

**ASBESTOS SURVEY**

**AT**

**NAVAL STATION PUGET SOUND  
SEATTLE, WASHINGTON**

**N44255-93-4056**

**BUILDING 2  
RESERVES**

**FOR**

**NAVAL FACILITIES ENGINEERING COMMAND  
ENGINEERING FIELD ACTIVITY NORTHWEST  
SILVERDALE, WASHINGTON**



**DRAFT SUBMITTAL**

**PREPARED BY:**

**ALPHA ENGINEERING GROUP, INC.  
22232 - 17TH AVENUE SE, SUITE 301  
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**JULY, 1993**

July 30, 1993

Commander  
Naval Facilities Engineering Command  
Engineering Field Activities Northwest  
3505 Anderson Hill Road  
Silverdale, WA 98383

Subject: **Transmittal of Asbestos Survey Report, Building 2, Reserves,  
Naval Station Puget Sound, Seattle, Washington  
(N44255-93-C-4056)**

Transmitted with this letter are two copies of the subject report. This work was accomplished in accordance with the Architect/Engineer Contract dated January 20, 1993, Change Order \_\_\_\_\_ dated \_\_\_\_\_, 1993, and directives and reviews by EFA Northwest.

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Don Hemovich, P.E., Technical Director

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David Newman, C.I.H.

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R.R. (Ron) Underwood, Project Manager

copies to:  
Commanding Officer  
Naval Station Puget Sound  
Seattle, WA 98115-5000 (2 copies)

PHOTO WILL BE IN FINAL REPORT

BUILDING PHOTOGRAPH

**ASBESTOS SURVEY AT NAVAL STATION PUGET SOUND  
SEATTLE, WASHINGTON**

**BUILDING 2, RESERVES**

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## EXECUTIVE SUMMARY

A sampling survey for asbestos-containing materials (ACM) was performed in Building 2, Reserves on 4/26 through 5/11/93. A total of 101 bulk samples were collected of which 53 were found to contain asbestos. A follow-up on-site inspection was conducted on \_\_/\_\_/\_\_. The on-site inspection included a detailed review of this report by Alpha's Technical Director .

### High Priority Areas

High priority areas are those for which asbestos removal is recommended. The following material/areas are included in this category based on the three primary criteria shown.

Location and Material Description	Criteria		
	Condition	Toxicity Potential	Hazard Potential
155 (Loft) - 10 LF Block P.I.	Poor	Friable	High
169A - 8 LF Corr. P.I.	Poor	Friable	High
135 - 1 LF Corr. P.I.	Poor	Friable	High
130 - 20 LF Block P.I.	Poor	Friable	High
130 - 8 EA HMF	Poor	Friable	High
131, 132 & 132A - 26 LF Block P.I.	Poor	Friable	High
121 - 26 LF Block P.I.	Poor	Friable	High
246 - 1 EA HMG	Poor	Friable	High
Attic, NW Section 150 SF Debris	Poor	Friable	High
20 - W Side of N Wall - 4 SF Debris	Poor	Friable	High
Attic over Room 11, 13, 23 & 39, 50 LF Debris	Poor	Friable	High
Penthouse - 39 LF Block P.I. (Room 1-4)	Poor	Friable	High
- 22 EA HMF	Poor	Friable	High
- 520 SF Debris	Poor	Friable	High

### Special Attention Areas

Specific areas in the facility that require special attention include the following:

- Room 129 - remove 2 SF pipe insulation debris in loft.
- Room 121 - remove pipe insulation debris and repair pipe ends.
- Room 41 - west side, repair exposed end of pipe insulation on radiator near floor.
- Room 40 - repair open end of 8 inch deameter pipe, above ceiling tile.
- Penthouses - access should be limited until abated (as high priority item).

### Estimated Removal Cost

The following is a brief summary of the estimated removal cost by a commercial contractor for high priority asbestos containing materials.

	<u>Material</u>	<u>Quantity</u>	<u>Cost</u>
<b>REMOVAL</b>			
	Pipe Insulation	130 LF	\$910.00
	Fitting Insulation	31 EA	\$387.50
	Debris	404 SF	\$1,212.00
<b>REINSULATION</b>			
		130 LF	\$910.00
		31 EA	\$387.50
	Containments	4 EA	\$2,000.00
	Permits, Indust. Hyg., Monitoring		3,850.00
	Admin. Contingencies, Mob & Demob, Bonds, Insurance & Sales Tax		<u>\$3,444.00</u>
		Total	<u>\$13,101.00</u>

# INTRODUCTION

## **INTRODUCTION**

The Hazardous Materials Department of Alpha Engineering Group, Inc. was retained by the Engineering Field Activity, Northwest, Naval Facilities Engineering Command, Silverdale, Wash., to conduct an on-site asbestos survey of the U.S. Naval Station Puget Sound (NSPS), Seattle, Wash. The following describes the primary elements and requirements included in the agreement and scope of work for this project or as otherwise directed by EFA Northwest.

### **General Description**

Survey, locate, verify asbestos content, record and prioritize hazardous conditions of all reliable and nonfriable asbestos in each building and associated utilities services at NSPS, Seattle, Wash. The survey shall include sampling of building materials for asbestos, examination of the condition of asbestos-containing materials, analysis of risks to friable asbestos exposure, drawings depicting location of asbestos-containing materials, and cost estimates for asbestos abatement or encapsulation of materials deemed to be a significant health hazard.

### **Asbestos Survey**

Conduct a survey in all areas of buildings at NSPS to determine if any form of asbestos is present within the buildings. The survey shall be comprehensive in its identification, sampling and classification of the potentially hazardous asbestos-containing materials (ACMs). The survey shall include, but not be limited to, all accessible friable and nonfriable materials such as fireproofing, soundproofing, insulation, or other building materials suspected of containing asbestos. The survey shall also include identification of suspected ACM that might not be readily visible, such as that found in elevator and other shafts, along pipe chases, above ductwork or mixing boxes, inside air shafts, enclosed by sheetrock or paneling, behind perimeter induction air units and above false ceilings.

