

MEMORANDUM FOR THE RECORD

Subj: ANALYSIS OF 6 MAY 2021 AFHE EVENT AND ALARM LOGS FOR NAVSUP FLC PEARL HARBOR BULK FUEL TERMINAL

1. NAVSUP FLC Pearl Harbor Fuel Department's 6 May 2021 AFHE logs did not immediately reveal circumstances that could have led to a dynamic hydraulic surge that is assumed to have catastrophically damaged the Red Hill JP-5 pipeline.
2. Two things are needed for a dynamic hydraulic surge to occur: Fluid flow and an abrupt velocity change. For FLCPH's fuel operations on 6 May, JP-5 flowed in two directions: (1) Gravity flow downhill from Red Hill Tank 12 (RH12) to Surge Tank 2 (STK2) next to the underground pumphouse (UGPH), and (2) pumping uphill from STK2 to Red Hill Tank 20 (RH20). The event occurred after pumping operations had ceased, so gravity flow downhill was of greater interest in this analysis.
3. In the minutes leading up to the event, two butterfly valves, 218T-1 and 218T-2, were the only valves closed and stopping fuel from gravity flowing from RH12 to STK2. It is common knowledge in the Navy fuels community that butterfly valves are not the best choice for isolating fuel flow because of their tendency to "leak by," or allow residual flow around a valve in the closed position. For investigation purposes, I assumed either or both butterfly valves involved allowed fuel to flow, unbeknownst to the CRO.
4. The assumption of JP-5 gravity flowing past the two closed butterfly valves may have satisfied the first requirement for a dynamic hydraulic surge. Ball valve 218E4 closing at 18:06 seemed to satisfy the second. However, valve 218E4 closed over a period of 55 seconds, which significantly diminishes the likelihood that this action caused a hydraulic surge. Valve 218E4 was opened three times and closed three times on 6 May prior to the final closure and in each case, the movement cycle ranged from 52 to 60 seconds, as shown in Table 1 below; therefore, a closure time of 55 seconds is reasonable.
5. Following are my notes on the events immediately preceding the 6 May event:
 - a. At 18:00:21, the Control Room Operator (CRO) indicated in AFHE that the Evolution 3, gravity draining JP-5 from RH12 to STK2 and then pumping it back up the hill to top off RH20, was complete.
 - b. At this point, four valves were closed to prevent gravity flow of fuel from the JP-5 pipeline into STK2, as shown in Figure 1 below: A ball valve, 112C, just downstream of the RH12 skin valve (112B, which was half open); two butterfly valves in parallel, 218T-1 and 218T-2, primarily used to throttle fuel flow rates during operations; and a gate valve, 218ES, between the two throttle valves and STK2.

- c. Thirty-one seconds later, at 18:00:52, the CRO indicated in AFHE that Evolution 4, gravity draining JP-5 from RH12 to STK2 and then pumping it back up the hill to top off RH9, was starting.
- d. At 18:02:31, the CRO opened valve 218ES, leaving only three valves to stop flow.
- e. At 18:03:30, the CRO set RH12 skin valve 112B to open fully, from its previous position of half open. The valve began opening at 18:03:37 and the CRO told it to stop 14 seconds later at 18:04:01 for an unknown reason. At 18:04:11, AFHE notified CRO that 112B was closing, and three seconds later it stopped, at 18:04:14. At 18:06:58, CRO told 112B to close; it began closing eight seconds later and finished closing at 18:07:31.
- f. While the CRO was working with RH12 skin valve 112B, at 18:04:40 he told ball valve 112C to open. Figure 2 below shows the valve configuration as that valve opened. It began opening at 18:04:48 but jammed. The CRO followed standard procedure for addressing a jammed valve. The CRO directed the Red Hill Rover (RHR) to go to the RH12 area to switch the motor controller for valve 112C from remote mode into local mode. As the RHR walked to RH12, the CRO continued to attempt to control 112C, per standard practice. Before the RHR reached RH12, the CRO regained positive control of the motor controller for 112C and at 18:09:26 the valve was fully open. The CRO notified the RHR that he was no longer needed at RH12.
- g. For the two minutes and forty-three seconds between 18:04:48 and 18:07:31, both 112B and 112C were open to some degree. Given our assumption that 218T-1 and/or 218T-2 is worn and allowed fuel to flow, during this period, JP-5 had a flow path all the way down the hill and through the pumphouse to STK2.
- h. At 18:06:24, the CRO directed valve 218ES to close; it started closing at 18:06:36 and finished at 18:07:31, 55 seconds later. Figure 3 shows the valve lineup when it closed.

B. K. DODSON
NPO

Critical Infrastructure

Figure 1: Valve alignment at 18:00:21

Critical Infrastructure

Figure 2: Valve alignment at 18:04:40

Critical Infrastructure

Figure 3: Valve alignment at 18:06:24

start position	start time	end position	end time	elapsed time
closed	8:43:35	open	8:44:35	0:01:00
closed	11:00:05	open	11:01:00	0:00:55
open	12:15:10	closed	12:16:09	0:00:59
closed	13:25:31	open	13:26:23	0:00:52
open	13:31:08	closed	13:32:02	0:00:54
open	14:42:17	closed	14:43:12	0:00:55
open	18:06:36	closed	18:07:31	0:00:55

Table 1: Ball valve 218E4 closing times on 6 May


Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

From: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>
Sent: Wednesday, June 2, 2021 7:46 AM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA); Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA); Light, Christopher D CAPT USN COMNAVSUPSYSCOM PA (USA)
Subject: RE: Daily Investigation Report
Signed By: Personally Identifiable Information


Thanks Brian – I have informally shared with COM

Vr,
K

Kurt J. Wendelken
Vice Commander
Naval Supply Systems Command Headquarters

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Mark Gendron
EA to NAVSUP Vice Commander
NAVSUP Headquarters

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From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>

Sent: Tuesday, June 1, 2021 11:43 PM

To: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>

Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information> Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information> Light, Christopher <Personally Identifiable Information>

Subject: Daily Investigation Report

Vice,

Good afternoon. Below is a summary of my investigation activities today and significant meetings scheduled for the next several days. FLCPH has been welcoming and accommodating. At first glance, FLCPH's internal review revealed no major issues. NAVFAC EXWC has an idea of the cause of the 6 May pipeline event but wants their contractor to analyze data before they share it.

Please let me know if I should include COM on these updates going forward.

Today, Tue 01 Jun

- I met separately with FLCPH CO, ED, and C700, all of whom welcomed me and offered to provide whatever I need for the investigation.
- I reviewed the synopsis section of FLCPH C300's management inquiry into the 6 May pipeline event. In summary, he assessed a rating of "SATISFACTORY (with minor concerns)" for C700 in three areas, (1) Records Management, (2) Trainings and Qualifications, and (3) Inspections and Preventive Maintenance, acknowledging that analyzing the type of inspection and preventive maintenance was outside the scope of the inquiry. I will review the remainder of the report this week; I do not anticipate surprises.
- I spoke by phone with NAVFAC EXWC rep, Frank Kern. He and the rest of the NAVFAC EXWC civilians and their fuel systems contractor, Austin Brockenbrough (AB), returned to the mainland at the end of last week after physically observing the entire JP-5 pipeline system from Red Hill to the pump house. AB owed EXWC a timeline proposal today for their preliminary report on the three deliverables on their contract: (1) Root cause analysis, (2) Prevention of recurrence, and (3) Required repairs. Frank will share main points of the timeline with me tomorrow. I will also press for him to share his suspicions of the root cause.
- At my request, C700, 700 Engineer, and 700 Operations Supervisor took me to Red Hill in the afternoon and showed me the location of the 6 May pipeline event as well as the rest of Red Hill tank farm and the Operations Control Center (AFHE hub). I asked many questions and the 700 team answered all of them.
 - After discussions with NAVFAC EXWC and AB last week, FLCPH determined that they are willing, although they have not yet had the need, to issue JP-5 from the approximately seven million gallons now in Tank 8. 700's thought process seemed logical to me and was supported by physical evidence in the Red Hill tank farm.

Tomorrow, Wed 02 Jun

- 1215: CPF N4 office call

Thu 03 Jun

- 0900: CNRH office call
- 1000: DCOM CPF office call

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

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Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)





From: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) Personally Identifiable Information
Sent: Thursday, June 3, 2021 7:59 AM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA); Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA); Light, Christopher D CAPT USN COMNAVSUPSYSCOM PA (USA)
Subject: RE: Daily Investigation Report
Signed By: Personally Identifiable Information

Follow Up Flag: Follow up
Flag Status: Completed


Thanks Brian – appreciate the update. I agree with Disco that you need to remain on Island as the “lead investigator”. Please give a call if you have questions or need to discuss anything.

Vr,
Kurt

Kurt J. Wendelken
Vice Commander
Naval Supply Systems Command Headquarters

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Mark Gendron
EA to NAVSUP Vice Commander
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From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information
Sent: Wednesday, June 2, 2021 11:49 PM
To: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information Light, Christopher <Personally Identifiable Information
Subject: Daily Investigation Report

Vice,

Good afternoon. Below is a summary of my investigation activities today and significant meetings scheduled for the remainder of this week.

Today's meeting with RDML English led to a meeting with a member of CPF CAG, which is helping me prepare for tomorrow's meetings with CHRH and DCOM CPF. RDML English and RDML Adametz are also invited to the meeting.

