

# Environmental Restoration Installation Category PNSY Maine

## INTRODUCTION

**Mission** || The primary mission of the Portsmouth Naval Shipyard (PNSY) is to overhaul, repair, and modernize the U.S. Navy's nuclear-powered submarine fleet and to complete the work in a safe, timely, and cost effective manner. PNSY was officially established as a Federal facility in 1800 with the primary mission to build and repair Navy warships. PNSY built submarines until 1969 when the mission was realigned to function exclusively as a submarine overhaul facility. PNSY is only one of four remaining naval shipyards in the nation and is equipped with three dry docks capable of docking all active classes of submarines, including some of the most technologically advanced nuclear-powered submarines in the world.

**Population** || Approximately 5,260 civilian PNSY employees, 1,000 active duty military, and 1,000 base support/tenant civilians currently work at the installation. Although PNSY functions primarily as an industrial facility for the overhauling of submarines, it also provides support facilities for the Navy Survival, Evasion, Resistance, & Escape School (SERE), Naval Branch Health Clinic Portsmouth, Army New England Recruiting Battalion, Defense Logistics Agency, and Coast Guard. PNSY also supports military personnel with on-base berthing, family programs, and recreational opportunities.

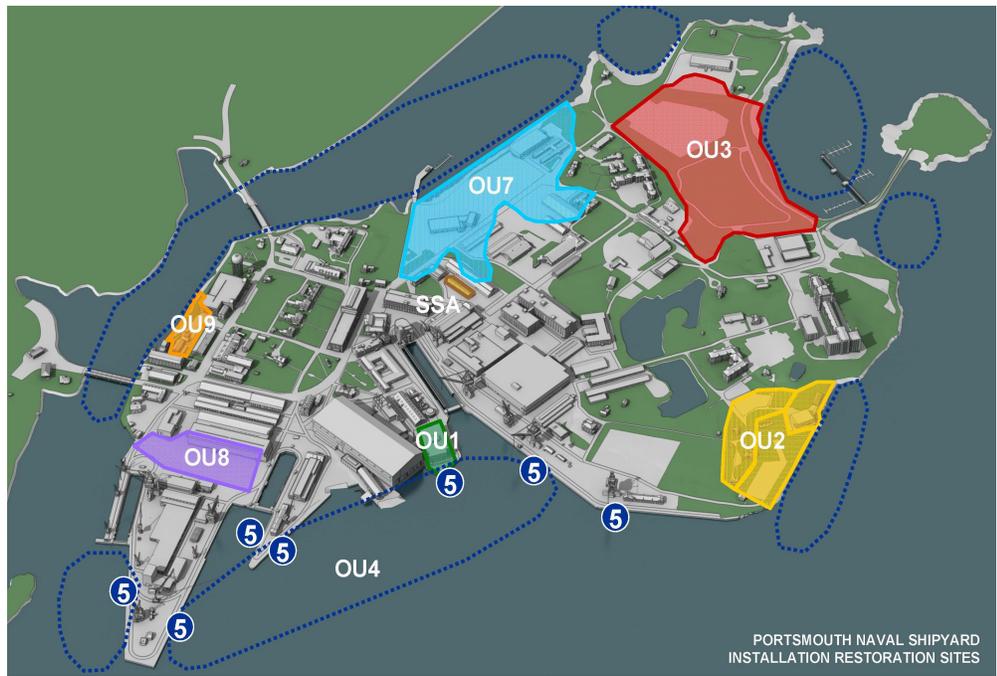
**Setting** || PNSY is located in the Town of Kittery at the southernmost tip of the State of Maine (ME), approximately 50 miles north of Boston, Massachusetts. PNSY encompasses Seavey Island which is situated at the mouth of the Piscataqua River. The river is a tidal estuary that forms a natural boundary between ME and New Hampshire (NH). This federally owned island is located across the harbor from Portsmouth, NH, with access to the mainland via two bridges connected to Kittery, ME.

**Acreeage** || PNSY is approximately 288 acres in size, over 62 acres of which is managed as Controlled Industrial Area (CIA). Industrial activities are concentrated at the western portion of the base within the CIA, which includes dry docks, vessel berths, and numerous trade shop buildings. Areas outside the CIA generally include additional trade shops, administration offices, military housing, recreational facilities, and vehicle parking.