### **Asbestos Sampling**

Collect samples, test for asbestos and determine the percent asbestos, type asbestos and record material friability and condition as observed in place.

Suspect ACM samples will be analyzed by an independent third party laboratory using polarized light microscopy (PLM) with dispersion staining and/or X-ray diffraction techniques.

### **Industrial Hygienist and Technical Director**

The Certified Industrial Hygienist (CIH) shall be employed during the asbestos survey to review the "Work Plan" and advise the Project Manager and Technical Director concerning personal and areal safety procedures. The CIH shall also work with the Technical Director to review each building survey report during the final inspection of each of the buildings.

The technical director shall be senior engineer skilled in construction practices and shall also advise the Project Manager concerning contract procedures.

## **Report**

The Consultant shall prepare a report summarizing findings based on a laboratory results, along with a cost estimate for removal of high priority asbestos-containing materials and recommendations for management of the low priority asbestos-containing materials found in the facility.

## **Report Use**

This report has been prepared for use by NSPS, Seattle, Wash., and the Naval Facilities Engineering Command, Silverdale, Wash. Implementation of the abatement work described in the report is outlined in the "Asbestos Abatement Projects" section of this report. Operations and maintenance (O&M) work regarding asbestos-containing materials is presented in a section titled, "Operations and Maintenance." Since this is a technical report for use in the planning of a hazardous environment correction program, it is not intended for use or interpretation by the general public who could misinterpret the contents. This report shall not be released by Alpha unless directed or allowed to otherwise by the Naval Facilities Engineering Command, EFA Northwest, Silverdale, Wash.

Questions by the reader concerning implementation of the recommendations or the findings leading to these recommendations, should be directed to Commander, EFA Northwest, Naval Facilities Engineering Command, 3305 NW Anderson Hill Road, Silverdale, WA 98383-9130, ATTN: Code 09ET8, phone No. (206) 396-5981.

## **Consultant Data**

The Alpha Engineering Group, Inc., located at 22232 - 17th Avenue SE, Suite 301, Bothell, WA 98021, is an engineering organization providing complete professional engineering services, as well as environmental, industrial hygiene and hazardous materials consulting services. Project teams for asbestos work include industrial hygienists, professional engineers, EPA/AHERA inspectors and certified asbestos workers.

# ASBESTOS INFORMATION

## **ASBESTOS INFORMATION**

### **Physical Characteristics of Asbestos**

Asbestos is a name given to a number of naturally-occurring fibrous silicates. There are two main types of asbestos: the Serpentine form, represented by chrysotile, which is identified by flexible, soft, long and finely-polished strands; the other type of asbestos form is the Amphiboles form, which occur as straight, needle-like fibers, of which crocidolite, amosite, and anthophyllite, tremolite, and actinolite are primary examples.

Chrysotile is also known as "white" asbestos and is noted for its tensile strength. It was widely used due to the fact that it is the only kind of asbestos that can be woven into cloth, although chrysotile appears in many other products as well. It was used in 90 to 92 percent of all commercial asbestos products.

Amosite, also known as "brown" asbestos, has somewhat coarser brownish fibers, which are straight and brittle, and does not readily absorb water well. Amosite was found in 7 to 8 percent of commercial asbestos applications and was generally used in insulating materials in marine facilities and shipbuilding. It has also been broadly used in pipe and boiler lagging in buildings.

Crocidolite, also known as "blue" asbestos, was also frequently used in marine insulation. Crocidolite was used in less than 1 percent of commercial applications. It is the most needle-like of all fibers enabling it to penetrate further and deeper into body tissues than any other asbestos type.

The three other types of asbestos in the amphibole group are: anthophyllite, actinolite and tremolite. These are extremely rare in commercial products.

In 1973, the U.S. Environmental Protection Agency (EPA) banned spray application of "insulating or fireproofing material containing more than 1 percent asbestos by weight." It was still applied in the form of "decorative materials" until 1977, when a law was passed to restrict the spray applications of "all materials containing asbestos."

### **Health Effects of Asbestos**

All types of asbestos can cause lung disease and cancer, and to date there is no scientific evidence showing how many fibers one must be exposed to before its effects are noted. Scientific evidence shows that any exposure to asbestos may cause cancer.

Possible ways for materials to get into the body are by absorption, ingestion (eating) or respiration (breathing). Generally, skin is a barrier to asbestos exposure, but there is a potential for it being worked into the skin can be ruled out. There have been a few cases of asbestos warts on the skin surface, but these are uncommon and localized.

Ingestion of asbestos fibers can produce tumors in various parts of the body. Cancers of the colon, spleen and other areas are associated with ingestion asbestos. Since most asbestos ingested passes through the digestive tract unabsorbed, a large exposure is believed to be necessary to have significant impact to health.

The most dangerous exposure to asbestos is from fibers that are inhaled which are small enough to float in the air (respirable fibers). The size of a respirable fiber is from 25 microns to less than 0.01 microns. A micron is about 1/20,000 of an inch, too small to be seen by the naked eye. Once these fibers become imbedded in the lung, they cannot be removed. Dust and other material inhaled are generally worked up from the lung and coughed out, but small asbestos fibers do not escape by these mechanisms. When scar tissue builds up around the asbestos fibers, a disease called asbestosis can develop. It is progressive, which means once it get started, it does not stop. It is incurable. It can shorten life and increase the risk of death from pneumonia or even a common cold.

Another effect of asbestos is its ability to cause lung cancer. Asbestos fibers, by themselves, have been shown to cause tumors in numerous tissues. Besides causing cancer by itself, it is co-carcinogenic. For instance, both smokers or asbestos workers develop cancer 10 to 20 times more often than other people, but asbestos workers who smoke increase their probability of developing lung cancer by up to 92 times.

