



## **HUNTERS POINT NAVAL SHIPYARD (HPNS) Environmental Restoration (Installation) Award Nomination Base Realignment and Closure Program Management Office (BRAC PMO)**

In FY12 and FY13, the HPNS installation achieved significant progress in reducing environmental risks and efficiently readying the property for transfer through a combination of treatability studies, removal actions, and remedial actions. Groundwater treatability studies at four separate parcels made use of innovative injection methods for amendments that reduced or eliminated the need for further remedial action at the plumes. Radiological cleanup was expedited under a basewide removal action, which ultimately functions as the final radiological remedy at all impacted parcels. Additional removal actions have removed high levels of PCBs near the San Francisco Bay, eliminating the spread of contamination and restoring the bay shoreline environment. In conjunction with these aggressive cleanup strategies, the remedial action milestone began concurrently at six of the twelve parcels at HPNS. All this was attainable only through superior program management, close communication with stakeholders, and innovative technical approaches.

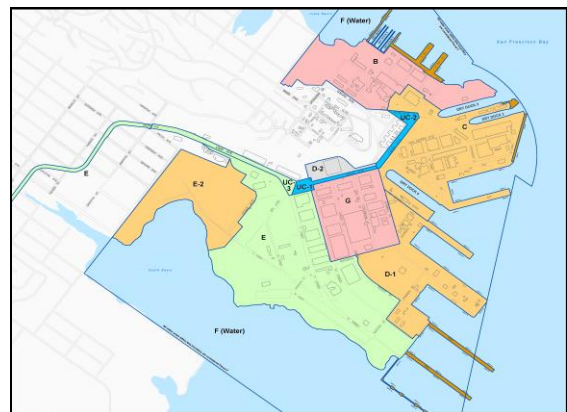
### **INTRODUCTION**

The Naval Facilities Engineering Command Base Realignment and Closure Program Management Office (BRAC PMO) mission at Hunters Point Naval Shipyard (HPNS) is to expeditiously and cost effectively provide all services necessary to realign, close, and dispose of the property. Innovative and thorough environmental restoration has been the key to meeting aggressive property transfer actions which will directly stimulate economic redevelopment in the area. The HPNS cleanup team works diligently to involve the regulatory agencies, local community, and the San Francisco Office of Community Investment and Infrastructure (OCII) to expedite the

restoration and transfer of the property. HPNS operated as a naval shipyard from 1939 to 1974. Most notably, the Naval Radiological Defense Laboratory (NRDL) and its predecessors operated at the shipyard from 1946 to 1969. The shipyard remained relatively unused until 1976, when most of the shipyard was leased to a private ship-repair company, which operated for 10 years. There are no military personnel on the site. The San Francisco Police Department leases space for a crime lab and employs approximately 25 civilian personnel. A local artist community, The Point, leases space to support about 100 local artists.

### **Environmental and Geographical Setting**

HPNS is located adjacent to San Francisco Bay in southeastern San Francisco. It lies within the Hunters Point Shear Zone, which consists of serpentine rock naturally high in arsenic, manganese, and asbestos. HPNS was expanded during the 1940s and 1950s by reclaiming tidelands through cut and fill operations. HPNS included a total of 936 acres; 493 acres on land and 443 acres beneath San Francisco Bay. To facilitate cleanup, HPNS was divided into 12 parcels: A, B, C, D-1, D-2, E, E-2, F, G, UC-1, UC-2, and UC-3. Parcel A (76 acres) was transferred in 2004.



**HPNS Parcel Location Map**



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**Community Setting**

The San Francisco community is politically and environmentally active, and the neighborhood is culturally diverse. The 2010 census shows a residential population of 33,996 within the Bayview/Hunters Point neighborhood adjacent to HPNS. The population is about 33% African American, 30% Asian, 23% Hispanic, 12% White, and 2% Pacific Islander. The median household income is \$47,952 and the median age is 34 years. Over half of all land zoned for industrial use in San Francisco is located in the Bayview/Hunters Point neighborhood. The Bayview neighborhood has higher unemployment and lower incomes than other parts of San Francisco. The San Francisco Bay Area is known for its liberal and politically active community, which has made community acceptance of proposed cleanup at the shipyard even more challenging. The HPNS cleanup team worked tirelessly becoming part of the neighborhood, developing guidelines, and working within existing programs to ensure local small businesses and residents have the opportunity to take part in the cleanup.

