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FIELD SURVEY REPORT FOR HAZARDOUS WASTE MINIMIZATION SURVEY NSB NEW
LONDON CT
4/1/1991
NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY

FIELD SURVEY REPORT
FOR
HAZARDOUS WASTE MINIMIZATION SURVEY
AT
NAVAL SUBMARINE BASE NEW LONDON
GROTON, CONNECTICUT

April 1991

Naval Energy and Environmental Support Activity
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EXECUTIVE SUMMARY

The Chief of Naval Operations (CNO) requires shore facilities to implement a Hazardous Waste Minimization (HAZMIN) Program. The HAZMIN Program should address management of hazardous materials, industrial processes, training, and waste reduction strategies. The aim of an activity HAZMIN Program is to help the Navy to reach its goal of a 50% reduction in hazardous waste generation (Navywide) by calendar year 1992.

The purpose of this comprehensive HAZMIN survey is to investigate hazardous material usage and hazardous waste generation at Naval Submarine Base (SUBASE) New London, Connecticut and develop HAZMIN recommendations. A Naval Energy and Environmental Support Activity (NEESA) HAZMIN team conducted a survey of SUBASE industrial shops and reviewed their hazardous material and hazardous waste management procedures. This Field Survey Report presents the preliminary findings of the survey and the resulting HAZMIN recommendations. Appendix A contains a list of attendees for the HAZMIN Survey Kickoff Meetings.

SUBASE New London has already initiated numerous HAZMIN projects, such as refrigerant recovery, HM inventory control, and the use of paint locker to reduce the generation of paint waste. In addition, some tenants and shops have incorporated waste minimization practices into their operations.

Shown below are the major preliminary HAZMIN recommendations which resulted from the Field Survey:

1. Commanding Officer, SUBASE New London, needs to appoint in writing a Hazardous Material Control Program Manager. To be effective, a HAZMIN Program must include materials control. Under the current organization, it is unclear who is responsible for ensuring that the HM Control Program is implemented. It is suggested that the Program be managed either by SUBASE Supply or SUBASE Safety.
2. Each industrial shop should develop a hazardous materials inventory, listing the types and quantities of materials that are needed to accomplish the shop's mission. These inventories will serve as authorized HM use lists. Any items that are not on the authorized list should not be procured without the specific permission of the HM Coordinator.
3. Establish a method for materials reutilization, similar to the Paint Locker in NSSF. DRMO and NSSF can work together to let the shop workers know what materials are available for use. Before ordering new material, shops should check with the Paint Locker and DRMO.
4. Recycle organic solvents for reuse as a parts cleaner. Solvents such as PD-680, II, Degreasol, Freon, and Trichloroethane can be reclaimed in a solvent distillation unit. If manpower is unavailable to support onsite recycling, it is suggested that a contractor be used to reclaim waste solvent.

For recommendations that require capital investment, NEESA will provide economic analyses and manufacturer information in the upcoming Survey Report.

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CHAPTER 1. FINDINGS AND RECOMMENDATIONS BY SHOP

1.1 NAVAL SUBMARINE SUPPORT FACILITY FINDINGS AND RECOMMENDATIONS.

The Naval Submarine Support Facility (NSSF), a tenant command of SUBASE, is the largest shore based industrial facility on the base. NSSF is comprised of four main areas: the Weapons Department, the Selected Restricted Availability (SRA) Department, the Repair Department, and the Facilities Support Group. The NSSF mission is to rework and repair submarine parts. They also oversee shipyards that come into the base to perform work on the submarines stationed at SUBASE. The Safety Department coordinates the HAZMAT and HAZMIN program at NSSF, and works closely with SUBASE Public Works Environmental (Code 834) and NSSF Supply.

1.1.1 NSSF SUPPLY, Building 20. NSSF Supply reviews material requisitions from NSSF facilities, and forwards them to SUBASE Supply. Though there is no warehouse for storing materials, NSSF Supply provides a vital function in limiting the amount of hazardous material ordered. Supply personnel use authorized hazardous material use lists to screen each order and ensure that the requester is permitted to have the material. If a shop wants to order a hazardous material that is not on their HM use list, written permission must be granted by the NSSF Commanding Officer before Supply will process the requisition. After the CO grants permission, the material is added to the authorized HM use list. The authorized use lists are reviewed periodically to reduce the number of materials, and determine if the materials on the list are necessary. NSSF Supply picks up all HM ordered by NSSF shop from SUBASE Supply. They also verify that the paperwork is in order and deliver the material directly to the appropriate shop.

The majority of excess and expired shelf life material consists of solvents and lube oils. The NSSF Supply and Safety departments are writing an instruction to outline a system of sharing the custody of hazardous material. Since many HMs are used by more than one division, NSSF Supply proposes to designate item managers in individual divisions. These managers would be responsible for ordering, storing, and passing out HM as needed to the other divisions, similar to the NSSF paint locker operation. The managers would only disburse the quantity of material needed to complete an individual job. For example, a shop would not be given a five-gallon pail of grease if they only need a pint to complete a project. This type of materials control will limit the amount of expired shelf life material and excess hazardous material generated. Presently, divisions are instructed to try and locate users for excess hazardous materials, before sending them back to SUBASE Supply. If the material has an expired shelf life, it may be suitable for use in a noncritical process. If it cannot be used, it is sent to DRMO for disposal.

NSSF Supply is trying to increase personnel awareness about limiting the amount of HM ordered. When interacting with shop personnel, NSSF Supply provides advice and guidance on materials control and minimization.

NSSF Supply generates no hazardous waste.

RECOMMENDATIONS:

- o Establish a "Hazardous Materials Reutilization Store" operated by NSSF personnel, perhaps with item managers located in different shops. A catalog should be issued monthly, listing items in the store by stock number and material description. The catalog should be distributed to all NSSF shops and supervisors. Materials would be given away free of charge, but the value of the material given away should be tracked. Materials should be kept in stock for at least three months before being disposed through DRMO or the HW storage facility. As an example, a reutilization store established at SUBASE Bangor gave away 1,900 items and saved an estimated \$56,000 in its first year of operation. More information on establishing a reutilization store will be provided in the final report.

1.1.2 NSSF WEAPONS, Buildings 176, 181, 393, 450, and Firing Range. The Weapons Department overhauls MK 48 Torpedoes and test rounds. When test rounds are fired and recovered, the seawater collected in the afterbody compartment is removed and the compartment cleaned with mineral spirits. The seawater is contaminated with the combustion products of OTTO fuel used to propel the torpedoes. These contaminants include methane, carbon dioxide, carbon monoxide, and hydrogen cyanide. The unburned fuel in the tank can be contaminated and must be removed.

There are three 1,000 gallon tanks used for accumulating contaminated OTTO fuel and combustion contaminants mixed with mineral spirits. Two of the tanks are used for OTTO fuel and seawater mixture; the other is used for mineral spirits. 2,000 gallons of OTTO fuel/seawater waste is reclaimed through a Texas facility each month. An NSSF OTTO fuel reclamation facility is under construction, and is scheduled for completion in 1992. It will contain a physical separation stage and carbon filtration for removing OTTO fuel from seawater. 1,000 gallons of the mineral spirits mixture is disposed as hazardous waste each month.

Shop personnel use Kim-wipes to clean up spills and Personal Protective Equipment (PPE) when handling OTTO fuel. These solid wastes are generated at the rate of 3,000 pounds per month. A compactor is used to compress the waste into 55 gallon drums. Rags are also used to clean the afterbody parts of the torpedoes, using trichlorotrifluoroethane (Freon) in spray cans. When testing the torpedoes with simulation equipment, it is required that the contacts be cleaned with Freon. The empty aerosol cans are collected and sent to the HW storage facility.

The Weapons Department has three mineral spirits dip tanks for cleaning parts. The solvent is cleaned out after every 10 torpedoes are serviced, which is approximately once per week. This waste goes into the 1,000 gallon mineral spirits collection tank. This waste contains hydraulic fluid, OTTO fuel, alcohol, oil, and grease.

Aerosol paint is used to touch up the torpedoes. The deck areas are painted with epoxy to prevent OTTO fuel contamination. At the "Hothouse", empty aerosol cans are collected, including paint and Freon, and they are disposed through the HW storage facility. There are three 55-gallon barrels for storing the empty cans, and all weapons facilities shops use these containers for their empty aerosol cans. One is for paint cans, one for Freon, and one

for miscellaneous empty cans. The drums are hauled weekly to the HW storage facility, and each drum weighs approximately 150 pounds. The miscellaneous cans are sorted and labeled before being sent to the HW storage facility. 1,1,1 Trichloroethane is also used to clean the torpedoes before sanding and painting. These rags are kept separate from rags used to clean off grease, paint, locktite, etc., and are disposed as hazardous waste.

Building 524 is the Tomahawk Cruise Missile Facility. Here, Tomahawk test rounds are overhauled, cleaned, and painted. Their main problem is expired shelf life material received from Supply. They must go by the microfiche shelf life based on the date of manufacture, not the expiration date marked on the item. Expired greases, solvents, and paints are disposed through DRMO.

The Ties Division discharges silver-cadmium battery cells and sends them to DRMO. The silver is reclaimed by a contractor. This constitutes a wastestream of approximately 50 pounds per year.

The Firing Range uses an embankment behind the targets to capture firing ordnance. When the Firing Range is closed, the land will be removed and disposed as hazardous waste due to the lead content.

Building 181 is the Torpedo Mounted Dispenser (TMD) rework facility. There is a parts cleaner dip tank (120 gallons) that uses KlearFlo Degreasol as a solvent. The tank is cleaned out every quarter and the solvent is disposed as hazardous waste. Corrosion preventative compound, antisieze, paint, and Freon are also used to clean, overhaul, and rebuild the TMDs. The empty HM containers from these items are brought to the hothouse and combined with the other empties. The empty Degreasol cans are disposed separately once per quarter.

Building 176, the "Ranch", is used to maintain the vehicles for transporting the torpedoes, called "mules". Oil changes, antifreeze changeouts, etc. are handled through Public Works Transportation. Speedy Dry clay granules are used to clean up any motor oil leaks that may occur, and they are reused as much as possible.

NSSF Weapons Department generates the following hazardous waste:

- 12,000 gallons/year contaminated mineral spirits waste
- 24,000 gallons/year seawater contaminated OTTO fuel (recycled)
- 50 pounds/year silver-cadmium battery cells
- 12,000 pounds/year OTTO fuel contaminated solid waste (wipes, PPE, etc.)
- 8,000 pounds/year empty trichlorotrifluoroethane aerosol cans
- 2,850 pounds/year used Degreasol solvent
- 50 pounds/year expired shelf life greases
- 50 pounds/year expired shelf life paint

NSSF Weapons also generates the following nonhazardous waste:

- 7,900 pounds/year empty cans (excluding paint and Freon)

RECOMMENDATIONS:

- o Segregate mineral spirits for possible distillation. NUWES Keyport is working on a system to distill mineral spirits contaminated with hydrogen cyanide. Additional information on manufacturers and processes will be provided in the final report.

- o Install a stainless steel bullet trap for the firing range to capture the ordnance waste. The bullets can be collected and sold as scrap, without extensive manpower requirements. Additional information will be provided in the final report.

- o Consider solvent recycling for the reclamation of Degreasol. The shop should use the recycled solvent for parts cleaning, if possible. If the recycled solvent does not meet the shop's specifications, it can be distributed to another NSSF shop for use. The final report will contain additional information on this recommendation.

- o Consider using expired shelf life paint for the decks and other non-critical uses. Obtain paint from the paint locker to minimize the amount of paint brought onto the base from different sources.