## RESTORATION BACKGROUND

**Program History** || In 1983, an Initial Assessment Study identified 28 potentially contaminated sites requiring further investigation at PNSY. Following this investigation, 15 of the 28 original sites were eliminated from the study. The 13 remaining sites were grouped together based upon similar contaminants and/or locations into seven distinct Operable Units (OUs) and a single Site Screening Area (SSA). The Navy formally established the Environmental Restoration (ER) Program in 1986 to address these sites. PNSY was placed on the National Priorities List (NPL) in May 1994; and in September 1999, a Federal Facility Agreement (FFA) was signed by the Navy and the Environmental Protection Agency (EPA). The Maine Department of Environmental Protection (MEDEP) elected not to be a party to the FFA, but to maintain a participatory role under CERCLA.



**Program Challenges** || PNSY was built on a combination of five islands historically connected by over 90 acres of fill material. The heterogeneous composition of the fill makes investigation, delineation, and cleanup of ER sites exceedingly challenging. PNSY is a 216 year-old facility with a long industrial history involving the manufacturing, processing, handling, and disposal of various hazardous and non-hazardous materials used in shipbuilding. Many of these materials had been managed in accordance with procedures accepted at that time, but unfortunately, resulted in the contamination of soils, groundwater, and sediments at the installation. In addition, the PNSY National Register Eligible Historic District encompasses over 200 of the 288 acres of the installation, with special consideration afforded to certain buildings, structures, landscape features, and areas of archaeological sensitivity. This contributes to the challenges of working within the installation, as facility modifications and ground disturbance within certain areas often require formal consultation with the Maine State Historic Preservation Officer (MESHPO).

**Community Involvement** || The Navy, EPA, MEDEP, and representatives of local communities from Kittery and Portsmouth meet quarterly at the Kittery Community Center as part of a Remedial Advisory Board (RAB). Evolving from the Technical Review Committee formed in 1987, the RAB was established in 1995 and has maintained a formal charter to provide an open forum between the Navy, regulatory agencies, and local community members to discuss PNSY ER investigation and cleanup activities. NH Department of Environmental Services representatives also participate in the RAB. The public is represented in the process by residents as well as the Seacoast Anti-Pollution League, a local citizen's group supported by the EPA's Technical Assistance Grant. The participation of local residents has proven vital to the success of the ER Program, especially given the community's common bond of the Piscataqua River. The extraordinary diversity of river usage, from recreational sailing and boating to commercial fishing and lobstering, creates a unique environment for local stakeholder interest. Many residential homes, historic and recreational parks, marinas, commercial businesses, and industrial facilities are situated along both sides of the Piscataqua River.



**Initiatives** || The PNSY ER Program is diligently pursuing Remedy In Place (RIP) for all sites by FY16, with the ultimate goal of delisting PNSY from the NPL. This will be accomplished through accelerated environmental cleanup using green remediation and innovative technology in collaboration with regulatory partners and stakeholders to ensure the protection of human health and the environment.

## PROGRAM MANAGEMENT

**Management Approach** | The PNSY ER Program has been successful in maintaining and promoting environmental stewardship, while never losing focus of PNSY's mission to support Navy Warfighters. Specific program objectives include: cleanup and closure of remaining active sites; optimizing existing remediation systems and long-term monitoring plans; enhancing community relations and stakeholder partnerships; and providing more efficient program management to ensure all remediation obligations are met in a timely manner. The ER Program is committed to the protection of human health and the environment accomplished in part through direct partnership with regulatory counterparts and collaboration with local community stakeholders via an engaged RAB.

Operable Unit	Site Designation	Site Discovery	Preliminary Investigation	Remedial Investigation	Feasibility Study	Record of Decision	Remedial Design	Remedial Action or Interim Removal Action	Remedy in Place
OU1	Site 10: Former Battery Acid Tank No. 24	•	•	•	•	•	•	•	•
OU2	Site 6: DRMO Storage Yard & DRMO Impact Area Site 29: Former Teepee Incinerator Site	•	•	•	•	•	•	•	•
OU3	Site 8: Jamaica Island Land Fill Site 9: Former Mercury Burial Sites Site 11: Former Waste Oil Tanks No. 6 & 7	•	•	•	•	•	•	•	•
OU4	Site 5: Former Industrial Waste Outfalls	•	•	•	•	•	•	•	•
OU7	Site 32: Topeka Pier Site	•	•	•	•	•	•	•	•
OU8	Site 31: West Timber Basin	•	•	•	FY16	FY16	FY16	FY16	FY16
OU9	Site 34: Former Oil Gasification Plant	•	•	•	•	•	•	•	•
Site Screening Area	Site 30: Galvanizing Plant, Building 184	•	•	•	•	•	•	•	•