If asbestos comes into contact with the thin layers of tissue which line the chest, a cancer can develop. This cancer is called mesothelioma. It is relatively rare, but it is almost always fatal in a few months. The only known cause of this cancer is exposure to asbestos.

Asbestos is a known human carcinogen. There are only about thirty proven human carcinogens and asbestos is one of them. Asbestos, like other carcinogens, requires an incubation period. Cancer from asbestos usually does not occur until 25-35 years after exposure. This means that an exposure today could cause a cancer 25-35 years from now.

The potential deleterious effects to human health from asbestos containing materials must not be minimized. Nevertheless, asbestos is not aggressive and when undisturbed, asbestos poses little danger. Asbestos is seldom found in a pure state in commercial products; it is almost always combined with other materials and binders such as tars, plastic, Portland cement, plaster, adhesives and sealants, to name a few. Many of the binders are so effective that the asbestos fibers cannot escape into the air unless the material is sanded, ground, broken-up or drilled. When asbestos is tightly bonded, the material is termed nonfriable and is therefore a low risk material (friable means that the material can be readily crushed by hand pressure and released into the air). Friable products are inherently high risk materials and must be abated or left undisturbed.

In this report, asbestos containing materials are identified as being either friable or nonfriable. The Operations and Maintenance section of this report provides recommended procedures relating to safeguarding against the release of asbestos fibers from asbestos-containing materials.

# BUILDING SURVEY

## **BUILDING SURVEY**

### **Building Description**

This building consists of 144,163 square feet on two floor levels with four small penthouses on the roof. The roof is composed of membrane and rolled roofing materials. The principal construction of the building is steel frame with brick and concrete walls. The floor is concrete.

### **Sampling**

The survey of this building was conducted by Ernest Edwards and Mike Smith from April 26 through May 11, 1993. A total of 101 samples were collected and tested. Two samples at least were collected for each homogenous material area. Each of these areas was assigned an identification number (HMG#) from the list in Appendix 3. The assignment of the HMG# was made during the survey and before laboratory test results were received. Therefore, some material areas were assigned HMG numbers and found to be non-asbestos.

Sample data from the survey is recorded in the Material Area Spreadsheet (Appendix 4) and the Bulk Sample Data Summary (Appendix 5).

Of the 101 samples of suspected asbestos containing materials (ACM) collected 53 were found to contain asbestos in quantities equal to or greater than 1 percent.

### **Methodology**

All samples were collected using standard industry methods and in accordance with Navy regulations. Each sample was labeled with a unique identification number and a photograph was taken of the sample site. Inaccessible areas, such as inside walls, above solid ceilings and inside pipe chases were examined using a borescope.

All bulk samples were analyzed by the standard technique using polarized light microscopy (PLM) using Interim Method for Determination of Asbestos in Bulk Insulation Samples EPA 600/M4-82-020, December, 1982. Bulk analyses were conducted by Analytica Solution, Golden, Colorado. Analytica Solutions participates in the EPA, NVLAP quality assurance program. The error factor for quantity determination is usually less than plus or minus 10 percent. The real intent of the analysis is to determine qualitatively whether or not asbestos is present. If there is any doubt in the microscopist's mind concerning the sample, it could be sent for transmission electron microscope (TEM) analysis. TEM was found not to be necessary for this survey.

### **Recommendations**

#### Basis for Recommendations

Report recommendations are based on the survey findings and the following:

1. Asbestos is considered to be a serious potential health hazard when the fibers become airborne. The Occupational Safety and Health Administration (OSHA) and the National Institute of Occupational Safety and Health (NIOSH) now state there is no known safe level of exposure to asbestos. Because the damage-causing

fibers are invisible to the naked eye, over-exposure can occur without the individual's knowledge.

2. Current federal, state and Navy regulations are very strict regarding asbestos work, permissible exposure levels for employees, and friable asbestos materials.
3. Current EPA regulations require asbestos to be removed from buildings before being renovated or demolished.

### Prioritization

Prioritization for abatement of asbestos containing materials is based on the "best professional judgement" of the Consultant, Alpha Engineering Group, Inc. Only high priority and low priority ratings are used. Criteria for a high priority rating included factors such as:

1. Friability (toxicity potential) of the asbestos-containing materials;
2. Damage or potential damage to coverings over friable asbestos-containing materials or, natural deterioration of the covering over friable asbestos containing materials; or raw, exposed friable asbestos-containing materials;
3. Spaces or areas where people are commonly present, and the exposure potential to asbestos-containing materials is high (hazard potential); and,

Concealed areas, such as attics and crawl spaces, where repairmen or technicians need to enter to perform maintenance or repairs on a more or less regular basis and friable asbestos-containing materials are present.

Those areas where two or more of these criteria presented a significant risk hazard are rated as high priority in this report. For example, areas regularly used for training or occupied office spaces with exposed friable asbestos containing materials automatically receive a high priority rating. A similar area where the asbestos-containing materials are not exposed and/or where fewer persons are likely to enter, receive a low rating. Attic spaces and tunnels are generally given a low rating, except where friable ACM debris or damage and exposed ACM is found, and repairmen or technicians need to enter to perform maintenance or repairs.

Asbestos-containing materials such as window putty, floor tile and cement asbestos board (CAB) receive a low rating because these materials are usually nonfriable, unless severely damaged or deteriorated.

### Specific Recommendations

The following material/area is recommended for abatement. However, because the hazard potential is low in this area, abatement may be delayed if the areas are labeled and access is restricted.