Today, Wed 02 Jun

- 0800: I sat in on FLCPH 700 Staff Meeting, improving my understanding of the operations, maintenance, and quality surveillance activities at this DFSP, as well as observe communication among the Divisions.
- 1050: I spoke with Frank Kern of NAVFAC EXWC. He had not received AB's proposed timeline and promised to follow up. I asked if EXWC and AB would categorize the cause of the 6 May pipeline event as (1) operator error, (2) unexpected mechanical failure, (3) a control system (AFHE) failure; Frank indicated that none of those categories can be ruled out at this point. Frank pointed out that it is possible that no single root cause can be identified; the event may have resulted from multiple main as well as multiple contributing factors.
- 1215: I met with RDML English, who offered his support and recommended I speak with Brian "Disco" Bennett, a member of CPF CAG.
- 1400: CPF CAG meeting (Disco Bennett). Disco provided additional historical perspective on local interest in Red Hill. He mentioned several investigation topics of interest DCOM, including timeline, methodology, and what, if anything, we can say now about circumstances that may have led to the 6 May event.
 - Disco asked how long I would be on island. I answered that I have a flight scheduled for Saturday but it's flexible. Indirectly, he recommended I stay longer to maintain focus on the investigation and convey the urgency that NAVSUP is giving to the investigation. I will follow up with a proposed COA including a departure date in tomorrow's report.
 - Disco also advised me to share information with CPF as well as my own chain of command to avoid CPF and INDOPACOM being surprised with new information from an unexpected source. I believe I understand his intent, and will confer with you separately if I have questions.
- 1540: I spoke again with Frank Kern. NAVFAC EXWC's contracting officer approved AB's extension until Friday to provide their proposed timeline. I shared with him that RDML Adametz might attend tomorrow's DCOM meeting. Frank will set up a meeting with EXWC employees Mr. Pat Pampo and Catherine Rosetti with me on Monday to discuss AB's timeline and deliverables, and how best to share information during the process.

Tomorrow, Thu 03 Jun

- 0700: Observe 700 daily operations huddle
- 0800: Touch base with CAPT Kalp prior to CNRH and DCOM meetings
- 0910-0940: CNRH office call (attendees: RDML Chadwick, CAPT Guenther (CoS))
- 1000: DCOM CPF office call (attendees: RADM Converse, RDML English, RDML Adametz, Mr. Disco Bennett, RDML Chadwick, CAPT Guenther)

Fri 04 Jun

- TBD at FLCPH

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

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Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

From: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>
Sent: Friday, June 4, 2021 7:54 AM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA); Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA); Light, Christopher D CAPT USN COMNAVSUPSYSCOM PA (USA)
Subject: RE: Daily Investigation Report
Signed By: Personally Identifiable Information


Thanks Brian – please make sure we see the investigation status report before it goes to CPF N4

Vr,
K

Kurt J. Wendelken
Vice Commander
Naval Supply Systems Command Headquarters

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Mark Gendron
EA to NAVSUP Vice Commander
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From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>

Sent: Thursday, June 3, 2021 10:25 PM

To: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>

Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information> Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information> Light, Christopher <Personally Identifiable Information>

Subject: Daily Investigation Report

Vice,

Good afternoon. Below is a summary of my investigation activities today and plans for the upcoming week.

Today's meeting with DCOM went smoothly. DCOM allowed me to explain my tasking, planned methodology, actions completed, and planned actions. DCOM asked a few questions that I answered with assists from RDML Chadwick, RDML English, CAPT Guenther, and Disco Bennett. DCOM seemed satisfied with progress so far and asked for an investigation status report tomorrow to inform his staff's discussions with external stakeholders.

Today, Thu 03 Jun

- 0525: Called Billy Rollins, NIWC Atlantic Industrial Control Systems Division Head (formerly SPAWAR Atlantic).
 - Billy advised me that DLA J6 has not tasked NIWC Atlantic to investigate the 6 May Red Hill pipeline event; DLA is leaving the investigation to the Navy. He explained that his team has the capability to explain to me how AFHE works on a technical level, but they cannot speak to fuel operations. He also advised me that DLA J6 could provide me CBT on AFHE and its subsystems, like ATG, if desired.
- 0700: Observed 700 daily operations huddle
- 0800: Touched base with CAPT Kalp prior to CNRH and DCOM meetings (CAPT Kalp, CDR Blake, Scott Hedrick, John Floyd)
- 0910-0940: CNRH office call (RDML Chadwick, CAPT Guenther (CoS))
- 1000: DCOM CPF office call (RADM Converse, RDML English, Mr. Disco Bennett, RDML Chadwick, CAPT Guenther, CAPT Meyer (NAVFAC Hawaii), and two other CEC Captains, and two or three additional CAPTs and a civilian not at the table)
 - After DCOM's departure, the RDMLs, CAPTs, Disco and I talked about DCOM's request for an investigation status report; I agreed to draft one and contact Vice on how best to route to RDML English. I will email a draft to CAPT Light separately, as discussed with Vice.
- 1300: Question and answer session with 700 staff about 6 May fuel operations, P&ID (piping and instrumentation diagrams) for the Red Hill JP-5 system, and a NAVFAC EXWC hydraulic analysis report for FLCPH fuel piping (John Floyd, Nelson Wu, and Guy Pasco)

Tomorrow, Fri 04 Jun

- 1200: Submit draft investigation status report to CPF N4, cc CNRH CoS
- TBD: Contact CAPT Partridge for advice prior to official interviews with FLCPH 700 employees
- Continue investigation at FLCPH
- Take necessary steps with NGIS to extend my stay in Hawaii and reschedule my return flight in DTS

Next week, 07-11 Jun

- 07 Jun: 0830: MS Teams meeting with EXWC employees Frank Kern, Pat Pampo, and Catherine Rosetti to discuss AB's timeline and deliverables, and how best to share information during the process
- Continue investigation at FLCPH

V/r,

Brian Dodson

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Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Sent: Saturday, June 5, 2021 12:34 AM
To: Personally Identifiable Information
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA); Partridge, Heather CDR NAVSUP, NOGC/N00J; Christopher D CAPT USN COMNAVSUPSYSCOM PA Light (USA)
Subject: Daily Investigation Report
Attachments: Draft Red Hill Update GEM v.3.docx
Signed By: Personally Identifiable Information

Vice,

Good afternoon. Below is a summary of my investigation activities today and plans for the upcoming week.

Today, Fri 04 Jun

- 1200: Submitted draft investigation status report to CPF N4, cc CNRH CoS. Attached is the version that left RDML English's office.
 - Two topics are included in the attachment that were specifically mentioned in yesterday's meeting with DCOM, the second of which was not included in the NAVSUP input to CPF today: (1) Validation of amounts released and recovered, and (2) assessment of impact on soil vapor monitoring.
 - (1) Today, I validated, from a reasonable person's perspective, FLCPH's calculations of the estimated maximum amount of JP-5 that could have been released in the 6 May event was 37.9 gallons more than was actually recovered. Three engineers with professional engineer (PE) licenses contributed to FLCPH's calculations. I validated the simple geometry calculations myself, and NAVFAC Hawaii agreed to let me ask one of his PE-licensed engineers to validate the calculations I cannot do from another engineer's perspective.
 - (2) The attachment includes the phrase, "agreed to broaden investigation to assess any impact to the environment." I did agree, and understand what I agreed to do is not a large step from what I was already doing. Discussion in the room with DCOM yesterday was that the Navy has already asserted to the public that erratic, high readings from soil vapor monitoring wells at Red Hill tanks 18, 17, and 16 since the May 6 event are due to JP-5 being washed into the monitoring wells during the water washdown immediately following the fuel release. I originally expected to need to validate for report purposes the amount of fuel released but not recovered. It seemed a reasonable step for me to say that the amount of fuel that got into the monitoring wells must not be greater than the amount that was not recovered. I intend to stipulate that my assessment is from a reasonable person perspective, explaining that I am not a hydrogeologist or engineer, and that I consulted with NAVFAC engineers who have worked with hydrogeologists for some time on the soil vapor monitoring wells (1100 08 Jun meeting with Sherri Eng and CDR Frame).
- 1530: Visited FLCPH underground pumphouse to locate fuel pipeline valves and surge tanks used in operations on 6 May (Nelson Wu)
 - The AFHE logs that 700 provided me yesterday appear to indicate that a JP-5 valve in the underground pumphouse was closed while JP-5 was flowing from a Red Hill tank. AFHE records indicate the valve closed within about a minute, but it should normally have taken about two ti

three minutes to reduce risk of hydraulic hammer. I understand that the control room operator may have the capability to choose a “quick stop” instead of allowing the valve to close in the usual two-minute time. I intend to interview the operator(s) on duty on 6 May for their accounts of what happened to determine if this may have been a contributing factor to the release.

- 1600: Visited Red Hill (John Floyd, Nelson Wu, CDR Darrel Frame (CEC))
- Made travel and lodging arrangements to stay another week on island

This weekend, 05-06 Jun

- Develop a list of interviews to conduct and questions to ask in each
- Email CAPT Partridge with my proposed list of interviews for her review and feedback
- Finish reading FLCPH internal review of Fuel Department preventative maintenance and training records
- Review a 2010 NAVFAC ESC (now called EXWC) report on hydraulic surge analysis of FLCPH’s fuel piping system
- Draft deliverables due on 8 Jun

Mon 07 Jun

- 0830: MS Teams meeting with EXWC employees Frank Kern, Pat Pampo, and Catherine Rosetti to discuss AB’s timeline and deliverables, and how best to share information during the process
- 1100: Meet with NAVFAC Hawaii Environmental to discuss impact of 6 May event on soil vapor monitoring (Sherri Eng, CDR Darrel Frame)

Tue 08 Jun

- Due date to report my (1) validation of amounts released and recovered, and (2) assessment of impact on soil vapor monitoring.

