unconfined water table present on top of the basal in the cap rocks. (Mark Frazier) **[Question for MF from BP: The second and third paragraphs of this section, lines 18-31, discuss the basal and caprock aquifers. Is this not sufficient to address your comment?]** {MF: We can push this to SOW}
- There is some uncertainty as to whether all flow is towards the harbor. The investigation that is beginning with the installation of these monitoring wells will help us understand if there are conditions present in the subsurface that would cause the groundwater to flow in directions other than towards the harbor. The last sentence in the first paragraph (line 17) should make mention of this uncertainty. (Bob Pallarino)
- The description of groundwater in this section fails to mention high-level dike confined groundwater. (Bob Whittier)

Lines 25 – 31:

- Cap rock diverts flow, barriers may confine flow all are within study area and possibly site area. (Mark Frazier) **[Note from BP: Are you saying that their statement that Caprock aquifers do not exist in the Red Hill site vicinity is incorrect?]** {MF: Yes. Study area limits need to be better defined. Cap rock is not on their property near the tanks but it is a barrier within the study area that impedes the basal flow, possibly causing a rise in the basal water elevation. Please see figure H-6 & 7 of the SOW, pg 861-862.}

Section 1.2.2 – Site History, Page 1-7

Line 37:

- The second paragraph of this section (lines 36-37) refers to the Navy supply well as being downgradient from the USTs. Since the actual downgradient direction in the vicinity of Red Hill has not been adequately defined this sentence should acknowledge the uncertainty, pointing out the importance of this and other investigations to characterize groundwater flow patterns beneath the foot print of the facility. It would be

more accurate to state "the assumed down gradient direction" or similar since at this point since we don't know regional gradient beneath the Facility.

- The blue arrow on the figure entitled "Location Map" (page 21 of the PDF version of the document) is consistent with that shown in USGS publications. However, these publications are based on conceptual models developed decades ago and without the new water level data that has been, and will be acquired by Red Hill investigations. The arrow should be removed. (Bob Whittier)
- The stated distances from USTs to the RHS vary from <2000 to >4000 ft. The distance from the east end of the Red Hill Shaft infiltration gallery to UST 1 is about 1,500 ft, while the distance from west end of the infiltration gallery to UST 20 is about 4,500 ft. Some consistency needs to be used when describing this important parameter. It seems the shortest distance to the infiltration gallery is the greatest concern when considering risk. (Bob Whittier)

Lines 43 – 45:

- Text should include that exposed basalt walls were mapped producing barrel logs (1943). Barrel logs document vadose zone of geology surrounding the tanks 250 feet high and 100 feet in diameter. Barrel logs document large voids (lava tubes) often 10 feet by 20 feet openings, clinker zones and loose rock zones. Our concern is that the openings are pathways for fluid migration. (Mark Frazier) **[Note from BP: I think this comment is better suited to the Section 6&7 Scope of Work. This WP is for the installation of the wells not for the development of the CSM. I think we should leave it out for now, but include in our review of the 6&7 Scope. Do you agree?]** {MF: Yes}

Page 1-8

Lines 1 – 7:

- Emplaced concrete could have bridges/openings. (Mark Frazier) **[Note from BP: I think this comment is better suited to the Section 6&7 Scope of Work. This WP is for the installation of the wells not for the development of the CSM. I think we should leave it out for now, but include in our review of the 6&7 Scope. Do you agree?]** {MF: Yes}
- The construction sequence of tanks is not described accurately. Upper domes were constructed first, cavity for tank barrel and bottom blasted and excavated and then barrel and bottom of tank were constructed. (Mark Frazier)

Lines 8-9:

- Text should acknowledge that the lack of information on past releases is a data gap. (Mark Frazier) **[Note from BP: I think this comment is better suited to the Section 6&7 Scope of Work. This WP is for the installation of the wells not for the development of the CSM. I think we should leave it out for now, but include in our review of the 6&7 Scope. Do you agree?]** {MF: Yes}

Section 2.1 – Step 1, State the Problem, Page 2-1

Lines 11-17:

- This paragraph should include an acknowledgement of a data gap regarding the potential migration. Potential migration pathways could include migration down within concrete cocoon next to tank and migration from tank to openings in basalt walls. (Mark Frazier)