## High Priority Areas

Location and Material Description	Criteria		
	Condition	Toxicity Potential	Hazard Potential
155 (Loft) - 10 LF Block P.I.	Poor	Friable	High
169A - 8 LF Corr. P.I.	Poor	Friable	High
135 - 1 LF Corr. P.I.	Poor	Friable	High
130 - 20 LF Block P.I.	Poor	Friable	High
130 - 8 EA HMF	Poor	Friable	High
131, 132 & 132A - 26 LF Block P.I.	Poor	Friable	High
121 - 26 LF Block P.I.	Poor	Friable	High
246 - 1 EA HMG	Poor	Friable	High
Attic, NW Section 150 SF Debris	Poor	Friable	High
20 - W Side of N Wall - 4 SF Debris	Poor	Friable	High
Attic over Room 11, 13, 23 & 39, 50 LF Debris	Poor	Friable	High
Penthouse - 39 LF Block P.I. (Room 1-4)	Poor	Friable	High
- 22 EA HMF	Poor	Friable	High
- 520 SF Debris	Poor	Friable	High

## Special Attention

- Room 129 - remove 2 SF pipe insulation debris in loft.
- Room 121 - remove pipe insulation debris and repair pipe ends.
- Room 41 - west side, repair exposed end of pipe insulation on radiator near floor.
- Room 40 - repair open end of 8 inch deameter pipe, above ceiling tile.
- Penthouses - access should be limited until abated (as high priority item).

## Low Priority

All asbestos-containing material/areas identified during this survey not requiring special attention or receiving a high priority rating are:

- Tank insulation (HMG# 8.1).
- Pipe insulation (HMG# 9.1, 9.2, 9.3; 10.1, 10.2, 10.3; 11.1; 13.1 and 15.1).
- Pipe fitting insulation (HMG# 12.1; 14.1; 15.1).
- Flooring materials (HMG# 20.1 through 20.12; and 21.1 through 21.12; 22.1 and 22.2).
- Cement Asbestos Board (HMG# 29.1).
- Cove Base Mastic (HMG# 33.1).
- Rolled Roofing (HMG# 38.2).
- Window Putty (HMG# 47.2).
- Electrical Insulation (HMG# 55.1 and 55.2).

See Appendix 2 Drawings; Appendix 4, Material Area Spreadsheets; Appendix 5, Bulk Sample Data Summary; Appendix 6, Photographs; and, Appendix 7, Lab Test Results, for a more detailed information.

The following Operations and Maintenance section of this report describes general procedures, and techniques regarding care and maintenance of these asbestos containing materials.

# OPERATIONS & MAINTENANCE

## **OPERATIONS AND MAINTENANCE**

### **Operation and Maintenance Program**

The principal objective of an O&M program is to minimize exposure of building occupants to asbestos fibers. This is accomplished by (1) maintaining ACM in good condition, (2) ensuring proper cleanup of materials when damaged, (3) preventing further damage and fiber release, and (4) periodic monitoring of the ACM.

An Operations & Maintenance Program is designed to observe and periodically verify the condition of asbestos-containing materials within the facility. This is done through labeling of ACM, documenting conditions on a periodic basis, and assuring that any work conducted in the facility is approved beforehand to determine if ACM will be disturbed. If ACM is, or is likely to be disturbed during any work in the facility, it should be removed or isolated prior to work being conducted. Any removal or large scale repair work should be performed only by trained, qualified and properly protected individuals in accordance with applicable federal, state and local regulations.

The Commanding Officer at the facility or his agent should make available to any contractor inspecting the facility, performing work, or submitting a bid to undertake any construction, renovation, remodeling, maintenance, repair, or demolition project:

1. This report, documenting the asbestos inspection, or
2. A written statement either of reasonable certainty of nondisturbance or of assumption of the presence of asbestos.

In either case, ACM will be clearly identified beforehand, to minimize inadvertent fiber release.

### **General Recommendations**

1. NSPS should designate an asbestos program manager to coordinate all repair, renovation, or demolition work so that asbestos can be properly abated prior to disturbance by construction or maintenance work. Institute and Operations and Maintenance (O&M) program to establish procedures to properly label, inspect, and repair all ACM which will remain in the building.

The asbestos program manager should maintain building plans showing locations of ACM and should keep records current of all asbestos abatement activities. The asbestos program manager should also ensure that all employees who might be exposed to asbestos in the course of performing their jobs receive adequate training in asbestos abatement techniques. By effectively coordinating the asbestos O&M program, the program manager will minimize the possibility of exposing building occupants to asbestos fibers.

2. Staff maintenance personnel and any maintenance contractors should be informed of the presence and location of ACM and cautioned against disturbing or damaging the ACM.
3. All asbestos work should be conducted in accordance with Chapter M of OPNAVINST 5100.23B, "Navy Occupational Safety and Health Program," and the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and state or local regulations.
4. The U.S. Environmental Protection Agency (EPA) through the National Emission Standard for Hazardous Air Pollutants (NESHAP) requires that friable ACM be removed from a building prior to demolition or renovation. The NESHAP standard requires that notification be made to the local air pollution control or state agency prior to removal of any asbestos material.
5. The following procedures should be implemented as part of an Operations and Maintenance Program for the asbestos containing materials in the building/structure.

### **Clean-Up Procedures**

When asbestos-containing materials or debris (such as pipe insulation) are discovered, or encountered as a result of damage to the material the following steps should be implemented:

1. Isolate the area to prevent spreading of contamination.
2. Inform the NSPS Asbestos Program Manager.
3. If material is a minimal amount, wet down (beware of electrical safety dangers) with an amended water solution (water with detergent added), wipe area up thoroughly with rags and amended water, place debris (insulation debris, rags, etc.) into an approved disposal bag, and dispose of in compliance with applicable regulations.
4. Do not use a broom to sweep up materials or debris.
5. Do not use vacuum cleaners to remove debris, as this will spread contamination further.
6. Clean up should only be done by asbestos trained workers.
7. In the event that a large section of insulation is damaged and there is extensive contamination, isolate the area, and obtain services of an asbestos abatement contractor.