09-11 Jun

- Interviews
- Continue investigation at FLCPH

V/r,

Brian Dodson
Deputy OIC, NAVSUP Naval Petroleum Office
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Draft GEM content: CPF Red Hill Update to COMUSINDOPACOM

Boss,

Since my last Red Hill update, Brian Dodson, Deputy OIC NAVSUP Naval Petroleum Office, has come to Hawaii to lead an investigation of the cause and impacts of the May 6 fuel release. NAVFAC EXWC contracted Austin Brockenbrough & Associates, which specializes in fuel infrastructure, to support. Dodson has provided PACFLT, NAVFAC-HI, and CNRH with an update that I would like to share with you.

BLUF: Investigation is ongoing. No “smoking gun” has been identified. Further study of data will be required to determine root cause. Investigation will also determine prevention measures and required repairs. FLCPH Fuel Department maintains mission capability to deliver JP-5 to customers while repairs are scoped. Investigation will include assessment of any impacts to environment. Jun 8 is timeline for validation of amounts released and recovered, and assessment of impact on soil vapor monitoring. Timeline for completion of the full investigation is 25 Jun, pending EXWC contractor’s report. That delivery date is part of an on-going contract negotiation process which will be completed by 11 Jun.

More detail:

- Investigation will determine root cause (human error, mechanical failure, systems failure), generate recommendations to prevent recurrence, and scope needed JP-5 pipeline repairs. Data will be used to model what happened to identify any and all contributing factors.
- It is possible no single event can be identified and that there were multiple contributory elements.
- PACFLT N4, NAVFAC-HI, and NAVSUP agreed to broaden investigation to assess any impact to the environment. Investigator will validate amounts released and recovered and any impact the event had on the soil/vapor monitoring wells NLT 8 Jun.
- NAVSUP FLC Pearl Harbor, in consultation with NAVFAC EXWC, has assessed a portion of the pipeline is structurally suitable to return to service. The portion damaged on 6 May is mechanically and physically isolated and empty, pending repairs.

V/R, Pappy

ADM S.J. Paparo, USN
Commander, US Pacific Fleet

RDHLCC0034481

Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)


From: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) Personally Identifiable Information
Sent: Tuesday, June 8, 2021 9:45 AM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA); Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA); Light, Christopher D CAPT USN COMNAVSUPSYSCOM PA (USA)
Subject: RE: Daily Investigation Report
Signed By: Personally Identifiable Information


Thanks Brian – good copy!

Vr,
K

Kurt J. Wendelken
Vice Commander
Naval Supply Systems Command Headquarters

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Mark Gendron
EA to NAVSUP Vice Commander
NAVSUP Headquarters

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From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>

Sent: Tuesday, June 8, 2021 2:31 AM

To: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>

Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>; Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>; Light, Christopher D <Personally Identifiable Information>

Subject: Daily Investigation Report

Vice,

Good evening. In addition to drafting the two deliverables due tomorrow, I obtained additional documentation and set up interviews with C700 Operations employees to get the remaining documentation I need for my investigation. CAPT Partridge and CAPT Light both provided helpful feedback on my interview plan. I think that tomorrow I will cross from taking in new information to assimilating the information I have into a coherent narrative.

Below are my activities today and my plans for the remainder of this week.

Mon 07 Jun

- 0830: I met on MS Teams with EXWC to discuss AB's timeline and deliverables, and how best to share information during the process (Frank Kern, Pat Pampo, Catherine Rosetti, Mike Rocha, Patrick Hawk).
 - Timeline, Deliverables, Priorities: I provided my experience briefing DCOM CPF last week and my sense of on-island priorities for EXWC's contractor's (AB) work. I was asked to say that NPO agrees that AB cannot complete the necessary analysis by the end of June, but refused; I explained that I understand that AB needs time to do a rigorous analysis, and if their analysis is completed after my report, I will have to include only my perspective in the report and explain that the rigorous analysis will follow. In negotiations with AB this week, EXWC will ask what AB expects to be able to provide this month for incorporation in my report.
 - Comms: EXWC plans to include me on their daily internal SITREP to keep me in the loop. I will share excerpts from my daily updates with them. We planned a standing Monday meeting during AB's work on this project, with additional ad hoc meetings, if needed.
- 1100: I met with NAVFAC Hawaii/CNRH Environmental to discuss impact of 6 May event on soil vapor monitoring (Sherri Eng, CDR Darrel Frame).
 - Sherri explained Red Hill soil vapor monitoring and we discussed the impact of whatever JP-5 got into the soil vapor monitoring vaults.
 - To ensure I didn't misrepresent facts, I asked both Sherri and CDR Frame for feedback on my draft responses for tomorrow's deliverables, after running it past FLCPH 700 Supervisory Engineer. The attached Word document incorporates their feedback.
- I inquired about C700 employee membership in unions and received LRER guidance to proceed with interviews unless a union member invokes their Weingarten rights. I set up interview times for tomorrow, Wednesday, and Thursday.

Tue 08 Jun

- Following NAVSUP review, email two deliverables (amount of JP-5 released and not recovered, and environmental impact) to CPF N4 and CNRH CoS.
- I will reach out to Robert Stewart, "StewBob", on RDML English's staff, to set up a progress review meeting with CPF N4 and CHRH this week.
- Various times: Interviews with C700 employees
- Report writing

Wed 09 Jun

- Various times: Interviews with C700 employees
- Report writing

Thu 10 Jun

- Various times: Interviews with C700 employees
- Report writing

Fri 11 Jun

- Various times: Interviews with C700 employees
- Report writing

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

8725 John J. Kingman Road, Suite 3724

Fort Belvoir, VA 22060-6224

Office: Personally Identifiable Information

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CVR email: Personally Identifiable Information

(1) Amount released to the environment

BLUF: The difference between the estimated amount of JP-5 released on 6 May and the volume recovered is approximately 38 gallons.

Background

- Three FLCPH and NAVFAC professional engineers licensed in different states contributed to the calculations that led to the figure above, so I have a high degree of confidence in it. I validated the numbers I could. The NAVFAC Hawaii Chief Engineer (another licensed professional engineer) is validating the calculations beyond my capabilities.
- The amount recovered is relatively easy to calculate because it involves gauging tanks, simple geometry, and counting adsorbent pads used during cleanup.
- The estimate of the release amount involves complex calculations assuming liquid compressibility, volume calculation for oddly shaped portions of pipeline, and estimates of pressures involved since FLCPH's AFHE does not record pressure in the fuel pipelines.

(2) Environmental impact

BLUF: It is extremely difficult to quantify the volume of JP-5 that entered soil vapor monitoring vaults at Red Hill Tanks 18 and 20. However, it is likely less than the estimated 38 gallons released from the pipeline that was not captured.

Background:

- Purpose of Soil Vapor Monitoring
 - Soil vapor monitoring in Red Hill is one of several measures the Navy utilizes to monitor the continued integrity of the Red Hill tanks. Additional measures include continuous fuel level monitoring, semi-annual tank tightness tests, manual tank gauging, and fuel inventory trend analysis. The original goal of Red Hill soil vapor monitoring was preliminary indication of release from a tank. A fuel release from a pipeline was not anticipated when the soil vapor monitoring vaults were constructed, and vault lids were not designed to be waterproof. Therefore, some unknown amount of the 38 gallons discussed above likely entered vaults near Tanks 18 and 20 during the release or subsequent water wash-down that was done to flush released fuel to collection areas in floor drains. During the 6 May event, a portion of the JP-5 likely vaporized immediately when it transitioned from a high-pressure environment in the pipeline to atmospheric pressure in the Red Hill tunnel. Additionally, the compressed fuel would have heated slightly, increasing the amount that vaporized.
 - Each soil vapor monitoring vault contains two to three monitoring ports connected to varying lengths of plastic tubing buried in the soil under the nearby Red Hill tank, one shallow, one mid-depth, and the final one is nearly under the center of the tank.
 - Soil vapor samples are manually collected from each monitoring port in each vault and analyzed in the field using a gas detector called a photo-ionization detector (PID). The PID readings from Red Hill show the total of all volatile organic compounds (VOC) in the sample. Samples are measured to the nearest parts per billion (ppb).
- Detection
 - Samples are also taken of ambient air in Red Hill tunnel in order to subtract background VOC from the readings taken from the soil.
 - Beginning in 2014, Red Hill soil vapor samples were collected monthly. After May 10, 2021, readings are currently collected daily.

- CNRH/NAVFAC Hawaii Environmental has a team of scientists and environmental specialists who collect and analyze the PID readings from all vapor monitoring ports since 2014.
- No Effect on Groundwater
 - The CNRH/NAVFAC Hawaii Environmental team is confident that none of the small amount of JP-5 that entered the vaults at Red Hill Tanks 18 or 20 has migrated downward to the basal aquifer approximately 100 feet below the bottom of the tanks. For reference, no free product from the fuel released from Tank 5 in 2014 has been detected in the groundwater.
 - Additionally, the team has seen no increase in fuel detected in the Red Hill groundwater monitoring wells since the 6 May event. This includes the nearest groundwater monitoring well nearest to Red Hill Tanks 18 and 20.
- Tank 17, Uniquely Erratic
 - The third soil vapor monitoring vault that has shown erratic readings recently is at Tank 17. The area of the Red Hill tunnel near Tank 17 were unaffected by the 6 May release. It does not appear the area was compromised during the subsequent water washdown that was completed to flush released fuel to collection areas in floor drains and sumps. Readings at Tank 17 vault (as well as other tank vaults) have historically both dramatically increased and decreased by several orders of magnitude over time, even prior to 6 May 2021. The CNRH/NAVFAC Hawaii Environmental team continues to investigate why readings from the vault at Red Hill Tank 17 are unlike those from vaults at Tanks 18 and 20.

Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)


From: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>
Sent: Wednesday, June 9, 2021 8:06 AM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA); Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA); Light, Christopher D CAPT USN COMNAVSUPSYSCOM PA (USA)
Subject: RE: Daily Investigation Report
Signed By: Personally Identifiable Information


Roger – thanks!

Vr,
K

Kurt J. Wendelken
Vice Commander
Naval Supply Systems Command Headquarters

 **Comm:** Personally Identifiable Information

 **Mobile:** Personally Identifiable Information


 **DSN:** Personally Identifiable Information

 **SVOIP:** Personally Identifiable Information

NIPR: Personally Identifiable Information

SIPR: Personally Identifiable Information

Mark Gendron
EA to NAVSUP Vice Commander
NAVSUP Headquarters

 **Mobile:** Personally Identifiable Information

NIPR: Personally Identifiable Information

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>

Sent: Tuesday, June 8, 2021 11:04 PM

To: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information> (b) (6)

Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>; Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>; Light, Christopher <Personally Identifiable Information>

Subject: Daily Investigation Report

Vice,

Good afternoon. Below are my activities today and my plans for the remainder of this week.

Today's interviews were informative, and I found more documents that could help inform my report. RDML English's office received my deliverables and had no questions.

Tue 08 Jun

- Following NAVSUP review, I emailed two deliverables (amount of JP-5 released and not recovered, and environmental impact) to CPF N4 and CNRH CoS.

- RDML English is out of the office until 16 Jun, so I touched base with Robert Steward, “StewBob” to ensure he received. He reviewed the document and saw no immediate issues with it; he will reach out to me if he has questions or needs additional information.
- I advised StewBob that I will be available for an in-person or phone meeting later this week, if desired.
- I interviewed FLCPH 700 Operations Supervisor, one Control Room Operator and one Red Hill Rover who were on duty on 6 May. I will summarize their notes this evening for their review and signature tomorrow.
- This evening I will also review operations orders, 700’s OMES manual, and interview statements for report writing.

Wed 09 Jun

- Various times: Interviews with C700 employees
- Report writing

Thu 10 Jun

- Various times: Interviews with C700 employees
- Report writing

Fri 11 Jun

- Various times: Interviews with C700 employees
- Report writing

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

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CVR email: Personally Identifiable Information

Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

From: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >
Sent: Thursday, June 10, 2021 3:44 PM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA); Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA); Light, Christopher D CAPT USN COMNAVSUPSYSCOM PA (USA)
Subject: RE: Daily Investigation Report

Roger - thanks!

Vr,
K

Sent with BlackBerry Work
(www.blackberry.com)

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >
Date: Thursday, Jun 10, 2021, 15:41
To: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information [mil](#)>
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >, Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >, Light, Christopher <Personally Identifiable Information >
Subject: Re: Daily Investigation Report

Vice,

I'm working towards the 25 Jun due date discussed last week. My plan is to send a draft report to CAPT Partridge and CAPT Light for feedback by Monday, 21 Jun.

V/r,

Brian Dodson
Deputy OIC, NAVSUP Naval Petroleum Office
8725 John J. Kingman Road, Suite 3719
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Office: Personally Identifiable Information
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SIPR: Personally Identifiable Information
NPO group SIPR email:
Personally Identifiable Information

From: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >
Sent: Thursday, June 10, 2021 12:04 PM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information ; Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >; Light, Christopher D CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information mil>
Subject: RE: Daily Investigation Report

Thanks Brian - GTG - Am ok with you departing on Saturday. Do you have a timeline for your report?

Vr,
Kurt

Sent with BlackBerry Work
(www.blackberry.com)

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information
Date: Thursday, Jun 10, 2021, 12:01
To: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information , Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information , Light, Christopher <Personally Identifiable Information
Subject: Daily Investigation Report

Vice,

Good morning.

I apologize for not sending my daily update yesterday. Late in the afternoon, my laptop pushed an update that I had postponed all day, and I was knocked offline for several hours.

Yesterday I conducted interviews. Today, I hope to finish with the last interviews and have interviewees review my interview summaries for accuracy. StewBob, in RDML English's office, expected to pull me into a phone call update today or tomorrow prior to my departure.

With your concurrence, I will keep my flight reservations to return this Saturday, 12 Jun, and finish out my report writing from Virginia. I believe I have the information I need to draft my report, and the contacts on island to assist if I discover gaps.

Wed 09 Jun

- Various times: Interviews with C700 employees
- Report writing

Thu 10 Jun

- Various times: Interviews with C700 employees
- Report writing

Fri 11 Jun

- Various times: Interviews with C700 employees
- Report writing

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

8725 John J. Kingman Road, Suite 3719

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SIPR: Personally Identifiable Information

NPO group SIPR email:

Personally Identifiable Information

Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

From: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>
Sent: Saturday, June 12, 2021 6:44 AM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA); Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA); Light, Christopher D CAPT USN COMNAVSUPSYSCOM PA (USA)
Subject: RE: Daily Investigation Report
Signed By: Personally Identifiable Information

Thanks Brian - good copy and great work! Appreciate your flexibility and leadership. Travel safe.

Vr,
Kurt

Sent with BlackBerry Work
(www.blackberry.com)

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) Personally Identifiable Information
Date: Friday, Jun 11, 2021, 21:51
To: Wendelken, Kurt J SES USN COMNAVSUPSYSCOM PA (USA) Personally Identifiable Information
Cc: Bresnihan, George E CAPT USN COMNAVSUPSYSCOM PA (USA) Personally Identifiable Information>, Partridge, Heather Dawn CAPT USN COMNAVSUPSYSCOM PA (USA) Personally Identifiable Information, Light, Christopher Personally Identifiable Information
Subject: Daily Investigation Report

Vice,

Good afternoon. I touched base with StewBob in RDML English's office and CAPT Guenther at CNRH. Both offered continued support for the investigation, and we confirmed our plan for continued comms.

NAVFAC EXWC Operations Officer, CDR Sullivan, informed me that his team is pushing AB for an initial assessment by 23 Jun so I can incorporate it into my report.

I finished with my final questions to the FLCPH Fuels team. I am set to depart tomorrow morning and continue working from Fort Belvoir for the next two weeks.

Today, Fri 11 Jun

- Various times: Interviews of opportunity with additional C700 employees
- Q and A with various C700 employees about the AFHE logs
- Observe C700 maintenance projects unrelated to the investigation

Tomorrow, Sat 12 Jun

- In transit

Sunday, 13 Jun

- Arrive home
- Rest

Next 14 days until report due date

- Continue investigating potential cause(s) and/or contributing factors to the 6 May event
- Draft report

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

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CVR email: Personally Identifiable Information

Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

From: Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) Personally Identifiable Information
Sent: Friday, June 4, 2021 11:30 PM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Subject: FW: Notice of Interest Sampling Results -3 Jun
Attachments: Red Hill Notice of Interest - Sampling Results (10 May 21 - 3 Jun 21) disclaimer.xlsx
Signed By: Personally Identifiable Information

Brian,

Attached are the latest SVM readings. The April monthly readings are on the 1st tab.

v/r-John

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA) Personally Identifiable Information
Sent: Friday, June 4, 2021 5:04 PM
To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information mil>; Meyer, James G (Gordie) CAPT USN NAVFAC HAWAII PEARL (USA) Personally Identifiable Information; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information Panthen, Donald C CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) Personally Identifiable Information; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) Personally Identifiable Information
Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information
Subject: RE: Notice of Interest Sampling Results -3 Jun

Good Afternoon,

Attached are the sampling results through 3 Jun.

SVMP:

- PID readings for SVMPs from Tanks 2 to 16 remain low
- PID readings for SVMPs from Tanks 17, 18, and 20 continue to trend downward.

I will be forwarding additional data over the weekend. Next submission to DOH is Monday.

Very Respectfully,

Sherri R. Eng
NAVFAC Hawaii Environmental Business Line Leader
Navy Region Hawaii Environmental Program Manager (N45)
400 Marshall Road
JBPHH, HI 96860-3139
Office: Personally Identifiable Information
Cell: Personally Identifiable Information

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)
Sent: Thursday, June 3, 2021 4:20 PM
To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information; Meyer, James G

(Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA) ^{Personally Identifiable Information}; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) ^{Personally Identifiable Information}; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) ^{Personally Identifiable Information}; Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA) ^{Personally Identifiable Information}; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) ^{Personally Identifiable Information}; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) ^{Personally Identifiable Information}

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) ^{Personally Identifiable Information}

Subject: RE: Notice of Interest Sampling Results -2 Jun

Good Afternoon,

Attached are the sampling results through 2 Jun.

SVMP:

- PID readings for SVMPs from Tanks 2 to 16 have remained low (<2,000 ppbv at most SVMPs)
- The PID readings for SVMPs from Tanks 17, 18, and 20 continue to trend downward.