Section 2.2 – Step 2, Identify Study Objectives, Page 2-1

Lines 24 -28:

- Section 2.2 of the MWIWP states that the secondary objective of the MWIWP is to evaluate the nature of petroleum product and constituent chemicals in the soil, if present in the vadose and saturated zones underlying and downgradient of the tanks. It further states that the scope of the sampling and analysis program in the MWIWP is limited to the collection of subsurface **soil**, which will only be conducted if soil is encountered at depths below the bottom of the tanks or if contaminated soil is encountered. The Regulatory Agencies require the Navy and DLA to broaden the scope of their sampling and analysis to

include any material that is coarse grained sand or smaller grain size, e.g. clay, sands, and clinker zone sand. Any contaminated material of this type will be sampled and analyzed if it is encountered at depths below the bottom of the tanks or if contaminated materials of this type are encountered while drilling.(Mark Frazier)

Section 2.5 – Step 5, Develop the Analytical Approach, Page 2-2
Lines 10 – 11:

- See previous comment to sample all coarse grained or smaller sediments with contamination. (Mark Frazier)
- While the Regulatory Agencies assume that all cores will be screened with a photoionization detector (PID) whether below or above the bottom of the tanks, this section should include a bullet stating such. (Bob Whittier)

Lines 12-13:

- How does the Navy define "significant contamination"? (Mark Frazier)
- The intention of this statement is not clear. What actions will the Navy propose to take in the event that significant contamination is detected (once "significant" is defined)? (Bob Pallarino)

Section 2.6 – Step 6, Specify Performance or Acceptable Criteria, Page 2-2
Lines 20 – 21:

- Data gaps should be include as a potential source of error. (Mark Frazier) [**[Note from BP: I am not sure if this is a source of error in the context of what is being discussed in this section. I agree that data gaps are a potential source of error when developing the conceptual site model but here the Navy is trying to address sources of error in the sampling and analysis of soils. Do you agree?]** {MF: Yes}

Section 2.6.1 – Types of Error, Page 2-2
Lines 24-33:

- This is the data gap of large voids shown in barrel logs. This is bias of samp only soil not fines. (Mark Frazier) [**[Note from BP: See my comment above, the Navy is only discussion error in terms of soil/sediment sampling and analysis]** {MF: Yes}
- Regarding groundwater, the focus is only on saturated zone, omits vadose perch waters problem. (Mark Frazier) [**[Note from BP: See my comment above, the Navy is only discussion error in terms of soil/sediment sampling and analysis]** {MF: Yes}

Section 2.6.2 – Managing Decision Error, Page 2-5
Lines 7-8:
Leveling the drilling well twice a day during drilling is not sufficient to ensure that well is plumb. Navy should refer to BWS well construction details for vertical truth of well. (Mark Frazier) **[Note from BP: this is similar to comments made by the Board of Water Supply – *"The level of the drill rig is not the only factor important to ensure drilling a "vertical" borehole. Other factors include bottom-hole weight (bottom-hole drill assembly) and rate of advance, which together should be balanced so the drill bit doesn't deflect as it encounters various basaltic intraflow structures. To accurately determine if each borehole is vertical, the driller should stop and trip-out of the hole and run a gyroscopic alignment survey once a day during drilling."* Is this what you are referring to?]** {MF: Yes}

Section 2.7 – Develop Plan for Obtaining Data, Page 2-5
Lines 27-32:

- This paragraph should include a listing of all known data gaps. (Mark Frazier) **[Note from BP: I think this comment is better suited to the Section 6&7 Scope of Work. This WP is for the installation of the**

wells not for the development of the CSM. The paragraph acknowledges that there are data gaps that may be addressed by information gained through the drilling of wells. I do not think they need to provide a complete listing of data gaps in this document but it should definitely be addressed in the 6&7 Scope. Do you agree?] (MF: Yes)

Section 3-1 – Monitoring Well Locations, Page 3-1

Lines 34- 35:

Identify the data gaps that the choice of well locations are intended to fill. (Mark Frazier) **[Note from BP: The 2nd paragraph of this section (lines 22 – 33) does mention how the well locations will address data gaps, but it is a more broad statement than I think you are looking for. What specifically would you want them to mention?]** (MF: The Navy says "site's geology and groundwater, and to fill in identified data gaps" I wanted them to explain, what they identified? Lines 22-33 is the geol.)