### **Routine O&M Procedures**

1. **Vinyl Floor Tiles/Mastic:** Vinyl floor tile (or linoleum) is considered a nonfriable material. During cleaning or waxing, do not abrade with a high speed buffer or

coarse compound. Use low speed buffers only. When tiles are broken, gently remove them and replace with non-asbestos tile, fill in small areas with leveling compound, or reattach tile to floor with contact cement. Where tile is exposed, periodically inspect for damaged or loose, missing tiles. Do not sand, grind or otherwise abrade tiles or mastic, except as noted above.

The mastic (including cove base mastic) is considered a friable material and must not be disturbed. As long as tile is in good condition the mastic does not present a problem. If mastic must be disturbed, limit work areas to less than 6 square feet, ventilate the area and use a petroleum based solvent (or other acceptable solvent) to remove mastic with putty knife and rags. Place rags and mastic debris in disposal bags and dispose of in accordance with applicable regulations. Do not sand, grind or otherwise abrade mastic.

If tiles are to be removed as part of a renovation, modification or demolition, it should be performed by a qualified asbestos abatement contractor.

2. **Roofing Materials and Sealant:** The built up asbestos-containing roofing materials and sealant pose little danger when left undisturbed. Current asbestos regulations exempt roofing materials provided the materials are in a nonfriable condition and remain so. Any roof repairs or penetrations should be done using manual (nonpower) tools and methods under conditions of extreme care so as not to cause the roofing materials to release fibers. A fine water spray directed upon the point of penetration or cutting, using a plastic "squirt bottle" is recommended.
3. **Pipe and Fittings Insulation and Tank Insulation:** Conduct periodic inspections to document condition. Minor areas of damage should be treated with a spray adhesive and covered with duct tape or other impermeable covering to limit fiber release. If pipe insulation is severely damaged (hanging, loose, friable material present) obtain services of an asbestos abatement contractor.
4. **Cement Asbestos Board:** This material is considered nonfriable and does not present an exposure hazard as long as it is not disturbed. Do not sand, grind, saw, drill, cut or otherwise abrade this material. Paint exposed edges of board. Periodically inspect board for damage and treat exposed areas with paint. If material is to be cut, drilled or removed, obtain services of an asbestos abatement contractor.
5. **Window Putty/Sealants:** These materials are nonfriable and in good condition at the time of survey. There is no potential health hazard as long as these material remain in good condition and are not disturbed. Do not saw, sand, drill, chip or grind these materials. When a window pane or the entire frame needs to be replaced, it is not practical to try to remove the asbestos window putty/sealant and replace it with nonasbestos materials. The usual practice is to remove the entire window frame containing the asbestos/sealant and dispose of the entire frame as asbestos-containing material in a proper manner. This work should be done by a qualified asbestos worker or contractor.

## Asbestos Abatement Projects

This report identifies high priority asbestos abatement work which should be performed to preclude accidental asbestos exposure to personnel who utilize the structure/building. Asbestos work may be accomplished by qualified contractors who perform work under contract to the Engineering Field Activity, Northwest. The following milestones apply for this type of work:

<u>Event</u>	<u>Responsible Party</u>
- Need to Perform Asbestos Work (a function of this report)	- Consultant
- Asbestos Abatement Project Prioritization	- EFA Northwest
- Engineering Service Request (ESR) and Step II to EFA Northwest	- NSPS
- Funding Sponsor	- Base Closure Realignment Account
- Preparation of Asbestos Abatement Design	- EFA Northwest
- Administration of Asbestos Abatement Contract	- EFA Northwest
- Asbestos Abatement	- Contractor
- Updating Asbestos Work Documents	- EFA Northwest/NSPS

APPENDIX 1  
COST ESTIMATE

**NAVAL STATION PUGET SOUND  
BUILDING 2, RESERVES**

**CONSULTANT ESTIMATE  
FOR  
ASBESTOS ABATEMENT**

HMG	Location Material	Quantity	Unit	Unit Cost	Cost \$
<b>REMOVAL</b>					
	155 - Block P.I.	10	LF	7.00	70.00
	169A - Corr. P.I.	8	LF	7.00	56.00
	135 - Corr. P.I.	1	LF	7.00	7.00
	130 - Block P.I.	20	LF	7.00	140.00
	130 - HMF	8	EA	12.50	100.00
	131, 132, 132A - Block P.I.	26	LF	7.00	182.00
	121 - Block P.I.	26	LF	7.00	182.00
	246 - HMF	1	EA	12.50	12.50
	Attic - Debris	200	SF	3.00	600.00
	20 - Debris	4	SF	3.00	12.00
	Penthouse - Block P.I.	39	LF	7.00	273.00
	HMF	22	EA	12.50	275.00
	Debris	200	SF	3.00	600.00
			SUBTOTAL		2,509.50
<b>REINSULATION</b>					
	155 - Block P.I.	10	LF	7.00	70.00
	169A - Corr. P.I.	8	LF	7.00	56.00
	135 - Corr. P.I.	1	LF	7.00	7.00
	130 - Block P.I.	20	LF	7.00	140.00
	130 - HMF	8	EA	12.50	100.00
	131, 132, 132a - Block P.I.	26	LF	7.00	182.00

HMG	Location Material	Quantity	Unit	Unit Cost	Cost \$
	121 - Block P.I.	26	LF	7.00	182.00
	246 - HMF	1	EA	12.50	12.50
	Penthouse - Block P.I.	39	LF	7.00	273.00
	HMF	22	EA	12.50	275.00
	Modified Containment, Const./Removal	4	EA	500	2,000.00
			SUBTOTAL		5,807.00
	Removal Permit	1	EA	250.00	250.00
	Industrial Hygienist	20	hrs	80.00	1,600.00
	Air Monitoring/Testing	40	hrs	50.00	2,000.00
			SUBTOTAL		9,657.00
	Administration	5%			482.00
	Contingencies	10%			965.00
	Mobilization & Demob.	2.5% (or \$100 min.)			241.00
	Bonds & Insurance	10%			965.00
	Sales Tax	8.2%			791.00
			GRAND TOTAL		\$13,101.00

Estimate uses 1993 dollars, Davis-Bacon wages, and is based on a single project abatement, 7 working days, 0% occupancy, and does not include costs associated with the preparation of abatement plans or specifications.