Very Respectfully,

Sherri R. Eng

NAVFAC Hawaii Environmental Business Line Leader
Navy Region Hawaii Environmental Program Manager (N45)

400 Marshall Road

JBPHH, HI 96860-3139

Office: ^{Personally Identifiable Information}

Cell: ^{Personally Identifiable Information}

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Wednesday, June 2, 2021 1:42 PM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) ^{Personally Identifiable Information}; Meyer, James G (Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA) ^{Personally Identifiable Information}; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) ^{Personally Identifiable Information}; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) ^{Personally Identifiable Information}; Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA) ^{Personally Identifiable Information} mil; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) ^{Personally Identifiable Information}; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) ^{Personally Identifiable Information}

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) ^{Personally Identifiable Information}

Subject: RE: Notice of Interest Sampling Results -1 Jun (includes SUMMA Canister and GW results)

Good Afternoon,

Attached are the sampling results through 1 Jun. This deliverable (spreadsheet and .pdf) includes the first round of groundwater samples and SUMMA canister results.

SVMP:

- PID readings for SVMPs from Tanks 2 to 16 have remained low (<2,000 ppbv at most SVMPs) and generally consistent with pre-spill PID readings
- The PID readings for SVMPs from Tanks 17, 18, and 20 have generally decreased over time since May 13. However, we have seen some day-to-day variations in the reading. In other words, on some days, PID readings at some individual SVMPs are higher than the prior day reading, but the overall, longer term trend appears to be decreasing.

SUMMA Canister Results (week of 10 May):

- The attached .pdf compiles the chromatograms for all the Summa canister results to date and provides the PID reading from each of the location when the sample was collected.

- The Summa canister sample chromatograms are consistent with the PID readings. When the PID reading are less than 10,000 ppbv, the chromatogram shows no visual evidence of Jet Fuel vapors. When the PID reading is above 50,000 ppbv, the chromatogram shows a visual pattern of peaks consistent with Jet Fuel Vapors.
- For the four Summa canister samples with high PID readings (Zone 7 sump, SV17S, SV18S, and SV20M), there are two different patterns in the chromatograms.
 - The samples from SV18S and SV20M show a predominance of heavier hydrocarbons (C9 to C12) consistent with Jet Fuel.
 - The samples from Zone 7 sump and SV17S show a broader range of material with more peaks between C8 (n-hexane) and C9 (n-nonane).
 - The reason for this difference is not clear. It is possible that the SVMP vaults at Tanks 18 and 20 were impacted by mostly Jet Fuel while the Zone 7 sump and Tank 7 SVMP vault were impacted by wash water mixed with lesser amounts of Jet Fuel.
 - Regardless of why the material is different, the observation of two distinct patterns suggests two or more local areas of migration from the tunnel to the SVMPs rather than a single point of migration from the tunnel that has impacted the SVMPs at all three tanks (i.e., 17, 18, and 20).

Groundwater Samples (week of 10 May):

- All detected analytes are within historical ranges (listed in columns D to I); there is no indication of a new release.

The contractor is experiencing some access issues – we will work with FLC and CDR Frame to resolve:

- The contractor gate at Tank 13 was locked again, so Element was not able to sample there.
- There were contractors working at Tank 17, so Element was not able to sample there.

I plan to release all data to DOH at noon tomorrow.

Very Respectfully,

Sherri R. Eng
 NAVFAC Hawaii Environmental Business Line Leader
 Navy Region Hawaii Environmental Program Manager (N45)
 400 Marshall Road
 JBPHH, HI 96860-3139
 Office: Personally Identifiable Information
 Cell: Personally Identifiable Information

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Tuesday, June 1, 2021 12:57 PM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Meyer, James G (Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA) Personally Identifiable Information; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>

Subject: RE: Notice of Interest Sampling Results - May 31

Good Afternoon,
 Attached are the sampling results through 31 May.

- SVM results at tanks 2-16 continue to be within normal levels.
- SVM Results at tanks 17, 18, and 20 are holding - there was an increase at 17S (general trend is still downward).

Tomorrow we will providing the first Summa Canister results (with interpretation) for your review. First groundwater sample results by the end of the week.

I plan to release the 31 May data to DOH tomorrow at noon.

Very Respectfully,

Sherri R. Eng
NAVFAC Hawaii Environmental Business Line Leader
Navy Region Hawaii Environmental Program Manager (N45)
400 Marshall Road
JBPHH, HI 96860-3139
Office: Personally Identifiable Information
Cell: Personally Identifiable Information

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Monday, May 31, 2021 7:48 PM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Meyer, James G (Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA) <Personally Identifiable Information>; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) Personally Identifiable Information; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) Personally Identifiable Information

Subject: RE: Notice of Interest Sampling Results - May 27-30

Good Evening,

Attached are the sampling results through 30 May.

- SVM results at tanks 2-16 continue to be within normal levels.
- SVM Results at tanks 17, 18, and 20 are holding - there was an increase at 18S (general trend is still downward).

I plan to release this data to DOH tomorrow at noon.

Very Respectfully,

Sherri R. Eng
NAVFAC Hawaii Environmental Business Line Leader
Navy Region Hawaii Environmental Program Manager (N45)
400 Marshall Road
JBPHH, HI 96860-3139
Office: Personally Identifiable Information
Cell: Personally Identifiable Information

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Sunday, May 30, 2021 5:49 AM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Meyer, James G (Gordie) CAPT USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>; Kalp, Trent C CAPT USN NAVSUPFLC PEARL

HI (USA) <Personally Identifiable Information>; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Panthen, Donald C CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>

Subject: RE: Notice of Interest Sampling Results - May 26

FYSA - tomorrow I will forward the long weekend cumulative spreadsheet for you review. A data will be shared with DOH before noon on Tuesday.

V/R,
Sherri

Sent with BlackBerry Work
(www.blackberry.com)

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Date: Thursday, May 27, 2021, 2:34 PM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>, Meyer, James G (Gordie) CAPT USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>, Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>, Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>, Panthen, Donald C CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>

Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>, Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>

Subject: Re: Notice of Interest Sampling Results - May 26

All,

Attached are the sampling results from 24 May.

- SVM results at tanks 2-16 continue to be within normal levels.
- SVM Results at tanks 17, 18, and 20 are holding or slightly decreased.

I plan to release this data to DOH tomorrow at 1500.

Very Respectfully,

Sherri R. Eng
NAVFAC Hawaii Environmental Business Line Leader
Navy Region Hawaii Environmental Program Manager (N45)
400 Marshall Road
JBPHH, HI 96860-3139
Office: <Personally Identifiable Information>
Cell: <Personally Identifiable Information>

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Thursday, May 27, 2021 7:00 AM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA); Meyer, James G (Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA); Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA); Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA); Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA); Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA); Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA)
Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA)
Subject: RE: Notice of Interest Sampling Results - May 25

All,

Attached are the sampling results from 24 May.

- SVM results at tanks 2-16 continue to be within normal levels.
- The sampling team encountered multiple issues with PID instrumentation. The SVM tab has 2 new notes
 - o ** Estimated value - Calibration check observed an approximately 40% low bias reading.
 - o *** Estimated value - Inadvertent early termination of PID reading.
- RHMW02 initially had an elevated headspace reading. The subsequent PID reading represented normal levels. It is unknown what caused the initial high reading, but data from previous days have been low and we'll have data collected today to confirm that the high reading was an anomaly. Note added to the 2nd headspace reading that was recorded.

I plan to release to DOH at noon tomorrow.

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Tuesday, May 25, 2021 12:19 PM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Meyer, James G (Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA) <Personally Identifiable Information>; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>

Subject: RE: Notice of Interest Sampling Results - May 24

All,

Attached are the sampling results from 24 May.

- SVM results at tanks 2-16 continue to be within normal levels.
- Decreases in SVM readings at Tank 17, 18, and 20.
- The SVM readings are trending downward. Our contractors say this is a good sign and is indicative of a smaller release. SVM readings would remain consistently high if it were a larger release.

I will release to DOH tomorrow at 1000.

Very Respectfully,

Sherri R. Eng
NAVFAC Hawaii Environmental Business Line Leader
Navy Region Hawaii Environmental Program Manager (N45)
400 Marshall Road

JBPHH, HI 96860-3139

Office: Personally Identifiable Information

Cell: Personally Identifiable Information

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Monday, May 24, 2021 6:48 PM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Meyer, James G (Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA) <Personally Identifiable Information>; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>

Subject: RE: Notice of Interest Sampling Results - May 23

All,

Attached are the sampling results from 23 May.

- SVM results at tanks 2-16 continue to be within normal levels.
- Increases in SVM readings at Tank 17, 18, and 20.

I plan to share with DOH at 1000 Tuesday.

Very Respectfully,

Sherri R. Eng

NAVFAC Hawaii Environmental Business Line Leader

Navy Region Hawaii Environmental Program Manager (N45)

400 Marshall Road

JBPHH, HI 96860-3139

Office: Personally Identifiable Information

Cell: Personally Identifiable Information

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Monday, May 24, 2021 10:05 AM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Meyer, James G (Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA) <Personally Identifiable Information>; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>; Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Cc: Morris, Patricia Ann (Trish) CIV USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>

Subject: RE: Notice of Interest Sampling Results - May 21-22

All,

Attached are the sampling results from 21-22 May.

- SVM results at tanks 2-16 continue to be within normal levels.
- SVM was not conducted at Tank 17 on Friday (noted with NC1) due to workers working in the area.
- SVM at Tanks 17, 18 and 20 are trending downward.

- Headspace monitoring and fuel product gauging results are consistent with previous days. No fuel product has been detected.

I plan to send these results at 1100 to DOH. Unless I hear otherwise, the following disclaimer will be placed on the spreadsheet “ “Preliminary Data – Undergoing Validation. Subject to Change”.

A call is scheduled for Wednesday with DOH to review the sampling procedures and discuss the results.

