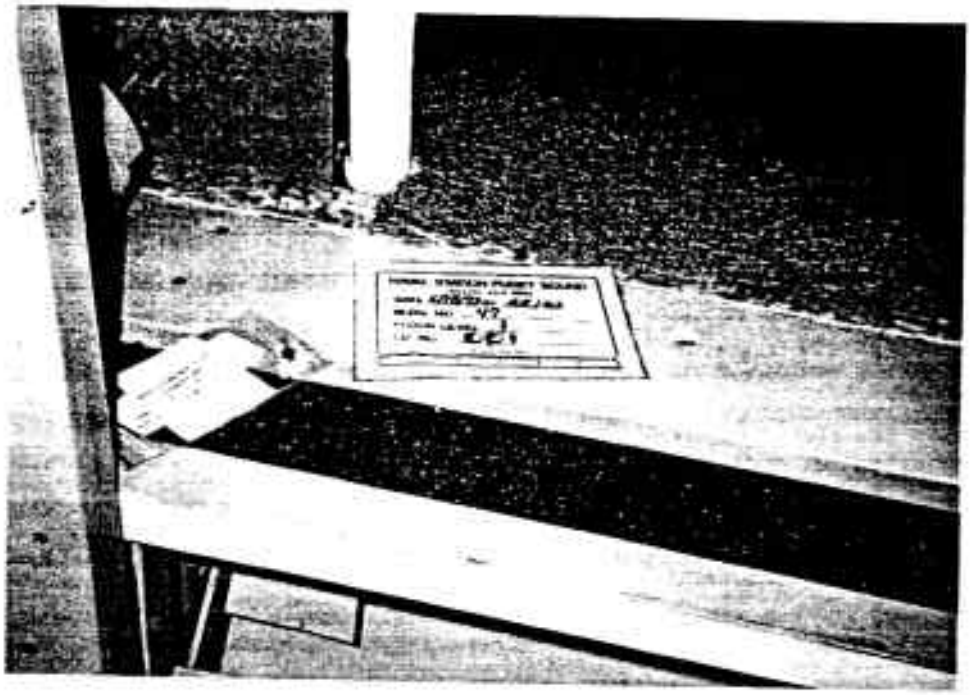
# APPENDIX 6

# PHOTOGRAPHS



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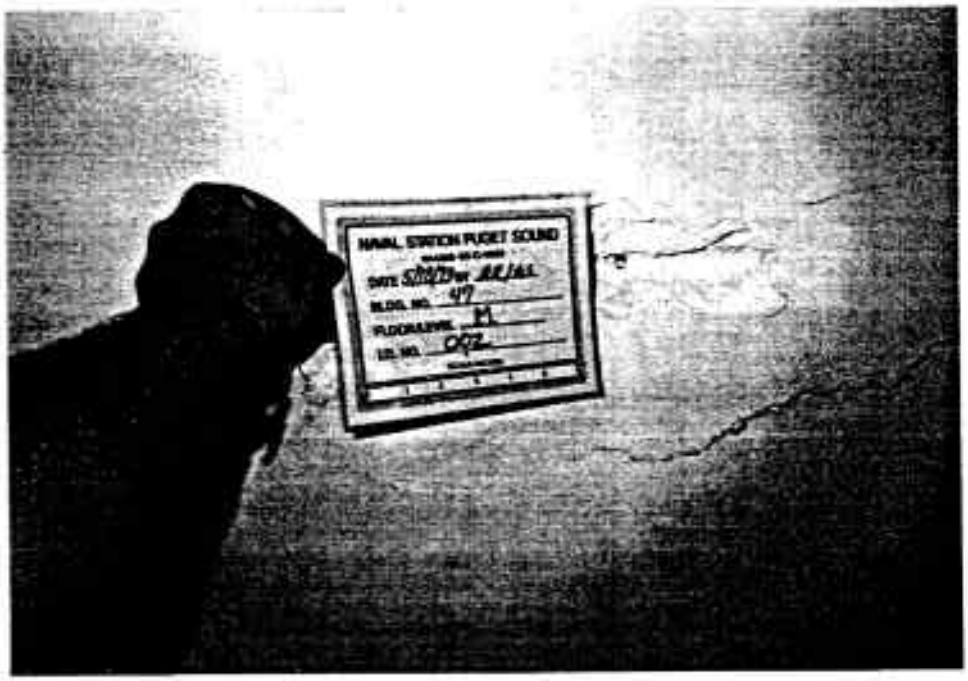
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: LINOLEUM | Sample No: 001 | Location: Rm 1 |