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Line 45:

- The Regulatory Agencies believe the elevation above mean seal level (msl) at the location of proposed well RHMW08 is 360 ft. (Bob Whittier)

Page 3-2

Line 8:

- The Regulatory Agencies believe the location of proposed well RHMW09 is at an elevation of 374 msl. (Bob Whittier)

Line 15:

- The Regulatory Agencies believe the location of proposed well RHMW10 is at an elevation of 288 msl. (Bob Whittier)

Line 27:

- The Regulatory Agencies believe the location of proposed well RHMW11 is at an elevation of 223 msl. (Bob Whittier)

Lines 31-32:

- The text should specify that RHMW11 is intended to provide data to help characterize the geological matrix of ***South*** Halawa Valley. (Mark Frazier)

Figure 3, Geological Cross Section (Transverse)

- The description of RHMW11 on page 3-2 states that this well may be extended if bedrock is not encountered in order to investigate the extent of valley fill or saprolite. Figure 3 should provide an indicator to show additional depth of RHMW11 in the event that bedrock not encountered at target depth. (Mark Frazier)
- Since the facility is the focus of the investigation and RHMW02 is located more or less in the center of the facility, it would be easier to determine lateral distances from the facility if the X-axis was centered at RHMW02. (Mark Frazier)
- The figure incorrectly shows the Halawa Shaft terminating within the valley fill. The Halawa Shaft extends to the basalt underlying the valley fill. (Bob Whittier) **[Note from BP: It would seem that the bottom depth of the Halawa Shaft would be easy to obtain. Do you think the figure is incorrect in its depiction of the bottom of the shaft (a known number, I assume) or is it being too generous with its depiction of the assumed valley fill?]**

Figure 4, Longitudinal Cross Section

- Dashed line representing South Halawa and Moanalua Streams appear flat in area of tanks, which they are not. This should be removed or corrected. (Mark Frazier) **[Note from BP: The dashed lines do show a slight downward gradient. I would assume that elevation data for the streams would be available**

from USGS maps or other resources. Do you think this was a mistake or did they simply not bother to look up available data?] {MF: I think the stream projection is misleading. They are not a flat surface that can be projected great distances. The cross as shown implies they are under the tanks which is not the case.

Section 3.2.3 – Rock Coring, Page 3-8
Lines 21-22:

- Checks for perched should occur more frequently. If only checked at the beginning and end of the day it would be easy to drill through a perched zone without knowing it. (Bob Whittier) **[Note from BP: On our call with the Navy on May 31 Stephen Turnbull stated that it is difficult to check for perched water during the drilling process due to the interferences from the drilling machinery and drilling fluid, if used. Can we provide a reference to them on how to check and an idea on how frequently they should be checking?]**

Figure 5, Cross section of Borehole and Monitoring Well

- Regarding the bentonite seal, how is a chip different than a seal? (Mark Frazier) **[Note from BP Page 218 of the PDF provides a description]**
- The filter pack should be described. (Mark Frazier) **[Note from BP: Page 197 of the PDF, in the appendices, includes a chapter on Monitoring Well Installation and Abandonment. It states: "Filter pack is sand or gravel that is smooth, uniform, clean, well-rounded, and siliceous. It is placed in the annulus of the well between the borehole wall and the well screen to prevent formation materials from entering the well and to stabilize the adjacent formation." Page 213 of the PDF includes a more extensive discussion of the filter pack material. Is this a sufficient description?]** {MF: yes, but typically the simple gravel pack info is given on well construction diagrams.}

Section 3.3 – Subsurface Soil Sampling, Page 3-11
Lines 2-9

- Not soil limitation as described earlier. Say sediment sampling. With in vadose or saturated. Sample contaminated sediments regardless of origin. (Mark Frazier) {MF: A repeat of an earlier statement}

Section 3.4 – Monitoring Well Installation, Page 3-11
Lines 26-29:

- HDOH TGM (Section 6.2) recommends maximum screen length of 10 ft, with 7 ft below water table surface and 3 ft above. The appendix to the MWIWP also includes a discussion of appropriate screen lengths (page 212 of the PDF, page 16 of 44 of the appendix section entitled "Monitoring Well Installation and Abandonment") stating that screen length should be limited to 5 to 10 feet, however longer intervals may be justified in certain circumstances. This section should include an explanation for the Navy's choice of a 30 foot screen length. (Bob Pallarino)

Table 3-3, Existing and Anticipated Borehole and Well Dimensions

- Wells RHMW01 and OWDFMW01 both are screened below groundwater surface. Wells RHMW 2254-01 and HDMW 2253-03 are not screened. Any sampling results from these wells will be biased since the LNAPL release is at the water surface. This bias should be noted on all future sampling results. (Mark Frazier) **[Note from BP: These wells are not the subject of this MWIWP. This comment, while certainly valid, is more an issue for the long term monitoring being done in as part of the Groundwater Protection Plan. I do not see how this comment would be addressed in this document.]** {MF: Agreed. I was surprised and wanted to highlight the point.}

- Rather than listing Not Applicable for the screen interval for wells RHMW 2254-01 and HDMW 2253-03, the Navy should determine and provide the depth of the bottom of the well casing. (Mark Frazier)

Section 3.5 – Surveying, Page 3-12
Lines 5 – 12:

- The groundwater flow gradient is a regional problem involving the possibility of groundwater flow from the Honolulu Aquifer to the Pearl Harbor Aquifer. This is particularly important as needs consistent elevation datum to wells from Moanaulua Ridge to well west of North Halawa Valley. (Bob Whittier)

Section 4.3.1 – Drilling, Page 4-3
Lines 23-26:

- The possibly exists for encountering contaminated perch water in RHMW08. Increased vigilance is needed when drilling this hole to ensure that no contamination is advanced down the borehole. (Bob Whittier) **[Note from BP: On our call with the Navy on May 31 Stephen Turnbull stated that it is difficult to check for perched water during the drilling process due to the interferences from the drilling machinery and drilling fluid, if used. Can we provide a reference to them on how to check and an idea on how frequently they should be checking?]**

Section 4.3.7 – Dedicated Groundwater Pump System Installation, Page 4-7
Lines 18-19:

- Pump intakes at 10 feet below the water table is too deep and may introduces a sampling bias. This is why we want short screen wells. **[Note from BP: Do we want shorter screen lengths? See previous comment on this subject above]** At this time it is believed that any contamination from Red Hill fuel is near the water surface. 10 feet depth is influenced by clean water at depth-dilution of sample=lower number or less contamination. **[Note from BP: Please provide a better explanation of the previous sentence, it was not clear to me what you are saying]** The Regulatory Agencies suggest that the pump intakes be placed at 2 to 5 feet below the water table. (Mark Frazier) (MF: If LNAPL is present wouldn't it be better represented if the intake is at 2-5 ft rather than 10 ft? Deeper you go the more possibility of dilution. Is this not why we say to use shorter screens? Intakes can easily be moved up and down it is my opinion 5 ft is sufficient.

Section 4.3.9 – Subsurface Soil Sampling, Page 4-7
Line 32:

- This section states that soil samples will be collected if soil is present at depths lower than the tank bottoms or if contaminated soil is encountered. In Section 3.3 it states that soil samples will be collected if soil is encountered at depths >= 100 ft bgs. This plan needs to have consistent specifications. (Bob Whittier) **[Note from BP: I am not sure if this comment is correct. The first sentence of Section 3.3 states "*Subsurface geotechnical samples will be collected if unsaturated zones of unconsolidated material or significant layers of clay or low permeability zones are encountered during rock coring. Additionally, if soil is present at depths below 100 ft bgs or if contamination in the vadose zone is observed, subsurface soil samples will be collected for laboratory analysis of COPCs to provide additional data on the level of contamination present in the area.*" To me this seems consistent. Am I misreading section 3.3?]** (MF: The navy simply states sampling is "discrete and 100 grams". Discrete means to grab from a single spot. 100 grams indicates the volume but no specific sample method, are they using a spoon to fill a jar? Typically, a consultant states encore or similar sampling device then extrude to a preservative w/in a VOA or jar. Then the table they present needs much more than 100 grams to fill.)

