

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

N44255-93-C-4056

**BUILDING 18
FIRE STATION**

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



PREPARED BY:



ALPHA Engineering Group, Inc.
22232 - 17th AVENUE S.E., SUITE 301
BOTHELL, WASHINGTON 98021

SEPTEMBER 1993

September 17, 1993

Commander
Naval Facilities Engineering Command
Engineering Field Activity, Northwest
3505 NW Anderson Hill Road
Silverdale, WA 98383-9130

Subject: Transmittal of Asbestos Survey Report, Building 18, Fire Station, 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, and Change Order P00002 dated July 1, 1993, directives and reviews by EFA Northwest.



Don Hemovich, P.E., Technical Director



David Newman, C.I.H.



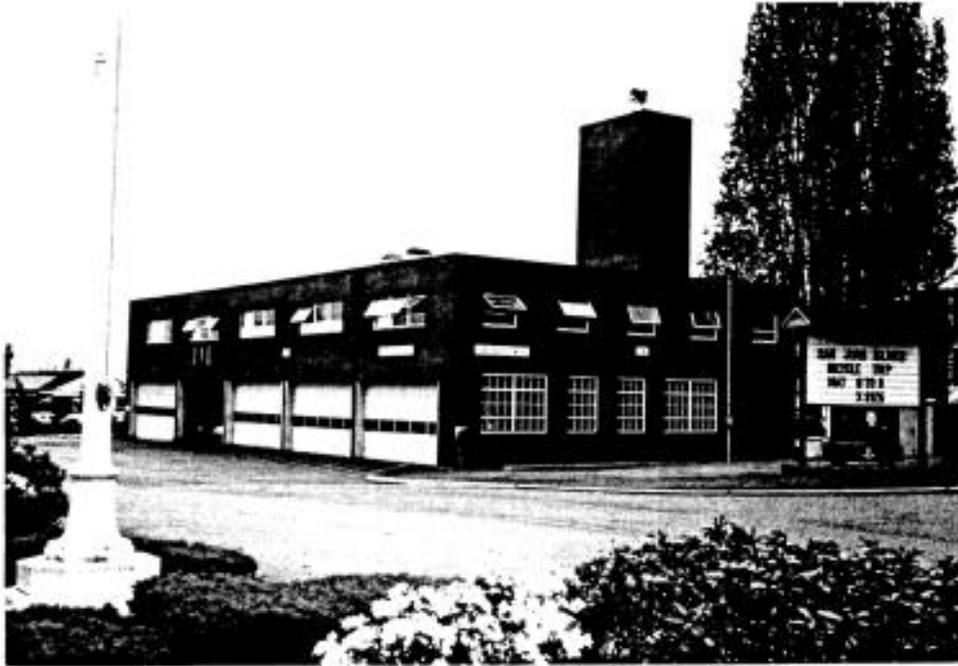
R.R. (Ron) Underwood, Project Manager

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

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

BUILDING 18, FIRE STATION

LETTER OF TRANSMITTAL	
EXECUTIVE SUMMARY	1
High Priority Areas	1
Special Attention Areas	1
Estimated Removal Cost	1
Risk Assessment	2
Special Note	2
INTRODUCTION	3
General Description	3
Asbestos Survey	3
Asbestos Sampling	3
Industrial Hygienist and Technical Director Report	3
Report Use	4
Consultant Data	4
ASBESTOS INFORMATION	5
Physical Characteristics of Asbestos	5
Health Effects of Asbestos	5
BUILDING SURVEY	7
Building Description	7
Sampling	7
Methodology	7
Recommendations	7
OPERATIONS AND MAINTENANCE	10
Operation and Maintenance Program	10
Asbestos Management Program Ashore	10
General Recommendations	11
Routine O&M Procedures	12
Asbestos Abatement Projects	13
Mandatory Records	14
APPENDIX	
1. Cost Estimate	
2. Drawings	
3. Homogenous Materials List	
4. Material Area Spreadsheets	
5. Bulk Sample Data Summary Sheets	
6. Photographs	
7. Lab Test Results	



BUILDING 18, FIRE STATION

EXECUTIVE SUMMARY

A sampling survey for asbestos-containing materials (ACM) was performed in Building 18, Fire Station on 3/09/93. A total of 56 bulk samples were collected consisting of flooring materials, wall and ceiling materials, window putty, cement asbestos board, pipe and fitting insulation, sealants, cove base mastic and roofing materials. Of the samples collected only vinyl floor tile and mastic, linoleum, pipe insulation, mudded fittings, cement asbestos board, window putty, sealants and roofing materials were found to contain asbestos. A follow-up on-site inspection was conducted on 7/08/93 by Alpha's Technical Director and on 8/18/93 by Alpha's certified industrial hygienist.

High Priority Areas

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

Location and Material Description	Criteria		
	Condition	Toxicity Potential	Hazard Potential
1. Damaged pipes and fittings, on S. wall, Room 105 ground floor.	Moderate to poor, subject to more damage from items stored next to pipes.	Friable	High
2. Debris - Rooms 110, 111, 112 and 114, ground floor, attic.	Poor; small pieces and fragments of pipe and fitting insulation.	Friable	Low

Because the hazard potential is low in the attic area, abatement may be delayed if the areas are labeled and access is restricted.

Special Attention Areas

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

- The hatch opening to the attic above the stairwell (Room 112) should be designated as restricted access until the attic is abated.

Risk Assessment

The approach is derived from MILSTD-882B (System Safety Program Requirements) and OPNAVINST 5100.23C, Chapter 12 (Deficiency Abatement Program). Probability of hazard and severity of hazard are combined to produce a relative numerical Risk Assessment Code (RAC). The RAC is used Navy-wide as a management tool to prioritize corrective action at multiple sites.

Risk Assessment Code (RAC)						Total Deficiencies
	1	2	3	4	5	
# of Deficiencies	-	2	1	18	-	21

* Cost estimate is for high priority items (RAC 1 and 2) only.

Special Note

All correspondence, files and records in existence or which may be created in the future that relate to insulation/asbestos are exempt from destruction and must be preserved until further notice. This encompasses all insulation/asbestos-related documents, both long-term and short-term. This requirement applies to all originals and nonidentical copies. Therefore, the recording of subject documents on microfilm or microfiche or electronic media does not relieve an activity from the requirements to retain all original documents. See also "Mandatory Records" in the last section of this report.

INTRODUCTION

INTRODUCTION

The Hazardous Materials Department of Alpha Engineering Group, Inc. was retained by the Engineering Field Activity, Northwest, Naval Facilities Engineering Command, Silverdale, WA, to conduct an on-site asbestos survey of the U.S. Naval Station Puget Sound (NSPS), Seattle, WA. 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 friable and nonfriable asbestos in each building and associated utilities services at NSPS, Seattle, WA. 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 a 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 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, WA, and the Naval Facilities Engineering Command, Silverdale, WA. 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 instructed to by the Naval Facilities Engineering Command, EFA Northwest, Silverdale, WA.

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, 3505 NW Anderson Hill Road, Silverdale, WA 98383-9130, ATTN: Code 09ETIMS, 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. A few cases of asbestos warts on the skin from asbestos have been reported, but these occurrences are uncommon and usually not considered serious.

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 of 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 micron. 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 starts, 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 14,137 square feet on two floor levels. There are several roof levels formed of tar and gravel, built-up roofing materials and rolled roofing. The principal construction is wood framing and brick exterior with a small cement asbestos board/wood frame section on the east portion of the building.

Sampling

The survey of this building was conducted by Ernest Edwards and Mike Smith on March 9th, 1993. A total of 56 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 may have been assigned HMG numbers and found to be non-asbestos. Homogeneous material areas are listed on the Material Area Spreadsheets (Appendix 4). Sample data from the survey is recorded on the Bulk Sample Data Summary (Appendix 5).

Of the 56 samples of suspected asbestos containing materials (ACM) collected 33 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, where ACM was suspected of being present, 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 for Occupational Safety and Health (NIOSH) now state that 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,
4. 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 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 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. A high priority rating is equivalent to a risk assessment code (RAC) of 1 or 2.

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. A low priority rating is equivalent to a risk assessment code (RAC) of 4 or 5.

Specific Recommendations

The following material/area(s) are recommended for abatement (defined as "control of asbestos beyond an operations and maintenance program, that includes removal, enclosure and encapsulation techniques"). However, because the hazard potential is low for the debris above the ceiling, abatement may be delayed if the area is labeled and access is restricted.

High Priority Areas

Location and Material Description	Criteria		
	Condition	Toxicity Potential	Hazard Potential
1. Damaged pipes and fittings, on S. wall, Room 105 ground floor. Approx. 10 LF HMG 9.1 and 2 EA., HMG 10.1	Moderate to poor, subject to more damage from items stored next to pipes.	Friable	High
2. Debris - Rooms 110, 111, 112 and 114, ground floor, attic. Approx. 116 SF, HMG 46.1	Poor; small pieces and fragments of pipe and fitting insulation.	Friable	Low (Due to limited accessibility)

Special Attention

- The hatch opening to the attic above the stairwell (Room 112) should be designated as restricted access until the attic is abated.

Low Priority

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

- Cement asbestos board (HMG# 29.1)
- Vinyl flooring materials and mastics (HMG# 20.1, 20.2, 20.6, 20.7; 21.1, 21.3, 21.4, 21.5, and 21.7).
- Roofing materials and sealants (HMG# 43.1 and 45.2)
- Pipe and fitting insulation (HMG# 9.1, 10.1, 13.1 and 14.1)
- Window Putty (HMG# 47.1)
- Debris (HMG# 46.1)

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 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 (O&M)

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.

Asbestos Management Program Ashore

The Navy Asbestos Management Program Ashore consists of the following key elements: Inventory, assessment, abatements, operations and maintenance (O&M) program, and training. These elements are not a step by step process, but rather the key components of an activity's plan to protect personnel from asbestos exposure. The cornerstone of the program is the O&M program. An active and aggressive O&M program protects personnel by ensuring that any known or suspect asbestos containing material (ACM) is tested before a maintenance or repair operations disturbs it, and that proper work practices are employed whenever ACM is disturbed. An O&M program also protects the activity by maintaining adequate records, and by training all personnel who have access to ACM. An excellent first step in the process is to designate an asbestos program coordinator per paragraph 1712d(4), OPNAVINST 5100.23C. The coordinator's first step should be to establish an O&M program. The following further describe the key elements.

- I. Operation and Maintenance Program
 - A. Objective: Ensure that personnel are protected from asbestos exposure caused by inadvertent disturbance of asbestos containing materials.
 - B. Scope: An O&M program should include the following elements. An activity will already have a system of inputting, tracking, and executing work requests, a

medical surveillance program, and other features mentioned below. The elements of the O&M program should be incorporated into these existing systems to the degree possible.

1. Notification. A program to tell building occupants and maintenance personnel where ACM is located, and how and why to avoid disturbing it. All persons affected should be informed.
2. Surveillance. Regular inspection of ACM to note, assess, and document any changes in its condition.
3. Controls. A system to review all work requests for the likelihood of disturbing ACM, and to issue permits to ensure proper work practices are employed whenever ACM will be encountered.
4. Work Practices. O&M work practices to avoid, or minimize fiber release during activities affecting ACM.
5. Recordkeeping. To document all O&M activities.
6. Training. Asbestos program coordinator and maintenance staff training.
7. Worker Protection. Medical and respiratory protection programs for workers who will require respiratory protection as part of their asbestos activities.

Excerpted from: Appendix 17-B, OPNAVINST 5100.23C, 2 November 1992.

General Recommendations

1. 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.
2. All asbestos work should be conducted in accordance with Chapter 17 of OPNAVINST 5100.23C, "Navy Occupational Safety and Health Program," and the Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA) and state or local regulations.
3. 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.
4. The following procedures should be implemented as part of an Operations and Maintenance program for the asbestos containing materials in the building/structure.

Routine O&M Procedures

1. **Debris:** When asbestos-containing friable materials in the form of dust, powder, fragments, chips, etc., exist or are discovered, the following steps should be implemented:
 - a. Isolate the area to prevent spreading of contamination.
 - b. Inform the NSPS Asbestos Program Manager.
 - c. 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.
 - d. Do not use a broom to sweep up materials or debris.
 - e. Do not use vacuum cleaners to remove debris, as this will spread contamination further.
 - f. Clean up should only be done by asbestos trained workers.
 - g. 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.

2. **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.

The mastic is considered a nonfriable material as long as it is not disturbed or exposed to foot traffic. If the 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.

3. **Roofing Materials and Sealants:** The asbestos-containing patches, roofing materials and sealants 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 mist should be applied as cuts or penetration are made.