**Installation Restoration Investigation / Cleanup schedule**  
• = Complete; FY\_\_ = Anticipated Completion Date

**Site Management Plan** | The ER investigation and cleanup schedules are established and updated annually as part of the Site Management Plan (SMP). The SMP serves as a management tool for planning, reviewing, and setting priorities for ER activities at PNSY. The summary table to the left shows the aggressive schedule the Navy is committed to in expediting RIP at each site. In brief, the schedule lists final remedies for all sites by FY16, a plan intended to streamline the site closure process. This ambitious goal has been sustained with the completion of three Records of Decisions (RODs) and a Final No Further Action (NFA) decision document during FY13-FY14 as well as two Remedial Action Completion Reports (RACRs) in FY15.

**Organization Staffing** | The Remedial Project Manager (RPM) with Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic Northeast Integrated Project Team is the lead for the Navy with regards to regulatory collaboration, technical review, contractor management, funding and budgeting requirements, and overall program management. The PNSY ER Program Coordinator with NAVFAC Public Works Department Maine (PWD-ME) Environmental Division provides installation support for the RPM, serves as the local technical representative for all ER-related issues at PNSY, and enforces compliance for PNSY and contractors conducting work within ER sites. The PWD-ME EV Division Director provides installation ER support and command coordination and serves as the Navy RAB Co-chair.

**Quantity & Scale of Projects** | The table to the right provides a summary of accomplishments accelerated over the past two fiscal years which aid in meeting the goal of RIP for each site by FY16 and ultimately, the delisting of PNSY from the NPL. Notably, the ER Program has successfully executed Remedial Actions (RAs) at three separate sites, resulting in the overall excavation, transport, and disposal of over 24,300 tons of contaminated soils and sediments in FYs 14-15. For significant agreements, one NFA decision document, two RACRs, and three Land Use Control Remedial Designs (LUCRDs) were signed by the PNSY Commanding Officer (CO) and EPA Region 1 Administrator.

ENVIRONMENTAL RESTORATION ACTIONS, DOCUMENTS, & MILESTONES FOR FY14 - FY15				
Site	Actions	Documents/Agreements	Near Term Milestones	Out Year Milestones
OU1	LUC Inspection - MAY 2014 LUC Inspection - JUN 2015	Final LUCRD Rev 1 - SEP 2014 Final RACR - DEC 2014	Annual LUC Inspections	LUC Inspections Five-year Reviews
OU2	RA - JUL 2013 to AUG 2014 LUC Inspection - OCT 2013 LUC Inspection - OCT 2014	Final CCR (DRMO Area) - MAR 2015 Final CCR (WDA) - MAY 2015 Draft LTMgt Plan - JUN 2015	RACR LTMgt Plan Annual LUC Inspections	LUC Inspections & LTMgt Five-year Reviews
OU3	Landfill (Round 13) and LUCs Inspection - MAY 2014 Minor Maintenance - OCT 2014 Landfill Gas Probe Abandonment - JUL 2015	Final Gas Probe Abandonment Plan - JUN 2014 Final Data Package Report, Annual Landfill Inspection Round 12, and Corrective Actions - JUN 2014 Final Round 13 Inspection & Maintenance Summary Report and Annual Landfill Inspection - JAN 2015 Final RACR - FEB 2015 Final Closure Report, Landfill Gas Probe Abandonment - FEB 2015	Landfill & Annual LUC Inspections & LTM	Landfill & LUC Inspections Five-year Reviews
OU4	Round 12 Interim Off-Shore/Pre-Removal Sediment Confirmation Sampling - NOV 2013 RA (Dredging) - SEP 2014 to APR 2015 Supplemental Sediment Sampling - SEP 2014 Post RA Eel Grass Survey SEP 2015	Final Pre-Removal Confirmation Sediment Sampling Report and APP - SEP 2014 Final RAWP - DEC 2014 Final Pre-Removal Sediment Confirmation Sampling Data Package Report - OCT 2014 Final Tech Memo Functions and Values Assessment at MS-12A - JAN 2015 Final Tech Memo - Additional Pre-Removal Sediment Sampling - MAR 2015	CCR NFA	RACR
OU7	LUC Inspection - OCT 2014 RA - MAY to SEP 2015	Draft LTMgt Plan - AUG 2014 Final LUCRD - SEP 2014 Final RAWP - APR 2015	CCR Annual LUC Inspections RACR LTM	LUC Inspections Five-year Reviews
OU8	RI Soil Borings & Groundwater Sampling - JUN 2015	Final RI SAP & APP - MAY 2015	RI/FS Report PRAP ROD RACR	LUC Inspections (TBD) LTMgt (TBD) RACR
OU9	LUC Inspection - OCT 2014 LUC Inspection - JUN 2015	Draft RACR - AUG 2014 Final LUCRD - SEP 2014	RACR	LUC Inspections Five-year Reviews
SSA	N/A	CCR - NOV 2013 Final NFA Decision - MAR 2014	N/A	N/A