**BACKGROUND**

Disposal practices, spills, and releases from past shipyard operations resulted in numerous environmental problems. Contaminants include industrial cleaning solvents, fuels, oils, metals, pesticides, polychlorinated biphenyls (PCBs), radioisotopes and material potentially presenting explosive hazard (MPPEH).

Radiologically impacted sites include 52 building or former building sites; six dry docks; eight IR sites; all ship berths; five piers; 34-miles of sanitary and storm drain systems;



**USS Ranger, Hancock & Coral Sea at HPNS**

nearly 150 outdoor/open areas, and the offshore sediments in Parcel F. These sites were radiologically impacted based on their historical uses including: repair, use, and disposal of radio-luminescent dials, gauges, deck markers, and gamma radiography sources. Releases may have also occurred as NRDL conducted decontamination of and scientific research on ships present during atomic weapons testing, and scientific research on the effects of radioactivity on materials, plants, and animals.

The U.S. Environmental Protection Agency (EPA) placed HPNS on the National Priorities List (NPL) in 1989. Cleanup is accomplished in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), which was amended by the Superfund Amendment and Reauthorization Act of 1986. In 1991, the Department of Defense listed HPNS for closure as part of the Base Realignment and Closure (BRAC) program. After cleanup, the property will be transferred to the OCIL.



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### **Summary of Challenges**

- The cleanup area is massive at more than 860 acres and multiple contaminants in various media. Large-scale, heavy industry associated with ship repair was conducted by the Navy from 1939 to 1974 and from 1976 to 1986 by Triple A Shipyard, a private company that filed for bankruptcy in 1986.
- The presence of radionuclides and the proximity to San Francisco Bay add additional levels of difficulty to the cleanup by requiring innovative methods and coordination with additional regulatory agencies.
- The community is very concerned about environmental justice. The Restoration Advisory Board (RAB) was dissolved after several years of ineffective community meetings. Newly formatted bi-monthly meetings are held in lieu of RAB meetings, complemented by an extensive community outreach program.

### **Stakeholder Interaction**

While the HPNS RAB, which was the Navy's official forum for addressing community concerns, was dissolved in 2009, the HPNS cleanup team has worked diligently to keep the community engaged and involved in the cleanup in a more positive approach. The HPNS team now holds bi-monthly community meetings to discuss the cleanup progress and address community questions and concerns. In FY13, the HPNS cleanup team implemented community bus tours of HPNS twice a year. The response has been overwhelmingly

positive and has provided the local community a firsthand view of the ongoing cleanup activities. The Navy team also provides updates to local faith-based groups, neighborhood improvement, school, and cultural groups, such as the Chinese-American community. The Navy partners with the San Francisco Mayor's program called City Build. This program trains local low-income students in environmental restoration for 6 months. The Navy has assisted in the classroom and Navy contractors have hired graduates to assist in the cleanup. The Navy also developed guidelines to encourage local small businesses to take part in the cleanup effort. Notable participants include trucking, equipment rental, and engineering services. In FY12 and FY13, over 60 local businesses including trucking, local vendors, and environmental technicians/labors participated in the cleanup with contracts totaling over \$15M.

The Navy and regulatory agencies work together to complete the shipyard restoration. The HPNS Base Closure Team (Navy, U.S. EPA, California Department of Toxic Substances Control, California Dept. of Public Health, and California Water Board) hold monthly meetings to help manage and administer the cleanup. The Radiological Affairs Support Office (RASO) and Naval Ordnance Safety and Security Activity (NOSSA) assist on specific projects.

The regulatory agencies are often present during fieldwork and share their expertise with the Navy and their contractors. The trust developed among team members has accelerated document approval and decision making.