4. **Pipe and Fitting 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 or if over a few linear feet is damaged, obtain the services of an asbestos abatement contractor.
5. **Cement Asbestos Board:** This material (CAB) is considered nonfriable and does not present an exposure hazard as long as it is not disturbed or damaged. 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.
6. **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

Where high priority asbestos-containing materials are recommended for removal, the work should be accomplished by qualified contractors. 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 Realignment and Closure Account
- Preparation of Asbestos Abatement Design	- EFA Northwest

- Administration of Asbestos Abatement Contract
- Asbestos Abatement
- Updating Asbestos Work Documents
- EFA Northwest
- Contractor
- NSPS

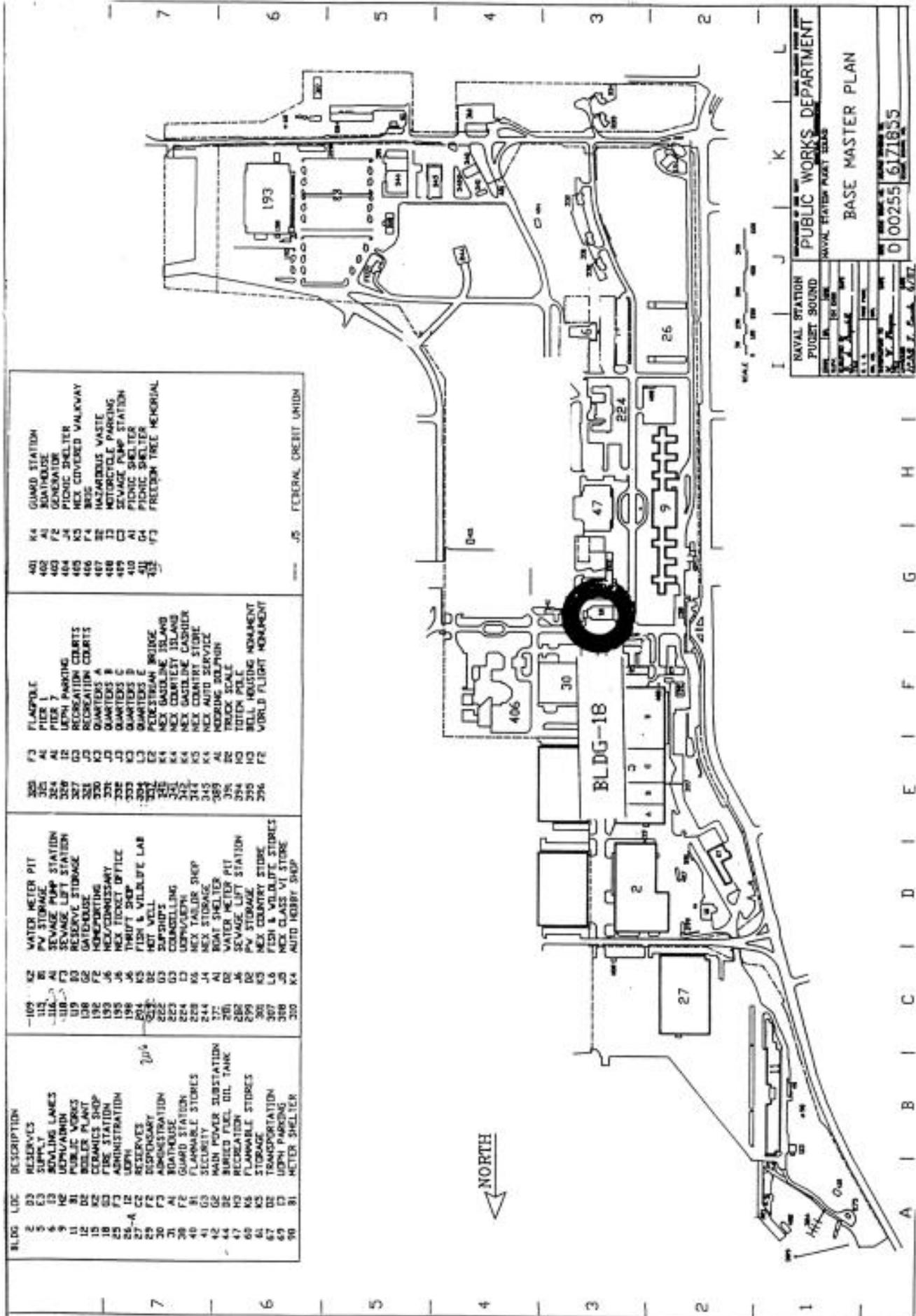
Mandatory Records

The requirements for asbestos related recordkeeping at this facility are the responsibility of the Naval Station Puget Sound, Seattle, WA. The records include such items as removal of asbestos-containing materials; personnel training, fit testing and medical records; operations and maintenance activities; fiber release episodes, etc. References for these requirements include Part III Environmental Protection Agency; 40 CFR Part 763; OPNAVINST 5100.23C, 1704e(3), 1708d.(2), 1709g; and SECNAVINST 5212.10A, "Mandatory Retention of Insulation/Asbestos Related Records".

APPENDIX 2
DRAWINGS

BLDG LOC	DESCRIPTION					
2	RESERVES	109	WATER METER PIT	F3	FLAPJACK	401
3	SUPPLY	111	PV STORAGE	325	PIER 1	402
4	SOILING LAKES	112	SEWAGE PUMP STATION	326	PIER 7	403
5	LOUNGE	113	SEWAGE LIFT STATION	327	LEON PARKING	404
6	PUBLIC WORKS	114	RESERVE STORAGE	328	RECREATION COURTS	405
7	BEILER PLANT	115	GATEHOUSE	329	RECREATION COURTS	406
8	CERAMICS SHOP	116	REPORTING	330	QUARTERS A	407
9	FIRE STATION	117	REC/COMMISSARY	331	QUARTERS B	408
10	ADMINISTRATION	118	WATER TICKET OFFICE	332	QUARTERS C	409
11	RESERVES	119	THRIFT SHOP	333	QUARTERS D	410
12	RESERVES	120	FISH & VILLOVE LAB	334	QUARTERS E	411
13	RESERVES	121	HOT WELL	335	PERCUTAN BRIDGE	412
14	RESERVES	122	COINTEGRATING	336	NEC BATHLINE ISLAND	413
15	RESERVES	123	COINTEGRATING	337	NEC COURTESY ISLAND	414
16	RESERVES	124	LEPCO/LEPCO SHOP	338	NEC BATHLINE CASINER	415
17	RESERVES	125	NEC STORES	339	NEC COUNTRY STORE	416
18	RESERVES	126	BOAT SHELTER	340	NEC AUTO SERVICE	417
19	RESERVES	127	WATER METER PIT	341	NECING SHELTER	418
20	RESERVES	128	SEWAGE LIFT STATION	342	TRUCK SCALE	419
21	RESERVES	129	PV STORAGE	343	TITEN PILE	420
22	RESERVES	130	NEC COUNTRY STORE	344	BELL HOUSING MONUMENT	421
23	RESERVES	131	FISH & VILLOVE STORES	345	WORLD FLIGHT MONUMENT	422
24	RESERVES	132	NEC CLASS VI STORE	346		423
25	RESERVES	133	AUTO HOBBY SHOP			

--- .J5 FEDERAL CREDIT UNION



NAVAL STATION
PUGET SOUND
NAVAL STATION PUGET SOUND

PUBLIC WORKS DEPARTMENT
BASE MASTER PLAN

00255 6171855

DATE: 7-2-66

A | B | C | D | E | F | G | H | I

J | K | L

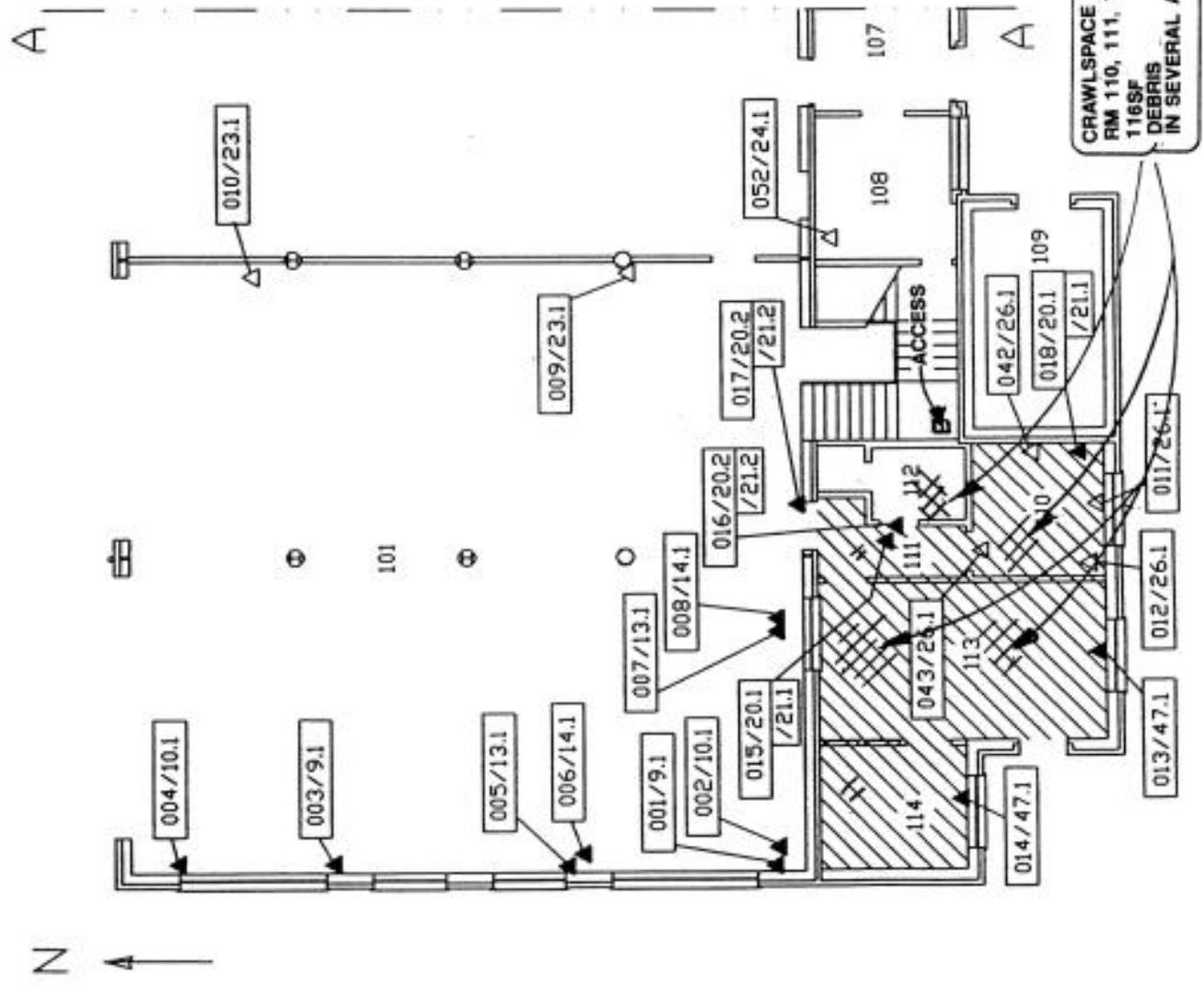
EXPLANATION

SAMPLE No. / HMG No.

HMG CODES

- 9.1 Block PI
- 10.1 HMF
- 13.1 Comp. PI
- 14.1 HMF
- 20.1 VFT
- 20.2 VFT
- 21.1 VFT Mastic
- 21.2 VFT Mastic
- 23.1 GwB
- 24.1 Plaster
- 26.1 Spline CT
- 47.1 Window Putty

▲ Negative
 ▲ Positive
 VFT/MASTIC
 HIGH PRIORITY



DEPARTMENT OF NAVY	
NAVAL STATION OF PUGET SOUND	
FIRE STATION	BLDG-18
GROUND FLOOR	SH 1 OF 5

EXPLANATION

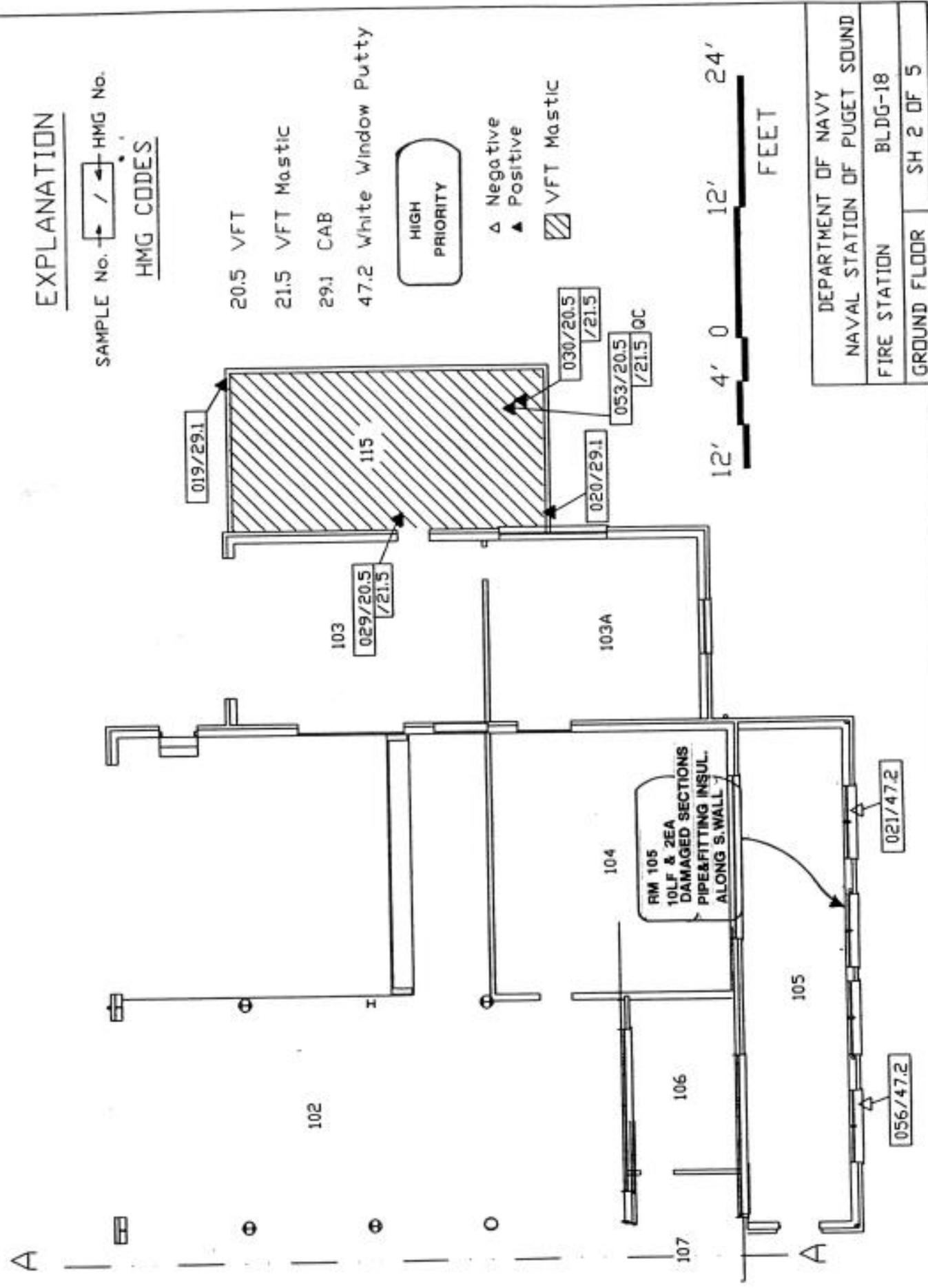
SAMPLE No. / HMG No.