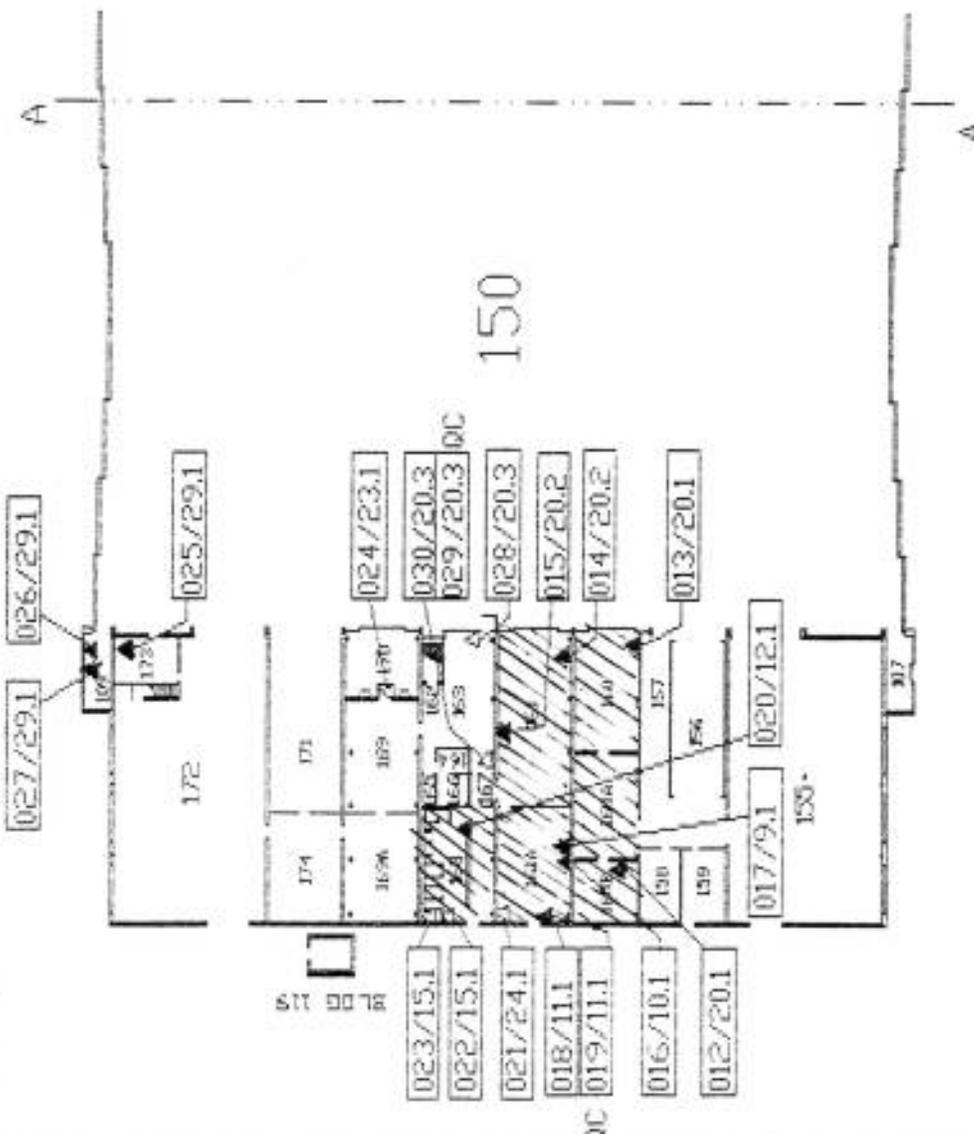
Probable Asbestos Removal/Reinsulation Cost Estimate in the Appendix is for the high priority asbestos containing materials. The cost should be considered an estimate and not a guarantee that bids will be obtained at or less than the bottom line figure. Many factors can affect the actual cost of abatement, such as: time of year of bidding, language in the technical specifications governing the work, hours available for doing the work, and number of contractors bidding the job, etc.

The administration amount (5 percent) includes the contractor's effort required in Division 1 of the Specifications.

APPENDIX 2  
DRAWINGS

APPENDIX 2  
DRAWINGS





EXPLANATION

SAMPLE No.   /   - HMG No.

HMG CODES

- 9.1 Block PI
- 10.1 HMF
- 12.1 HMF
- 15.1 HMF
- 20.1 VFT
- 20.2 VFT
- 20.3 VFT
- 23.1 GWB
- 24.1 Plaster
- 29.1 CAB