**Distinction of Present to Past Successes** | Through expediting the finalization of three RODs for OU4, OU7, and OU9 in FY13, the Navy and its ER stakeholders set the stage for continued success with accelerated cleanups and site closures at PNSY. Through planning and commitment, the team accelerated the Proposed Remedial Action Plan (PRAP) and ROD schedules by more than four months. Special attention was afforded as to how each remedy would support the PNSY mission, be sustainable, and best meet remedial action objectives to protect of human health and the environment. This partnership led to three RAs being completed during the following field season along with the signing of two RACRs and three others being drafted in FY15 for finalization in FY16.

**Substantive Involvement of Internal Offices** | Since the OU2 area has been used for mission-critical equipment storage as well as contractor laydown space, close coordination with PNSY base personnel was critical during the RA efforts in minimizing impacts to Buildings 298 and 310 occupants as well as to various PNSY codes/shops utilizing the area. In addition, the OU4 offshore dredging RA involved substantial PNSY collaboration for coordination of barge berthing and port operations to minimize mission impacts. Working with internal stakeholders, PNSY facilitated more efficient land use planning and construction and mission coordination through effective use of the base mapping system, Environmental Checklists and excavation permits, All Hands messages, and personnel training.

## TECHNICAL MERIT

**Innovative Techniques** | The PNSY ER team is continually considering smarter, greener ways of conducting environmental remediation. For example, the Navy collaborated with EPA and MEDEP to design and implement an innovative method using Portland cement to stabilize 8,750 tons of lead-contaminated soil excavated from OU2 to render it non-hazardous for handling and disposal. As documented in technical memorandums, a field-scale study concluded that a 4% ratio for Portland cement additive to 50-ton piles was successful in reducing Toxicity Characteristic Leaching Procedure (TCLP) lead concentration from as high as 503 mg/L to 0.0025 mg/L. The success of this project prompted further utilization of the technique only months later to address 107 tons of lead contamination that would have been hazardous waste in sediment associated with a large scale dredging effort conducted at OU4.



**Sustainable Use of Resources** | Sustainability was evident in the recent renovation of the historically significant Building 178 conducted as part of a \$40M energy project. A portion of the construction site was located at OU4 within a tidally influenced area containing shipway ramps formerly connecting the interior of Building 178 to the Piscataqua River. The Navy project and ER teams partnered to address the presence of contaminated sediments within the construction footprint. In coordination with EPA and MEDEP, the Navy developed a strategy to address the overlapping areas. Contaminated sediments were excavated and all issues fully addressed, achieving the ER program remedial goal of NFA. This supported unrestricted use of the area, accommodated the successful completion of renovation activities, and paved the way for adaptive reuse and sustainability of Building 178, an iconic feature of PNSY.

OU3 RACR SIGNING



## ORIENTATION TO MISSION

**Leadership Involvement** | Command support is provided by the PNSY CO and XO, PWD-ME Public Works Officer (PWO), and the Public Affairs Office (PAO). The PNSY Command provides superb leadership support of the ER Program in its steadfast dedication to environmental stewardship. The PNSY Command has also been consistently involved in community interaction as is clearly evident with its continual participation in RABs, RAB dry runs, All-Hands outreach, document review, and public inquiries.

**Enhancement of Military Readiness & Mitigation of Restrictions** | The RA activities completed in FYs 14-15 led to the NFA of OU4 offshore areas, including those around the CIA, dry dock, and berthing areas, allowing for

unrestricted use of these areas to support mission requirements as well as future dredging and construction projects. In addition, the RAs completed for OU2 and OU7 allow for potential use of these areas to support future facility construction projects. Frequent coordination among numerous Navy commands and tenants ensures alignment of mission critical activities, future land uses, sustainable practices, and remedial goals.