HMG CODES

- 20.5 VFT
- 21.5 VFT Mastic
- 29.1 CAB
- 47.2 White Window Putty

HIGH
PRIORITY

- △ Negative
- ▲ Positive
- ▨ VFT Mastic

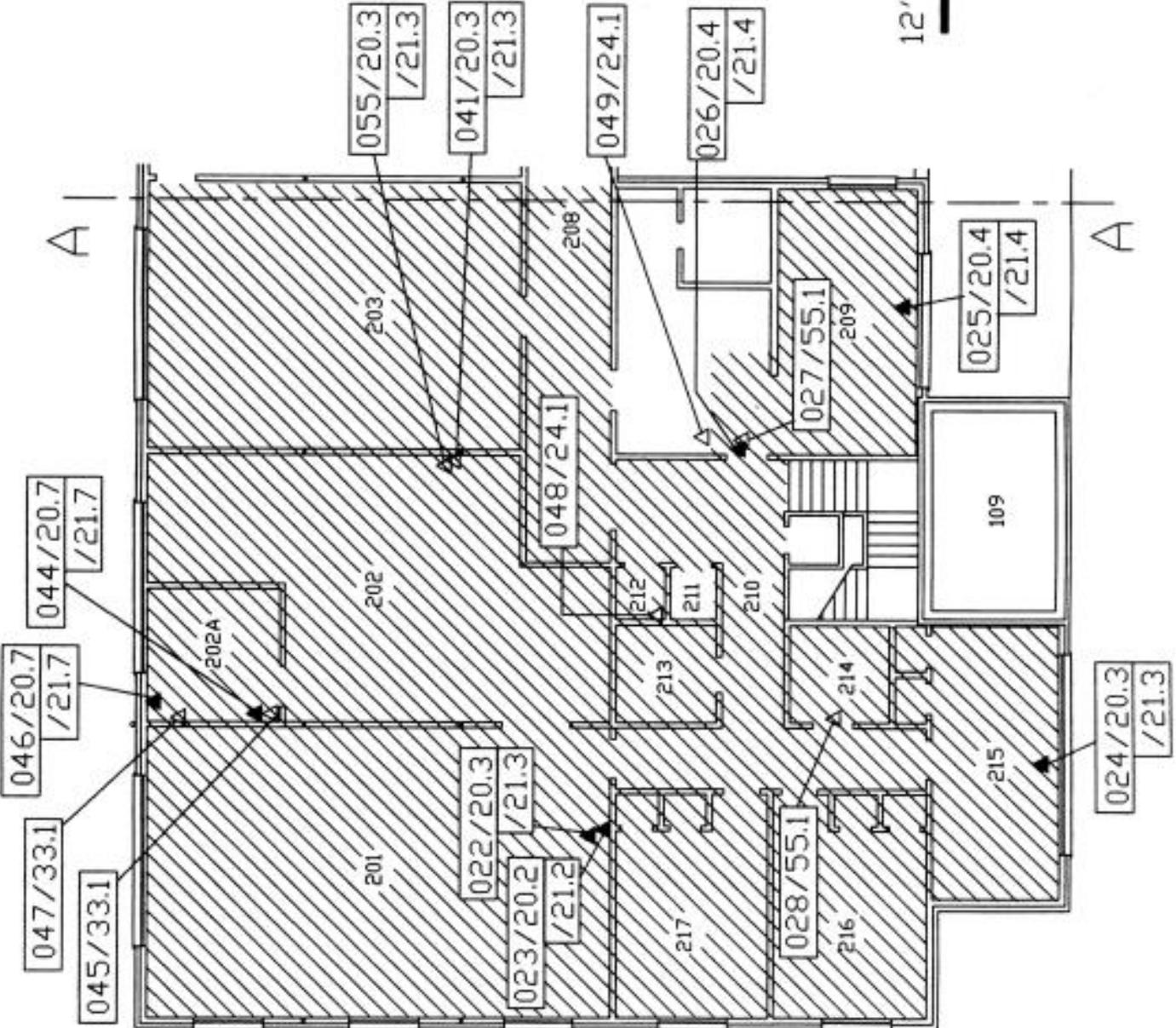


DEPARTMENT OF NAVY	
NAVAL STATION OF PUGET SOUND	
FIRE STATION	BLDG-18
GROUND FLOOR	SH 2 OF 5



A

A



EXPLANATION

SAMPLE No. / -HMG No.

HMG CODES

- 20.2 VFT
- 20.3 VFT
- 20.4 VFT
- 20.7 VFT
- 21.2 VFT Mastic
- 21.3 VFT Mastic
- 21.4 VFT Mastic
- 21.7 VFT Mastic
- 24.1 Plaster
- 33.1 Cove Base Mastic
- 55.1 Masonry Flooring

- Negative
- Positive
- Positive VFT/MASTIC



DEPARTMENT OF NAVY	
NAVAL STATION OF PUGET SOUND	
FIRE STATION	BLDG-18
SECOND FLOOR	SH 3 OF 5



EXPLANATION

SAMPLE No.  /  HMG No.

HMG CODES

- 20.6 VFT
- 21.6 VFT Mastic
- 26.2 Spline CT
- 47.1 Window Putty

△ Negative

▲ Positive

 VFT

12' 4' 0 12' 24'
FEET

DEPARTMENT OF NAVY	
NAVAL STATION OF PUGET SOUND	
FIRE STATION	BLDG-18
SECOND FLOOR	SH 4 OF 5



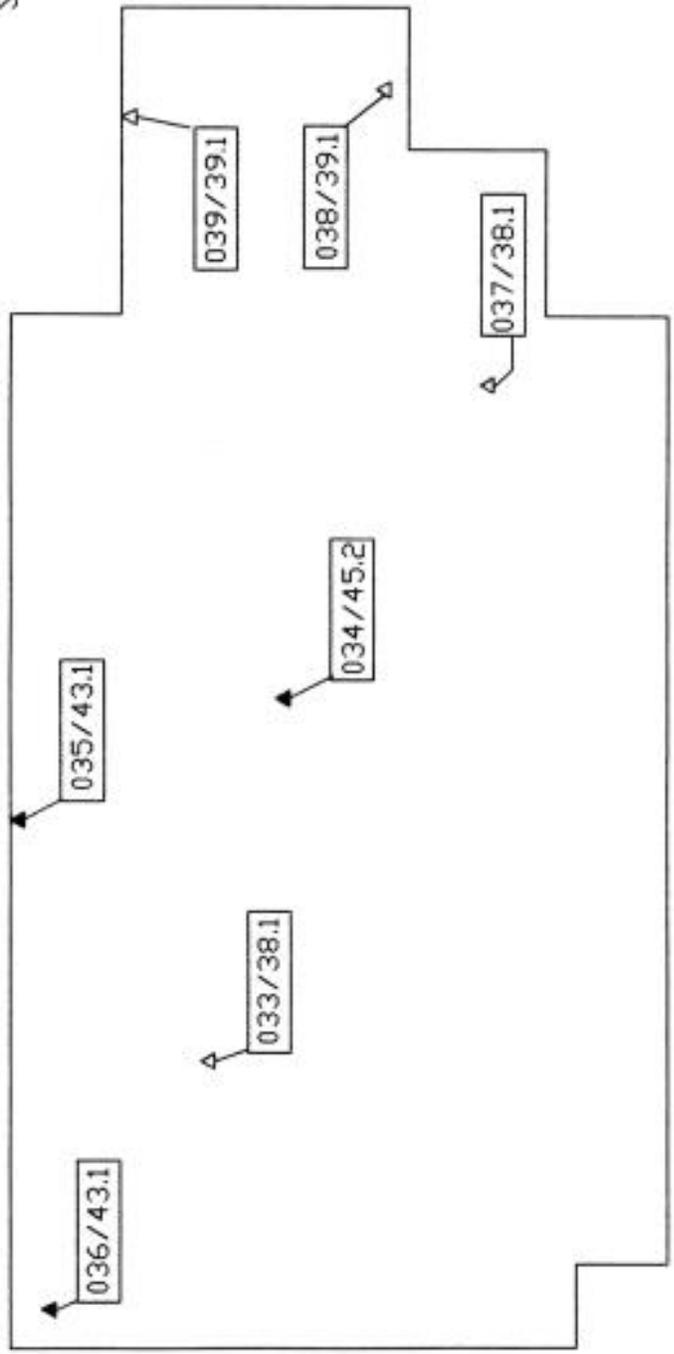
EXPLANATION

SAMPLE No.  HMG No.

HMG CODES

- 38.1 Rolled Roofing
- 39.1 Roofing
- 43.1 Roof Patch
- 45.2 Duct Sealant

- ▲ Negative
- ▲ Positive



DEPARTMENT OF NAVY	
NAVAL STATION OF PUGET SOUND	
FIRE STATION	BLDG-18
ROOF	SH 5 DF 5

APPENDIX 3

HOMOGENEOUS
MATERIALS LIST

APPENDIX 3

HOMOGENEOUS MATERIAL AREA I.D. NUMBER (HMG#) REFERENCE LIST

UNIT I.D. # DESCRIPTION

Surfacing

- SF 1.X Sprayed - on finish
- SF 2.X Troweled - on finish
- SF 4.X Other surfacing

UNIT I.D. # DESCRIPTION

Thermal

- SF 5.X Cloth wrap at seams/joints
- SF 6.X Breaching
- SF 7.X Duct insulation
- SF 8.X Tank insulation
- LF 9.X Block pipe insulation - Block PI
- EA 10.X Hard mudded fitting (HMF) and joints associated with block PI
- LF 11.X Corrugated pipe insulation - Corr.PI
- EA 12.X Hard mudded fitting (HMF) and joints associated with corrugated PI
- LF 13.X Compressed pipe insulation - Comp.PI
- EA 14.X Hard mudded fitting (HMF) associated with compressed PI
- EA 15.X Hard mudded fitting (HMF) associated with fiberglass or other misc. insulation
- EA 16.X Joint with white sealant on ends
- LF 17.X Tarpaper pipe insulation
- LF 18.X Troweled-on pipe insulation
- SF 19.X Finish mud
- EA 19.X Finish mud
- 56.X Other thermal

PIPE AND FITTING PARAMETERS

- Pipe and Fitting OD \leq 6"
- Pipe and Fitting OD $>$ 6" but \leq 10"
- Pipe and Fitting OD $>$ 10"

UNIT I.D. # DESCRIPTION

Miscellaneous

- SF 20.X Vinyl floor tile - VFT
- SF 21.X Floor tile mastic
- SF 22.X Linoleum or sheet vinyl (includes mastic and backing)
- SF 23.X Drywall, mud, tape (walls and ceiling) - GWB
- SF 24.X Plaster (walls and ceiling)
- SF 25.X Lay-in ceiling tile - Lay-in CT
- SF 26.X Spline ceiling tile - Spline CT
- SF 27.X Glue-on ceiling tile - Glue-on CT
- SF 28.X Ceiling tile glue - CT glue
- SF 29.X Cement asbestos board CAB
- SF 30.X Cement asbestos pipe
- SF 31.X Cement asbestos shingles - CAB
- SF 32.X Cove base
- SF 33.X Cove base mastic
- EA 34.X Vibration joint cloth - VJC
- LF 35.X Caulking
- SF 36.X Mortar
- SF 37.X Asphalt roof shingles
- SF 38.X Rolled roofing
- SF 39.X Asphalt and gravel roofing
- SF 40.X Cant strip
- LF 41.X Weatherproofing sealant
- SF 42.X Tar patch
- LF 43.X Tar patch
- EA 44.X Firedoors
- LF 45.X Duct sealant
- SF 46.X Debris
- LF 47.X Window putty
- SF 48.X Tarpaper
- LF 49.X Tape
- LF 50.X Wire insulation
- EA 51.X Contact shields
- EA 52.X Elevator brake shoes
- SF 53.X Dust
- SF 54.X Blown-in insulation
- 55.X Other miscellaneous

APPENDIX 4

MATERIAL
AREA SPREADSHEET

MATERIAL AREA SPREADSHEET

(Type 1)

Alpha Engineering Group, Inc.



Date: 03-09-93

NSPS, Seattle

Project Name: Comprehensive Asbestos Survey

Project No: 17-3830-11

Surveyor(s): E X E

Building Name/Number: 18

Facility Usage: FIRE DEPT.