1.1.3 NSSF SELECTED RESTRICTED AVAILABILITY (SRA) DEPARTMENT, Barges 41, 34, 1247, and NR1. The SRA Department hosts shipyard crews that have been contracted to perform work on SUBASE New London submarines. The shipyard personnel provide their own materials, but SRA is responsible for the accumulation, labeling, and disposal of the hazardous waste generated. The shipyard crews often overestimate the amount of materials required for projects and excess HM is left for disposal by SRA. Excess HM from the Navy supply system with a Navy Stock Number (NSN) can be turned into the SUBASE Supply Department to be reissued. However, items without an NSN will not be accepted by the Supply Department or by DRMO, Groton. These excess non-standard materials must generally be disposed as hazardous waste, even if they are unopened and in good condition. Official policy states that the visiting shipyard crews provide MSDSs to SRA when beginning a project; however, this policy is not always followed. As a result, unidentified excess hazardous material has been generated. Lab analysis for these materials is costly and it can take from several weeks to several months to complete the process. In some cases, HM boxes are labeled, but the individual containers in the boxes (e.g. 1 quart cans) do not have NSN or identification labels. When these are left behind, SRA must have the material analyzed to identify it for disposal.

The SRA staff performs maintenance on the machinery used by the shipyard teams and the barges containing the equipment. They use PD-680 Type II for cleaning, generating only empty cans and oily rags. The empty cans are disposed as nonhazardous waste, and the rags are combined with rags from the shipyard workers. The machine shop has two lathes, two band saws, one drill press, one milling machine (not operational), one power hacksaw, one steel grit blast box, one glass bead blast box, one small table-top dry filter paint booth, and a 15 gallon parts cleaner which contains Simple Green. The machines that use cutting fluid contain a water-soluble fluid, Type 1 VV-C-846A. The fluid is filtered in the machine to remove metal filings and pieces; the fluid is then recirculated for reuse. The operators of the machines from the shipyard crews are responsible for cleaning the machines and

SRA personnel perform PMS. The drill press operators use cans of cutting oil (Draco) that are used until empty and then disposed as nonhazardous waste. Lubricating oil (2190 TEP) is drained from the drill press and the milling machine and combined with other waste lube oil from the shipyard workers and disposed through Public Works. The waste oil generated from the machinery amounts to approximately 8 gallons per year. SRA also paints the barges frequently using expired shelf life or excess paint whenever possible. Clean-up rags and a small amount of mineral spirits is generated from painting operations.

HW is removed from the submarine work area every day, so there is no accumulation on the vessels. The waste is brought to the laydown area at Barge 41 where SRA personnel can inspect the waste and make sure it is labeled properly. It is then taken to the Barge 34 laydown compound, where it is kept fenced and locked until transported to the HW Storage Facility. After Public Works Environmental inspects the HW containers, Public Works Transportation is called to provide vehicles. SRA personnel operate the fork-lifts and trucks to take the waste to the HW storage facility once per week.

SRA personnel try to find users for excess hazardous material, whenever possible. They are sometimes able to give the material to the NSSF Repair shops for use in repair and maintenance operations. SRA also uses the excess and expired shelf life paint (normally white, grey, red, and black) in their own shop maintenance.

The majority of the waste disposed by the SRA Department is generated by shipyard crews. The SRA disposes of the following hazardous waste:

- 1,100 gallons/year of Chemcrest 200
- 990 gallons/year of sodium phosphate
- 495 gallons/year of sulfamic acid
- 363 gallons/year of waste epoxy paint
- 320 gallons/year of waste paint
- 165 gallons/year of cosmoline
- 135 gallons/year of waste enamel paint
- 455 pounds/year of waste paint debris (rags, brushes, etc)
- 130 gallons/year of grease
- 110 gallons/year of trichlorotrifluoroethane
- 110 gallons/year of corrosion prevention compound
- 92 gallons/year of non-skid decking material
- 56 gallons/year of butyl alcohol solvent
- 55 gallons/year of settacin general purpose cleaner
- 55 gallons/year of sandblast grit
- 46 gallons/year of adhesive
- 45 gallons/year of waste vinyl paint
- 41 gallons/year of waste zinc chromate paint
- 20 gallons/year of paint thinner
- 20 gallons/year of monoethanolamine
- 15 gallons/year of acetone
- 10 gallons/year of naphtha
- 50 pounds/year of cutting fluid
- 5 gallons/year of Methyl Ethyl Ketone (MEK)
- 5 gallons/year of trichloroethane
- 5 gallons/year of xylene

- 2 gallons/year of denatured alcohol
- 1 gallon/year of paint remover

SRA also disposes of the following nonhazardous wastes:

- 5,160 pounds/year of hydraulic fluid
- 1,950 pounds/year of lube oil
- 750 pounds/year of oily rags and oily residue

RECOMMENDATIONS:

o For all future SRA-shipyard contracts, SUPSHIPS should explicitly designate who is responsible for HM and HW handling and disposal. Require that visiting shipyard crews designate a HW coordinator who is tasked with coordinating with SRA personnel on proper HW storage and disposal. Require that shipyard crews provide Material Safety Data Sheets for all hazardous materials that they bring on base. Excess hazardous materials should be returned to the cognizant shipyard Supply department for reissue. By taking responsibility for the excess material, the shipyard will be motivated to revise their planning for HM ordering.

o Provide written instructions for visiting crews concerning segregation of wastestreams and overall HM/HW procedures at the SUBASE. The instructions need to be posted clearly in the work area near the HW containers and HM storage lockers.

o Require a HM inventory list (with quantities) from all visiting shipyard teams, and account for the material used during their stay.

o Use excess non-skid paint on gang-ways, ladder steps, etc. to make walkways safer. This will prevent usable paint from being disposed as hazardous waste.

o Contract with a laundering service that will supply cloth rags for maintenance and cleaning purposes. The soiled rags can be turned into the service for laundering and clean rags can be provided to the shop on a regular basis. The only waste generated from this process would be the wastewater that is generated by the laundry. Additional information on this recommendation will be included in the final report.

o Establish a mechanism for more effective HM reutilization. One way to accomplish this is a "Hazardous Materials Reutilization Store" operated by DRMO or NSSF personnel. A catalog should be issued monthly, listing items in the store by stock number and material description. The catalog should be distributed to all the industrial shops and supervisors throughout the base as well as all supply departments. Materials would be given away free of charge, but the value of the material given away should be tracked. Materials should be kept in stock for at least three months before being disposed through DRMO or the HW storage facility. As an example, a re-ute store established at SUBASE Bangor gave away 1,900 items and saved an estimated \$56,000 in its first year of operation. Additional information on establishing a reutilization store will be provided in the final report.

1.1.4 NSSF R0 DIVISION, Building 89.

1.1.4.1 R0 PHOTO LAB AND DRAFTING, CODES 34A & 64D, Building 89. The Photo Lab is responsible for taking and developing pictures for NSSF. The lab uses various developing chemicals for production of pictures. The silver nitrate used in the process is accumulated and taken by an outside contractor for recycling. The remaining chemicals used in the shop are neutralized by the shop and disposed of in the sanitary sewer. The Drafting Shop performs drafting duties for NSSF Planning. Hazardous materials such as inks and ink removers are consumed by the shop.

The Photo Lab generates the following hazardous waste:

- 120 gallons/year of recycled Silver Nitrate developing solution.

The Drafting Shop generates no hazardous waste.

RECOMMENDATIONS:

- o None.

1.1.5 NSSF R1 DIVISION, HULL DIVISION, Building 478.

GENERAL R1 DIVISION RECOMMENDATIONS:

- o Consider using a central accumulation area for dirty rags for all of the shops in the R1 Division.
- o Contract with a laundering service that will supply cloth rags for maintenance and cleaning purposes. The soiled rags can be turned into the service for laundering and clean rags can be provided to the shop on a regular basis. The only waste generated from this process would be the wastewater that is generated by the laundry. Additional information on this recommendation will be included in the final report.
- o SUBASE Public Works (Code 834) should implement centralized coolant recycling for the reclamation of water soluble cutting fluids and coolants. The final report will contain an economic analysis and additional information for this recommendation.

1.1.5.1 R1 SHIPFITTER SHOP, Code 11A, Building 478. This shop performs repair and installation of submarine support structures and other related tasks to support the refit of submarines. The shop is equipped with cutting tools and other machinery needed to fabricate or modify metal plate support structures for the submarines. Each of these machines requires periodic maintenance and fluid changeouts. The shop is currently using a water-based cutting fluid in each of its cutting machines. The contaminated cutting fluid is placed in 5 gallon drums and disposed of as hazardous waste. The shop utilizes blue marking dye for cutting operations. The Shipfitter shop also replaces zinc for cathodic protection on the submarines. Spent cutting fluids and coolants (synthetic type) are collected by Public Works as hazardous waste. All wastes are collected in a satellite accumulation area (SAA) located in the building. Drums are appropriately marked for contents.

The Shipfitter Shop generates the following hazardous waste:

- 40 gallons/year of contaminated cutting fluid

The Shipfitter Shop also generates the following nonhazardous wastes:

- 28 gallons/year of hydraulic oil
- 50 pounds/year oily rags

RECOMMENDATIONS:

- o See General R1 Division Recommendations above.

1.1.5.2 R1 SHEETMETAL SHOP, Code 310, Building 478. This shop removes, fabricates, and installs sheet metal items and systems on submarines. The majority of the work consists of fabrication and repair of ventilation systems, cabinets and fixtures. Machinery used by the shop does not utilize any cutting oils in its operation but it does require hydraulic fluid changeouts periodically. Cloth rags are used to remove dirt and oil from the sheetmetal prior to marking. The shop uses blue layout dye for marking the sheetmetal. Tig welding is also performed in the shop. Small amounts of touchup paint are applied to weld locations to minimize oxidation.

The Sheetmetal Shop generates no hazardous wastes.

The Sheetmetal Shop generates the following nonhazardous wastes:

- 40 pounds/year of oily waste rags
- 20 gallons/year of hydraulic oil

RECOMMENDATIONS:

- o See General R1 Division Recommendations above.

1.1.5.3 R1 WELDING SHOP, Code 310, Building 478. This shop performs welding and flame cutting of metals in support of the shipfitters shop. Items welded include piping systems, valve seats and through-hull fittings. Materials welded include steel, stainless steel and aluminum. Prior to welding, metal surfaces are wiped down with acetone to remove any grease, dirt or blue layout dye. Welds are cleaned with acetone prior to applying the dye penetrant for visual inspection. Rags utilized in the wipe down procedure are placed in a 55 gallon drum and are disposed as hazardous waste.

The Welding Shop generates the following hazardous waste:

- 100 pounds/year of contaminated rags.

RECOMMENDATIONS:

- o See General R1 Division Recommendations above.

1.1.5.4 R1 PIPEFITTER SHOP, Code 56A, Building 478. This shop removes, repairs and manufactures piping systems for submarines. Pipe fitting processes include cleaning, grinding, threading and cutting of pipe. Acetone is often required for pipe cleaning prior to applying thread locking compounds. Other wastes generated includes cutting and cleaning lubricants for grinding and fitting.

The Pipefitter shop generates the following hazardous wastes:

- 40 gallons/year of contaminated cutting oil

The Pipefitter shop also generates the following nonhazardous wastes:

- 60 pounds/year oily rags

RECOMMENDATIONS:

- o See General R1 Division Recommendations above.

