Alternate Site Requirements

Requirements for considering alternate locations are that they must meet or exceed the current facility’s capabilities.

**ENERGY INDEPENDENT**

*Gravity Fed* – Alternate sites must be able to operate without electricity & deliver same rates of fuel to the base.

**SECURE**

*Off the Grid* – Alternate sites must be cyber-hardened & Anti-Terrorism Force Protection compliant.

**STRATEGIC**

*Proximity to Consumers* – Alternate sites must be Accessible to Navy, Marines, Army, Air Force, Coast Guard, National Guard, National Oceanic & Atmospheric Administration, Humanitarian Aid, etc.

**CAPACITY**

*250 Million Gallons* – Alternate sites must meet or exceed current capacity.

Red Hill Public Meeting, June 2017
Tanks undergo a rigorous clean, inspect, and repair process (approximately 3 years per tank). The recently completed TIRM Decision Document/Implementation Plan highlights requirements and improvements: past, current, and future.

Current Methods of Leak Detection

- Continuous monitoring of alarms and measurements of fuel levels in all tanks
- Annual tank tightness testing
- Monthly soil vapor monitoring

Future Methods of Leak Detection

Section 4 of the AOC-SOW will be completed in 2018 and will determine the best leak detection technology(s) suited to install at Red Hill.
There are 21 attributes being rated. Some examples are:

*Constructability  *Inspectability  *Reliability  *Repairability  *Cost

Red Hill Public Meeting, June 2017
Red Hill is a unique, operational facility that does not afford off-the-shelf solutions. The Size, Logistics, and Engineering are all contributing factors to compressing the timeframe.

**SIZE**

Each tank is 250ft tall and 100ft in diameter, which equates to ~2.25 acres of steel liner per tank.

**ENGINEERING**

- The size and logistics completely change the science/engineering and pose significant challenges.
- All materials, equipment, and people have to mobilize and access each tank through a single hatch deep in a tunnel.

**LOGISTICS**

Operational facility that supports an active Pacific Theater.

*The Administrative Order on Consent (AOC) tank upgrade schedule is structured and designed to accommodate the demand and scale of the Red Hill Facility.*
Public Water Sources Near the Red Hill Underground Tanks

<table>
<thead>
<tr>
<th>Public Drinking Water Source</th>
<th>Red Hill Shaft</th>
<th>Halawa Shaft</th>
<th>Moanalua Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td>U.S. Navy</td>
<td>Honolulu Board of Water Supply</td>
<td></td>
</tr>
<tr>
<td>Areas served by water source</td>
<td>Joint Base Pearl Harbor-Hickam (exclusively)</td>
<td>Metropolitan Honolulu-Moanalua Valley to Hawaii Kai</td>
<td></td>
</tr>
<tr>
<td>Associated public water system</td>
<td>Joint Base Pearl Harbor-Hickam</td>
<td>Honolulu Windward- Pearl Harbor</td>
<td></td>
</tr>
<tr>
<td>Population served by system</td>
<td>65,230</td>
<td>630,266</td>
<td></td>
</tr>
<tr>
<td>Relative amount sources represent in the associated system</td>
<td>1 of 3 sources in system</td>
<td>Combined 25% of system</td>
<td></td>
</tr>
<tr>
<td>Within Federal and State Drinking Water Standards</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Last date water source was sampled</td>
<td>April 18, 2017</td>
<td>March 8, 2017</td>
<td>March 8, 2017</td>
</tr>
</tbody>
</table>

The Safe Drinking Water Act requires testing for more than 90 contaminants including several petroleum-related contaminants, such as Benzene, Toluene, Ethylbenzene, Xylene and Polyaromatic hydrocarbons.

More information is available in the Consumer Confidence Reports published by the water system operators.
The Navy/DLA are collecting geologic data to better understand and evaluate groundwater flow and potential chemical movement beneath the tanks and nearby areas.