MKS

Floor	HMG #	Material Description	Location	Qty	CR	DM	%	FR	EP	PE
I	9.1	<6" BLOCK PI	BAY 101	375 LF	3	5 LF	Y	Y	3	OT
I	10.1	<6" HMF	BAY 101	50 EA	3	2 EA	Y	Y	3	OT
I	13.1	<6" COMP. PI	BAY 101	86 LF	3	2 LF	Y	Y	3	OT
I	14.1	<6" HMF	BAY 101	25 EA	3	2 EA	Y	Y	3	OT
I	9.1	<6" BLOCK PI	Rm's 110, 111	20 LF	2	1 LF	Y	Y	3	OT
I	10.1	<6" HMF	Rm's 110,	3 EA	2	2 EA	Y	Y	2	OT
I	20.1	12" X 12" BLK. VFT	Rm's 110, 113, 114, 111	430 SF	3	0	Y	N	3	OT
I	21.1	BLK, FLOOR TILE MASIC	Rm's 110, 113, 114, 111	430 SF	3	0	Y	N	3	OT
I	26.1	12" X 12" SPLINE CT	Rm's 110, 113	291 SF	3	0	N	Y	3	OT
I	47.1	WINDOW PUTTY	Rm's 110, 113, 114	180 SF	3	4 LF	Y	N	3	OT
ATTIC	9.1	<6" BLOCK PI	ABOVE Rm 114	12 LF	1	6 LF	Y	Y	2	OT
ATTIC	10.1	<6" HMF	ABOVE Rm 114	5 EA	1	2 LF	Y	Y	2	OT
ATTIC	46.1	DEBRIS (PI)	ABOVE Rm 114	80 SF	1	80 SF	Y	Y	2	OT
I	20.2	LOWER LAYER 9" X 9" VFT	Rm's 110, 113, 114, 111	430 SF	3	0	Y	N	3	CO

LEGEND:

Qty. • Quantity	CR • Condition Rating	DM • Damage Quantity	% • Percentage & Type Asbestos	FR • Friable	EP • Exposure Potential	PE • Personnel Exposed
SF Sq. Ft	1 Poor	SF Square Ft	C Chrysotile	Y Yes	1 High	GP General Public
LF Lineal Ft	2 Moderate	LF Lineal Ft	A Amosite	N No	2 Moderate	OW Office Worker
EA Each	3 Good	EA Each	T Tremolite		3 Low	JA Janitor
			AC Actinolite			CO Contractor
			CR Crocidolite			AL All
			AN Anthrophyllite			OT Other

MATERIAL AREA SPREADSHEET
(Type 1)

Alpha Engineering Group, Inc.



Date: 03-09-93

Project Name: NSPS, Seattle
Comprehensive Asbestos Survey

Project No: 17-3830-11

Surveyor(s): EXE

Building Name/Number: 13

Facility Usage: FIRE DEPT.

MKS

Floor	HMG #	Material Description	Location	QTY	OR	DM	%	FR	EP	PE
I	21.2	LOWER LAYER VET MASTIC	RM'S 110, 113, 114, 111	430 SF	3	O	Y	N	3	CO
ATTIC	9.1	<6" BLOCK PI	ABOVE RM'S 110, 111, 112	50 LF	2	10 LF	Y	Y	2	OT
ATTIC	10.1	<6" HMF	ABOVE RM'S 110, 111, 112	9 EA	2	3 EA	Y	Y	2	OT
ATTIC	13.1	<6" COMP. PI	ABOVE RM'S 110, 111, 112	10 LF	2	2 LF	Y	Y	2	OT
ATTIC	14.1	<6" HMF	ABOVE RM'S 110, 111, 112	2 EA	2	1 EA	Y	Y	2	OT
ATTIC	46.1	DEBRIS (PI + FITTING)	ABOVE RM'S 110, 111, 112	36 SF	1	36 SF	Y	Y	2	OT
I	9.1	<6" BLOCK PI	RM 107	20 LF	2	4 LF	Y	Y	2	OT
I	10.1	<6" HMF	RM 107	3 EA	2	O	Y	Y	2	OT
I	47.1	Window PUTTY	RM 107	80 LF	2	5 LF	Y	N	2	OT
I	9.1	<6" BLOCK PI	BAY 102	523 LF	3	10 LF	Y	Y	3	OT
I	10.1	<6" HMF	BAY 102	75 EA	3	4 EA	Y	Y	3	OT
I	13.1	<6" COMP. PI	BAY 102	20 LF	3	O	Y	Y	3	OT
I	14.1	<6" HMF	BAY 102	6 EA	3	O	Y	Y	3	OT
I	29.1	1/4" CAB PANEL	NE EXTERIOR OF BLDG	858 SF	3	10 SF	Y	N	3	ALL

LEGEND:

Qty. • Quantity	CR • Condition Rating	DM • Damage Quantity	% • Percentage & Type Asbestos	FR • Friable	EP • Exposure Potential	PE • Personnel Exposed
SF Sq. Ft	1 Poor	SF Square Ft	C Chrysotile	Y Yes	1 High	GP General Public
LF Lineal Ft	2 Moderate	LF Lineal Ft	A Amosite	N No	2 Moderate	OW Office Worker
EA Each	3 Good	EA Each	T Tremolite		3 Low	JA Janitor
			AC Actinolite			CO Contractor
			CR Crocidolite			AL All
			AN Anthophyllite			OT Other

MATERIAL AREA SPREADSHEET

(Type 1)

Alpha Engineering Group, Inc.



Date: 03-09-93

NSPS, Seattle

Project Name: Comprehensive Asbestos Survey

Project No: 17-3830-11

Surveyor(s): E, E

Building Name/Number: 18

Facility Usage: FIRE DEPT.

MKS

Floor	HMG #	Material Description	Location	Qty	CR	DM	%	FR	EP	PE
1	9.1	<6" BLOCK PI	Rm 106	24 LF	2	4 LF	Y	Y	2	OT
1	10.1	<6" HMF	Rm 106	4 EA	2	1 EA	Y	Y	2	OT
1	47.1	WINDOW PUTTY	Rm 106	80 LF	2	10 LF	Y	N	3	OT
1	9.1	<6" BLOCK PI	Rm 105	114 LF	2	10 LF	Y	Y	2	OT
1	10.1	<6" HMF	Rm 105	13 EA	2	2 EA	Y	Y	2	OT
1	47.1	WINDOW PUTTY	Rm 105	130 LF	2	20 LF	Y	N	3	OT
1	47.2	WHITE WINDOW PUTTY	Rm 105	90 LF	3	5 LF	N	N	3	ALL
1	9.1	<6" BLOCK PI	Rm 104	64 LF	2	4 LF	Y	Y	2	OT
1	10.1	<6" HMF	Rm 104	4 EA	2	0	Y	Y	2	OT
2	20.3	12" X 12" DK BRN. VFT.	Rm's 201, 202, 210, 213, 215-217	2,500 SF	3	0	N	N	3	OT
2	21.3	FLOOR TILE MASTIC	Rm's 201, 202, 213, 215-217	2,500 SF	3	0	Y	N	3	CO
2	20.2	LOWER LEVEL 9" X 9" VFT	Rm's 201, 202, 202A	1,500 SF	3	0	N	N	3	CO
2	21.2	FLOOR TILE MASTIC	Rm's 201, 202, 202A	1,500 SF	3	0	Y	N	3	CO
2	20.4	12" X 12" BEIGE VFT	Rm's 214, 209	204 SF	3	0	N	N	3	OT

LEGEND:

Qty. • Quantity	CR • Condition Rating	DM • Damage Quantity	% • Percentage & Type Asbestos	FR • Friable	EP • Exposure Potential	PE • Personnel Exposed
SF Sq. Ft	1 Poor	SF Square Ft	C Chrysotile	Y Yes	1 High	GP General Public
LF Lineal Ft	2 Moderate	LF Lineal Ft	A Amosite	N No	2 Moderate	OW Office Worker
EA Each	3 Good	EA Each	T Tremolite		3 Low	JA Janitor
			AC Actinolite			CO Contractor
			CR Crocidolite			AL All
			AN Anthophyllite			OT Other

MATERIAL AREA SPREADSHEET
(Type 1)

Alpha Engineering Group, Inc.



Date: 03-09-93

NSPS, Seattle

Project Name: Comprehensive Asbestos Survey

Project No: 17-3830-11

Surveyor(s): ExE

Building Name/Number: 18

Facility Usage: FIRE DEPT.

MKS

Floor	HMG #	Material Description	Location	Qty	CR	DM	%	FR	EP	PE
2	21.4	BLK. FLOOR TILE MASTIC	Rm's 214, 209	264 SF	3	0	Y	N	3	CO
2	55.1	GREEN MASONRY FLOOR	Rm's 214, 209 UNDER VFT	264 SF	3	0	N	N	3	CO
2	47.1	WINDOW PUTTY	Rm's 209, 213-217, 201	450 LF	2	20 LF	Y	N	3	OT
1	9.1	< 6" BLOCK PI	Rm's 103, 103A	40 LF	1	10 LF	Y	Y	2	OT
1	10.1	< 6" HMF	Rm's 103, 103A	4 EA	1	1 EA	Y	Y	2	OT
1	20.5	12" X 12" LT. BRN. VFT	Rm. 115	420 SF	3	0	N	N	3	OT
1	21.5	BLK. FLOOR TILE MASTIC	Rm. 115	420 SF	3	0	Y	N	3	OT
1	9.1	< 6" BLOCK PI	Rm 115	20 LF	2	2 LF	Y	Y	2	OT
1	10.1	< 6" HMF	Rm 115	2 EA	2	0	Y	Y	2	OT
ROOF	38.1	ROLLED ROOFING	OVER ENTIRE ROOF, EXCEPT Rm 115	8500 SF	3	20 SF	N	N	3	CO
ROOF	45.2	DUCT SEALANT (GREY)	ON DUCT WORK ON ROOF	30 SF	3	0	Y	N	3	CO
ROOF	43.1	GREY ROOF PATCH	ON N. EDGE OF ROOF	150 LF	3	0	Y	N	3	CO
ROOF	39.1	BUILT-UP ROOFING	OVER Rm 115	450 SF	2	0	N	Y	3	CO
2	20.6	BRN/BLK VFT. BELOW CARPET.	Rm's 203 - 208	2375 SF	3	0	Y	N	3	CO

LEGEND:

Qty. • Quantity	CR • Condition Rating	DM • Damage Quantity	% • Percentage & Type Asbestos	FR • Friable	EP • Exposure Potential	PE • Personnel Exposed
SF Sq. Ft	1 Poor	SF Square Ft	C Chrysotile	Y Yes	1 High	GP General Public
LF Lineal Ft	2 Moderate	LF Lineal Ft	A Amosite	N No	2 Moderate	OW Office Worker
EA Each	3 Good	EA Each	T Tremolite		3 Low	JA Janitor
			AC Actinolite			CO Contractor
			CR Crocidolite			AL All
			AN Anthophyllite			OT Other

MATERIAL AREA SPREADSHEET

(Type 1)

Alpha Engineering Group, Inc.



Date: 03-09-93/03-10-93

NSPS, Seattle

Project Name: Comprehensive Asbestos Survey

Project No: 17-3830-11

Surveyor(s): EXE

Building Name/Number: 18

Facility Usage: FIRE DEPT

MKS

Floor	HMG #	Material Description	Location	Qty	CR	DM	%	FR	EP	PE
2	21.3	BLK. FLOOR TILE MASTIC	Rm's 203-208	2375 SF	3	0	Y	N	3	CO
2	20.7	12" X 12" BRN VFT	Rm 202 A	90 SF	3	0	Y	N	3	OT
2	21.7	BLK. FLOOR TILE MASTIC	Rm 202 A	90 SF	3	0	Y	N	3	CO
2	33.1	BASE COVE MASTIC	Rm 202 A	50 LF	3	0	N	N	3	CO
2	26.2	12" X 12" CT (SPALINE)	Rm 206	156 SF	3	0	N	Y	3	OT
2	29.1	CAB PANEL	Rm 202	135 SF	3	0	Y	N	3	OT
2	29.1	CAB PANEL	Rm 204	334 SF	3	0	Y	N	3	OT
2	29.1	CAB PANEL	Rm 205	105 SF	3	0	Y	N	3	OT
2	29.1	CAB PANEL	Rm 207	45 SF	3	0	Y	N	3	OT
2	24.1	PLASTER	THROUGHOUT	10,000 SF	3	0	N	N	3	OT
2	23.1	GWB	THROUGHOUT	6,000 SF	3	0	N	N	3	OT
2	29.1	CAB PANEL	Rm 206	160 SF	3	0	Y	N	3	OT

LEGEND:

Qty. • Quantity	CR • Condition Rating	DM • Damage Quantity	% • Percentage & Type Asbestos	FR • Friable	EP • Exposure Potential	PE • Personnel Exposed
SF Sq. Ft	1 Poor	SF Square Ft	C Chrysotile	Y Yes	1 High	GP General Public
LF Lineal Ft	2 Moderate	LF Lineal Ft	A Amosite	N No	2 Moderate	OW Office Worker
EA Each	3 Good	EA Each	T Tremolite		3 Low	JA Janitor
			AC Actinolite			CO Contractor
			CR Crocidolite			AL All
			AN Anthrophyllite			OT Other

APPENDIX 5
BULK SAMPLE DATA SHEETS

**BULK SAMPLE DATA SUMMARY
AND CHAIN OF CUSTODY RECORD**



Date: 03-09-93

Project Name: NSPS, Seattle
Comprehensive Asbestos Survey

Project No: 17383011

304734

Surveyor(s): EXE

Building Name/Number: 18

Facility Usage: FIRE DEPT.