- ▲ Negative
- ▲ Positive



Positive VFT/Mastic



DEPARTMENT OF NAVY	
NAVAL STATION OF PUGET SOUND	
COAST GUARD & MARINES	BLDG-2
RESERVE TRAINING	
FIRST FLOOR	SH 1 OF 6

# EXPLANATION

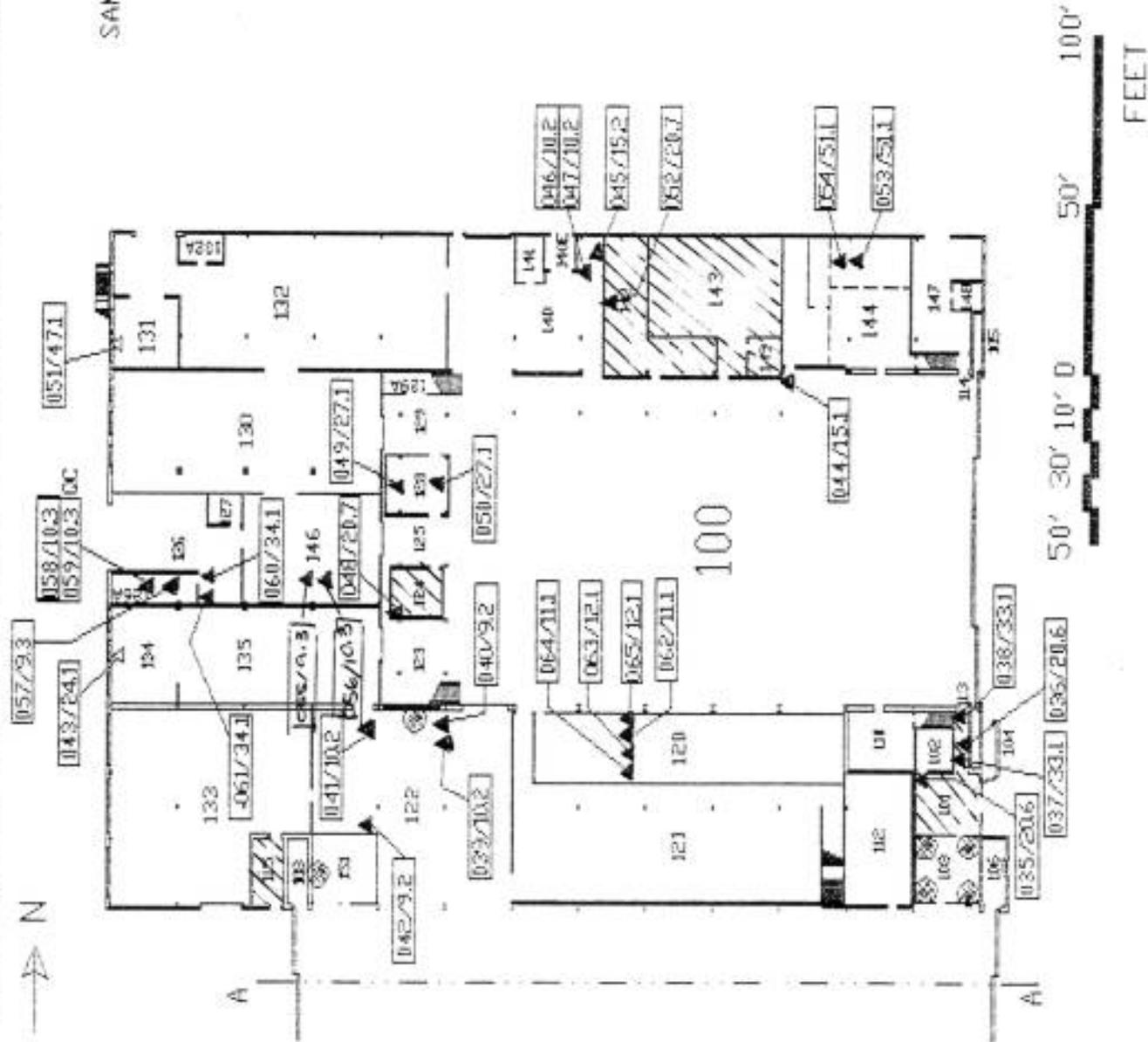
SAMPLE No. + / + HMG No.

## HMG CODES

- 9.2 Block PI
- 9.3 Block PI
- 10.2 HMF
- 10.3 HMF
- 11.1 Corr. PI
- 12.1 HMF
- 15.1 HMF
- 15.2 HMF
- 20.6 VFT
- 20.7 VFT
- 24.1 Plaster
- 27.1 Glue-On CT
- 33.1 Cove Base Mastic
- 34.1 VJC
- 47.1 Window Putty
- 51.1 Contact Shields

- ▲ Negative  Positive
- ⊗ Debris

DEPARTMENT OF NAVY	
NAVAL STATION OF PUGET SOUND	
COAST GUARD & MARINES	BLDG-E
RESERVE TRAINING	
FIRST FLOOR	SH 2 OF 6



FEET



# EXPLANATION

SAMPLE No. b / a HMG No.

## HMG CODES

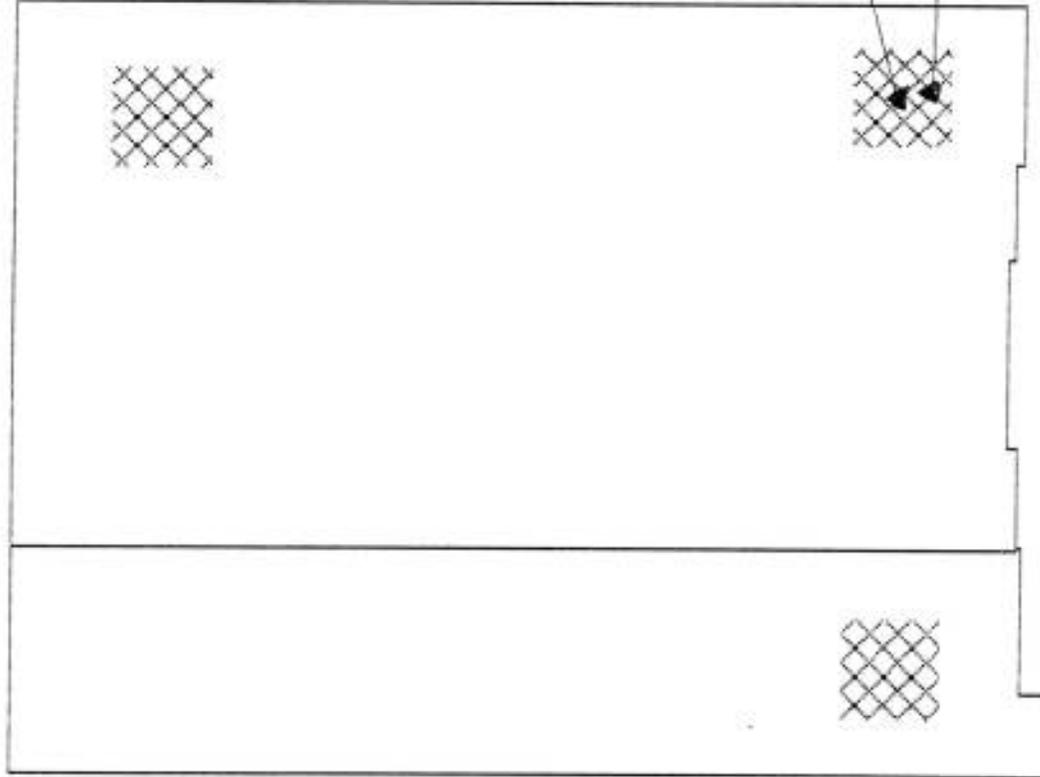
- 1.0 Sprayed On
- 20.8 VFT
- 20.9 VFT
- 20.11 VFT
- 20.12 VFT
- 22.1 Linoleum
- 22.2 Linoleum
- 24.1 Plaster
- 25.1 Loy-in CT
- 25.2 Loy-in CT
- 25.3 Loy-in CT
- 27.1 Glue-on CT
- 47.1 Window Putty