1.1.5.5 R1 FLEXIBLE HOSE SHOP, Code 56C, Building 478. This shop cuts and fabricates new hoses for use on submarines. The shop is equipped with a band saw, flexible hose saws, assembly machines and a hydrostatic test stand. The shop uses various adhesives and acetone to clean and cement hoses. The large volume of work done by the shop allows for the complete consumption of hazardous materials. Therefore, the shop does not dispose of HM due to expired shelf life.

The Flexible Hose Shop generates no hazardous wastes.

RECOMMENDATIONS:

- o None.

1.1.5.6 R1 LAGGING SHOP, Code 57A, Building 478. This shop removes, fabricates and installs insulating materials for heating and cooling systems on submarines. The primary work performed includes installing insulation on pipes, machinery and ventilation equipment. The shop also performs asbestos removal on the submarines. Materials used by the shop include fiberglass, adhesives, epoxy coatings and isopropyl alcohol for cleaning. The Lagging shop stores only those hazardous materials needed for current work loads and disposes of no hazardous waste due to expired shelf life. Waste produced by the shop, such as dried epoxy adhesives and fiberglass resin, is disposed of as nonhazardous waste.

The Lagging Shop generates no hazardous wastes.

RECOMMENDATIONS:

- o None.

1.1.6 NSSF R2 DIVISION, INSIDE MACHINE DIVISION, Building 40.

GENERAL R2 DIVISION RECOMMENDATIONS:

- o Consider purchasing a filter system to recycle used grinding and cutting fluids.
- o Centralize the used rag accumulation area for the entire division.
- o Contract with a laundering service that will supply cloth rags for maintenance and cleaning purposes. The soiled rags can be turned into the service for laundering and clean rags can be provided to the shop on

a regular basis. The only waste generated from this process would be the wastewater that is generated by the laundry. Additional information on this recommendation will be included in the final report.

1.1.6.1 R2 MACHINE AND ENGRAVING SHOP, Code 31A, Building 40. The machine shop is responsible for all turning, drilling and tapping of metal stock at NSSF. The shop also fabricates nuts, bolts and shafts from metals such as stainless steel, bronze, brass and cold rolled steel. The shop has numerous metal cutting and grinding machines for providing machine shop services to the submarines and other NSSF shops. The cutting machines use a water-based cutting oil and the grinding machines use a water-based grinding fluid. Periodic maintenance for these machines requires the cutting and grinding fluid to be changed and disposed. The fluids are nonhazardous in their virgin form, but become hazardous as oil and metals build up in the fluid during cutting and grinding operations. The shop also performs engraving on metal stock for identification and measurement markings.

The waste from the machine and engraving shop is collected in the shop's accumulation area.

The Machine and Engraving shop generates the following hazardous waste:

- 600 gallons/year of water-based grinding fluid
- 385 gallons/year of contaminated water-based cutting fluid

The Machine and Engraving shop also generates the following nonhazardous wastes:

- 220 gallons/year of oily rags
- 825 gallons/year of used lube oil

RECOMMENDATIONS:

- o See General R2 Division Recommendations above.

1.1.6.2 R2 MEASURING INSTRUMENT REPAIR AND CALIBRATION SHOP (MIRCS), CODE 96A, Building 40. The MIRCS lab is responsible for the repair and calibration of all fluid measuring gauges on the submarines. Gauges are dismantled and flushed with Freon R-113 in a flushing machine to remove foreign matter. The machine requires changeouts quarterly. The waste Freon is disposed as hazardous waste. The vacuum pump used in the machine also requires periodic oil changes.

The MIRCS Lab generates the following hazardous waste:

- 40 gallons/year Freon R-113

The MIRCS Lab also generates the following nonhazardous waste:

- 4 gallons/year vacuum pump oil

RECOMMENDATIONS:

- o SUBASE Public Works should (Code 834) should implement centralized solvent recycling for reclamation of Freon 113 for Divisions R2 and R9. The final report will contain an economic analysis and additional information on this recommendation.

1.1.6.3 R2 WATCH SHOP, CODE 35D, Building 40. The Watch shop disassembles, cleans and repairs mechanical watches on the submarines. A water-based cleaning solution is used in the shop for cleaning operations. The used solution is disposed of as nonhazardous waste.

The Watch Shop generates no hazardous waste.

RECOMMENDATION:

- o None.

1.1.7 NSSF R3 DIVISION, ELECTRICAL DIVISION.

1.1.7.1 R3 MOTOR GENERATOR SHOP, Code 51A, Building 456, 1st Deck. The Motor Generator shop is responsible for the repair and reconditioning of all electric motors and generators used by the submarines. Duties include rewinding motors, greasing or replacing bearings and replacing connectors. Motors are rewound with wire and placed in a varnish dip tank for sealing. The varnish is thinned with 50 % xylene for viscosity. Due to process specifications, the varnish must be changed every six months. Small amounts of lubricating grease are used by the shop for greasing bearings. Epoxy sealant is used on the contacts for moisture proofing. A small sandblasting booth is utilized by the shop to resurface motor and generator casings. Dust produced by the booth is disposed of as hazardous waste. Small amounts of paint is used for repainting motor casings.

The Motor Generator Shop produces the following hazardous waste:

- 200 gallons/year of varnish/xylene coating

RECOMMENDATIONS:

- o Contact the manufacturer of the varnish to investigate the possibility of extending the useful life of the varnish coating. Extending the life of the varnish would considerably reduce this waste stream.

1.1.7.2 R3 METER SHOP, GYRO SHOP, INTERIOR COMMUNICATIONS SHOP, Codes 51C,F,G BUILDING 456 1st Deck. The meter shop is responsible for the calibration of electric meters on the submarines. The Gyro Shop is responsible for the maintenance of the gyros utilized on the submarines for navigation. The Interior Communications shop maintains all navigation equipment, alarm systems and atmospheric monitoring systems on the submarines. The shops use small amounts of isopropyl alcohol and adhesives to perform their duties. All hazardous materials used by the shops are consumed in the processes.

The Meter, Gyro, and Interior Communications shops generate no hazardous waste.

RECOMMENDATIONS:

- o None.

1.1.7.3 R3 RUBBER AND PLASTICS SHOP, Code 57B, Building 456. The Rubber and Plastics shop fabricates and coats electric fittings. The shop operates a small sandblasting unit to remove paint and scale from electrical components repaired at the R3 Division. Dust produced from the unit is disposed of as nonhazardous waste. The shop utilizes 13 different colors of plastisol coating. Items are dipped in the plastisol and heated to set the coating. The plastisol is supplied in 55 gallon drums and must be changed annually. The shop is also responsible for sanding and painting antenna masts used on the submarines. Epoxy paints are used for the painting procedure. 1,1,1-trichloroethane and acetone are used by the shop for paint cleanup purposes.

The Rubber and Plastics Shop generates the following hazardous waste:

- 100 pounds/year hardened epoxy paint
- 260 gallons/year of plastisol coating

RECOMMENDATIONS:

- o Mix only what is required when using epoxy paint.
- o Consult the plastisol manufacturer for the possibility of extending the useful life of the material.

1.1.8 NSSF R4 DIVISION, ELECTRONICS DIVISION, Building 456, 2nd DECK.

1.1.8.1 R4 PERISCOPE/OPTICAL SHOP, Code 35A, Building 456 and 157. The Periscope and Optical shop is responsible for the repair and calibration of periscopes. Materials such as acetone, denatured alcohol and isopropyl alcohol are used to remove dirt and moisture from the periscope body and optical parts. All rags used in the shop are allowed to dry and are disposed of as nonhazardous waste. All hazardous materials used by the shop are consumed in the cleaning process.

The Periscope/Optical Shop generates no hazardous waste.

RECOMMENDATIONS:

- o None.

1.1.8.2 R4 ELECTRONICS SURVEILLANCE MEASURING (ESM), Code 67A, Building 456. The ESM shop is responsible for the repair of electronic search equipment, directional finders and periscope electronics. Soldering is performed by shop personnel. Aerosol Freon 112 is used to clean and cool parts during testing procedures. Small amounts of isopropyl alcohol is used for removing grease. The shop consumes all hazardous materials used by the shop.

The ESM shop generates no hazardous waste.

RECOMMENDATIONS:

- o None.

1.1.8.3 R4 ELECTRONIC CALIBRATION LAB, CRYPTO REPAIR SHOP, TELETYPE REPAIR SHOP, FIRE CONTROL REPAIR SHOP, SONAR REPAIR SHOP, NAVIGATION REPAIR SHOP, MODULE SCREENING AND REPAIR SHOP, Codes 67B,C,D,E,G,J,& 84A, Building 456. The shops listed in this section all perform electronic repair on their designated electronic components. For cleaning and moisture removal, the shops use Freon 112 in aerosol cans and 1,1,1 Trichloroethane. The use of these solvents is dictated by specifications. Soldering is also performed at each shop. The Teletype repair shop uses an Agitene cleaning machine to remove grease and dirt from parts repaired by the shop. The machine requires quarterly fluid changeouts for maintenance purposes. The used Agitene solution is disposed of as hazardous waste. The remaining shops consume the hazardous materials used in their processes.

The Teletype Repair Shop generates the following hazardous waste:

- 160 gallons/year Agitene solution (parrafin-napthene)

RECOMMENDATIONS:

- o Replace Agitene with a solvent that has a higher flashpoint and is recyclable. The flashpoint of Agitene is 80°F, which is near room temperature. There are precision cleaners on the market which have much higher flashpoints and have been formulated to meet high cleanliness levels. A high flashpoint petroleum solvent will be safer to use and recycle. The final report will contain manufacturer's information on solvent substitutes.

1.1.9 NSSF R6 DIVISION, SERVICE BRANCH, Buildings 20 and 38.

1.1.9.1 R6 RIGGING LOFT and SAIL LOFT , CODE 72A & 74A, Building 20. Duties performed by the Rigging Loft include rigging pumps for installation, moving valves and fabricating mooring harnesses from wrapped wire cables. The cables are fitted with steel eyes and swedges through the use of a swedge press. Small amounts of high pressure grease are applied to the swedges prior to being placed in the press. The shop stores lubricants for the press maintenance and high pressure grease in a flammable storage locker. After the grease has reached its shelf life, the material is analyzed for extension by visual inspection. The shop Hazardous Material Coordinator extends the shelf life as recommended by the manufacturer, if applicable. Waste production in this shop is limited to expired shelf life high pressure grease. The current practice of extending shelf life has eliminated generation of this wastestream. The Sail Loft is responsible for testing ropes and cables for tension requirements. Several testing machines are utilized by the shop. No hazardous materials are involved with the testing procedures performed by the shop.

The shops generate no hazardous waste.

RECOMMENDATIONS:

- o None.

1.1.9.2 R6 CARPENTER & PATTERNMAKER SHOP, Code 64A & 64C, Building 38. The Carpentry shop is responsible for fabricating and coating wood furniture with lacquer. They also perform general carpentry, install vinyl floor tile and

formica counter tops, and construct temporary enclosures for RADCON purposes. The shop sprays lacquer onto the furniture using a canister type air gun in the shop's dry filter paint booth. Lacquer thinner is used by the shop for thinning purposes and equipment cleaning. Equipment cleaning consists of placing a small amount of lacquer thinner in the spray canister and quickly spraying thinner onto the dry filters to remove any lacquer in the spray gun. Excess thinner resulting from cleaning operations is utilized for thinning lacquer on future jobs. As a result, no excess lacquer thinner is generated as hazardous waste by the shop. When paint booth changeouts are required, the spent filters are allowed to dry completely and are disposed of as nonhazardous waste. Lubricating grease is utilized in the shop for maintenance on shop equipment. Hazardous waste is generated by the shop due to shelf life expiration. After material has reached its shelf life, the material is analyzed for shelf life extension by visual inspection. The shop Hazardous Material coordinator extends the shelf life as recommended by the manufacturer, if applicable. Current shelf life extension practices have reduced the generation of this wastestream by an estimated 25%.