Very Respectfully,

Sherri R. Eng
NAVFAC Hawaii Environmental Business Line Leader
Navy Region Hawaii Environmental Program Manager (N45)
400 Marshall Road
JBPHH, HI 96860-3139
Office: Personally Identifiable Information
Cell: Personally Identifiable Information

From: Eng, Sherri R CIV USN NAVFAC HAWAII PEARL (USA)

Sent: Friday, May 21, 2021 1:22 PM

To: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information>; Meyer, James G (Gordie) CAPT USN COMNAVEXPDCMBTCOM VA (USA) <Personally Identifiable Information>; Kalp, Trent C CAPT USN NAVSUPFLC PEARL HI (USA) Personally Identifiable Information; Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) Personally Identifiable Information; Panthen, Donald C CDR USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information> Robertson, Lydia R CIV USN COMNAVREG PEARL HI (USA) Personally Identifiable Information; Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>

Subject: Notice of Interest Sampling Results - May 20

All,

Attached are the sampling results from 20 May.

- SVM results at tanks 2-16 are within normal levels.
- SVM results at tanks 17, 18, and 20 seem to be reducing, but we will need to keep an eye on the results/trend to make any real interpretations.
- For fuel product gauging, AECOM monitored at RHMW01R, 02, and 03 – no product detected.

Results are being forwarded to DOH.

Site visit with DOH this morning went as expected. They observed sampling and the pipeline rupture at Tank 18. DOH will be providing recommended improvements to the sampling SOP early next week. We will follow-up with a call for the technical SME's to discuss DOH recommendations. DOH informed us that sampling results will be posted on their website starting Monday.

Very Respectfully,

Sherri R. Eng
NAVFAC Hawaii Environmental Business Line Leader

Navy Region Hawaii Environmental Program Manager (N45)

400 Marshall Road

JBPHH, HI 96860-3139

Office: Personally Identifiable Information

Cell: Personally Identifiable Information

AVERAGE SOIL VAPOR CONCENTRATION READINGS

DATE	SV02 S	SV02 M	SV02 D	SV03 S	SV03 M	SV03 D	SV04 S	SV04 M	SV04 D	SV05 S	SV05 M	SV05 D	SV06 S	SV06 M	SV07 S	SV07 M	SV07 D	SV08 S	SV08 M	SV08 D	SV09 S	SV09 M	SV09 D	SV10 S	SV10 M/D	SV11 S	SV11 M/D	SV12 S	SV12 M	SV12 D	SV13 S	SV13 M	SV13 D	SV14 S	SV14 M	SV14 D	SV15 S	SV15 M	SV15 D	SV16 S	SV16 M	SV16 D	SV17 S	SV17 M	SV17 D	SV18 S	SV18 D	SV20 S	SV20 M	SV20 D
4/22/2021	241	234	248	180	175	446	149	157	186	187	416	1170	3993	243	293	235	477	263	238	227	222	223	367	269	242	259	257	304	368	346	770	693	550	404	361	475	175	NC2	170	207	185	191	289	320	363	1009	1184	223	173	184

DISCLAIMER: Preliminary Data: Undergoing Validation - Subject to Change.

Notes:

* Air compressor used to clear obstruction prior to collecting sample

** "M/D" monitoring points were constructed to screen both middle & deep depth intervals along the respective underground storage tank.

NC - Not collected

NC1 - Not collected due to tank maintenance

NC2 - Not collected due to obstruction in vapor line

Red Hill Bulk Fuel Storage Facility
 Notice of Interest 20210507-0852 JP-5 spill that occurred on 6 May 2021
 2.c. Monitoring Wells: RHMW01R, RHMW02, RHMW03 - Groundwater Sampling
DISCLAIMER: Preliminary Data: Undergoing Validation - Subject to Change.

2021 May NOI event - SDG 96179, 96188

Preliminary laboratory results (final results pending)

Final results provided (validation pending)

Final results provided (validation completed)

	Sample ID	ERH1363	ERH1365	ERH1367	ERH1362	ERH1364	ERH1366
	Collected	5/12/2021	5/13/2021	5/13/2021	5/12/2021	5/13/2021	5/13/2021
	Sample Type	Primary	Primary	Primary	Trip Blank	Trip Blank	Trip Blank
	Location	RHMW01R	RHMW02	RHMW03	RHMW01R	RHMW02	RHMW03

Analyte	Screening Criteria	SSRBL	RHMW01 2018-2021 Historical Ranges (min/max)		RHMW02 2018-2021 Historical Ranges (min/max)		RHMW03 2018-2021 Historical Ranges (min/max)		Units	Result Q	Result Q	Result Q	Results Q	Result Q	Result Q
Benzene	5	750	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ug/L	<0.30 U	<0.30 U	<0.30 U	<0.30 U	<0.30 U	<0.30 U
Ethylbenzene	30	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	ug/L	<0.50 U	<0.50 U	<0.50 U	<0.50 U	<0.50 U	<0.50 U
Toluene	40	-	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	ug/L	<0.30 U	<0.30 U	<0.30 U	<0.30 U	<0.30 U	<0.30 U
Xylenes (Total)	20	-	<0.30	<0.30	<0.30	0.4	<0.30	<0.30	ug/L	<0.30 U	<0.30 U	<0.30 U	<0.30 U	<0.30 U	<0.30 U
TPH-g	300	-	<18.0	<18.0	<18.0	95.0	<18.0	<18.0	ug/L	<18.0 U	83.0	<18.0 U	<18.0 U	<18.0 U	<18.0 U
TPH-d	400	4500	<300.0	350.0	1500.0	2900.0	150.0	380.0	ug/L	180.0 J	890.0/ 1600.0*	200.0 J	-	-	-
TPH-d w/ Silica Gel Cleanup	400	-	<300.0	67.0	260.0	690.0	<25.0	<300.0	ug/L	<300.0 U	360.0	<300.0 U	-	-	-
TPH-o	500	-	<40.0	<300.0	<300.0	330.0	<300.0	310.0	ug/L	<300.0 U	< 300.0/ 240.0* J	220.0 J	-	-	-
TPH-o w/ Silica Gel Cleanup	500	-	<40.0	<300.0	<40.0	<300.0	<40.0	<300.0	ug/L	<300.0 U	<300.0 U	<300.0 U	-	-	-
1-Methylnaphthalene	10	-	<0.025	<0.10	8.7	52.0	<0.025	<0.10	ug/L	<0.10 U	33 1	<0.10 U	-	-	-
2-Methylnaphthalene	10	-	<0.025	<0.10	7.2	51.0	<0.025	<0.10	ug/L	<0.10 U	24 1	<0.10 U	-	-	-
Naphthalene	17	-	<0.10	0.19	32.0	98.0	<0.025	<0.10	ug/L	<0.10 U	59 1	<0.10 U	-	-	-

Notes:
 J - estimated value
 B - blank method contamination
 U - nondetect value
 ID - identification
 TPH-d/o - total petroleum hydrocarbons diesel/oil
 DO - dissolved oxygen
 ORP - oxidation-reduction potential
 "-" - not applicable
 * - sample was re-extracted due to surrogate failure which is included as the 2nd result, and will be verified once validation has been completed.

Interpretation:
 1 - Concentrations for these analytes are consistent with concentrations seen during quarterly monitoring events. In accordance with the LTM program, monitoring will continue.

(1) Amount Released to the environment

BLUF: The difference between the estimated amount of JP-5 released on 6 May and the volume recovered is approximately 38 gallons.

Background

- This number accounts for:
 - The volume of fuel originally contained in the cross-tunnel portion of pipeline between Tanks 19 and 20 (700 gal)
 - The volume of a similar cross-tunnel portion between Tank 17 and 18 (587 gal)
 - We assumed the entire volume of both these cross-tunnel portions was released, since the Tank 17-18 cross-tunnel section is at a lower elevation.
 - A calculation of the amount of fuel in the main JP-5 pipeline that was released at the point where the Tank 18 expansion coupling was before the event (221 gal)
 - This accounts for the portion of the main JP-5 line that was between the higher cross-tunnel portion between Tanks 19 and 20, and the lower elevation portion between Tanks 17 and 18.
 - An estimate of the amount of fuel that was released simply due to pressure build-up from the surge (110 gal)
- The amount recovered is 1580 gallons. This number incorporates the amounts collected:
 - In Tank 311 (1,111 gal)
 - In two sumps in Zone 7 of the Red Hill lower tunnel (119 gal)
 - With 11 bales of adsorbent pads and two adsorbent material net booms (350 gal)
- Three FLCPH and NAVFAC professional engineers licensed in different states contributed to the calculations that led to the figure above, so I have a high degree of confidence in the estimate. I validated the numbers I could. The NAVFAC Hawaii Chief Engineer (another licensed professional engineer) is validating the calculations beyond my capabilities.
- The amount recovered is relatively easy to calculate because it involves gauging tanks, simple geometry, and counting adsorbent pads used during cleanup.
- The estimate of the release amount involves complex calculations assuming liquid compressibility, volume calculation for oddly shaped portions of pipeline, and estimates of pressures involved since FLCPH's AFHE does not record pressure in the fuel pipelines.

(2) Environmental Impact

BLUF: It is extremely difficult to quantify the volume of JP-5 that entered soil vapor monitoring vaults at Red Hill Tanks 18 and 20. However, it is likely less than the estimated 38 gallons released from the pipeline that was not captured.