Red Hill’s Groundwater Monitoring Network

Navy’s Investigation Tasks:
- Evaluate geology
- Investigate subsurface petroleum
- Identify chemicals
- Expand groundwater monitoring network
- Update groundwater flow & contaminant transport models
- Identify appropriate remedies

Modified from Source:

1. Acronyms and Abbreviations:
   COPC Chemical of Potential Concern
   EAL Environmental Action Levels
   TPH-d Total Petroleum Hydrocarbons - Diesel range µg/L micrograms per liter

2. RHMW08, RHMW09, and RHMW10 are newly installed groundwater monitoring wells.

3. Screening Criteria are Hawai‘i Department of Health Environmental Action Levels (EALs).


5. RHMW10 was installed April 2017, and first sampled in May 2017.

COPC

<table>
<thead>
<tr>
<th>Compound</th>
<th>Concentration (µg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPH-d</td>
<td>940</td>
</tr>
<tr>
<td>1-Methylnaphthalene</td>
<td>20</td>
</tr>
<tr>
<td>2-Methylnaphthalene</td>
<td>27</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>12</td>
</tr>
</tbody>
</table>

April 2017 Validated Result | 2014 Leak

Legends:
- Drinking Water Supply Well
- Groundwater Monitoring Location with April 2017 Validated Results Above Screening Criteria
- Groundwater Monitoring Location with April 2017 Validated Results Below Screening Criteria
- Newly installed Groundwater Monitoring Location
- Proposed Groundwater Monitoring Well Location
- Red Hill Tank
- Red Hill Tank 5
- Red Hill’s Groundwater Monitoring Network

Point of 2014 Leak (Tank # 5)
1. Acronyms and Abbreviations:
   - COPC: Chemical of Potential Concern
   - EAL: Environmental Action Levels
   - TPH-d: Total Petroleum Hydrocarbons - Diesel range
   - µg/L: micrograms per liter

2. RHMW08, RHMW09, and RHMW10 are newly installed groundwater monitoring wells.

3. Screening Criteria are Hawai‘i Department of Health Environmental Action Levels (EALs).

5. RHMW10 was installed April 2017, and first sampled in May 2017.

**Red Hill's Groundwater Monitoring Network**

**Navy's Investigation Tasks:**
- Evaluate geology
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**Legend**
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- Groundwater Monitoring Location with April 2017 Validated Results Below Screening Criteria
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- Red Hill Tank
- Red Hill Tank 5

**Notes**
1. Acronyms and Abbreviations:
   - COPC: Chemical of Potential Concern
   - EAL: Environmental Action Levels
   - TPH-d: Total Petroleum Hydrocarbons - Diesel range
   - µg/L: micrograms per liter
2. RHMW08, RHMW09, and RHMW10 are newly installed groundwater monitoring wells.
3. Screening Criteria are Hawai‘i Department of Health Environmental Action Levels (EALs).
5. RHMW10 was installed April 2017, and first sampled in May 2017.

**COPC Concentration (µg/L)**

<table>
<thead>
<tr>
<th>COPC</th>
<th>April 2017 Validated Result</th>
<th>Maximum Since 2014 Leak</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPH-d</td>
<td>940</td>
<td>6,900</td>
</tr>
<tr>
<td>1-Methylnaphthalene</td>
<td>20</td>
<td>74</td>
</tr>
<tr>
<td>2-Methylnaphthalene</td>
<td>27</td>
<td>48</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>52</td>
<td>180</td>
</tr>
</tbody>
</table>
The Navy and Defense Logistics Agency continues to monitor and further investigate the area’s groundwater and has proposed additional investigative measures to evaluate and protect the groundwater resource.

The Navy begins environmental investigation and monitoring at Red Hill in 1998.

- Established routine soil vapor monitoring
- Groundwater Protection Plan approved by DOH on August 13, 2008

Tank 5 leak identified; reported to DOH in January 2014.


Established routine soil vapor monitoring.

AOC Parties continue to collect data and evaluate groundwater flow direction and potential movement of chemicals.

Sections 6 and 7 Work Plan / Scope of Work conditionally approved.

Installed five additional monitoring wells.

Administrative Order on Consent signed.

Red Hill Public Meeting, June 2017