The Patternmaker shop duties include the fabrication of wooden patterns and molds for making plastic and bronze plaques and signs. Patterns are fabricated at the shop using various wood cutting and sanding machines. The patterns are then sent to the Foundry shop for casting. The shop uses no hazardous materials.

The Carpenter shop generates the following hazardous waste:

- 160 pounds/year of Expired Shelf Life Lacquer

The Carpenter shop also generates the following nonhazardous waste:

- 2 gallons/year of expired shelf life Lubricating Grease

RECOMMENDATIONS:

- o Purchase lacquer in 1 gallon containers instead of five gallon cans. This will allow the shop to order in smaller quantities thus reducing the amount of material kept in stock for long periods of time.

1.1.9.3 R6 FOUNDRY SHOP, Code 81A, Building 37. The Foundry performs bronze casting operations. Items such as plaques, sockets and levers are fabricated at the shop. Wires used in the casting procedure are cleaned with hydrochloric acid or 1,1,1 trichloroethane to remove Cosmoline grease. Sand impregnated with 40 Wt. non-Detergent oil is used as a mold for the castings. Excess slag produced from the casting procedure is stored in a 55 gallon drum until full and is then disposed as hazardous waste. The sand mixture used for molding is changed every two years due to the buildup of slag and oil in the mixture. Greases are used in the shop for equipment maintenance. Some grease has been disposed due to expired shelf life.

The Foundry generates the following hazardous waste:

- 2 gallons/year hydrochloric acid with expired shelf life
- 2 gallons/year 1,1,1 Trichloroethane with expired shelf life
- 1000 pounds/year slag containing lead, bronze, brass, oil

The Foundry also generates the following nonhazardous waste:

- 2 gallons/year expired shelf life grease

RECOMMENDATIONS:

- o Consider using a metal recycling contractor to reclaim the metal slag instead of disposing of the slag as hazardous waste.
- o Order solvents in smaller containers to reduce the amount of material stored in the shop.
- o Consider replacing the 1,1,1 Trichloroethane with a nonchlorinated solvent in the near future. The Clean Air Act has listed 1,1,1 Trichloroethane as a ozone depleting substance and has listed the solvent to be banned from use in the near future.

1.1.9.4 R6 DIVING LOCKER, Code 72B, Building 20. The Diving Locker is responsible for storage and maintenance of diving equipment used by the dive team at the SUBASE. Scuba gear, dive suits, diving boats and other equipment is maintained at the shop. Outboard engines on the diving boats require lube oil changes. The shop uses adhesives for wet suit repair and small quantities of spray paint for touch-up purposes.

The Diving Locker produces no hazardous waste.

The Diving Locker produces the following nonhazardous waste:

- 40 gallons/year used lube oil

RECOMMENDATIONS:

- o None.

1.1.9.5 R6 NSSF PAINT LOCKER, Code 99B, Building 174. The Paint Locker is responsible for the issue and disposal of all non-aerosol paints used by NSSF activities. Paint types supplied by the shop consist of epoxy, enamel, non-skid and latex. Mineral Spirits is the only solvent issued by the Paint Locker and it is used solely for brush and roller cleaning. When shops need paint, they fill out a request form at the Paint Locker. Activities requesting oil-based paints are issued an adequate amount of Mineral Spirits for brush and equipment cleaning. Those activities requesting epoxy paints are not issued any solvent. The Paint Locker operating procedures restrict the use of epoxy thinners to the Paint Locker personnel only. All equipment used for the application of epoxy paints must be returned for cleaning at the Paint Locker. This procedure ensures that shops do not accumulate any solvents in the shop.

All paint waste generated from the use of paints or Mineral Spirits issued by the Paint Locker is returned to the Paint Locker for disposal. Unused portions of paint and Mineral Spirits are returned to the Paint Locker for reissue if possible. Contaminated Mineral Spirits generated from equipment cleaning is accumulated at the shop and disposed of as hazardous waste. Contaminated epoxy solvents are accumulated in the same container as the Mineral Spirits. Solidified Non-Skid epoxy paints are returned to the Paint Locker for disposal. According to Paint Locker personnel, instructions for

mixing non-skid paints dictate that mixing of epoxy paints must be done using the entire contents of each can regardless of quantity needed. In addition, the personnel also state that they are unable to order black non-skid paint in containers less than four gallons in size. Activities requiring quantities less than four gallons must mix the entire amount and waste the unused portion.

Submarine activities will occasionally bring hazardous wastes to the paint locker that were not originally supplied by the paint locker. These items include adhesives, greases and cleaning compounds. According to the Paint Locker personnel, the shop is not required to accept the waste but they do so as a service to NSSF.

The Paint Shop generates the following hazardous waste:

- 2,000 pounds/year of solid paint waste
- 100 gallons/year of contaminated Mineral Spirits
- 550 pounds/year of enamel paint
- 800 pounds/year of epoxy paint
- 20 pounds/year zinc dust paint
- 400 pounds/year epoxy non-skid paint
- 140 pounds/year anti-fouling paint
- 40 pounds/year SHT paint
- 60 pounds/adhesives
- 40 pounds/year grease
- 100 pounds/year expired shelf life latex paint
- 350 pounds/year expired shelf life enamel paint
- 120 pounds/year expired shelf life epoxy paint

RECOMMENDATIONS:

- o Segregate used solvents accumulated in the shop. Segregation will allow for possible recycling of the material.

- o Consider recycling the contaminated mineral spirits in a distillation unit. The final report will contain an economic analysis and additional information for this recommendation.

- o Work with the Supply Department to obtain non-skid paint in containers less than 4 gallons in size. This will reduce the amount of over mixing generating waste.

- o Consider changing the instruction for mixing epoxy paints. Mix only partial amounts of the paint containers instead of the whole can.

1.1.10 NSSF R8 DIVISION, QUALITY ASSURANCE DIVISION.

1.1.10.1 R8 NONDESTRUCTIVE TESTING SHOP, Code 93A, Building 40. The Nondestructive Testing Shop is responsible for testing welds for critical areas. Acetone is used to clean welds prior to applying a die penetrant for visual inspection of welds. X-ray pictures are also taken for inspection of the welds. Silver nitrate developer used in the process is taken to the Photo Lab for recycling by an outside contractor. Rags used for cleaning with acetone are allowed to dry and are disposed of as nonhazardous waste.

The NDT Shop generates no hazardous waste.

RECOMMENDATIONS:

- o None.

1.1.10.2 R8 CHEMICAL LAB, Code 95A, Building 40. The Chemical lab is responsible for testing lubricating oil and battery electrolyte for maintenance specifications. 4 ounce oil samples are mixed with ether and are tested in the testing machine. The samples are then accumulated in a 1 gallon can and are disposed of as hazardous waste. Small amounts of battery electrolyte are taken from the submarines and brought to the lab for testing. The electrolyte is tested and then neutralized in the shop. The neutralized electrolyte is then disposed of in the sanitary sewer.

The Chemical Lab generates the following hazardous waste:

- 60 gallons/year of oil test samples.

RECOMMENDATIONS:

- o None.

1.1.11 NSSF R9 DIVISION, OUTSIDE MACHINE DIVISION, Building 40.

1.1.11.1 R9 VALVE SHOP, Code 31D, Building 40. This shop repairs, reassembles, and tests valves from various piping systems on the submarines. Simple Green is used for initial removal of dirt and grease from the valves being repaired. Acetone is then used to remove any remaining residue. Valve seals are removed and replaced using silicone compounds and valve stems are lubricated with mineral oil. Plastic coatings are applied to external valve parts. Simple Green contaminated with oil and grease is disposed of as hazardous waste. Rags contaminated with acetone, grease and oils are also disposed of as hazardous waste. Small amounts of spray paint are used by the shop for touchup work.

The Valve Shop generates the following hazardous wastes:

- 550 gallons/year of contaminated Simple Green
- 10 pounds/year of contaminated rags

RECOMMENDATIONS:

- o Consider purchasing a filtering system to recycle the used Simple Green.

1.1.11.2 R9 HYDRAULICS SHOP, Code 31F, Building 40. This shop maintains and repairs hydraulic and pneumatic systems from the submarines. Hydraulic pumps and fixtures are dismantled, flushed and reassembled in the shop. Oily rags are generated from repair work and cleaning around the shop. One ultrasonic cleaner containing Freon is used to clean pneumatic system parts per process specification. The cleaner is used for removing grease from parts. Sludge from the Freon cleaner is disposed as hazardous waste.

The Hydraulics shop generates the following hazardous waste:

- 10 gallons/year of Freon tank sludge

The Hydraulics Shop also generates the following nonhazardous wastes:

- 40 gallons/year of waste hydraulic oil
- 660 gallons/year of oily rags

RECOMMENDATIONS:

- o Contract with a laundering service that will supply cloth rags for maintenance and cleaning purposes. The soiled rags can be turned into the service for laundering and clean rags can be provided to the shop on a regular basis. The only waste generated from this process would be the wastewater that is generated by the laundry. Additional information on this recommendation will be included in the final report.

1.1.11.3 R9 OUTSIDE MACHINE SHOP, AIR CONDITIONING AND REFRIGERATION REPAIR SHOP, AND ENGINE OVERHAUL SHOP, Codes 38A, 25A, 31E, Building 40 The Outside Machine Shop provides machining services to the outside repair shops at the waterfront. The Air Conditioning & Refrigeration Repair Shop provides air conditioning and refrigeration repair support for the submarine maintenance and repair operations. Freon 113 is used to flush compressor parts. The shop has a Freon recycling unit which is not being used. According to shop personnel, the recycled Freon does not meet the shop's specifications. Freon generated from flushing parts is now disposed as hazardous waste. Recharging of refrigerating systems is performed by a contractor; therefore, no waste Freon is generated in the shop from recharging operations. However, the shop does replenish systems with Freon as needed. The shop also changes vacuum pump oil during maintenance. This oil must be disposed as hazardous waste due to the small amount of Freon present.

The Engine Overhaul Shop removes and overhauls pump engines. Engine injectors are also reconditioned by the shop. Engine sumps are cleaned using Degrease-All, which is a hydrocarbon degreaser. Waste degreaser generated from the shop is disposed as hazardous waste. An oil-based degreaser Formost-34 is also used in a parts cleaning machine. Periodic maintenance requires the degreaser to be changed out and disposed as hazardous waste. All Outside Machine shops share a single accumulation area.

The Outside Machine Shops generate the following hazardous wastes:

- 440 gallons/year Formost-34 oil based degreaser
- 5 gallons/year of compressor oil contaminated with Freon
- 110 gallons/year of used Freon 113
- 880 gallons/year of Degrease-All degreaser

RECOMMENDATIONS:

- o Consider substituting the oil based degreaser Formost-34 with a water-based degreaser. The degreaser could then be recycled through a filtering system.

o Recycle the Freon in the shop distillation unit. If the Freon is not suitable for flushing compressors, it could be used for general degreasing. Another alternative is to distribute the Freon to another NSSF shop that has less stringent quality specifications.

1.1.11.4 R9 TOOL ROOM, Code 06D, Building 40. The tool room is responsible for issuing tools and materials for all R9 Division Shops. Materials such as greases, oils, solvents, alcohol, sealing compounds and PD 680 Type II are issued by the tool room for shop use. Spray paints and paint thinner are ordered from Supply for use in some of the shops. Some paints are supplied from the paint locker for the shops. Unused portions of paint are returned to the paint locker for reuse. According to shop personnel, the paint shop does not accept paint cans with missing lids, hardened paint brushes or used rollers. Therefore, the Tool Room disposes of some paint wastes as hazardous waste. The Tool Room does not dispose of any expired shelf life materials.