MKS

Sample No.	HMG #	Material Description	Sample Location	Asbestos Detected	
				Yes	No
001	9.1	<6" BLOCK PI	SW CORNER OF BAY 101	35% A, 5% C	
002	10.1	<6" HMF	SW CORNER OF BAY 101	35% A, 5% C	
003	9.1	<6" BLOCK PI	W. SIDE OF BAY 101	35% A, 5% C	
004	10.1	<6" HMF	W. SIDE OF BAY 101	25% A, 15% C	
005	13.1	<6" COMP. PI	W. SIDE OF BAY 101	40% C	
006	14.1	<6" HMF	W. SIDE OF BAY 101	20% A, 25% C	
007	13.1	<6" COMP. PI	S. SIDE OF BAY 101	40% C	
008	14.1	<6" HMF	S. SIDE OF BAY 101	20% A, 25% C	
009	23.1	GW8	E. SIDE OF BAY 101		✓
010	23.1	GW8	E. SIDE OF BAY 101		✓
011	26.1	12" X 12" SPLINED CT	S. SIDE OF RM 110		✓
012	26.1	12" X 12" SPLINED CT	S. SIDE OF RM 110		✓

LEGEND

- Yes C = Chrysotile
- A = Amosite
- T = Tremolite
- AC = Actinolite
- CR = Crocidolite
- AN = Anthophyllite
- No X = None Detected

CHAIN OF CUSTODY RECORD

Turnaround _____ Rush _____ 24 hr _____ 3 day _____ 5 day _____
 PLM Analysis
 Fax Results
 Dispose of Samples After 6 Months

Relinquished by: [Signature] Date: 3/13/93 Time: 1600
 Received by: [Signature] Date: 3/13/93 Time: 9

Relinquished by: _____ Date: _____ Time: _____
 Received by: _____ Date: _____ Time: _____
 Relinquished by: _____ Date: _____ Time: _____
 Received by: _____ Date: _____ Time: _____

**BULK SAMPLE DATA SUMMARY
AND CHAIN OF CUSTODY RECORD**

Alpha Engineering Group, Inc. **A**

Date: 03-09-93

Project Name: NSPS, Seattle
Comprehensive Asbestos Survey

304734

Project No: 17383011

Surveyor(s): E, X, E

Building Name/Number: 18

Facility Usage: FIRE DEPT.

MKS

Sample No.	HMG #	Material Description	Sample Location	Asbestos Detected	
				Yes	No
013	47.1	WINDOW PUTTY	S. SIDE OF RM. 113	5% C	
014	47.1	WINDOW PUTTY	S. SIDE OF RM. 114	8% C	
015	20.1	12" X 12" BLK. VFT.	N. END OF HALL III	4% C	
	21.1	FLOOR TILE MASTIC	N. END OF HALL III	-	
016	20.2	LOWER LAYER 9" X 9" BLK VFT	N. END OF HALL III	15% C	
	21.2	LOWER LAYER VFT MASTIC	N. END OF HALL III	-	
017	20.2	LOWER LAYER 9" X 9" BLK VFT	N. END OF HALL III	15% C	
	21.2	LOWER LAYER VFT MASTIC	N. END OF HALL III	-	
018	20.1	12" X 12" BLK. VFT.	SE CORNER OF RM 110	3% C	
019	29.1	BLK. FLOOR TILE MASTIC	SE CORNER OF RM 110	30% C	
	29.1	1/4" CAB PANEL	NE EXTERIOR OF BLDG	35% C	
020	29.1	1/4" CAB PANEL	E EXTERIOR OF BLDG	35% C	

LEGEND

- Yes C = Chrysotile
- A = Amosite
- T = Tremolite
- AC = Actinolite
- CR = Crocidolite
- AN = Anthophyllite
- No X = None Detected

CHAIN OF CUSTODY RECORD

Turnaround 24 hr 3 day
5 day

PLM Analysis
Fax Results

Dispose of Samples After 6 Months

Relinquished by: [Signature]

Name [Signature] Date 3/11/93 Time 1600

Received by: [Signature]

Name [Signature] Date 3/12/93 Time 9

Relinquished by:

Name _____ Date _____ Time _____

Relinquished by:

Name _____ Date _____ Time _____

**BULK SAMPLE DATA SUMMARY
AND CHAIN OF CUSTODY RECORD**



Date: 03-09-93

Project Name: NSPS, Seattle
Comprehensive Asbestos Survey

304734

Project No: 17383011

Surveyor(s): EXE

Building Name/Number: 18

Facility Usage: FIRE DEPT.

MKS

Sample No.	HMG #	Material Description	Sample Location	Asbestos Detected	
				Yes	No
021	47.2	WHITE WINDOW PUTTY	E EXTERIOR OF RM 105		✓
022	20.3	12' X 12' DK. BRN. VFT	Rm. 201, S. SIDE		✓
023	21.3	FLOOR TILE MASTIC	Rm. 201, S. SIDE	30% C	
023	20.2	9' X 9' BK. FLOOR TILE	UNDER 12' X 12' DK. BRN. VFT.	20% C	
024	21.2	FLOOR TILE MASTIC	UNDER 12' X 12' DK. BRN. VFT.		
024	20.3	12' X 12' DK. BRN. VFT	Rm 215, S. SIDE		✓
025	21.3	BLK. FLOOR TILE MASTIC	Rm 215, S. SIDE	30% C	
025	20.4	12' X 12' BEIGE VFT	Rm 209		✓
026	21.4	BLK. FLOOR TILE MASTIC	Rm 209	30% C	
026	20.4	12' X 12' BEIGE VFT	Rm 209		✓
027	21.4	BLK. FLOOR TILE MASTIC	Rm 209	30% C	
027	55.1	GREEN MASONRY FLOORING	UNDER VFT RM 209		✓

LEGEND

- Yes C = Chrysotile
- A = Amosite
- T = Tremolite
- AC = Actinolite
- CR = Crocidolite
- AN = Anthrophyllite
- No X = None Detected

CHAIN OF CUSTODY RECORD

Turnaround 3 day
24 hr 5 day

PLM Analysis
 Fax Results
 Dispose of Samples After 6 Months

Relinquished by: [Signature] Date 3/14/93 Time 1600

Received by: [Signature] Date 3/15/93 Time 900

Relinquished by: _____ Date _____ Time _____

Relinquished by: _____ Date _____ Time _____

Received by: _____ Date _____ Time _____

Received by: _____ Date _____ Time _____

**BULK SAMPLE DATA SUMMARY
AND CHAIN OF CUSTODY RECORD**



Date: 03-09-93

Project Name: NSPS, Seattle
Comprehensive Asbestos Survey

Project No: 17383011

Surveyor(s): EXE

Building Name/Number: 18

Facility Usage: FIRE DEPT.

MKS

Sample No.	HMG #	Material Description	Sample Location	Asbestos Detected	
				Yes	No
028	55.1	Green MASONRY FLOORING	UNDER VFT Rm 214		✓
029	20.5	12" X 12" LT. BRN. VFT	Rm 115		✓
030	21.5	BLK FLOOR TILE MAST	Rm 115	30% C	
031	20.5	12" X 12" LT BRN VFT	Rm 115	8% C	
031	20.6	9" X 9" BLK VFT.	Rm 115		
032	21.6	BLK. FLOOR TILE MASTIC	S. SIDE 207	20% C	
032	20.6	9" X 9" BLK VFT	S. SIDE 207		
033	21.6	BLK. FLOOR TILE MASTIC	N. SIDE 204	20% C	
034	38.1	ROLLED ROOF, SOUNDBOARD	N. SIDE 204		
034	45.2	DUCT SEALANT (GREY)	NW ROOF		✓
035	43.1	GREY ROOFING PATCH	S. SIDE OF ROOF ON DUCT	20% C	
			N EDGE OF ROOF	35% C	

LEGEND

- Yes C = Chrysotile
- A = Amosite
- T = Tremolite
- AC = Actinolite
- CR = Crocidolite
- AN = Anthrophyllite
- No X = None Detected

CHAIN OF CUSTODY RECORD

Turnaround Rush _____ 3 day
24 hr _____ 5 day

PLM Analysis
Fax Results

Dispose of Samples After 6 Months

Relinquished by: _____
Name _____ Date _____ Time _____

Received by: _____
Name _____ Date _____ Time _____

Received by: _____
Name _____ Date _____ Time _____

Received by: Audrey Albert
Name Audrey Albert Date 3/2/93 Time _____

**BULK SAMPLE DATA SUMMARY
AND CHAIN OF CUSTODY RECORD**



Date: 03-09-93

Alpha Engineering Group, Inc.

Project Name: NSPS, Seattle
Comprehensive Asbestos Survey

Project No: 17383011

Surveyor(s): EXE

Building Name/Number: 18

Facility Usage: FIRE DEPT

MKS

Sample No.	HMG #	Material Description	Sample Location	Asbestos Detected	
				Yes	No
036	43.1	GREY ROOFING PATCH	NW ROOF AREA	35% c	
037	38.1	ROLLED ROOF, SOUNDBOARD	S ROOF AREA		✓
038	39.1	BUILT-UP ROOFING	S ROOF OVER RM 115		✓
039	39.1	BUILT-UP ROOFING	N ROOF OVER RM 115		✓
040	47.1	WINDOW PUTTY	S EXTERIOR OF RM 205	4% c	
041	20.3	DK BRN 12" X 12" VFT/MASTIC	E SIDE OF RM 202		✓
042	26.1	12" X 12" SPLINED CT	E SIDE OF RM 110		✓
043	28.1	CT GLUE	E SIDE OF RM 110		✓
	26.1	12" X 12" SPLINED CT	W SIDE OF RM 110		✓
	28.1	CT GLUE	W SIDE OF RM 110		✓
044	20.7	12" X 12" BRN. VFT.	Rm 202 A, W. SIDE	5% c	
	21.7	BLK FLOOR TILE MASTIC	Rm 202 A W. SIDE	25% c	

LEGEND

- Yes C = Chrysotile
- A = Amosite
- T = Tremolite
- AC = Actinolite
- CR = Crocidolite
- AN = Anthophyllite
- No X = None
- Detected

CHAIN OF CUSTODY RECORD

Turnaround _____ Rush _____ 24 hr _____ 3 day _____ 5 day _____
 PLM Analysis
 Fax Results
 Dispose of Samples After 6 Months

Relinquished by: [Signature] Date 3/9/93 Time 1600

Received by: [Signature] Date 3/12/93 Time 9

Relinquished by: _____ Date _____ Time _____

Received by: _____ Date _____ Time _____

**BULK SAMPLE DATA SUMMARY
AND CHAIN OF CUSTODY RECORD**

Date: 03-09-93

Alpha Engineering Group, Inc.



Project Name: NSPS, Seattle
Comprehensive Asbestos Survey

304734

Project No: 17383011

Surveyor(s): EXE

Building Name/Number: 18

Facility Usage: FIRE DEPT

MKS

Sample No.	HMG #	Material Description	Sample Location	Asbestos Detected	
				Yes	No
045	33.1	BASE COVE MASTIC	RM 202 A, W. SIDE		✓
046	20.7	12"X12" BAN. VFT	RM 202 A N. SIDE	5%AC	
	21.7	BK FLOOR TILE MASTIC	RM 202 A N. SIDE	25%OC	
047	33.1	BASE COVE MASTIC	RM 202 A W. SIDE		✓
048	24.1	PLASTER	RM 212 W. WALL		✓
049	24.1	PLASTER	RM 209 W. WALL		✓
050	26.2	12"X12" SPLINED CT	RM 206 E. SIDE		✓
051	26.2	12"X12" SPLINED CT	RM 206 E SIDE		✓
052	24.1	PLASTER	RM 108 W SIDE		✓
053	20.5	12"X12" 6th BRN VFT	Rm 115	7%OC	
054	47.1	window Putty	S. Exterior Room 205	50%OC	
055	20.3	DK. BRN 12"X12" VFT/MASTIC	E. Side of Room 202		✓

LEGEND

- Yes C = Chrysotile
- A = Amosite
- T = Tremolite
- AC = Actinolite
- CR = Crocidolite
- AN = Anthophyllite
- No X = None Detected

CHAIN OF CUSTODY RECORD

Turnaround _____ Rush _____ 3 day
 24 hr _____ 5 day

PLM Analysis
Fax Results

Dispose of Samples After 6 Months

Relinquished by: [Signature] Date 3/10/93 Time 1600
 Relinquished by: _____ Date _____ Time _____
 Relinquished by: _____ Date _____ Time _____

Received by: [Signature] Date 3/10/93 Time _____
 Received by: _____ Date _____ Time _____
 Received by: _____ Date _____ Time _____



**CHAIN OF CUSTODY
RECORD**

**Environmental
Engineering
Department**

22232 17th Ave S.E. #300

Bothell, WA 98021

(206) 488-3400 Fax (206) 483-7360

307131

To: Analytica Solutions Job No.: 17-3830-11
 Address: 18000 W. Highway 72
Golden, CO 80403-8299 VIA: Fed Exp.
 Attn: Jeff Lyons

SAMPLE TYPE

ANALYSIS REQUESTED

TURN AROUND

- Air # _____
- Bulk # _____
- Soil # _____
- _____

- Phase Contrast Microscopy
- Polarized Light Microscopy
- Transmission Electron Microscopy
- _____

- 2 hour
 - 24 hour
 - 48 hour
 - 3 day turnaround
- Date/Time required

Notification of analysis: Telephone FAX Written

Description/Comments:

Total number of samples: 1, Blkg #18; See Bulk Sample
Data Summary sheet for sample location and
description.

