Air Force Meets Challenges of PFOS/PFOA at Closed Installations

Stephen TerMaath, Ph.D., P.E.
Chief, BRAC Program Management
Air Force Civil Engineer Center
Agenda

• BRAC Program Mission and Vision
• Background
• CERCLA Process
• BRAC Perfluorooctanesulfonic acid (PFOS)/Perfluorooctanoic acid (PFOA) CERCLA Status
• Drinking Water Mitigation
• Protecting Drinking Water
• Spotlights
• Nonpotable Water Mitigation
• Final Thoughts
Mission

• Execute the disposal of Air Force property in support of BRAC law, optimize post transfer management of assets and liabilities, eliminate or reduce environmental liabilities, and support other Real Property services and decisions.

Vision

• Complete property transfer by 2027 and achieve response complete at over 96% of all environmental sites by 2020; reduce liabilities to the lowest level that can be practically achieved; maintain proactive and responsive relationships with communities; and retain and maintain unique BRAC capabilities.
Background

• 1969 – Formally issued Military Specification for Aqueous Film Forming Foam (AFFF) (MIL-F-24385)
• 1970 – Air Force began use of AFFF containing PFOS with resulting degradation precursor substance, PFOA through base closure
• 2009 – US EPA issued provisional Health Advisory (HA) for PFOS/PFOA
• 2013 – BRAC initiated Preliminary Assessments (PAs) and Site Inspections (SIs)
• 2016 – US EPA issued lifetime HA for PFOS/PFOA
• 2017 – Air Force replaces legacy AFFF for use in firefighting vehicles
CERCLA Process

- **PA**
  - Review historical records
  - Identify potential release locations

- **SI**
  - Determine if release occurred
  - Identify drinking water receptors
  - Can be expanded to include mitigation and investigation

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
BRAC PFOS/PFOA CERCLA Status

• Preliminary Assessment (PA) 2015-2016 – all 40 locations
  • No SI required – 11 locations
• Site Inspection (SI) 2015-2018 – 29 locations
  • Determine release of PFOS/PFOA
  • Identify drinking water receptors
  • No release (1); SI Report complete (3)
• PA/SIs completed by Dec 2018
  • Can be expanded (Supplemental SI) to include mitigation and streamlined investigation
Drinking Water Mitigation and Groundwater Impacts

AFCEC BRAC PFOS/PFOA Impacts a/o 5Feb2018
- AF BRAC PFOS/PFOA Drinking Water Mitigation
- BRAC PFOS/PFOA Groundwater Impacts
- No Site Inspection required or no PFOS/PFOA above HA in Groundwater

1 EPA Region
## Drinking Water Mitigation

<table>
<thead>
<tr>
<th>Installation</th>
<th>Private Drinking Water Wells</th>
<th>Public Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number Sampled</td>
<td>Number Above HA</td>
</tr>
<tr>
<td>Former K.I. Sawyer, MI</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Former March, CA</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Former Pease, NH</td>
<td>45</td>
<td>4</td>
</tr>
<tr>
<td>Former Plattsburgh, NY</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
<td>Former Reese, TX</td>
<td>135</td>
<td>51*</td>
</tr>
<tr>
<td>Former Wurtsmith, MI</td>
<td>55</td>
<td>1</td>
</tr>
</tbody>
</table>

EPA Health Advisory = HA

*Includes exceedance of Texas criteria
Protecting Drinking Water

- Focus on protecting drinking water
- Use Supplemental SIs
  - Evaluation of drinking water exposure pathway
- Tiered approach for prioritization

<table>
<thead>
<tr>
<th>PFOS/PFOA Tiered Prioritization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
</tr>
<tr>
<td>An Air Force release linked to contamination found in</td>
</tr>
<tr>
<td>receptor drinking water &gt; HA</td>
</tr>
<tr>
<td>Tier 2</td>
</tr>
<tr>
<td>An Air Force release linked to groundwater contamination &gt;</td>
</tr>
<tr>
<td>HA that will likely impact receptor drinking water</td>
</tr>
<tr>
<td>Tier 3</td>
</tr>
<tr>
<td>An Air Force release linked to groundwater contamination &gt;</td>
</tr>
<tr>
<td>HA with no drinking water receptors</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Other requirements*</td>
</tr>
</tbody>
</table>

*Such as: applicable State requirements, meet permit requirements, regulatory enforcement.
Spotlight
BRAC – Former Pease AFB

• First AF PFOS/PFOA drinking water impact

• Municipal well shut down May 2014
  • Tested above the EPA Health Advisory (HA)
  • 50% of the municipal supply capacity
    • Remaining capacity in two wells downgradient
  • 400 to 600 gallons per minute (gpm)

• Limited supplemental water from system serving the rest of the community

• 4 private drinking water wells tested above HA
  • Installed whole-house treatment systems
Spotlight
BRAC – Former Pease AFB
Spotlight
BRAC – Former Wurtsmith AFB

• “Do not eat fish” Michigan advisory for Clarks Marsh
  • Downgradient of former fire training area

• Groundwater interceptor wells and treatment system operational 2015

• One private drinking water well tested above HA
  • Home connected to municipal water supply

• PFOS/PFOA treatment systems added to existing TCE groundwater treatment

• Michigan groundwater surface water interface regulation
Spotlight
BRAC – Former Wurtsmith AFB
Spotlight
BRAC – Former Reese AFB

• Fire Training Area had low level PFOS/PFOA
• Groundwater wells typically 100 - 150 feet deep
• EPA HA for PFOS/PFOA and Texas protective concentration levels (PCLs) for additional PFAS
• 51 of 135 drinking water wells tested above HA and/or PCLs
  • Requires combination of resin and granular activated carbon (GAC) for whole-house treatment system
Spotlight
BRAC – Former Reese AFB

LEGEND
- Sampled Water Well with Results Below Screening Criteria
- Sampled Water Well with Results Above Screening Criteria
- Sampled Water Well – Awaiting Results
- Red (On-bone)
- Former Reese Air Force Base Boundary

1 Mile Radius from Former Reese AFB Boundary

EMERGING CONTAMINANTS SUMMIT
#ECSUM18
## Nonpotable Water Mitigation

<table>
<thead>
<tr>
<th>Installation</th>
<th>Mitigation Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Former Chanute, IN</td>
<td>Landfill leachate being treated for discharge to wastewater treatment plant</td>
</tr>
<tr>
<td>Former Mather, CA</td>
<td>Effluent from pump and treat system being treated prior to re-injection near private wells</td>
</tr>
<tr>
<td>Former Pease, NH</td>
<td>Effluent from pump and treat system being treated prior to re-injection near private wells</td>
</tr>
<tr>
<td>Former Wurtsmith, MI</td>
<td>Effluent from pump and treat systems being treated prior to discharge</td>
</tr>
</tbody>
</table>
Final Thoughts

• PFOS/PFOA
  • Changing regulatory horizon
  • Evolving requirements in response to public concerns
  • Rush to cleanup
  • Opportunities in lower cost treatment technologies

• Managing resources

• Maintaining momentum on overall cleanup