The Tool Room generates the following hazardous waste:

- 10 gallons/year used paint thinner for brush cleaning
- 50 pounds/year of partially full paint cans, paint brushes and rollers

RECOMMENDATIONS:

o Standard operating procedure for the Paint Locker is to accept hardened paint wastes and opened cans from shops using the Paint Locker for supply. The Tool Room should use the Paint Locker exclusively for supply of non-aerosol paints and thinners to ensure that all paint wastes are returned to the Paint Locker for disposal.

1.1.12 NSSF, FACILITY SUPPORT GROUP (FSG), Building 88. The FSG provides maintenance for all facilities on base in conjunction with the Public Works Department. Services performed by the FSG include: refurbishment and fabrication of office spaces, carpentry, paneling, electrical services, and plumbing. Small amounts of greases and spray lubricants are used for maintenance operations, but the material is used up in the processes and no hazardous waste is generated. The shop uses various adhesives and joint compounds for sheet rock paneling and carpentry. In the past, the shop disposed of approximately 40 pounds of various expired shelf life materials such as cement, epoxy, soldering flux, aerosol paint cans, etc. To prevent the generation of expired shelf life materials, the shop orders hazardous materials only as needed.

The NSSF Facility Support Group generates the following hazardous waste:

- 9 pounds/year of various adhesives

RECOMMENDATIONS:

o None.

1.2 SUBRON TWO SQUADRON, Building 80. The SUBRON TWO SQUADRON is an Echelon II command, which oversees NSSF operations. The facility consists of 12 fast attack submarines, including submarines from the disbanded SUBRON 10 Squadron.

SUBRON TWO also has an administrative building and two floating dry-docks, Waterford ARDM-5 and Shipping Port ARDM-4. The SUBRON TWO SQUADRON performs SRA operations on its submarines. All SRA operations are performed aboard the drydocks.

The SUBRON TWO Engineering Department is responsible for HM and HW handling training for Naval personnel on submarines. They have developed an internal HW handling instruction, which briefly summarizes the proper procedure for HW disposal.

In the past, a large amount of hazardous wastes generated by COMSUBRON TWO was due to excess or expired shelf life hazardous materials that were in usable condition. Currently, excess materials are distributed to other shops to decrease the hazardous waste generation by SUBRON TWO. Also, in the past, the facility used a grease that was susceptible to water washout and generated approximately 400 pounds/year of waste. Now, the facility is using a grease called Turmoline, which is more resistant to washout. Much of the used oil generated by SUBRON TWO is lightly contaminated with water and particulate matter, but it may be possible to filter and reuse the oil for non-critical use in other shops.

At the dry-docks, supply personnel limit the inventory of hazardous materials that can be kept on hand, to prevent the generation of expired shelf life material. Authorization from the Commanding Officer is required to purchase all hazardous materials. In addition, dry-dock personnel inspect basins and piers before ships undock to ensure that all hazardous waste has been properly identified and packaged for disposal. The majority of hazardous waste generated by dry-docks is due to painting operations. At the Shipping Port dry-dock, five SRA operations were performed last year. These operations generated 6,000 pounds of paint waste and 3,000 pounds of Primer 150 waste last year. Much of this waste is generated when shop personnel mix too much epoxy paint during a shift. Any paint that is not used during the shift must be disposed as hazardous waste. Currently, the Shipping Port dry-dock uses only white paints for dock maintenance to reduce hazardous waste generation by eliminating different colors of paints. At Waterford dry-dock, they obtain paint through NSSF and all unused paints are turned into NSSF after the projects are completed. This process does not generate any hazardous waste. However, about 8,520 pounds of paint chip waste is generated through hydroblasting operation annually.

The SUBRON TWO SQUADRON generates the following hazardous wastes:

Expired shelf life or excess materials:

- 200 gallons/year of monoethanolamine (MEA) waste
- 100 pounds/year of charcoal waste (filtration process)
- 30 gallons/year of methyl ethyl ketone (MEK) waste
- 30 gallons/year of potassium hydroxide (KOH) waste

Floating dry-docks:

- 660 gallons/year of used antifreeze
- 8,250 pounds/year of paint chips
- 140 gallons/year of paint thinner waste

- 3,000 pounds/year of primer 150 waste
- 6,000 pounds/year of paint waste

SUBRON TWO SQUADRON also generates the following nonhazardous wastes:

- 1,000 gallons/year of used hydraulic oil
- 100 gallons/year of used lube oil
- 650 gallons/year of diesel fuel waste
- 650 pounds/year of oily rags

RECOMMENDATIONS:

- o Shipping Port ARDM-4 should use the NSSF Paint Locker for all painting operations. Limiting the on-hand stock will help prevent the generation of expired shelf life paint as hazardous waste.

- o Consider the purchase of a coolant recycling system for the reclamation of ethylene glycol. There are filtration and purification units commercially available that will process spent coolant and add make-up concentrate as needed. If the recycled material does not meet submarine specifications, it may be suitable for use in the transportation or auto hobby shop. The final report will contain an economic analysis and additional information for this recommendation.

- o NSSF should implement recycling for reclamation of paint thinner. SUBRON TWO should use the recycled thinner for equipment cleaning. The final report will contain an economic analysis and additional information for this recommendation.

1.3 SUBDEVRON 12 DEVELOPMENT SQUADRON, Building 88. SUBDEVRON 12, supported by the NSSF, oversees submarine maintenance operations and develops submarine war tactics. The squadron consists of seven fast attack submarines. COMSUBDEVRON 12 is an administrative organization and is not involved in any industrial processes. Thus, the facility does not generate any hazardous waste on a regular basis. Last year, the facility used latex paints for office and building maintenance and generated 60 empty paint cans. Unused and half empty paint cans are stored in a flammable locker located in the basement.

SUBDEVRON 12 does not regularly generate any hazardous waste:

SUBDEVRON 12 generates the following nonhazardous waste:

- 60/year of empty latex paint cans

RECOMMENDATIONS:

- o Implement a hazardous materials inventory system for the shop including all areas where materials are stored or staged. The system should help to encourage the use of containers until they are empty to minimize the amount of excess material generated as hazardous waste.

- o Coordinate with the NSSF Paint Locker to obtain latex paint only as needed. By reducing the quantity of paint stored, COMSUBDEVRON 12 will reduce the quantity of paint waste generated from excess ordering and expired shelf life.

1.4 DEFENSE REUTILIZATION AND MARKETING (DRMO), Building 397 DRMO receives only material and equipment that the government plans to re-utilize or sell. These items include: scrap metals, industrial equipment, furniture, and excess property that is turned in by the submarines and the seventeen tenants on the base.

Expired shelf life hazardous materials can be turned in to DRMO, if they are accompanied by a 1348-1 Form and an MSDS. These materials are then staged in the DRMO storage facility in Building 491. DRMO only accepts hazardous materials which have not been opened, and are in good condition. DRMO also takes materials that are not in their original unit-of-issue. For example, DRMO will take a single can of paint. DRMO gets the majority of its hazardous materials from the SUBASE Supply Department.

DRMO rarely re-sells its hazardous material stock. It takes approximately six months to prepare for a sale. Ninety percent of the materials in stock are expired shelf life paints, oils, and greases. Ninety-five percent of these materials are ultimately disposed as hazardous wastes. A hazardous waste contractor picks up these materials from DRMO for disposal.

DRMO would like the SUBASE and tenant shops to use the available expired shelf life materials such as paints, greases, and oils. Using these materials for non-critical applications will help reduce the generation of hazardous waste. In the past, SUBASE enforced a procurement practice requiring all shops to check with DRMO for usable materials, before ordering new material through SUBASE Supply. This practice is no longer enforced.

DRMO does not generate any hazardous waste.

RECOMMENDATIONS:

- o Establish a Re-Utilization Store at DRMO. Additional information will be included in the final report.

- o Supply Officers from tenant activities need to require that all shops check with DRMO before ordering any new hazardous materials for non-critical maintenance jobs. Projects such as painting buildings, lubricating shop tools, and marking items with aerosol paint can generally be accomplished using expired shelf life materials.

1.5 SUBMARINE BASE NEW LONDON.

SUBASE New London maintains and operates facilities to support training and experimental operations of the submarine force. The SUBASE also provides support to submarines, submarine rescue vessels and assigned service and small craft; and provides support to other activities of the Navy and other governmental activities in the area. The major commands are SUBASE, Naval Submarine School (NAVSUBSCOL), the Naval Submarine Support Facility (NSSF),

and the Naval Hospital. SUBASE New London is divided into the upper base and the lower base, where the waterfront is located. The afloat commands, NSSF, SUBASE, SUBASE Supply and some public works and school functions are in the lower base. The NAVSUBSCOL and the Naval Hospital are located in the upper base.

1.5.1 SUBASE PORT SERVICES, Buildings 79 and 110. Port Services operates and maintains tug boats and other marine vessels such as oil skimmers, Boston Whalers, "pusher" boats and a SWOB barge. Ports Services is broken down into three divisions: Maintenance and Support (Building 79), Service Craft and Pollution Control (Building 110), and the Tugs. There are three Boston Whalers (18 ft.) with outboard motors, one Dip 3001 Oil Skimmer (1,500 gallon capacity), two LCM-6 pusher boats, one Mike-8 pusher boat, and two ITVs (large harbor tugs) owned by Port Services.

Port Services maintains the spill response unit, and is responsible for waterborne spills. They also control the use of the oil collection donuts. In the past, the spill response has been called out about 10 times per year to contain a spill. (Usually a spill is caused by improper handling by the users of the donuts or the SWOB.) However, instructions (SUBASE NLON INST 3170.1) concerning proper handling of donuts and SWOBs, liabilities of the subs using the equipment, and increased control by Port Services personnel on the use of the donuts and SWOBs, spills and accidental discharges have decreased significantly. Port Services personnel keep the donuts and SWOB secured when not in use to prevent contamination by foreign substances, which has been a problem in the past also. Now the hatch covers, previously padlocked, are bolted closed and painted, so that any tampering can be detected by the damaged paint. If foreign material has been emptied into a donut or SWOB, the unit borrowing the equipment is responsible for the cleanout and disposal. This practice has eliminated much of the misuse of the oil collection equipment.

In Building 79, there are two parts cleaners dip tanks with 25 and 120 gallon capacities. The smaller tank is empty and is no longer used. The large tank contains detergent and water and it is used for cleaning large parts when performing major overhauls on the tug engines. The tank is cleaned out twice per year and the waste is disposed as hazardous, due to contamination from oil and other engine products. There is a small glove box sandblaster that is used infrequently. The waste from this box is nonhazardous. Workers in Building 110 perform maintenance for the outboard motors for the Boston Whalers.

The antifreeze used on the tugs is MIL-A-53009, which is a hazardous material containing sodium metaborate octahydrate, potassium silicate, and sodium mercaptobenzothiazole. Personnel must obtain special training and use PPE when working with this material. It has special rust inhibitors and antifreeze properties that make it effective with water vessels in the cold climate. As part of the PMS procedures, the antifreeze is tested monthly and adjusted as necessary with chemicals provided by the manufacturer. The samples are stored in a bottle labeled "Boric Cuprate Wastes", and each tug generates 4 gallons per year. When the tugs undergo a major overhaul, the antifreeze is disposed as hazardous waste because it contains metal particulate matter. These overhauls occur every five years and they generate 95 gallons of hazardous waste per tug. The Mike-8 pusher boat uses 53009

antifreeze in the winter. In the summer, this is replaced with ethylene glycol. This results in 10 gallons of 53009 per year. The other boats operate with ethylene glycol, which is changed out every year, generating 80 gallons per year.