Relinquished by: (Signature/Company)	Received by: (Signature/Company)	Date/Time
<u>Greg Stoneford / Alpha Eng. Group</u>	<u>Andrew C. Peterson / Analytica</u>	<u>9/2/93</u> <u>15:30</u>
Relinquished by: (Signature/Company)	Received by: (Signature/Company)	Date/Time
Relinquished by: (Signature/Company)	Received by: (Signature/Company)	Date/Time
Relinquished by: (Signature/Company)	Received by: (Signature/Company)	Date/Time

Laboratory - • Save all samples for 90 days
 • Return one copy of Chain of Custody Record with written analytical results

Distribution: White copy - Originator , Goldenrod copy - Laboratory

APPENDIX 6
PHOTOGRAPHS



Building: #18 FIRE STATION	Date: 3/9/93 By: EXE-MKS	
Material: BLOCK PI	Sample No: 001	Location: SW COR BAY 101



Building: #18 FIRE STATION	Date: 3/9/93 By: EXE-MKS	
Material: HMF	Sample No: 002	Location: S.W COR. BAY 101



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: BLOCK PT Sample No: 003

Location: W. SIDE BAY 101

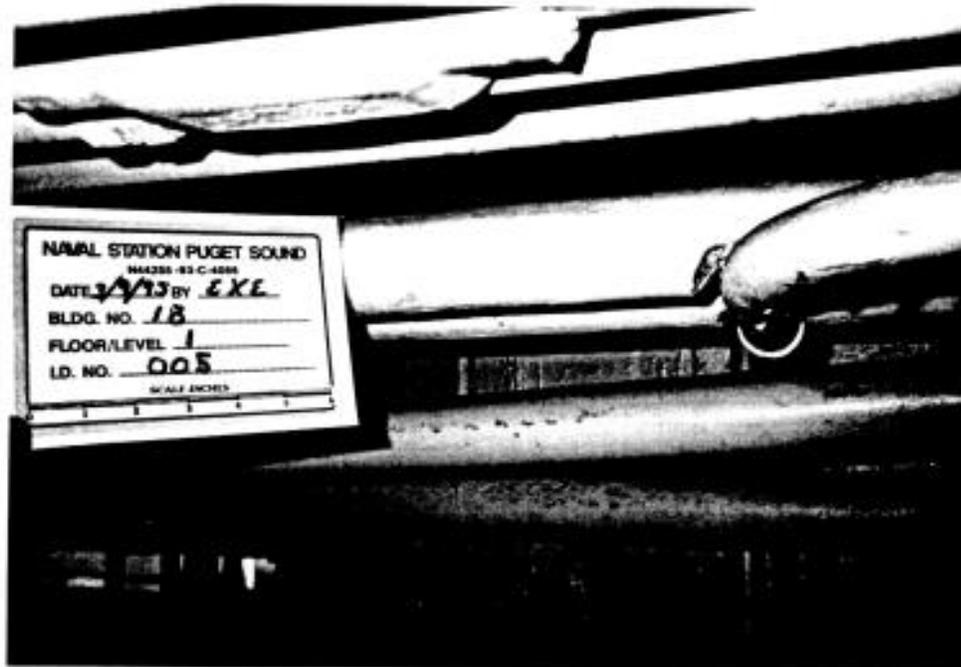


Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: HMF Sample No: 004

Location: W. SIDE BAY 101



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: COMP. PI

Sample No: 005

Location: W. SIDE BAY 101



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: HMF

Sample No: 006

Location: W. SIDE BAY 101



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: COMP. P1

Sample No: 007

Location: S. SIDE BAY 101



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: HMF

Sample No: 008

Location: S. SIDE BAY 101



Building: #18 FIRE STATION	Date: 3/9/93 By: EXE-MKS
Material: GWB	Sample No: 009
	Location: E. SIDE BAY 101



Building: #18 FIRE STATION	Date: 3/9/93 By: EXE-MKS
Material:	Sample No: 010
	Location: E. SIDE BAY 101



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: SPLINE CT

Sample No: 011

Location: S. SIDE RM 110



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: SPLINE CT

Sample No: 012

Location: S SIDE RM 110

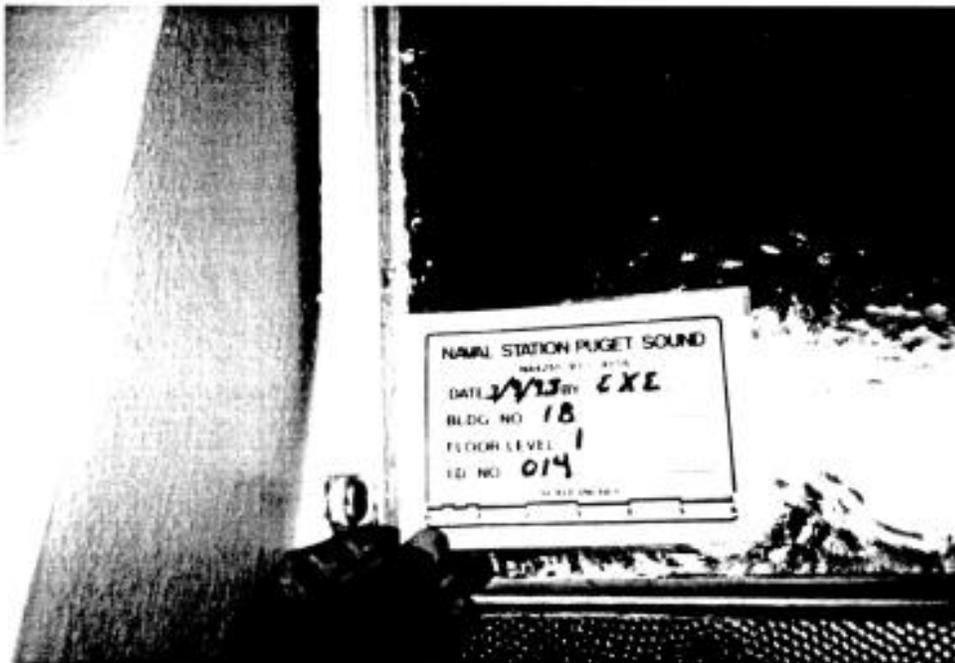


Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: WINDOW PUTTY Sample No: 013

Location: S SIDE RM 113



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: WINDOW PUTTY Sample No: 014

Location: S SIDE RM 113



Building: #18 FIRE STATION	Date: 3/9/93 By: EXE-MKS	
Material: VFT	Sample No: 015	Location: N END HALL III



Building: #18 FIRE STATION	Date: 3/9/93 By: EXE-MKS	
Material: VFT	Sample No: 016	Location: N END HALL III



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 017

Location: N. END HALL 111



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 018

Location: SE. COR. RM 110



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: WINDOW PUTTY Sample No: 021

Location: EXTERIOR RM 105

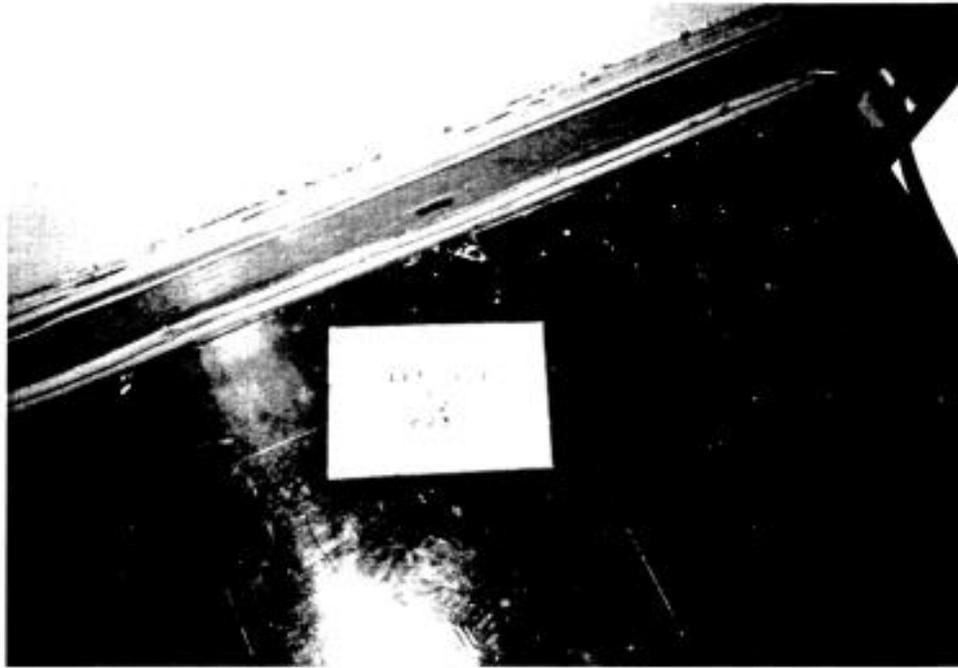


Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT Sample No: 022

Location: S SIDE RM 201



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 023

Location: S SIDE RM 201



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 024

Location: S SIDE RM 215



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 025

Location: RM 209



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 026

Location: RM 209



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: CAB

Sample No: 019

Location: EXT. N.E. SIDE



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: CAB

Sample No: 026

Location: EXTERIOR N.E. SIDE



Building: #18 FIRE STATION		Date: 3/9/93 By: EXE-MKS
Material: MASONRY FLR.	Sample No: 027	Location: RM 209 (UNDER VFT)



Building: #18 FIRE STATION		Date: 3/9/93 By: EXE-MKS
Material: MASONRY FLR.	Sample No: 028	Location: RM 214 (UNDER VFT)



Building: #18 FIRE STATION		Date: 3/9/93 By: EXE-MKS
Material: VFT	Sample No: 029	Location: RM 115



Building: #18 FIRE STATION		Date: 3/9/93 By: EXE-MKS
Material: VFT	Sample No: 030	Location: RM 115



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 031

Location: S SIDE RM 207



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 032

Location: N SIDE RM 204

ASBESTOS SURVEY AT NAVAL STATION PUGET SOUND
 NAVAL FACILITIES ENGINEERING COMMAND
 N44255-93-C-4056



Building: #18 FIRE STATION		Date: 3/9/93 By: EXE - MRS
Material: ROOFING	Sample No: 033	Location: N W Roof



Building: #18 FIRE STATION		Date: 3/9/93 By: EXE - MRS
Material: SEALANT	Sample No: 034	Location: S SIDE ROOF ON DUCT

ASBESTOS SURVEY AT NAVAL STATION PUGET SOUND
NAVAL FACILITIES ENGINEERING COMMAND
N44255-93-C-4056



Building: #18 FIRE STATION

Date: 3/9/95 By: EXE - MKS

Material: TAR PATCH Sample No: 035

Location: N EDGE OF ROOF



Building: #18 FIRE STATION

Date: 3/9/95 By: EXE - MKS

Material: TAR PATCH Sample No: 036

Location: N.W ROOF



Building: #18 FIRE STATION		Date: 3/9/93 By: EXE-MKS
Material: ROOFING	Sample No: 037	Location: S. ROOF AREA



Building: #18 FIRE STATION		Date: 3/9/93 By: EXE-MKS
Material: ROOFING	Sample No: 038	Location: S ROOF / RM 115



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: ROOFING

Sample No: 039

Location: N ROOF / RM 115



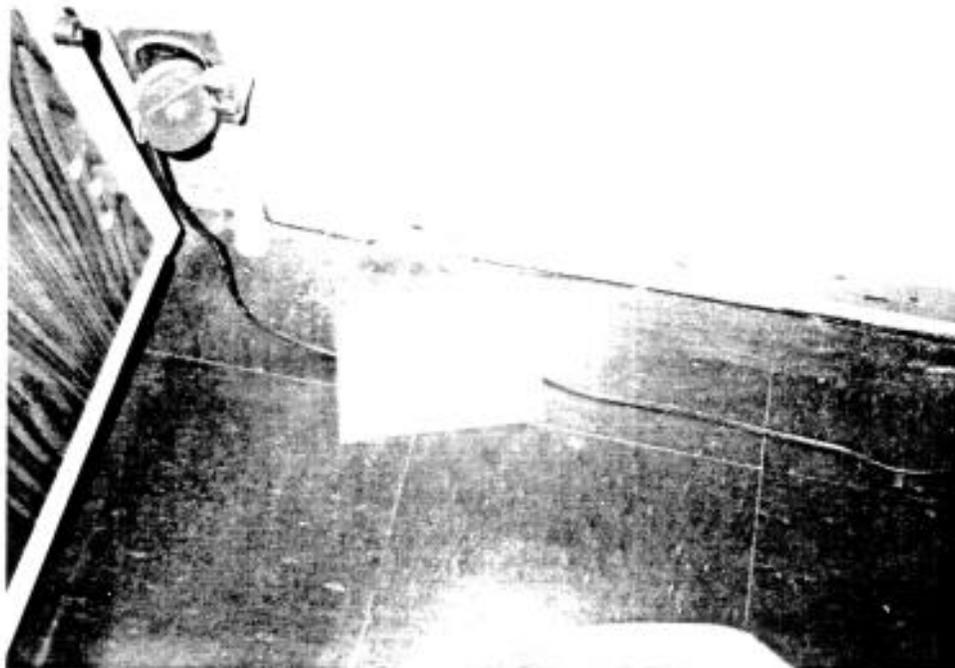
Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: WINDOW PUTTY