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**Program Management**

The Navy and other BCT members closely track cleanup progress. The cleanup schedule and program milestones are detailed in a Site Management Plan (SMP), which is issued in hardcopy annually, reviewed monthly, and updated as required. In FY12 and FY13, all program milestones for transfer were met, which included preparation of Findings of Suitability of Transfer (FOST) documents for Parcel B (IR-07/18) and Parcel D-2.

In addition, during FY13, the HPNS team developed a GIS tool which overlays field work areas within the different parcels with a sliding schedule feature to identify possible conflicts in work areas prior to mobilization. Quarterly Contractor Integration Meetings (CIMs) were developed by the HPNS team to bring together all contractors conducting fieldwork and discuss work scopes and identify conflicts. These tools have enabled the team to coordinate the unprecedented amount of fieldwork at HPNS in FY12 and FY13.

**SUMMARY OF ACCOMPLISHMENTS**

Removal actions and treatability studies jump-started the cleanup, and the shipyard is a hive of activity supporting remedial action and finalizing the radiological removal action. A large number of projects are run simultaneously to support the cleanup.

**Objectives and Degree of Success**

- 1) Accelerated environmental cleanup through innovative remedial/removal actions and treatability studies;
- 2) Completed final remedies at Parcel B (IR-07/18), G, UC-1 and UC-2;

- 3) Remedial action underway at Parcels B (remainder) and C;
- 4) Cleaned up and received no further action for 33 petroleum sites; and
- 5) Achieved unrestricted release for 17 radiological buildings/sites and over 57,000 linear feet of sewer line trenches.

Parcel	Completed Documents
B	RD/RAWP
B (IR-7/18)	FOST
C	RD/RAWP
D-1	RAD RAWP
D-2	FOST
E-2	ROD
G	RD/RAWP
UC-1	RD/RAWP
UC-2	RD/RAWP

**Significant Documents Prepared in FY13**

In addition to the approval of remedial designs and remedial action work plans during FY 2012-2013, the team quickly addressed leachate flowing from the shipyard landfill to SF Bay and avoided a Notice of Violation (NOV). The leachate leak was blanketed with an adsorbent clay mat and anchored with beach sand.



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**Leachate area with clay mat in place**

### **Radiological Removal Action**

Cleaning the largest radiologically impacted Navy site in the country has been a formidable task. An accredited on-site radiological laboratory expedited cleanup by reducing sample turn-around from 21 to 7 days. The radiological removal action is complete in Parcels B, G, D-2, E-2, UC-1, UC-2 and UC-3. The removal action is underway in Parcels C, D-1 and E. In FY13 over 32,000 feet of piping was tested and disposed, 56,000 cubic yards of soil was excavated, and 28 buildings and sites were remediated. The Navy received approval for the unrestricted reuse of 57,204 feet of the sewer line and 17 buildings. The removal action greatly expedited final radiological cleanup, and allowed other cleanup work to proceed without radiological restrictions.

### **MPPEH Screening**

When MPPEH was encountered during a removal action, the Navy gained agency approval and saved about \$6M during the remediation by developing a sampling protocol

that reduced screening costs. The protocol was based on principles of a World War II statistical quality control method applied by the U.S. military for testing of small arms ammunition.

### **PCB Removal Action**

The second part of two phase PCB removal action addressed the discovery of oily waste and PCBs in shoreline sediments at Parcel E-2. 44,000 cubic yards of soil were added to the 81,000 cubic yards and over 50 drums and 700 containers already excavated and disposed.

### **Treatability Studies**

Solvent contamination from a large degreaser was addressed by combining in-situ thermal remediation, hydraulically fracturing the serpentine bedrock, and injecting long-lived microbes for bioremediation. Thermal remediation reduced contaminant mass by 86-99% in 4 months. Fracturing and bioremediation further reduced residual contaminants. This project received the American Academy of Environmental Engineering and Science award in 2013 and used methods pioneered at a HPNS case study reported in the NAVFAC Technical Report (TR-NAVFAC-EXWC-1303), Best Practices for Injection and Distribution of Amendments (Battelle, 2013).