The SWOB Barge is used to hold used oil from submarines and the closed-bottom donuts operated by Port Services. Approximately, 12,000-15,000 gallons of used oil is off-loaded each month from the SWOB. There are two methods of disposal for this oil: oil that is suitable for burning as fuel is donated to the Brookhaven National Laboratories through DLA donation to be burned in their power plant; otherwise, it is turned into a recycler for reclamation as a lube oil. Oil that has too much water or chlorinated solvent is not suitable for burning in a power plant. The donuts (6 presently in use) are cleaned out every year by a contractor, removing 110,000 pounds per year of oily sludge.

Another large wastestream, generated by Port Services, is oily waste from spill cleanups and engine work. Oily rags, 3-M absorbent pads, and oil boom pads are stored in 55 gallon drums. They generate 5-6 drums per month, with each drum weighing about 200 pounds.

Solvents are also used in small quantities for required PMS. PD 680 Type II is used for PMS and it is ordered in pint containers. It is applied by a rag, and generates no hazardous waste. During a recent HM inventory, all unclaimed hazardous materials were disposed.

Expired shelf life and spoiled material are also disposed as hazardous waste. Floor polish regularly goes bad, with approximately 15 gallons per year disposed due to weather exposure. The cans are currently stored outside in the HM locker located behind Building 110.

Port Services generates the following hazardous waste:

- 110,000 pounds/year oil sludge from donuts
- 15 gallons/year expired shelf life floor polish
- 100 gallons/year oily detergent and water
- 56 gallons/year (average for 5 years) 53009 antifreeze

Port Services also generates the following nonhazardous waste:

- 162,000 gallons/year used oil (sent to reclaimer or Brookhaven Power Plant)
- 13,200 pounds/year oily rags and clean-up pads

RECOMMENDATIONS:

o Contract with a laundering service that will supply cloth rags for maintenance and cleaning purposes. The soiled rags can be turned into the service for laundering and clean rags can be provided to the shop on a regular basis. The only waste generated from this process would be the wastewater that is generated by the laundry. Additional information on this recommendation will be included in the final report.

- o Consider the purchase of a coolant recycling system for the reclamation of ethylene glycol. There are filtration and purification units commercially available that will process spent coolant and add make-up concentrate as needed. This could be performed in conjunction with other NSSF departments, or as part of a basewide program for recycling ethylene glycol. The final report will contain additional information for this recommendation.
- o Consider filtering used 53009 antifreeze for reuse. After the particulate is removed, makeup chemicals could be added as needed. A testing kit could be used to ensure that the antifreeze is suitable for use.
- o Consider the purchase of a compactor to reduce the volume of oily rag waste, oil booms, etc. in the drums. This will reduce the total weight disposed because fewer drums will be disposed along with the oily waste. The final report will contain manufacturers information and economic analysis for this recommendation.
- o Generate an authorized HM use list for the department, and update continually to ensure that only necessary hazardous materials are ordered and stocked.

1.5.2. AUTO HOBBY SHOP, Building 460. This shop provides an area for base personnel to perform maintenance on their private vehicles. People can use the facility for oil changes, radiator flushing, brake servicing, and general repair work. However, no auto bodywork or painting is permitted in the shop. Most of the waste generated at the shop comes from oil changes. After draining the oil from their engines, the shop patrons empty the oil into a 1,000 gallon underground storage tank; this oil is haul away by a contractor once every month. Oil changes also generate approximately 100 pounds per month of used oil filters. The filters are drained to remove the oil and the oil is accumulated in the underground storage tank. The drained filters are collected in 55 gallon drums and are sent to the HW Storage Facility for disposal. In addition, the shop generates approximately 330 gallons of used antifreeze and 20 used lead-acid batteries annually. Used antifreeze is also collected in 55 gallon drums and sent to HW Storage Facility for disposal. Used lead-acid batteries are shipped to DRMO for reclamation. The shop does not drain the electrolyte from the batteries.

The shop contains a 30 gallon parts cleaner and a five gallon brake cleaner. Both cleaners use Cyclo Solve mineral spirits solvent. Cyclo Solve personnel visit the shop once every month to remove the dirty solvent, clean the tank, and provide new solvent.

Abandonment of wastes at the shop accounts for approximately 35% of total waste generated by the shop. On a regular basis, individuals leave wastes such as oil, antifreeze, tires, etc. at the shop for disposal.

The Auto Hobby Shop generates following hazardous wastes:

- 330 gallons/year of used antifreeze
- 20/year of used batteries
- 35 gallons/year of Cyclo Solve mineral spirits

The Auto Hobby Shop also generates following nonhazardous waste:

- 12,000 gallons/year of used oil (engine and transmission)
- 6,000 lbs/year of oily rags

RECOMMENDATIONS:

- o Ensure that oil is the only waste that is disposed in the underground storage tank. Post a sign in the shop that contains the proper disposal procedure for all wastes. Specific instructions should be included for waste oil, empty cans, and antifreeze.
- o Encourage patrons to filter antifreeze and reuse it. Provide funnels, buckets, and paper paint filters for removing contaminants.
- o Establish a program for waste "turn-in" days to discourage the abandonment of unknown wastes. This will give base personnel a safe alternative for disposal and will help eliminate the need for testing wastes for identification. Publicize the "turn-in" days in the base newspaper and by posting flyers in administrative buildings and housing areas.

1.5.3 **SUBASE FIRE DEPARTMENT,** The Fire Department is the first responder for all land based hazardous material spills at SUBASE New London, in addition to fire response. Specifically, the Fire Department deals with HM spill mitigation and containment. They are not involved with spill clean up. Specially trained personnel are available every shift to respond to HM spills. The Department stocks the following spill control materials at the fire house: absorbent booms and pads, grate covers, sodium bicarbonate, speedy dry clay granules, sand, and Aqueous Film Forming Foam (AFFF).

The Department hydrostatically tests all extinguishers on the base. Air and Carbon Dioxide bottles are tested regularly. After the extinguishers are tested, they are color-coded and stenciled with test dates using aerosol spray cans. This process generates empty aerosol paint cans, which is the only hazardous waste generated by the Fire Department. The Public Works Transportation Shop maintains the fire engines and disposes of wastes generated from the vehicle maintenance.

The SUBASE Fire Department generates the following nonhazardous waste:

- 48 empty aerosol paint cans/year

RECOMMENDATIONS:

- o The Fire Department should only store those paints they are using for stenciling the extinguishers. If paints are needed for noncritical operations, such as painting the building, they should be obtained from DRMO or the NSSF Paint Locker.
- o Implement a hazardous materials inventory system for the shop, including all areas where materials are stored or staged. The system should help to encourage the use of containers until they are empty to minimize the amount of excess material generated as hazardous waste.

1.5.4 SUBASE MAINTENANCE DIVISION, Building 400, Shop 850. The SUBASE Maintenance division is organized into three major sections: an electrical shop, a mechanical and structural shop, and a maintenance support shop.

The Electrical Branch of the Maintenance Division is divided into the Electrical Shop WC-11, Air Conditioning Shop WC-12, and the Laborers WC-13. They work out of Buildings 85, 400, and 406. The Maintenance Support Shop procures all materials needed for the electrical branch's operations.

The Electrical Shop, WC-11, maintains the electrical distribution system for the entire base, including all transformers. Electrical contacts and components are cleaned using spray cleaners containing trichloroethane. No Freon is used for cleaning. Alcohols are used on high voltage insulators to remove carbon build-up. All materials are consumed in the process and the only waste generated is empty containers. Cutting oils are used in a pipe threader machine that is used for conduit work. The oils are recycled and no waste is produced. In Building 85, a substation, transformer oils are stored in 55 gallon drums which are used during maintenance of the transformers. Waste transformer oil is generated during regular maintenance and accumulated in a 55 gallon drum.

The Air Conditioning Shop, WC-12, is responsible for A/C units in six buildings. Chemicals are used for treating cooling tower water and the chilled water lines in the unit. The chemicals are currently purchased from NUTMEG Chemicals Inc. and stored in Building 400. Specific chemicals are added to the tower waters to retard bacteria and algae growth, and added to the chilled water lines to prevent calcium build-up. All refrigerant is recovered using the two refrigerant recovery units on hand. General maintenance is accomplished on the vacuum pumps which generates a small amount of waste lube oil. Freon is used infrequently to clean the inside of the refrigeration units.

The laborers, WC-13, provide services from asbestos work to hazardous material spill cleanup. There is a staff of thirteen people at present. The only materials stored in the shop located in part of Building 406 are used for cleaning up oil trapped in the steam trenches. One is NAVEE 42 and the other is Biogenic. All materials are consumed in the process and are not containerized for disposal.

The Electrical Branch generates the following non-hazardous wastes:

- 24 to 36/year of empty denatured alcohol cans
- 48/year of empty spray cleaner cans
- 6/year of empty aerosol paint cans
- 5 gallons/year of solidified NC-84
- 2 gallons/year of waste lube oil
- 55 gallons/year of waste transformer oil

The mechanical and structural group is divided into specific work centers; WC-21, WC-22, and WC-23. They are located in Buildings 405 and 406. This group is, also, responsible for operating OT-10, the base waste oil tank, and chlorinating the lakes for swimming in the summer.

There is a welding booth, sheet metal shop and pipe shop located in Building 405 (WC-21). In the welding shop, welders use primer on materials prior to welding. In the pipe shop, there are sand blasting operations ongoing on pipe, valves, and pump casings. Spent blasting media is disposed of as non-hazardous waste. Cleaners such as Oatey cleaner which contains MEK and Acetone and a spray cleaner product which contains Trichloroethane are used to clean the pipe. These materials are consumed in the process. PVC cement is used to seal pipe. Once containers of cement are opened by shop personnel, the contents will dry up if not used. There are also pipe threaders and band saws in the pipe shop where cutting oils are used. Oils are recycled and produce no waste. A parts cleaner is used infrequently but no waste is generated and solvents are added as necessary.

The pipe shop is responsible for waste oil transfer operations at OT-10. The catch basin is cleaned regularly with toluene.

Work center 22 maintains all fire alarms and emergency lighting for the entire base. Waste batteries are generated from routine maintenance on these systems.

Located in Building 406 is the carpenter shop and paint locker. This is considered work center 23 and they provide services for SUBASE and Housing. Primers, stains, paints, varnishes, and polyurethanes are used in this shop. All work is initiated by P&E and service calls. Most materials used are contained in aerosol spray cans or one gallon containers. The paint locker is used to store all materials needed for painting operations. Thinner is stored in a 55 gallon drum for dispensing on as needed basis. Excess paint from completed projects is stored here at the paint locker until it can be reused or until it must be disposed as hazardous waste.