Background:

- Purpose of Soil Vapor Monitoring
 - Soil vapor monitoring in Red Hill is one of several measures the Navy utilizes to monitor the continued integrity of the Red Hill tanks. Additional measures include continuous fuel level monitoring, semi-annual tank tightness tests, manual tank gauging, and fuel inventory trend analysis. The original goal of Red Hill soil vapor monitoring was preliminary indication of release from a tank. A fuel release from a pipeline was not anticipated when the soil vapor monitoring vaults were constructed, and vault lids were not designed to be waterproof. Therefore, some unknown amount of the 38 gallons discussed above likely entered vaults near Tanks 18 and 20 during the release or

subsequent water wash-down that was done to flush released fuel to collection areas in floor drains that lead to sumps where the fuel was recovered. During the 6 May event, a portion of the JP-5 released likely vaporized immediately when it transitioned from a high-pressure environment in the pipeline to atmospheric pressure in the Red Hill tunnel. Additionally, the compressed fuel would have heated slightly, increasing the amount that vaporized.

- Each soil vapor monitoring vault contains two to three monitoring ports connected to varying lengths of plastic tubing buried in the soil under the nearby Red Hill tank, one shallow, one mid-depth, and the final one is nearly under the center of the tank.
- **Detection and Analysis**
 - Soil vapor samples are manually collected from each monitoring port in each vault and analyzed in the field using a gas detector called a photo-ionization detector (PID). The PID readings from Red Hill show the total of all volatile organic compounds (VOC) in the sample. Samples are measured to the nearest parts per billion (ppb).
 - Samples are also taken of ambient air in Red Hill's lower tunnel and subtracted from soil readings to negate background VOC.
 - Beginning in 2014, Red Hill soil vapor samples were collected monthly. After May 10, 2021, readings are currently collected daily.
 - CNRH/NAVFAC Hawaii Environmental has a team of scientists and environmental specialists who collect and analyze the PID readings from all vapor monitoring ports since 2014.
- **No Effect on Groundwater**
 - The CNRH/NAVFAC Hawaii Environmental team is confident that none of the small amount of JP-5 that entered the vaults at Red Hill Tanks 18 or 20 has migrated downward to the basal aquifer approximately 100 feet below the bottom of the tanks. For reference, no free product from the fuel released from Tank 5 in 2014 has been detected in the groundwater.
 - Additionally, the team has seen no increase in fuel detected in the Red Hill groundwater monitoring wells since the 6 May event. This includes the nearest groundwater monitoring well nearest to Red Hill Tanks 18 and 20.
- **Tank 17, Uniquely Erratic**
 - The third soil vapor monitoring vault that has shown erratic readings recently is at Tank 17. The area of the Red Hill tunnel near Tank 17 was unaffected by the 6 May release. It does not appear the area was compromised during the subsequent water washdown that was completed to flush released fuel to collection areas in floor drains and sumps. Readings at Tank 17 vault (as well as other tank vaults) have historically both dramatically increased and decreased by several orders of magnitude over time, even prior to 6 May 2021. The CNRH/NAVFAC Hawaii Environmental team continues to investigate why readings from the vault at Red Hill Tank 17 are unlike those from vaults at Tanks 18 and 20.

Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

From: Stewart, R Bruce (Stewbob) CIV USN COMPACFLT (USA) <Personally Identifiable Information >
Sent: Wednesday, June 9, 2021 8:46 PM
To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Cc: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA)
Subject: RE: Draft Red Hill Investigation Deliverables due 8 Jun 2021
Signed By: Personally Identifiable Information

Brian,

I am good with it.

Of course, I will send it out for cross staff look.

I also appreciate this is a draft portion.

Any idea when NAVFAC Chief Engineer will have his calculations done?

Thanks again.

Dave Rhone and I will set-up a call for tomorrow afternoon or Friday morning so we can synch prior to you reaching escape velocity.

Vr Stew

Mr. R. Bruce 'Stewbob' Stewart

Director for Pacific Fleet Logistics Planning & Exercises (CPF N40)

SIPR: Personally Identifiable Information

DSN: Personally Identifiable Information

Office: Personally Identifiable Information

Cell: Personally Identifiable Information

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >
Sent: Wednesday, June 9, 2021 2:28 PM
To: Stewart, R Bruce (Stewbob) CIV USN COMPACFLT (USA) <Personally Identifiable Information >
Cc: Guenther, Darren B CAPT USN COMNAVREG PEARL HI (USA) <Personally Identifiable Information >
Subject: Re: Draft Red Hill Investigation Deliverables due 8 Jun 2021

StewBob,

Please let me know if the attached revision works for you.

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

8725 John J. Kingman Road, Suite 3719

Fort Belvoir, VA 22060-6224

Office: Personally Identifiable Information

DSN: Personally Identifiable Information

Mobile: Personally Identifiable Information

NIPR: Personally Identifiable Information

SIPR: Personally Identifiable Information

NPO group SIPR email:

Personally Identifiable Information

From: Stewart, R Bruce (Stewbob) CIV USN COMPACFLT (USA)

Sent: Wednesday, June 9, 2021 1:53 PM

To: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

Cc: Guenther, Norman H CIV DLA ENERGY (USA)

Subject: RE: Draft Red Hill Investigation Deliverables due 8 Jun 2021

Thanks Brian,

2 questions.

1. You say estimated 1618 released (can you characterize while it is an estimate and given this figure is an order of magnitude larger than the less than a 1,000 gals and 557 recovered previously reported. folks will ask – why we should have confidence in this figure?)
2. Can you insert the figures into document that you sent yesterday?

Thanks appreciate the assist.

Vr Stew

Ps. Bill J is swing-by the office this AM.

Mr. R. Bruce 'Stewbob' Stewart

Director for Pacific Fleet Logistics Planning & Exercises (CPF N40)

SIPR: Personally Identifiable Information

DSN: Personally Identifiable Information

Office: Personally Identifiable Information

Cell: Personally Identifiable Information

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information>

Sent: Wednesday, June 9, 2021 7:49 AM

To: Stewart, R Bruce (Stewbob) CIV USN COMPACFLT (USA) <Personally Identifiable Information>

Cc: Guenther, Norman H CIV DLA ENERGY (USA) <Personally Identifiable Information>

Subject: RE: Draft Red Hill Investigation Deliverables due 8 Jun 2021

StewBob,

Following up on our phone call last night, below are the additional numbers you requested:

Estimated JP-5 amount released: 1,618 gal

JP-5 amount recovered: 1,580.1

$1618 - 1580.1 = 37.9$, or approximately 38 gallons

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

8725 John J. Kingman Road, Suite 3724

Fort Belvoir, VA 22060-6224

Office: Personally Identifiable Information

DSN: Personally Identifiable Information

Mobile: Personally Identifiable Information

NIPR: Personally Identifiable Information

NPO group SIPR email: **Personally Identifiable Information**

CVR email: Personally Identifiable Information

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

Sent: Tuesday, June 8, 2021 10:27 AM

To: 'Dion.English@navy.mil' <Personally Identifiable Information>

Cc: 'robert.b.stewart@navy.mil' <Personally Identifiable Information>; Guenther, Norman H CIV DLA ENERGY (USA) <Personally Identifiable Information>

Subject: Draft Red Hill Investigation Deliverables due 8 Jun 2021

RDML English,

Following up on last week's discussions, attached are draft deliverables on the following topics, with concurrence from COM NAVSUP.

1. How much JP-5 was released but not recovered on 6 May?
2. What was the effect on the environment?

Standing by in case you have questions or need more information.

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

8725 John J. Kingman Road, Suite 3724

Fort Belvoir, VA 22060-6224

Office: Personally Identifiable Information

DSN: Personally Identifiable Information

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Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)

From: Pasco, Guy F CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information >
Sent: Thursday, June 10, 2021 4:11 PM
To: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA)
Cc: Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA); Wu, Nelson K CIV USN NAVSUPFLC PEARL HI (USA); Darley, Aaron C CIV USN NAVFAC HAWAII PEARL (USA); Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA)
Subject: RE: Review of estimated discharge calculations for Red Hill
Signed By: Personaly Identifiable Information

Yes Sir, you are correct. According to AFHE the JP5 pumps had been secured for over an hour prior to the event.

Thanks,
Guy.

From: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >
Sent: Thursday, June 10, 2021 9:41 AM
To: Darley, Aaron C CIV USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >; Dodson, Brian <Personally Identifiable Information >
Cc: Floyd, John L CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information >; Pasco, Guy F CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information >; Wu, Nelson K CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information >
Subject: RE: Review of estimated discharge calculations for Red Hill

Good morning Aaron,

Thanks for the review.

My understanding from the information from the AFHE system (Navy word for SCADA) is that pumps were not operating at the time of the event. I am including FLC Fuels leadership and engineers on this email so they can confirm this. Again, thanks for reviewing this.

V/R

CDR Darrel Frame

From: Darley, Aaron C CIV USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >
Sent: Thursday, June 10, 2021 9:36 AM
To: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >; Dodson, Brian <Personally Identifiable Information >
Subject: RE: Review of estimated discharge calculations for Red Hill

CDR Frame, Brian,

I have reviewed the calculations and for the most part they are sound calculations with reasonable assumptions. There is an accounting for the fuel in the cross piping between Tanks 19 and 20 as well as the cross piping between 17 and 18. There is also an accounting for a volume of fuel that would have been in the main line which is above the elevation of the breaks. I am not 100% certain of the geometry behind this volume from the main line as it was not shown in excel files. If I assume that 200 lf of 18" pipe

had 10% of its volume above the break point and then use the volume per linear foot used in the calculations we get → $200 \text{ lf} \times 2.14 \text{ gal/lf} \times 10\% = 242.8 \text{ gal}$. This rough estimate is close to what is listed in the excel file (221 gal). The last item accounted for is a compressed volume which would have been realized after the break (decompression → assumes the pipe was at 100 psi at the time of the break) which look reasonable.