Sample No: 040

Location: S EXTERIOR RM 205



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 041

Location: E SIDE RM 202



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: SPLINE CT

Sample No: 042

Location: E SIDE RM 110



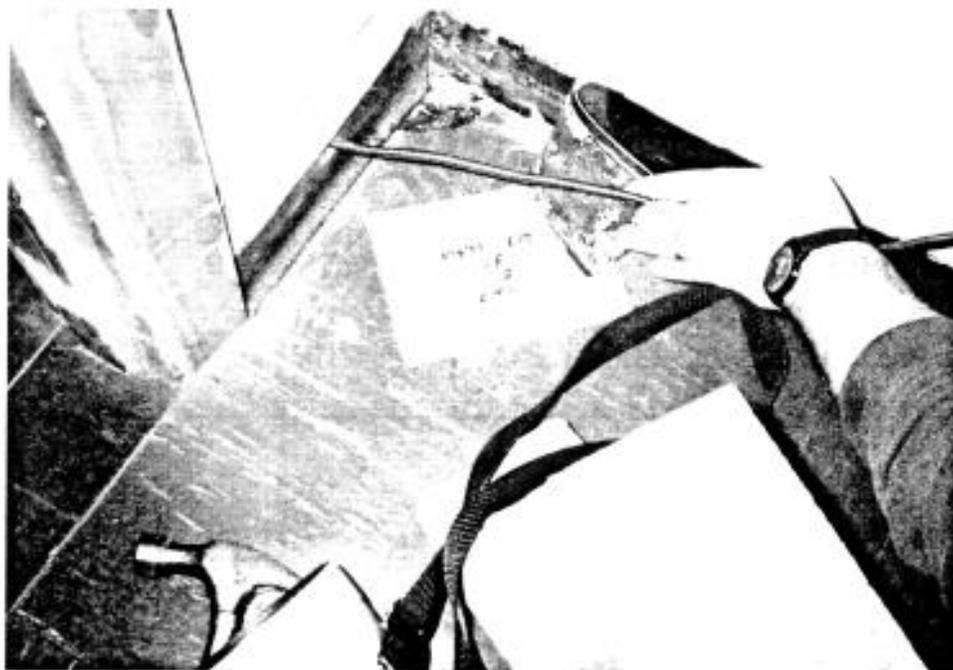
Building: #18 FIRE STATION

Date: 3/9/93 By: EYE-MKS

Material: SPLINE CT

Sample No: 043

Location: W SIDE RM 110



Building: #18 FIRE STATION

Date: 3/9/93 By: EYE-MKS

Material: VFT

Sample No: 044

Location: W SIDE RM 202 A



Building: #18 FIRE STATION

Date: 3/9/93 By: EYE-MKS

Material: COVE MASTIC

Sample No: 045

Location: W. SIDE RM 202 A



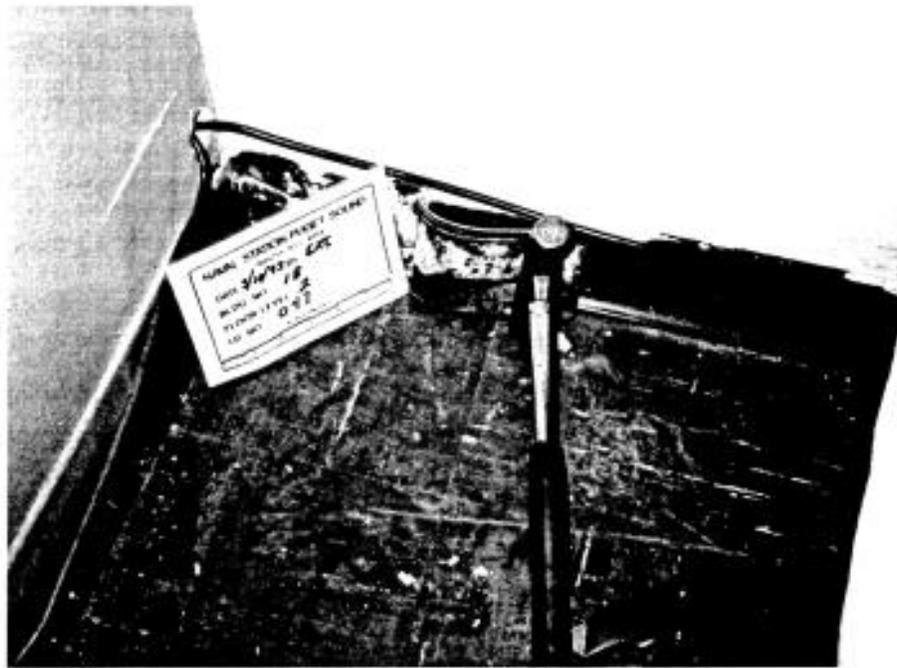
Building: #18 FIRE STATION

Date: 3/9/93 By: EYE-MKS

Material: VFT

Sample No: 046

Location: N. SIDE RM 202 A

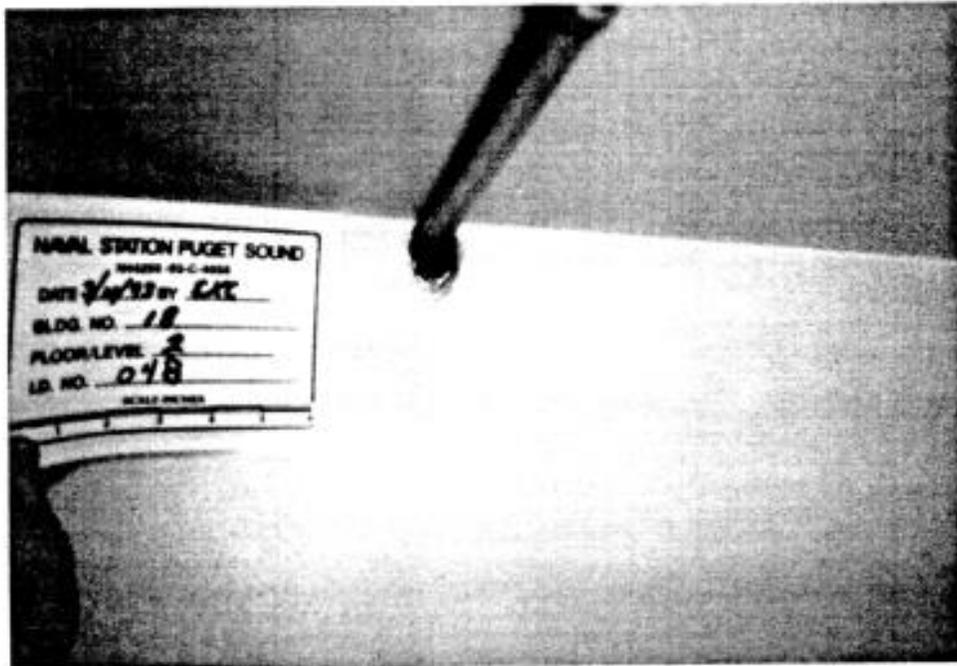


Building: #18 FIRE STATION

Date: 3/9/93 By: EYE-MKS

Material: COVE MASTIC Sample No: 047

Location: W SIDE RM 202A



Building: #18 FIRE STATION

Date: 3/9/93 By: EYE-MKS

Material: PLASTER Sample No: 048

Location: W WALL 212



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: PLASTER

Sample No: 049

Location: W WALL RM 209



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: SPLINECT

Sample No: 050

Location: E SIDE RM 206



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: SPLINE CT

Sample No: 051

Location: E SIDE RM 206



Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: PLASTER

Sample No: 052

Location: W SIDE RM 108

SEE PHOTO 030

Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 053

Location: RM 115

SEE PHOTO 040

Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: WINDOW PUTTY

Sample No: 054

Location: S. EXTERIOR RM 205

SEE PHOTO 041

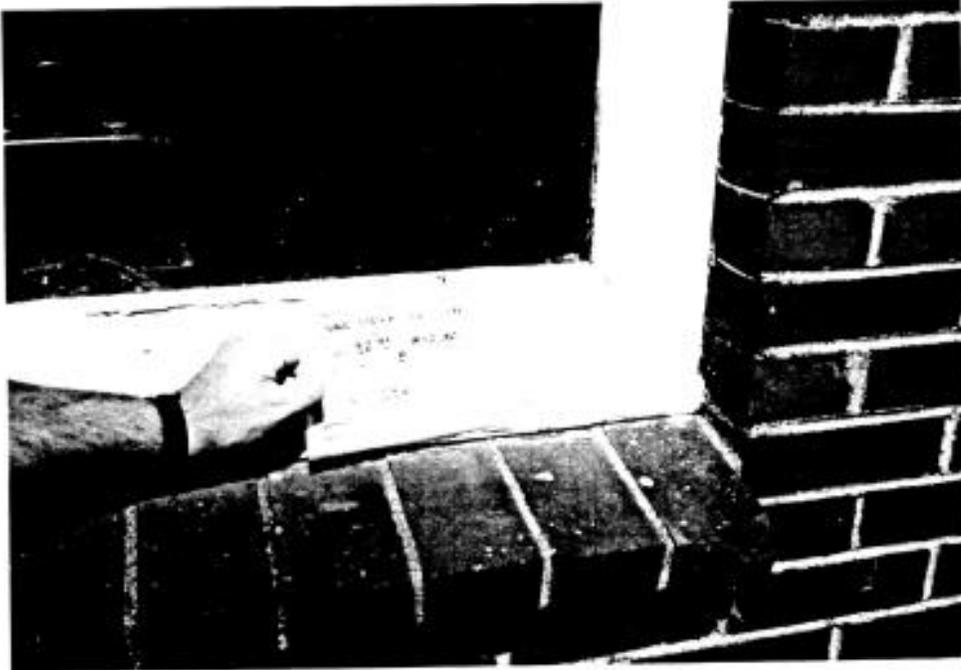
Building: #18 FIRE STATION

Date: 3/9/93 By: EXE-MKS

Material: VFT

Sample No: 055

Location: E. SIDE RM 202



Building: #18 FIRE STATION

Date: 7/2/93 By: IMS-GS

Material: Window Putty

Sample No: 056

Location: EXTERIOR S SIDE

APPENDIX 7
LAB TEST RESULTS



an Analytica Group company

18000 W. Highway 72
Golden, CO 80403-8299
(303) 420-4449
(800) 873-8707
FAX: (303) 420-1434

March 19, 1993

Mr. RON UNDERWOOD
ALPHA ENGINEERING GROUP
22232 17TH AVE S.E.
SUITE 301
BOTHELL, WA 98021

Re: LGN 304734 Project: #17 3830 011/051, Bldg. 18

Dear Mr. RON UNDERWOOD:

The bulk samples recently submitted to our laboratory have been analyzed by polarized light microscopy (PLM), the EPA-recommended method for identification of fibrous constituents in building materials. The results of these analyses are summarized in the enclosed table. Also enclosed is a copy of documentation submitted with your samples.

If you have any technical questions concerning these analyses, please feel free to call me. All other calls should be directed to our Customer Service Representatives.

Sincerely,

Ed Raines
QA-QC-Training Manager

Enclosures

RECEIVED

MAR 26 1993

ALPHA Engineering Group, Inc.
Bothell



an Analytica Group company

18000 W. Highway 72
Golden, CO 80403-8299
(303) 420-4449
(800) 873-8707
FAX: (303) 420-1434

RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 1 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
001	03/09/93	<6" block PI/SW corner of bay 101
002	03/09/93	<6" block HMF/SW corner of bay 101
003	03/09/93	<6" block PI/W. side of bay 101
004	03/09/93	<6" block HMF/W. side of bay 101
005	03/09/93	<6" block COMP. PI/W. side of bay 101

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	001	002	003	004	005
Asbestiform Minerals:					
Amosite	35	35	35	25	
Anthophyllite					
Chrysotile	5	5	5	15	40
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	40	40	40	40	40
Other Fibrous Materials:					
Fibrous Glass	5	5	5	5	
Cellulose	5	5	5	5	15
Synthetics					
Other:					
Percent Nonfibrous Material	50	50	50	50	45

Analyst: Craig B. Bruno
Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
Golden, CO 80403-8299
(303) 420-4449
(800) 873-8707
FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 2 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
006	03/09/93	<6" block HMF/W, side of bay 101
007	03/09/93	<6" block COMP. PI/S, side of bay 101
008	03/09/93	<6" block HMF/S, side of bay 101
009	03/09/93	GWB/E, side of bay 101 [drywall]
010	03/09/93	GWB/E, side of bay 101 [drywall]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	006	007	008	009	010
Asbestiform Minerals:					
Amosite	20		20		
Anthophyllite					
Chrysotile	25	40	25		
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	45	40	45	0	0
Other Fibrous Materials:					
Fibrous Glass	5		5	1	1
Cellulose	10	15	10	15	10
Synthetics					
Other:					
Percent Nonfibrous Material	40	45	40	84	89

Analyst: _____

Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
Golden, CO 80403-8299
(303) 420-4449
(800) 873-8707
FAX: (303) 420-1434

RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 3 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
011	03/09/93	12"x12" splined CT/S. side of bay 101
012	03/09/93	12"x12" splined CT/S. side fo rm. 110
013	03/09/93	Window putty/S. side of rm. 113
014	03/09/93	Window putty/S. side of rm.
015	03/09/93	12"x12" blk. VFT/N. end of hall 111 [insufficient mastic for analysis]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	011	012	013	014	015
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile			5	8	4
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	0	0	5	8	4
Other Fibrous Materials:					
Fibrous Glass	40	40			
Cellulose	30	30			
Synthetics					
Other:					
Percent Nonfibrous Material	30	30	95	92	96

Analyst:

Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
Golden, CO 80403-8299
(303) 420-4449
(800) 873-8707
FAX: (303) 420-1434

RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 4 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
016	03/09/93	Lower layer, 9"x9" blk VFT/N. end of hall 111 [no mastic]
017	03/09/93	Lower layer, 9"x9" blk. VFT/N. enf of hall 111 no mastic]
018*	03/09/93	12"x12" blk. VFT/SE corner of rm. 110 [with mastic]
018 [A]	03/09/93	[floor tile]
018 [B]	03/09/93	[mastic]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	016	017	018*	018 [A]	018 [B]
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile	15	15	4	3	30
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	15	15	4	3	30
Other Fibrous Materials:					
Fibrous Glass					
Cellulose					
Synthetics					
Other:					
Percent Nonfibrous Material	85	85	96	97	70

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Craig B. Bruno
Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 5 of 16

Sample Description:

Sample Number	Sample Date	Description
019	03/09/93	1/4" cab panel/NE exterior of bldg.
020	03/09/93	1/4" cab panel/E. exterior of bldg.
021	03/09/93	White window putty/E. exterior of rm. 105
022*	03/09/93	12"x12" dk. brn. VFT/rm. 201, S. side [with mastic]
022 [A]	03/09/93	[floor tile]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	019	020	021	022*	022 [A]
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile	35	35	Trace <1%	Trace <1%	
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	35	35	Trace <1%	Trace <1%	0
Other Fibrous Materials:					
Fibrous Glass					
Cellulose				5	5
Synthetics					
Other:					
Percent Nonfibrous Material	65	65	99	94	95

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst:

Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 6 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
022 [B]	03/09/93	[mastic]
023	03/09/93	9"x9" blk. floor tile/under 12"x12; dk. brn. VFT [with inseparable mastic]
024*	03/09/93	12"x12" dk. brn. VFT/rm. 215, S. side [with mastic]
024 [A]	03/09/93	[floor tile]
024 [B]	03/09/93	[mastic]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	022 [B]	023	024*	024 [A]	024 [B]
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile	30	20	Trace <1%		30
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	30	20	Trace <1%	0	30
Other Fibrous Materials:					
Fibrous Glass					
Cellulose					
Synthetics					
Other:					
Percent Nonfibrous Material	70	80	99	100	70

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst:

Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 7 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
025*	03/09/93	12"x12" beige VFT/rm. 209 [with mastic]
025 [A]	03/09/93	[floor tile]
025 [B]	03/09/93	[mastic]
026*	03/09/93	12"x12" beige VFT/rm. 209 [with mastic]
026 [A]	03/09/93	[floor tile]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number: 025* 025 [A] 025 [B] 026* 026 [A]

Asbestiform Minerals:

Amosite	_____	_____	_____	_____	_____
Anthophyllite	_____	_____	_____	_____	_____
Chrysotile	2	_____	30	Trace <1%	_____
Crocidolite	_____	_____	_____	_____	_____
Tremolite-Actinolite	_____	_____	_____	_____	_____
TOTAL ASBESTOS	2	0	30	Trace <1%	0

Other Fibrous Materials:

Fibrous Glass	_____	_____	_____	_____	_____
Cellulose	_____	_____	_____	_____	_____
Synthetics	_____	_____	_____	_____	_____
Other:	_____	_____	_____	_____	_____

Percent Nonfibrous
 Material

98	100	70	99	100
----	-----	----	----	-----

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: _____

Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: **ALPHA ENGINEERING GROUP**

LGN: **304734**

Project ID: **#17 3830 011/051, Bldg. 18**

Page: **8 of 16**

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
026 [B]	03/09/93	[mastic]
027	03/09/93	Green masonry flooring/under VFT, rm. 209 [insufficient mastic for analysis]
028	03/09/93	Green masonry flooring/under VFT, rm. 214
029*	03/09/93	12"x12" lt. brn. VFT/rm. 115 [with mastic]
029 [A]	03/09/93	[floor tile]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	026 [B]	027	028	029*	029 [A]
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile	30			Trace <1%	
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	30	0	0	Trace <1%	0
Other Fibrous Materials:					
Fibrous Glass					
Cellulose				5	5
Synthetics				2	2
Other:					
Percent Nonfibrous Material	70	100	100	92	93

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: _____

Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
Golden, CO 80403-6299
(303) 420-4449
(800) 873-8707
FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 9 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
029 (B)	03/09/93	[mastic]
030	03/09/93	12"X12" lt. brn. FVT/rm. 115 [no mastic]
031	03/09/93	9"x9" blk. VFT/S. side 207 [with inseparable mastic]
032	03/09/93	9"x9" blk. VFT/N. side 204 [with inseparable adhesive and mastic]
033	03/09/93	Rolled roof, soundboard/NW roof

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	029 (B)	030	031	032	033
Asbestiform Minerals:					Ashed
Amosite					
Anthophyllite					
Chrysotile	30	8	20	20	
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	30	8	20	20	0
Other Fibrous Materials:					
Fibrous Glass					35
Cellulose					
Synthetics					
Other:					
Percent Nonfibrous Material	70	92	80	80	65

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Craig B. Bruno
Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: **ALPHA ENGINEERING GROUP**

LGN: **304734**

Project ID: **#17 3830 011/051, Bldg. 18**

Page: 10 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
034	03/09/93	Duct sealant (grey)/S. side of roof on duct
035	03/09/93	Grey roofing patch/N. edge of roof
036*	03/09/93	Grey roofing patch/NW roof area [with gray caulk]
036 [A]	03/09/93	[roofing patch]
036 [B]	03/09/93	[gray caulk]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	034	035	036*	036 [A]	036 [B]
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile	20	35	27	35	15
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	20	35	27	35	15
Other Fibrous Materials:					
Fibrous Glass					
Cellulose					
Synthetics					
Other:					
Percent Nonfibrous Material	80	65	73	65	85

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Craig B. Bruno
 Craig B. Bruno

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 11 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
037*	03/09/93	Rolled roof, soundboard/S. roof area [shingle, black felt with insepararable tar, and brown felt]
037 [A]	03/09/93	[shingle]
037 [B]	03/09/93	[black felt with insepararable tar]
037 [C]	03/09/93	[brown felt]
038	03/09/93	Built-up roofing/S. roof over rm. 115 [black felt with insepararable tar]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	037*	037 [A]	037 [B]	037 [C]	038
Asbestiform Minerals:					
Amosite	_____	_____	_____	_____	_____
Anthophyllite	_____	_____	_____	_____	_____
Chrysotile	_____	_____	_____	_____	_____
Crocidolite	_____	_____	_____	_____	_____
Tremolite-Actinolite	_____	_____	_____	_____	_____
TOTAL ASBESTOS	0	0	0	0	0
Other Fibrous Materials:					
Fibrous Glass	15	10	15	2	2
Cellulose	15	Trace <1%	20	20	30
Synthetics	_____	_____	_____	_____	_____
Other:	1	_____	_____	25	_____
Perlite					
Percent Nonfibrous Material	69	89	65	53	68

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Bruce G. Sales
 Bruce G. Sales

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 12 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
039	03/09/93	Built-up roofing/N. roof over rm. 115
040	03/09/93	Window putty/S. exterior of rm. 205
041	03/09/93	Dk. brn. 12"x12" VFT/E. side of rm. 202
042	03/09/93	12"x12" splined CT/E. side of rm. 110
043	03/09/93	12"x12" splined CT/W. side of rm. 110

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	039	040	041	042	043
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile		4			
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	0	4	0	0	0
Other Fibrous Materials:					
Fibrous Glass				40	40
Cellulose	35	1	2	40	30
Synthetics			Trace <1%		
Other:					
Percent Nonfibrous Material	65	95	97	20	30

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Bruce G. Sales
 Bruce G. Sales

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 13 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
044*	03/09/93	12"x12" brn. VFT/rm. 202 A, S. side [with mastic]
044 [A]	03/09/93	[floor tile]
044 [B]	03/09/93	[mastic]
045	03/09/93	Base cove mastic/rm. 202 A, S. side
046*	03/09/93	12"x12" brn. VFT/rm. 202 A, N. side [floor tile, mastic, and leveling compound]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	044*	044 [A]	044 [B]	045	046*
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile	6	5	25		6
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	6	5	25	0	6
Other Fibrous Materials:					
Fibrous Glass					
Cellulose	1	1		1	Trace <1%
Synthetics				Trace <1%	
Other:					
Percent Nonfibrous Material	93	94	75	98	93

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Bruce G. Sales
 Bruce G. Sales

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
Golden, CO 80403-8299
(303) 420-4449
(800) 873-8707
FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: **ALPHA ENGINEERING GROUP**

LGN: **304734**

Project ID: **#17 3830 011/051, Bldg. 18**

Page: 14 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
046 [A]	03/09/93	[floor tile]
046 [B]	03/09/93	[mastic]
046 [C]	03/09/93	[leveling compound]
047	03/09/93	Base cove mastic/rm. 202 A, N. side
048	03/09/93	Plaster/rm. 212, W. wall

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	046 [A]	046 [B]	046 [C]	047	048
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile	5	25			
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	5	25	0	0	0
Other Fibrous Materials:					
Fibrous Glass					
Cellulose		1	2	1	Trace <1%
Synthetics					
Other:					
Percent Nonfibrous Material	95	74	98	99	99

Asbestiform Minerals:

Amosite					
Anthophyllite					
Chrysotile	5	25			
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	5	25	0	0	0

Other Fibrous Materials:

Fibrous Glass					
Cellulose		1	2	1	Trace <1%
Synthetics					
Other:					
Percent Nonfibrous Material	95	74	98	99	99

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Bruce G. Sales
Bruce G. Sales

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
 Golden, CO 80403-8299
 (303) 420-4449
 (800) 873-8707
 FAX: (303) 420-1434

RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
 POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 15 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
049	03/09/93	Plaster/rm. 209, W. wall
050	03/09/93	12"x12" splined CT/rm. 206, E. side
051	03/09/93	12"x12" splined CT/rm. 206, E. side
052	03/09/93	Plaster/rm. 108, W. side
053*	03/09/93	12"x12" lt. brn. VFT/rm. 115 [with adhesive]

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number:	049	050	051	052	053*
Asbestiform Minerals:					
Amosite					
Anthophyllite					
Chrysotile					7
Crocidolite					
Tremolite-Actinolite					
TOTAL ASBESTOS	0	0	0	0	7
Other Fibrous Materials:					
Fibrous Glass					
Cellulose		98	98	1	2
Synthetics					Trace <1%
Other:					
Percent Nonfibrous Material	100	2	2	99	90

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Bruce G. Sales
 Bruce G. Sales

Date: 03/19/93



an Analytica Group company

18000 W. Highway 72
Golden, CO 80403-8299
(303) 420-4449
(800) 873-8707
FAX (303) 420-1434

RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020

Client: ALPHA ENGINEERING GROUP

LGN: 304734

Project ID: #17 3830 011/051, Bldg. 18

Page: 16 of 16

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
053 [A]	03/09/93	[floor tile]
053 [B]	03/09/93	[adhesive]
054	03/09/93	Window putty/S. exterior, room 205
055	03/09/93	Dk. brn. 12"x12" VFT/E. side of room 202

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number: 053 [A] 053 [B] 054 055

Asbestiform Minerals:

Amosite				
Anthophyllite				
Chrysotile	7		5	
Crocidolite				
Tremolite-Actinolite				
TOTAL ASBESTOS	7	0	5	0

Other Fibrous Materials:

Fibrous Glass				1
Cellulose	1	2	1	4
Synthetics		1		
Other:				

Percent Nonfibrous
Material

92	97	94	95
----	----	----	----

* Composite analysis (multilayered sample, see individual layer analyses).

Analyst: Bruce G. Sales
Bruce G. Sales

Date: 03/19/93



an Analytica Group company

18000 W Highway 72
Golden, CO 80403-8299
(303) 420-4449
(800) 873-8707
FAX: (303) 420-1434

**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY
POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: ALPHA ENGINEERING GROUP *

LGN: 307131

Project ID: 17383011, Bldg. 18

Page: 1 of 1

Sample Description:

<u>Sample Number</u>	<u>Sample Date</u>	<u>Description</u>
056	09/02/93	White window putty/exterior, south, rm. 105

Results of PLM Analysis: Visual Area Estimation: Percentages Detected

Sample Number: 056

Asbestiform Minerals:

Amosite	_____	_____	_____	_____	_____
Anthophyllite	_____	_____	_____	_____	_____
Chrysotile	_____	_____	_____	_____	_____
Crocidolite	_____	_____	_____	_____	_____
Tremolite-Actinolite	_____	_____	_____	_____	_____
TOTAL ASBESTOS	0	_____	_____	_____	_____

Other Fibrous Materials:

Fibrous Glass	_____	_____	_____	_____	_____
Cellulose	Trace <1%	_____	_____	_____	_____
Synthetics	Trace <1%	_____	_____	_____	_____
Other:	_____	_____	_____	_____	_____

Percent Nonfibrous Material	99	_____	_____	_____	_____
-----------------------------	----	-------	-------	-------	-------

Analyst: Craig B. Bruno
Craig B. Bruno

Date: 09/13/93

Analytica Solutions
18000 West Highway 72
Golden, CO 80403-8299
(303) 420-4449

PLM BULK SAMPLE ANALYSIS PROCEDURES

Bulk samples of construction materials are analyzed by professional mineralogists with at least a Bachelor's Degree in Geology according to the guidelines set by the Environmental Protection Agency (EPA-600/M4-82-020, December 1982). As specified in the EPA method, the total asbestos reported is the average of all components in the material analyzed with separate layers delineated at the bottom of the report. As suggested by the EPA, our laboratory uses the preferred Becke Line Method to test the index of refraction of the materials, not the alternate method of stain dispersion. Each sample is prepared and analyzed in three different Cargille certified refractive index oils. Estimates of asbestos content are based on visual comparison using a calibrated graticule. Additional tests and treatments (see below) may also be required for certain samples.

Analytica is accredited by the National Institute for Standards and Technology (Lab Code 1086) under the National Voluntary Accreditation Program (NVLAP) and is an AIIHA accredited industrial hygiene laboratory (certificate #307). Analytica participates in the NVLAP bulk asbestos proficiency testing program (results available upon request). Analytica maintains an in-house QA/QC program whereby at least ten percent (10%) of all submitted samples are reanalyzed in a quality control manual. Analytica also participates in three quarterly round robin QA/QC programs with accredited laboratories throughout the United States and the world. Unused portions of samples are archived for six months unless client requests special handling.

ASHING

Ashing is a procedure in which one half of the sample is placed in a crucible and then set in a furnace at 500°C for one hour. Most non-silicate interferants are eliminated; asbestos remains behind. The amount of the ashed material is compared to the original amount to determine the volume percent lost due to ashing. The ashed sample is analyzed by PLM for the type and percentage of asbestos present.

Unless otherwise noted, the results shown on the final report are the percentage of asbestos in the original material, not the ashed material. For example, if 50% of the original material is lost due to combustion and the ashed sample contains 10% asbestos, the final report would show 5% asbestos in the original material.

POINT COUNTING

As of November 20, 1990, National Emissions Standards for Hazardous Air Pollutants (NESHAP) established a rule that requires that friable ACM bulk samples with less than 10% asbestos be analyzed by the point count procedure described in the EPA-600/M4-82-020 method. Analytica Solutions Inc. cannot assume responsibility for client compliance with the NESHAP rule, however, the laboratory does have experienced analysts ready to perform requested point counting.