The Mechanical and Structural Branch generate the following hazardous wastes:

- 100/year of batteries (25 lead acid, 75 gel cell)
- 55 gallons/9 months of waste thinner

The Mechanical and Structural Branch also generate the following non-hazardous wastes:

- 235/year of empty aerosol paint cans
- 300 pounds/year of oily rags
- 300 pounds/year of soiled rags
- 144/year of empty aerosol BIN primer cans
- 48/year of empty BIN primer gallon cans
- 48/year of empty latex paint gallon cans
- 10/year of empty varnish/polyurethane gallon cans
- 40/year of 1/2 full tubes of adhesive
- 100 pounds/year of spent blasting media (sand containing paint chips and mineral deposits)

The Maintenance Support section, WC-02, of the Maintenance division is located in building 400 and handles procuring all materials used within the division. All material orders are initiated by service calls or P&E work project requirements. Hazardous materials are located in various areas throughout the building. All hazardous materials are used by the work centers throughout the

maintenance division and disposed of by the specific shop using them. WC-02 will handle completion of the 1348 document but it is the responsibility of the individual shops to dispose of the waste properly. The support section does not maintain a HM inventory but is constantly aware of stocked materials. Occasionally, materials arrive from Supply close to shelf life such as batteries, film, superglue, and caulk. These items will be attempted to be used. This shop does not generate any hazardous wastes. This department relies on manufacturers or GSA's suggestions on material substitutions. When bad material is delivered by Supply to them (the end user), it turns into their responsibility to dispose of it properly.

RECOMMENDATIONS:

- o Replace TCA Spray cleaner with a biodegradable solvent that will not produce a hazardous waste and be safer to use for the workers. The final report will contain manufacturer's information on solvent substitutes.

- o Implement a hazardous material inventory system for the shop, and particularly the paint locker, including all areas where materials are stored or staged. The system should help to encourage the use of containers until they are empty to minimize the amount of excess material generated as hazardous waste.

1.5.5 SUBASE POWER PLANT, Building 29. SUBASE New London purchases 15 megawatts from Groton Utilities and the Power Plant generates any additional amount needed for base operations. The SUBASE Power Plant is capable of generating 10 Megawatts of power. The Plant uses both acidic and caustic chemicals for water treatment. These chemicals are purchased from NUTMEG Chemicals Inc. and stored in holding tanks outside the buildings. They are transferred to 55 gallon drums which are stored inside and dispensed as needed. Lube oils, gear oils and hydraulic oils are used in the operation and maintenance of the generators. Due to the ongoing painting operations for machinery and the building itself, the Power Plant generates a large number of waste paint cans and products. A small amount of silver nitrate waste is generated by the lab from water analysis and is disposed as a hazardous waste.

The SUBASE Power Plant generates the following hazardous wastes:

- 120 gallons/year of oil-based paints
- 2/year of filters from Super Parts Cleaner (3 pounds per filter)
- 500 gallons/year of Diesel generator lube oil
- 10/year of lead acid batteries
- 2,400/year of empty aerosol paint cans
- 30 gallons/year of silver nitrate

The SUBASE Power Plant also generates the following nonhazardous wastes:

- 2,000 pounds/year of oily rags
- 625 empty paint cans/year
- 100 gallons/year of antifreeze
- 1 gallon/year of lube oil

RECOMMENDATIONS:

- o Implement a hazardous materials inventory system for the shop including all areas where materials are stored or staged.

- o When paint is needed for noncritical operations, obtain it from DRMO or the NSSF Paint Locker. Excess or expired shelf life paint can be used for painting buildings and machinery, thereby preventing the need for costly disposal of usable material.

1.5.6 SUBASE TRANSPORTATION SHOP, Code 870, Buildings 107 and 26. The Transportation Shop maintains all government vehicles for SUBASE New London. In addition, they provide trucks for HW transport within the base boundaries. They also provide sludge truck services for the transport of oily waste. The vehicles are maintained in Building 107. Waste lube oil from oil changes is accumulated in a 200 gallon tank. Approximately 100 to 150 filters are also drained into this tank prior to disposal. Typically, antifreeze is accumulated in 55 gallon drums after testing to see if it can be reused. Another source of waste is the steam cleaning of engines and large parts. The generated wastewater drains into a catch basin which is equipped with an oil/water separator. The separated oil is contained in a waste tank which is pumped out by a contractor on an as needed basis. For cleaning small parts, the shop uses a parts washer containing a Hydro-Seal Heavy Duty Cold Parts Cleaner. The parts washer is changed approximately twice a year. Oily rags and spent absorbents are generated daily. All other hazardous materials used such as brake fluids, steering gear fluids, and starting fluids are consumed in the process and do not generate any waste except empty containers. Current disposal procedures include pumping out the waste oil tank once a month and transporting it to OT-10. Lead-Acid car batteries are turned into DRMO for reclamation. Hazardous and nonhazardous materials are stored in the supply store located in Building 107. There are two flammable storage lockers where small containers of brake fluids, starting fluids, etc. are stored. The material inventory is updated continuously.

The SUBASE Transportation Shop generates the following hazardous wastes:

- 620/year of lead-acid batteries
- 30 gallons/year of Hydro-Seal Heavy Duty Parts Cleaner from parts washer

The SUBASE Transportation Shop also generates the following nonhazardous wastes:

- 3,000 gallons/year of used engine oil
- 1,500/year of drained oil filters
- 600 pounds/year of oily rags
- 1,440 pounds/year of spent speedy dry
- 1,300 gallons/year of waste oil from oil/water separator

RECOMMENDATIONS:

- o Public Works should consider contracting with a laundering service that will supply cloth rags for maintenance and cleaning purposes. The soiled rags can be turned into the service for laundering and clean rags can be provided to the shop on a regular basis. The only waste

generated from this process would be the wastewater that is generated by the laundry. Additional information on this recommendation will be included in the final report.

o Replace Hydro-Seal, Heavy Duty Cold Parts Cleaner with a biodegradable solvent that will not produce a hazardous waste. If the use of a nonhazardous substitute is not feasible, recycle the parts cleaner in a distillation or filtration unit. Additional information on this recommendation will be provided in the final report.

1.6 NAVAL UNDERSEA MEDICAL INSTITUTE (NUMI), Building 86. At NUMI, medical personnel are specially trained in undersea medicine. Navy personnel, from E3s to officers, are trained in courses lasting 10 weeks to one year. This facility is the only one of its kind nationwide training independent duty hospital corpsman and undersea medical officers. Hands-on experience includes the use of needles to draw body fluids for testing. NUMI generates approximately 240 pounds of needles, body fluids, and microscope slides each year. This waste is classified as medical waste, not hazardous waste. NUMI has an agreement with the Naval Hospital who handles the disposal of their medical waste.

The Naval Undersea Medical Institute does not generate any hazardous waste.

RECOMMENDATIONS

o None.

1.7 NAVY PRINT SHOP, Building 83. The Navy Print Shop provides printing and reproduction work for SUBASE New London and all tenants, including the ships. The shop personnel conduct minimal maintenance on their individual offset duplicators weekly. For example, a deglazing solvent is applied by print shop personnel to the machine rollers weekly. Two solutions are used continuously in the machines. "Blankrola" solution is used to prevent the buildup of ink on the rollers. "Electrostatic" solution is used to keep the plates moist. The shop also uses cleaning solvents for planned maintenance. Contractors are called in monthly to conduct maintenance on the copier machines. This includes changing belts and photo receptors, in addition to changing the developer. Oils are used for preventing paper buildup in the classified material shredder. All materials are procured by the Print Shop directly from supply contractors. The shop's material inventory is updated monthly. Most of the hazardous materials used at the Print Shop are consumed in the process and do not have to be disposed. The only liquid wastes that are generated are waste Blankrola and waste Electrostatic solution. Empty containers are disposed through the Public Works Department.

The Navy Print Shop generates the following hazardous wastes:

- 60 gallons/year of "Blankrola" solution
- 60 gallons/year of "Electrostatic" solution with water

RECOMMENDATIONS:

- o The Print Shop's materials contractor has suggested using less hazardous materials to replace the current items. The Navy Print Shop should investigate these options and substitute nonhazardous materials wherever possible.

1.8 NAVAL SUBMARINE MEDICAL RESEARCH (MEDRES) LABORATORY, Buildings 141, 148, and 156. The Research Laboratory conducts physiological research projects for submarine personnel and deep sea divers. The Lab has three chemical laboratories, a photo lab, and a compression chamber area.

1.8.1 MEDRES CHEMICAL LABS, Building 141. The chemical labs perform blood and gas analysis, and grow cell cultures. The wastes generated from this lab are classified as biological, rather than hazardous waste. The biological wastes are disposed through the Naval Hospital at Groton.

The MEDRES Chemical Labs generate no hazardous waste.

RECOMMENDATIONS:

- o None.

1.8.2 MEDRES PHOTO LAB, Building 156. The photo lab develops approximately one roll of 36 exposure film and 100 enlargements per month. This process uses 48 oz. of developer D-76 and 12 oz. of stop bath per year. Approximately twenty gallons/year of fixer solution is accumulated in containers and sent to the SUBASE Photo Lab for silver recovery. Other spent chemicals are disposed as nonhazardous wastes in the sanitary sewer.

The MEDRES Photo Lab generates the following hazardous wastes:

- 166 pounds/year of fixer solution

The MEDRES Photo Lab also generates the following nonhazardous wastes:

- 3 pounds/year of D-76 developer
- 2 pounds/year of stop bath

RECOMMENDATIONS:

- o None.

1.8.3 MEDRES COMPRESSION CHAMBER AREA, Building 141. This area contains two compression chambers which are used for performing physical tests on submarine personnel. Approximately, one gallon per year of Freon is used to clean grease from lightly soiled equipment that is connected to the chambers. The Freon is applied with cloth rags that are laundered and reused. No hazardous waste is generated by this process.

The Compression Chamber Area generates no hazardous waste.

RECOMMENDATIONS:

- o Replace Freon with a biodegradable solvent that does not produce a hazardous waste. OPNAVINST 5090, OP-4 of 22 Jan 1990 provides guidance for Management of Ozone Depleting Substances, such as Freon. As directed by this document, SUBASE New London should pursue the substitution of Freon, wherever possible.

1.9 NAVAL SUBMARINE SCHOOL.

The Naval Submarine School provides training to Naval personnel on all aspects of submarine operations. Training includes classroom and hands-on exercises on equipment identical to systems on the submarines.

The Engineering Training Department trains personnel on all mechanical systems, electrical systems, and maintenance operations on submarines. The department includes Engineering Laboratory, Electrical Division, Machinery Division, Diesel Group, Fire Fighting, Welding, Machine Tool, Auxiliary Division, and Oxygen Generator Group. These shops are located in three different buildings and generate a small amount of hazardous waste.

1.9.1 SUBMARINE SCHOOL SECONDARY CHEMISTRY LAB, Code 211, Building 519, Room 338. This lab is used to do chemical testing for submarine reactor plants. Lab personnel perform water chemistry tests, such as pH measurement, phosphate measurement, and turbidity. The lab is used by students in training and by submarine personnel that need access to the testing equipment. Excess and expired shelf life lab chemicals are sent to the HW Storage Facility for disposal.

The Submarine School Secondary Chemistry Lab generates the following hazardous wastes:

- 0.5 gallons/year of Isopropyl Alcohol
- 830 pounds/year of nitric acid-phosphate solution
- 8 pounds/year of sodium hydroxide
- 33 pounds/year of 100 ppm chloride standard
- 8 pounds/year of silver nitrate
- 17 pounds/year of mercuric nitrate solution (includes chloride indicator capsule waste with bromophenol blue)
- 17 pounds/year of hydrochloric acid
- 3 pounds/year of hydrogen peroxide
- 7 pounds/year of sodium thiosulfate
- 0.1 gallon/year of formaldehyde
- 0.1 gallon/year of oxygen ampules (containing diethylene glycol)

RECOMMENDATIONS:

- o Order the smallest quantity issues of lab chemicals to prevent the generation of excess hazardous materials.