What may be missing is a volume lost due to continued or residual pressure after the break. The only information with regards to pressure in the system is the 100 psi pressure for calculating the compressed fuel lost (assuming static pressure at the time of the break). No information regarding post break pressure has been provided and therefore impossible to determine any additional lost fuel. Is there any information as to the pressure profile during the time of the break? Do we know if the pressure build up was due to static pressure or a continuous buildup of pressure (pump(s) on)? Any pressure profiles or readings before, during, and after the break could help better determine the possibility of additional lost fuel.

If you have any questions please let me know.
Happy to discuss.

Thanks.

v/r
AD

Aaron C. Darley, P.E.
Chief Engineer
&
Design and Construction
Business Line Leader
NAVFAC Hawaii
C: Personally Identifiable Information
Personally Identifiable Information

From: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>
Sent: Monday, June 7, 2021 10:21 AM
To: Darley, Aaron C CIV USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information>
Cc: Dodson, Brian Personally Identifiable Information
Subject: FW: Review of estimated discharge calculations for Red Hill

Aaron,

Please see attached calculations supporting the estimated volume of fuel lost from the pipeline and recovered from the 06 MAY event.

Please let me know what questions you have. I can arrange a meeting to discuss calculations if you like.

V/R

CDR Frame

From: Wu, Nelson K CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information>
Sent: Monday, June 7, 2021 10:08 AM

To: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >

Cc: Dodson, Brian <Personally Identifiable Information >

Subject: RE: Review of estimated discharge calculations for Red Hill

Hi CDR Frame, please see the attached. 'Fuel Recovered' is the sheet to go off of, the other sheet has some calcs and 'fuel recovered' has final numbers with some explanations.

V/R Nelson Wu, P.E.

Supervisory General Engineer

NAVSUP Fleet Logistics Center Pearl Harbor, C701

Nelson.Wu@navy.mil

Office Ph: <Personally Identifiable Information >

DSN Ph: <Personally Identifiable Information >

Cell Ph: <Personally Identifiable Information >

From: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >

Sent: Monday, June 7, 2021 9:59 AM

To: Wu, Nelson K CIV USN NAVSUPFLC PEARL HI (USA) <Personally Identifiable Information >

Cc: Dodson, Brian <Personally Identifiable Information >

Subject: FW: Review of estimated discharge calculations for Red Hill

Nelson,

Please provide me with a copy of the calculations for the volume of estimated fuel lost and recovered from the 06 MAY event. CAPT Meyer has requested the calculations be reviewed by the NAVFAC HI Chief Engineer.

V/R

CDR Frame

From: Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >

Sent: Friday, June 4, 2021 5:22 PM

To: Meyer, James G (Gordie) CAPT USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >

Cc: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >; Darley, Aaron C CIV USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >

Subject: RE: Review of estimated discharge calculations for Red Hill

Captain,

I am very appreciative of your and your team's assistance.

Have a great weekend.

V/r,

Brian Dodson

Deputy OIC, NAVSUP Naval Petroleum Office

8725 John J. Kingman Road, Suite 3724

Fort Belvoir, VA 22060-6224

Office: <Personally Identifiable Information >

DSN: <Personally Identifiable Information >

Mobile: <Personally Identifiable Information >

NIPR: Personally Identifiable Information

NPO group SIPR email: **Personally Identifiable Information**

CVR email: Personally Identifiable Information

From: Meyer, James G (Gordie) CAPT USN NAVFAC HAWAII PEARL (USA) Personally Identifiable Information

Sent: Friday, June 4, 2021 4:31 PM

To: Darley, Aaron C CIV USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >; Dodson, Brian K CIV USN COMNAVSUPSYSCOM PA (USA) <Personally Identifiable Information >

Cc: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) Personally Identifiable Information

Subject: RE: Review of estimated discharge calculations for Red Hill

Thanks Aaron for assisting. A review may require a field visit as well.

Brian, no need for me to specifically review if my Chief Engineer confirms the data and information.

V/R,
jgm

CAPT Gordie Meyer, CEC, USN

Commanding Officer, NAVFAC Hawaii

Regional Engineer, Navy Region Hawaii

Office: Personally Identifiable Information Mobile: Personally Identifiable Information

NIPR: Personally Identifiable Information SIPR: Personally Identifiable Information

From: Darley, Aaron C CIV USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >

Sent: Friday, June 4, 2021 2:48 PM

To: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >

Cc: Dodson, Brian <Personally Identifiable Information >; Meyer, James G (Gordie) CAPT USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information >

Subject: RE: Review of estimated discharge calculations for Red Hill

CDR Frame,

Happy to assist.

Brian,

Please forward the calculations for review.

Thanks.

v/r
AD

Aaron C. Darley, P.E.

Chief Engineer

&

Design and Construction

Business Line Leader

NAVFAC Hawaii

C: Personally Identifiable Information

From: Frame, Darrel E CDR USN NAVFAC HAWAII PEARL (USA) Personally Identifiable Information >
Sent: Friday, June 4, 2021 2:44 PM
To: Darley, Aaron C CIV USN NAVFAC HAWAII PEARL (USA) <Personally Identifiable Information
Cc: Dodson, Brian Personally Identifiable Information Meyer, James G (Gordie) CAPT USN NAVFAC HAWAII PEARL (USA)
Personally Identifiable Information
Subject: Review of estimated discharge calculations for Red Hill

Aloha Aaron,

Brian Dodson from NAVPETOFF is here conducting an investigation on behalf of NAVSUP as to the nature and cause of the release of product from Red Hill. As part of his work he is reviewing calculations to support the estimated volume that escaped from the pipeline. Would you be able to assist him by providing a second set of eyes for validation? He is included on the CC line as well as CAPT Meyer who is also aware of this request. Skipper, please let me know if you wanted to review the calcs as well.

Please let me know. It would be good to get this done within the next week or two.

V/R

CDR Darrel Frame

Darrel Frame, P.E.
CDR, CEC, USN
Director, NAVFAC HI Red Hill Program Management Office
Deputy Environmental Director (N45A), Navy Region Hawaii
Naval Facilities Engineering Systems Command, Hawaii
1942 Gaffney Street, Suite 100
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JBPHH HI 96860-4549

Personally Identifiable Information

wk

Personally Identifiable Information

cel

Personally Identifiable Information

Expansion Coupling Rupture Recovery

Estimated Fuel Release, gal	1,618
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Source	Fuel Recovered, gal	running total
Collection at tank 311	1111	1111
10 Bales of Pads	225	1336
1 KTR Bale of Pad	22.5	1358.5
10 Net Boom 5"X10'	90	1448.5
1 Net Boom 8"X10'	12.6	1461.1
Zone 7 AFFF Sump	9	1470.1
Zone 7 Fuel Recovery Sump	110	1580.1

gallons measured in tank 311
 each bale has 100 pads that are rated to catch 32 oz each. Assume 90% soak (128 fl oz in a gallon)
 10 gal capacity each with 90% catch
 15 gal each with 90% catch

Estimated Line Volume Between RH Tank 19 and RH Tank 20

Nominal Pipe Size:	ID (in):	Volume per Lineal Foot (gal):	Est Length (ft):	Volume (gal):
18 inch	17.25	12.14	38.5	467
12 inch	12.00	5.88	39.5	232

700 Est. Gallons

Estimated Line Volume Between RH Tank 17 and RH Tank 18

Nominal Pipe Size:	ID (in):	Volume per Lineal Foot (gal):	Est Length (ft):	Volume (gal):
18 inch	17.25	12.14	38.5	467
12 inch	12.00	5.88	20.3	119

587 Est. Gallons

due to pressure build up **110 Est. Gallons**
 fuel in the main line above elevation **221 Est. Gallons**

Estimated Line Volume Between RH Tank 19 and RH Tank 20

Nominal Pipe Size:	ID (in):	Volume per Lineal Foot (gal):	Est Length (ft):	Volume (gal):
18 inch	17.25	12.14	38.5	467
12 inch	12.00	5.88	39.5	232

700 Est. Gallons

Tank 19 JP5 line is permanently blanked off and pipe section removed from the tank.
 Tank 20 ball valve and DBBV were shut; volume from this section of line is not in the estimate.

Estimated Line Volume Between RH Tank 17 and RH Tank 18

Nominal Pipe Size:	ID (in):	Volume per Lineal Foot (gal):	Est Length (ft):	Volume (gal):
18 inch	17.25	12.14	38.5	467
12 inch	12.00	5.88	20.3	119

587 Est. Gallons

Tank 17 and Tank 18 are both blanked off for CIR; spools removed from cross-pipe.

Critical Infrastructure

Estimated Volume From Compressibility of Line Pack

Volume Change = Pressure x V initial / beta

where:

V initial is about 3 miles of 18" line

beta is compressibility factor (using kerosene)

Pressure (psi):	Volume Initial (gals):	beta (psi):	Volume Change (gals):
50	209,271	190,000	55
75	209,271	190,000	83
100	209,271	190,000	110
125	209,271	190,000	138

110 Est. Gallons

TOTAL Estimated Volume Released

Tank 19 & 20 crosspipe	700
Tank 17 & 18 crosspipe	587
Line Pack	110
fuel in the main line above elevati	221
1,618	TOTAL Est. Gallons