Lines 34-35:

- The plans description of discrete sampling is unclear. Discrete sampling with 100g. Not encore, not MIS, not per their SOP, no field methanol. Later sample table says use a VOA for soil. Need to research more. (Mark Frazier) **[Note from BP: Can you flesh out this comment some more, using complete sentences. I am not familiar with discrete sampling procedures]**

Lines 35-37:

- Insert evaluate for contamination per previous descriptions (stain FP PID etc.), Insert sample if contamination observed. (Mark Frazier) **[Note from BP: In section 3.2.3 "Rock Coring", line 23 states in part: "If evidence of contamination (i.e., visual, olfactory, elevated PID readings) is observed...". A similar statement is included in section 4.3.1. Is this what you are referring to? Possibly revise the sentence to state: "The subsurface soil samples will be inspected *for evidence of contamination (visual, olfactory, elevated PID readings) in order* to evaluate the potential migration of LNAPL and associated constituents."]** (MF: Agree)

Section 5, Sample Details, Page 5-1

Table 5-1, Subsurface Soil Sample Details for Monitoring Well Installation WP, RHSF

- Replace the word ***soil*** in the Table title with ***sediment.*** (Mark Frazier)
- For TPH-g and VOCs, it is unclear why the container type is listed as 40 mL VOA vial. 100g to be collected, no encore sampling method mentioned (encore takes 5 g) yet 40ml VOA? Needs clarification. Seems like a water sample. Ask Randy H for help to pursue/clarify. (Mark Frazier) **[Note from BP: Can you flesh out this comment using complete sentences?]** (MF: The sediment analysis for TPH G and VOC is use a 40 ml VOA. Encore or similar sample device is not mentioned. How is the Navy intending to collect their sample?)

  RH: Regarding Table 5-1, TPH-g container type should read "5 gram increment soil*/ 40 mL VOA vial". For preservative, it should read "3x 40-5 ml MeOH preserved ≤6°c". (requesting 3 40 mL vials to accommodate for duplicate run on new wells for TPH-g and one spare one just in case 1 of the other 2 are become compromised).

  * No need to mention various types/methods of sampling 5 grams worth like Encore ™, etc or field weighing is acceptable too.

Commented [HR1]:

Commented [HR2]:

Table 5-2, Geotechnical Sample Details for Monitoring Well Installation WP, RHSF

- This seems strange. The matrix is "solid" meaning rock core? If so, it appears the analysis are for soil. (Bob Whittier) **[Note from BP: So is our comment that they are using the wrong analysis methods for the matrix listed in the table?]**

Table 5-3, Potable Water Sample Details for Monitoring Well Installation WP, RHSF

- The table does not address the collection of split samples and the use of a silica gel preparation. The table should specify another set of TPH containers. (Mark Frazier) **[Note form BP: Please check that the wording on this comment is correct]** (MF: Needs Randy to comment.) RH: Regarding Table 5.3, thought that Rich would mention my previously forwarded comments to him in the follow up to this preliminary WP approval since the objective here was to provide the go-ahead for procuring the drilling contract. For consensus among us, the word "split" as how it is used in the field and for practical purposes will actually be a sequential pour in the field. Assuming this is all dissolved phase product and assuming the bottles are certified clean and no TPH particles will become entrained in the sequential pour.

For TPH-d/TPH-o, under container types lets request 5 x 1-Liter Amber bottles. This is to accommodate for dups of the traditional TPH-d/o analysis, and the silica gel (also in dups) work with one spare as a backup. Leave holding time at 7 days (which is just chilled to <6°c). Yes unpreserved is 7 days and 14 days is preserved (chilled and the addition of acid) but if the Navy says 7 days just leave it as such. This holding time is always the driver for shipping requirement's and arranged by the customer and the testing lab to allow for enough time for transportation and weekends. The lab then has 40 days to analyze the 7/14 day extracted sample.

- If sample is unpreserved it is 7 days and preserved is 14 days. If I am correct, needs to be corrected. Ask Randy H. (Mark Frazier) **[Note from BP: Is this a correct comment?]** (MF: I believe so.) RH: per previous comment, let's leave this at 7 days.