1.9.2 SUBMARINE SCHOOL ELECTRONICS TECHNICIAN MAINTENANCE SCHOOL (ETMS), Code 212, Building 519, Room 330. This school conducts six-week classes to train submarine personnel in electronics maintenance and repair. Most of the hazardous materials used at ETMS are consumed in the process and no hazardous waste is generated on a regular basis. For cleaning circuit boards, they use

approximately five gallons per year of isopropyl alcohol. After maintenance is complete, the circuit boards are coated with a thin film of "Hysol" for protection. This process generates one partially full quart-can of "Hysol" approximately every five years. Penetrating oil is used for lubrication during drilling and when operating the shredder. When repairing cable connectors, they use trichlorotrifluoroethane (Freon) for cleaning. The use of Freon is required by process specifications. "Anti-Seize" compound is applied to soldering irons to make the tips easy to remove. Grease and molybdenum disulfide are used for lubrication and mineral oil is used for cleaning soldering tools. Some touchup painting is done with enamel, latex and primer paints. Aerosol paint is also used occasionally for stenciling. ETMS stocks less than five gallons of paint in their hazardous material storage locker. Expired shelf life paint is used for non-critical jobs, instead of disposing of it as hazardous waste.

The Electronics Technician Maintenance School generates the following hazardous wastes:

- 0.5 pound/5 years of "Hysol" coating

RECOMMENDATIONS:

- o None.

1.9.3 SUBMARINE SCHOOL ELECTRICAL DIVISION, Code 213, Building 519. This division trains personnel to operate submarine electrical systems. This division consists of classrooms, no industrial processes are conducted.

The Electrical Division generates no hazardous waste.

RECOMMENDATIONS:

- o None.

1.9.4 SUBMARINE SCHOOL MACHINERY DIVISION, Code 215, Building 88. This division provides training courses to personnel in the operation of submarine machinery. Each machine is used less than 50 hours per year. Some of the machines have self-lubricating bearings which do not generate any used lubricating oils. This division has an oxygen generator which uses lithium bromide. The generator produces less than 20 gallons of lithium bromide samples per year. These samples are collected in a container and put back into the generator for reuse. The lithium bromide sediment is currently disposed of as nonhazardous waste. The refrigeration unit uses R-114, and it does not require changeout of the refrigerant. The 2190 lubricating oil is changed once a year, and is disposed of as regulated waste.

The Machinery Division generates the following nonhazardous wastes:

- 8 gallons/year of 2190 lube oil
- 1 gallon/year of lithium bromide sediment

RECOMMENDATIONS:

- o None.

1.9.5 SUBMARINE SCHOOL DIESEL GROUP, Code 217, Building 88. The Diesel Group uses two diesel engines in its training courses, but they are rarely in operation. Trainees disassemble and rebuild these engines in the course. The engines use 9250G lubricating oil, which is changed out annually. The Diesel Group also disposes oily rags in 55 gallon tanks as regulated waste.

The Diesel Group generates the following nonhazardous wastes:

- 55 gallons/year of 9250G lubricating oil
- 100 pounds/year of oily rags

RECOMMENDATIONS:

- o Use a laundering service that will supply cloth rags for maintenance and cleaning purposes. Additional information on this recommendation will be included in the final report.

1.9.6 SUBMARINE SCHOOL FIREFIGHTING GROUP, Code 222, Building 520. The Firefighting group trains personnel in fighting fires on submarines. Practice fires are fueled by propane and water is generally used to extinguish fires. Approximately 200 gallons of Cal-Soft (a soap-based liquid) and small amounts of sodium bicarbonate foam are also used to extinguish fires. No hazardous waste is generated from these processes. The Oxygen Breathing Apparatus (OBA) canisters used by the firefighters are disposed as hazardous waste. The firefighting facility is painted two times each year with aluminum based heat resistant paint. All painting is performed by contractors who dispose of any wastes generated. Contractors also are responsible for performing Planned Maintenance System and disposing of PMS waste.

The Firefighting Group generates the following hazardous wastes:

- 52 units/year of OBA canisters

RECOMMENDATIONS:

- o Treat the OBA canisters. Additional information on this recommendation will be included in the final report.

1.9.7 SUBMARINE SCHOOL WELDING SHOP, Code 233, Building 519. This shop is used to train students in welding operations. The shop also contains a lathe and a cutting machine to prepare parts for welding exercises. The welding shop uses acetone to prepare metal surfaces prior to welding and to clean oil off of shop equipment. Class members apply acetone with paper wipes which are accumulated in the Machine Tool Shop hazardous waste collection container. 2190 lubricating oil is also applied to shop equipment with paper wipes during PMS. Spray paints are used for marking surfaces and the only waste generated is empty cans. The acetone and spray paint cans are stored in a flammable locker. The welding rods are stored in two electrode stabilizing ovens.

The waste generated by the Welding Shop is combined with the waste from the Machine Tool Shop for disposal.

RECOMMENDATIONS:

- o For equipment cleaning, replace acetone with a biodegradable solvent that will not cause the paper wipes to be a hazardous waste. The final survey report will contain manufacturer's information on solvent substitutes.

1.9.8 SUBMARINE SCHOOL MACHINE TOOL SHOP, Code 234, Building 519. In the Machine Tool Shop, students learn to use lathes, cutting machines, and power saws. In the past, the shop was using a low carbon steel (ASTM-A-108, FED SPEC QQ-S-634) for training projects. This type of steel required the use of a cutting fluid that generated a hazardous waste. Recently, the shop replaced the low carbon steel with a free machining steel. The free machining steel does not require the use of cutting fluid, thereby eliminating the majority of the cutting fluid waste stream. The shop uses 2190 lubricating oil for the lathes and cutting machines. The lubricating oil is changed every two years. At the end of each day, the machines are cleaned with paper wipes which are disposed as regulated waste.

The Machine Tool Shop generates the following nonhazardous wastes:

- 3 gallons/2 years of 2190 lubricating oil
- 1 pound/year of oily paper wipes
- 10 pound/year of oily metal chips

RECOMMENDATIONS:

- o None.

1.9.9 SUBMARINE SCHOOL AUXILIARY DIVISION, Code 235A, Building 88. The Auxiliary Division has a gas burner and a refrigeration unit. The gas burner does not generate any hazardous waste. The refrigeration unit uses R-11, but the R-11 is not removed from the unit for disposal. 2190 is used as lubricating oil and it is changed out on an annual basis. The Auxiliary Division also produces oily rags from general maintenance and cleaning.

The Auxiliary Division generates the following nonhazardous wastes:

- 35 gallons/year of 2190 lubricating oil
- 1 pound/year of oily rags

RECOMMENDATIONS:

- o None.

1.9.10 SUBMARINE SCHOOL OXYGEN GENERATOR GROUP, Code 235B, Building 88. This group has four Oxygen Generator Type H.P. machines. These generators are electric powered and they do not produce any oily waste. However, potassium hydroxide is required for operating the oxygen generators.

The Oxygen Generator Group generates the following hazardous wastes:

- 400 pounds/year of Potassium Hydroxide solution

RECOMMENDATION:

- o None.

1.9.11 SUBMARINE SCHOOL PHOTO LABS, Building 83 and 448. The Naval School operates two photo processing laboratories. These laboratories train students to shoot, process, copy, and print photographs. Spent Developer D-76 and Dektol Developer are accumulated separately in 10 gallon tanks prior to disposal. These tanks are turned into the Public Works, Environmental Department for disposal. The Fixer, which contains the silver removed from film, is sent to the SUBASE Photo Lab for silver recovery.

The Photo Labs in Buildings 83 and 448 generate the following hazardous wastes:

- 415 pounds/year of Kodak Fixer containing silver
- 50 pounds/year of Dektol Developer with potassium sulfate and potassium carbonate.
- 166 pounds/year of Developer D-76

The Photo Labs in Buildings 83 and 448 also generate the following nonhazardous wastes:

- 17 pounds/year of Kodak Photo Flo
- 350 pounds/year of Itek Activator
- 58 pounds/year of Flexicolor Developer part A, B, & C (Bldg. 83 only)
- 58 pounds/year of Flexicolor Bleach part A & B (Bldg. 83 only)

RECOMMENDATIONS:

- o None.

1.10 MOBILE TECHNICAL UNIT FOUR (MOTU-4), Building 88.

The MOTU-4 facility provides weapons inspection and electronics training. The facility includes a soldering lab, which is maintained by MOTU personnel. Training processes use approximately 10 gallons/year of isopropyl alcohol and 1 gallon/year of soldering flux, but the material is completely used up in the process.

MOTU-4 does not regularly generate any hazardous waste.

RECOMMENDATIONS:

- o None.

1.11 NAVAL SECURITY GROUP ACTIVITY (NSGA), Building 88. NSGA operates communications systems for SUBASE New London in coordination with certain tenant activities. The facility uses approximately 100 pounds/year of isopropyl alcohol for electronic components cleaning. Greases and spray lubricants are used for system maintenance operations. All alcohol and lubricants are used up in the cleaning and maintenance processes. The shop uses latex paint for touchups and generates approximately 500 pounds of paint waste annually. Empty, dry containers are disposed as nonhazardous waste.

The NSGA generates the following hazardous waste:

- 500 pounds/year of latex paint

RECOMMENDATIONS:

- o Coordinate with the NSSF Paint Locker to obtain latex paint only as needed. By reducing the quantity of paint stored, NSGA will reduce the quantity of paint waste generated from excess ordering and expired shelf life.

APPENDIX A

SUBBASE NEW LONDON HAZMIN SURVEY KICKOFF MEETING ATTENDEES
9 APRIL 1990

NAME	ACTIVITY	CODE	PHONE
Monique Spears	NEESA	112F3	AV 551-3626
Rusty Harris-Bishop	NEESA	112F3	AV 551-6514
Andy Stackpole	NEESA	112F3	AV 551-4891
James Young	NEESA	112F2	AV 551-5567
Tom Kang	NEESA	112F1	AV 551-5463
Jean Shakarjian	NORTHDIV	1412	AV 443-6280
CAPT Adams	SUBBASE	00	AV 241-3400
CDR Norris	SUBBASE	01	AV 241-3401
LCDR Padd	SUBGRU2	JAG	AV 241-4632
Bill Mansfield	SUBBASE	834	AV 241-4481
Lt. Karyn Rinaldi	SUBSCOL	042	AV 241-3574
Senior Chief Simmons	SUBGRU2	45	AV 241-3060
RMC King	NSSF	Safety	AV 241-2602
Anne Fenn	EPA		
Christian Holmes	EPA		
Major Lew	EPA		
Gordon Davidson	EPA		

NSSF HAZMIN SURVEY KICKOFF MEETING ATTENDEES
9 APRIL 1990

NAME	ACTIVITY	CODE	PHONE
Monique Spears	NEESA	112F3	AV 551-3626
Rusty Harris-Bishop	NEESA	112F3	AV 551-6514
Andy Stackpole	NEESA	112F3	AV 551-4891
Thurston	NSSF	R-8	AV 241-2997
Renfors	NSSF	R-6/81A	AV 241-2958
SKC Richard Forman	NSSF	Supply	AV 241-4672
MMCM C.A. Dahl	NSSF	SRA	AV 241-3585
EMC Fredenbury	NSSF	R-0	AV 241-3563
TM2 Michael Gates	NSSF	Weapons	AV 241-4986
HA James Nappi	NSSF	Rad Health	AV 241-3200
MM1 Mowan	NSSF	R-9	AV 241-4236
MM2 Vaughn	NSSF	R-9	AV 241-4288
ET1 Worden	NSSF	R-4	AV 241-4209
MR1 Fregoe	NSSF	R-2	AV 241-4279
IM2 Lasseter	NSSF	R-2	AV 241-3204
EM1 A.S. Alcantara	NSSF	SRA	AV 241-4151
DE3 P.D. West	NSSF	SRA	AV 241-4151