**Science & Research Contributions** | PNSY had the unique opportunity to support the Strategic Environmental Research and Development Program (SERDP) executed in partnership with DoD, DoE, and the EPA. In support of two SERDP projects, the Navy provided researchers from the University of Michigan and Northwestern University with sediment samples from offshore locations at PNSY. Research objectives included enhanced understanding of physical, chemical, and biological processes interaction and control of transformation, mobility, bioavailability, and toxicity of metals in sediments. A summary of the research entitled, Sediment Re-suspension Affects Metal Bioavailability, was presented at a Society of Environmental Toxicology and Chemistry annual conference.

## TRANSFERABILITY

**Ability to Adopt/Transfer Program Innovations** | The extensive collaborative effort of the Navy, EPA, MEDEP, and other stakeholders in designing and finalizing the OU3 LUCRD resulted in wide acceptance and recognition by the regulatory community as EPA designated the OU3 LUCRD as a template for Region 1. This accomplishment speaks to the integrity of the team and its ability to produce a practical, protective plan that others can now use as a guide for successful long-term site management. This then served as the template for the LUCRDs for OU1, OU7, and OU9 finalized in FY14.

## STAKEHOLDER INTERACTION

**Community Interaction** | The Navy is fortunate to have an engaged group of members who bring diverse backgrounds and expertise to the RAB. The Navy, along with its regulatory team, continues to welcome the opportunity to share proposed investigation and cleanup activities, analytical data results, program schedules, and remedial goals with the local community members who have direct personal interest in, and respect for, the health of the Piscataqua River. PNSY has consistently received positive feedback from local community members during RAB events.

**Partnership Contributions** | PNSY was recently successful in finalizing an update to its ER Community Involvement Plan as well as in soliciting subsequent feedback via surveys of RAB members to gauge outreach effectiveness. Interviews conducted with federal, state, and community stakeholders were beneficial in documenting and assessing the quality and quantity of community outreach with regards to the PNSY ER Program. Insight gained from public feedback has aided PNSY in enhancing outreach and partnerships with stakeholders and other interested parties.

**Promotion of Public Access** | To keep the community and stakeholders informed on environmental issues at PNSY, an index of program documents is maintained in an Administrative Record File (ARF) for review by the public at repositories at the Portsmouth Public Library in Portsmouth and the Rice Public Library in Kittery. Additionally, the Navy hosts a public website for PNSY that includes site description and background information, community outreach information, and access to the ARF, which allows for the community to download any of the final pre-decision documents. The Navy's initiative to provide public access to Navy ER documents through a facility-specific public website was quickly embraced by all stakeholders during a Fall 2013 RAB meeting.

**Opportunities for Public Involvement** | Opportunities for public involvement are provided by the PNSY ER Program, as was evident in conducting quarterly RAB meetings and in the hosting of three public meetings for the PRAPs associated with OU4, OU7, and OU9. The meetings were held at Kittery Town Hall and began with a public informational session, followed by a public comment period. Each outreach opportunity was mutually beneficial with thoughtful public input received, facilitating sound remedy decision-making.

**Installation Education & Awareness** | PNSY provides frequent education of the ER Program to Shipyard personnel through many forms of communication, including All-Hands messages, pamphlets/fliers, signage, shipyard instruc-



tions, PNSY's intranet website, and NAVFAC's PNSY ER public website. Guidance and direction is also consistently provided to PNSY tenants and PWD-ME planning, engineering, construction, and facilities management branches.

## FUTURE IMPACTS / OUTCOMES

**Program Endurance & Framework** || The collaborative agreements established under the ER Program are firmly based on sound science, planning, and execution with every decision providing environmental stewardship and supporting the PNSY mission. The LUCs and Long Term Management Plans (LTMPs) will continue to provide appropriate protection of human health and the environment while considering land use management. Through achieving RIP for each site, the PNSY ER Program will have a lasting benefit and serve as a framework for continued success.

## ACCOMPLISHMENTS

**Accelerated Environmental Cleanup** || The Navy and EPA exceeded their goal in FY13 by signing three RODs in one year. This was achieved through effective communication and collaboration with ER Program stakeholders.