- ▲ Negative
- ▲ Positive

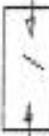
/ Positive VFT / Linoleum / Mastic



DEPARTMENT OF NAVY  
 NAVAL STATION OF PUGET SOUND  
 COAST GUARD & MARINES BLDG-2  
 RESERVE TRAINING  
 SECOND FLOOR SH 4 OF 6



EXPLANATION

SAMPLE No.  /  HMG No.

HMG CODES

- 8.1 Tank Insulation
- 51.2 Contact Shields

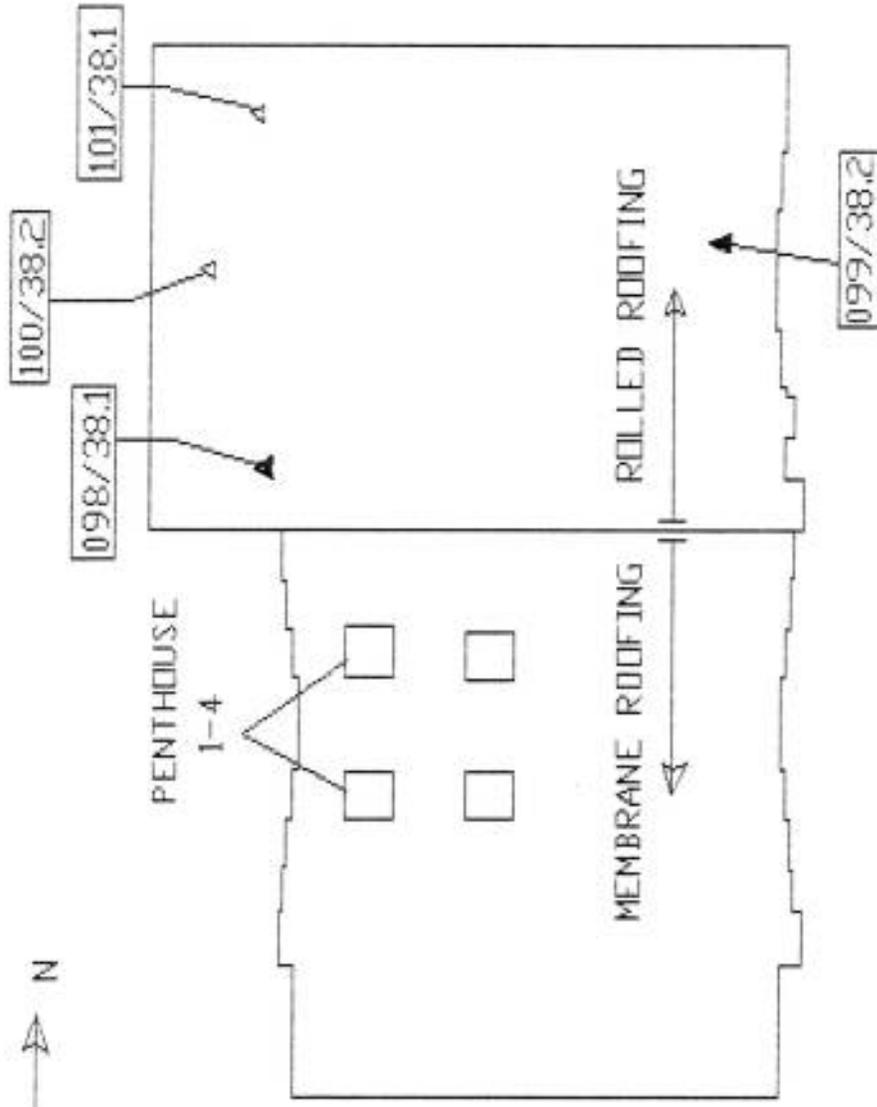
- △ Negative
- ▲ Positive
- ⊗ Debris

 085/51.2  
 086/51.2

Elevator Mech. Room

DEPARTMENT OF NAVY	
NAVAL STATION OF PUGET SOUND	
COAST GUARD & MARINES	BLDG-2
RESERVE TRAINING	
N.V.ATTIC	SH 5 OF 6





EXPLANATION

SAMPLE No. [ ] / [ ] - HMG No.

HMG CODES

38.1 Rolled Roof

38.2 Rolled Roof

- ▲ Asbestos
- △ Non-Asbestos



DEPARTMENT OF NAVY

NAVAL STATION OF PUGET SOUND

COAST GUARD & MARINES  
RESERVE TRAINING

BLDG-2

ROOF

SH 6 OF 6