At IR Site 3 (at Parcel E), the 5-acre oily waste ponds site, a treatability study is being performed to evaluate two technologies in the feasibility study: 1) In-situ thermal remediation to mobilize and extract mixed waste in the vapor phase, and 2) in-situ stabilization to limit contaminant migration to SF Bay. The treatability study will remove both LNAPL and DNAPL.



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**Treatability Study at Oily Waste Ponds**

A treatability study to reduce the bioavailability of PCBs by mixing activated carbon into contaminated bay sediment is being conducted with Stanford University and SPAWAR. The project covers a 1-acre test plot using different placement techniques and carbon types. The HPNS team would like to avoid dredging because the bay sediment is considered radiologically impacted, and a host of expensive requirements would be triggered by this technology. Other sediment sites including Lake Hartwell, SC and Eagle Harbor, WA have benefited from this work.

**Parcel B Remedial Action**

Most of the Parcel B remedial action was completed in FY12 – FY13. The remedy is in place at IR-07/18 and 14 acres are ready for transfer. The durable cover is installed and over 90% of contaminated soil has been removed. Approximately 6,300 pounds of

lactate was injected into TCE contaminated groundwater. A soil vapor extraction (SVE) system is removing residual soil contamination.



**Durable Cover Installed at Parcel B**

**Parcel C Remedial Action**

Remedial action at Parcel C is underway. Over 17,300 cubic yards of contaminated soil has been excavated and groundwater treatment is ongoing. The SVE system, bioremediation, and the durable cover will be constructed in FY14.

**Parcel D-1 Remedial Action**

The remedial action work plan is being prepared to guide the construction of the durable cover.

Zero-valent iron (ZVI) injection accomplished the groundwater cleanup in an earlier treatability study. The radiological removal action, scheduled for completion in February 2014, will address all radioactive contaminants.

**Parcel G Remedial Action**

Remedial action is complete at Parcel G. The durable cover has been installed. A ZVI treatability study successfully addressed groundwater contamination and radioactive



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contaminants were removed as part of the Basewide radiological removal action. The Final Remedial Action Completion Report is in preparation.

**Parcel E-2 ROD and Remedial Action**

The Parcel E-2 ROD was finalized in FY13, approving the remedial action required to address the shipyard landfill and adjacent areas. The ROD includes hot spot removal, waste consolidation, a landfill cover, groundwater containment (slurry walls), landfill gas extraction, shoreline revetment, and wetland mitigation.

**Green and Sustainable Remediation**

Concrete and asphalt are crushed and recycled for use as backfill in the top foot of excavations, reducing the cost of disposal and backfill import. Metal is recycled by a local salvage company.

Fill soil and rip rap transport by barge reduced truck traffic in the local community by over 100 trucks per day during times of peak need.

In-situ cleanup technologies that destroy contaminants in place are being used to minimize the need for costly waste removal and disposal.

Waste consolidation at the shipyard landfill eliminated the need for testing and disposal.

**NOMINATION SUMMARY**

1) Excellent program management enabled the team to perform multiple projects simultaneously. Treatability studies and removal actions put in place early expedited the final remedial action.

- 2) Groundwater monitoring has documented the unparalleled success of ZVI to destroy groundwater contaminants and stimulate bioremediation. Other in-situ methods used at HPNS include biological and thermal technologies. Activated carbon sequestration to limit bioavailability is being evaluated as a cost effective alternative to dredging.
- 3) Parcels G, D-2, UC-1 and UC-2 are ready for transfer to the OCII, which is a key mission component. A massive amount of contaminant removal has reduced risk. Durable covers address lower level contamination left in place and permit transfer to OCII.
- 4) The HPNS team continues to receive queries about injecting cleanup amendments, now a widely used technology across the United States. Activated carbon sequestration, while new, is being evaluated at other sediment sites including Eagle Harbor, WA.
- 5) The Navy's cleanup at HPNS is well known for involving the community. In FY12 and FY13, over 60 local businesses were participated in the environmental cleanup with contracts at HPNS totaling over \$15M for these businesses.
- 6) Positive impacts extending past the evaluation period include risk reduction from treatability studies, increased shoreline habitation by native species, and expedited remedial action at HPNS parcels.