### OU4 DREDGING



Through planning and commitment, the team expedited document review, accelerating PRAP and ROD schedules by more than four months. OU4 was one of the RODs signed during that time with a RA consisting of dredging contaminated sediments at five offshore locations at PNSY. Efforts were fast-tracked again in FY14 by completing pre-removal confirmation sediment sampling, eel-grass surveys, and Remedial Action Work Plan (RAWP) finalization. The momentum of the project continued into the RA which began the same month as regulatory approval of the RAWP was received. Accelerated cleanup was crucial in meeting the federally and state approved in-water work window intended to protect the threatened and endangered species, Atlantic and shortnose sturgeon, respectively.

**Restoration Partnerships** || The OU4 RA commenced at the end of FY14 with an eel grass survey performed at two dredging locations to delineate and document existing essential fish habitat. Partnering with numerous federal and state agencies aided in assessing and minimizing potential impacts to an eel grass bed within one of the dredging locations. Along with extensive coordination of barge berthing and port operations to minimize mission impacts, the effort was further challenged due to extreme Maine winter weather conditions and unforeseen site discoveries, such as a 4-inch artillery shell recovered from one of the dredge locations. The discovery of the munition required immediate and close coordination for site clearance and work approval by Naval Ordnance Safety and Security. Coordination with the MESHPO was also required due to the presence of dense debris with the potential for archaeological artifacts.

**Innovative Technology** || Analytical testing of the 5,752 tons of dredge spoils generated at OU4 characterized the waste as non-hazardous for all but 107 tons, which failed TCLP lead. In the wake of the successful innovative approach applied at OU2 only months earlier, the lead-contaminated sediment was stabilized with Portland cement rendering it non-hazardous waste. Augmenting the dredge spoils with cement was dual purposed, accomplishing both stabilization of lead as well as solidification of water-saturated sediment for proper offsite transportation and disposal. The 107 tons of stabilized sediment were disposed of locally as non-hazardous waste at a NH-licensed landfill facility. As noteworthy as the success of this technique was for OU4, it

was that much more impressive and cost-effective for the treatment of over 8,750 tons of lead-contaminated waste at OU2. Savings of over \$3M were realized by avoiding the exorbitant costs associated with potential hazardous waste transport and disposal. A 4% ratio of Portland cement additive to 50-ton piles was successful in reducing the TCLP lead concentration from 503 mg/L to essentially non-detectable levels, resulting in greater reduction of environmental impact than would have otherwise occurred if the technology had not considered or implemented.

**Reducing Risk to Human Health & the Environment** || A bathymetric survey was conducted at OU4 following the dredging activities to confirm removal of contaminated sediments posing unacceptable risk to ecological benthic receptors. This led to the unlimited site use and unrestricted exposure for the site, with no further action required, including LUCs, monitoring, or long-term management. This effort along with the RAs for OU2 and OU7 led to the expedited removal of over 24,300 tons of contaminated soil and sediments, providing a substantial reduction of human health and ecological risks. In addition, nearly 8,900 tons of lead-contaminated soils were stabilized to substantially minimize TCLP lead concentrations entering the disposal facility, reducing long-term impact to the environment.

**Green Remediation** || With a strong focus on sustainability, footprint reduction and remedy optimization were evaluated and implemented during the OU2 remediation process. The Navy team recently presented “Integrating Sustainability Considerations into Remedial Design” at the International Conference on Remediation of Chlorinated & Recalcitrant Compounds. The presentation focused on sustainability evaluation integrated into the remedial design for OU2. The results of a SiteWise™ evaluation indicated that the contribution from waste handling and disposal was directly proportional to the distance to the disposal facility. These findings were directly applicable to the OU2 remedial efforts, which faced an approximately 600-mile difference in roundtrip distance for hazardous waste transport to a disposal facility in Canada versus a non-hazardous disposal facility in NH. In addition to cost savings, this strategy significantly reduced air emissions associated with potentially longer hauling distances. These initiatives resulted in a more efficient and sustainable remedy strategy that may assist future remedies inside and outside DoD. In addition to these green initiatives, over 280 tons of asphalt and concrete materials were also recycled as part of this action.

**Summary** || In this achievement period, PNSY made significant progress in its initiative of pursuing RIP for all PNSY sites by FY2016 and the ultimate delisting PNSY from the NPL. While focusing on the PNSY mission and the interests of the installation, the ER program enhanced outreach and relationships with regulators and stakeholders, accelerated environmental investigation and cleanup, implemented green and innovative remedial techniques, and developed a long-term management framework that intends to endure over time and provide continued protection of human health and the environment for the future of PNSY.

OU2 EXCAVATION



Prepared by Matt Thyring, PNSY IR Program Coordinator