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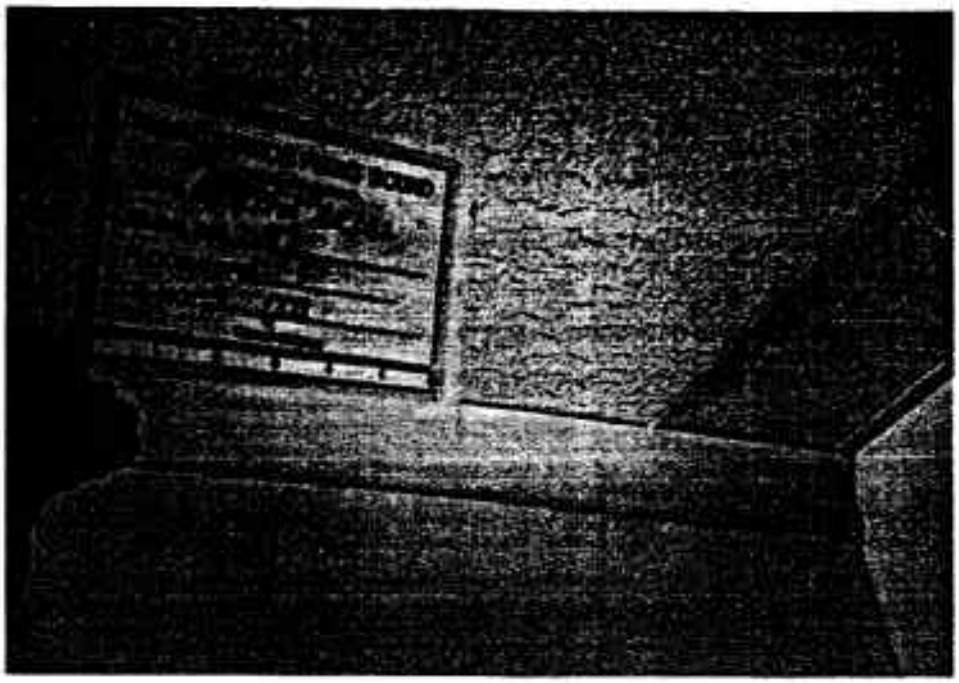
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: PLASTER | Sample No: 002 | Location: Rm 302 |



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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: CEILING TILE | Sample No: 003 | Location: Rm. 108 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: PIPE INSUL. | Sample No: 004 | Location: Rm. 31 |

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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: FITTING INSUL. | Sample No: 005 | Location: Rm 31 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: LINOLEUM | Sample No: 006 | Location: Rm 1 |

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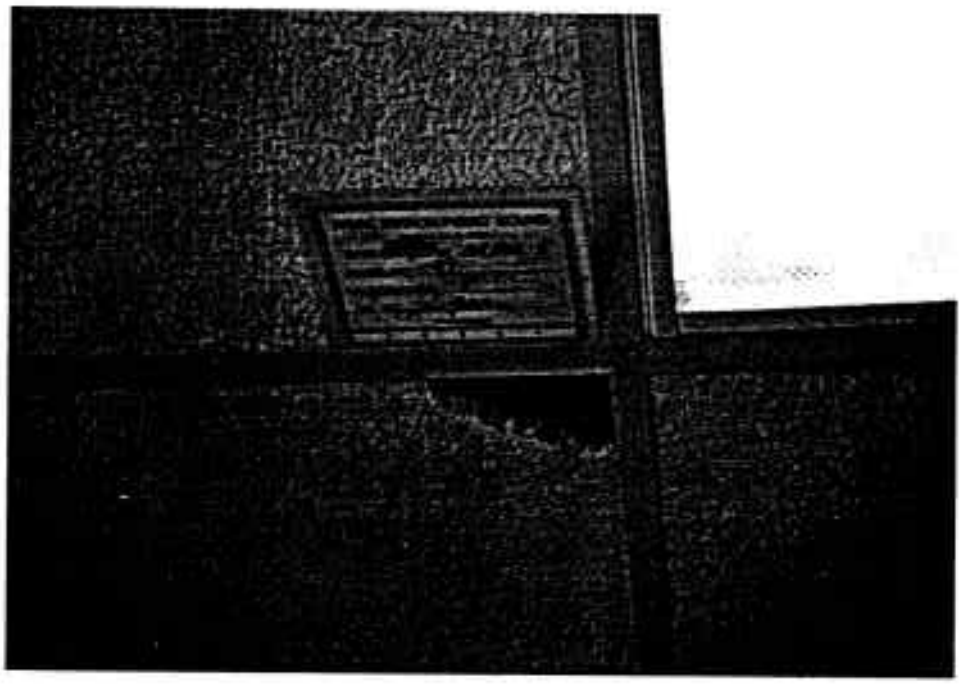
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSE-GRS |
| Material: PLASTER | Sample No: 007 | Location: Rm 28 |



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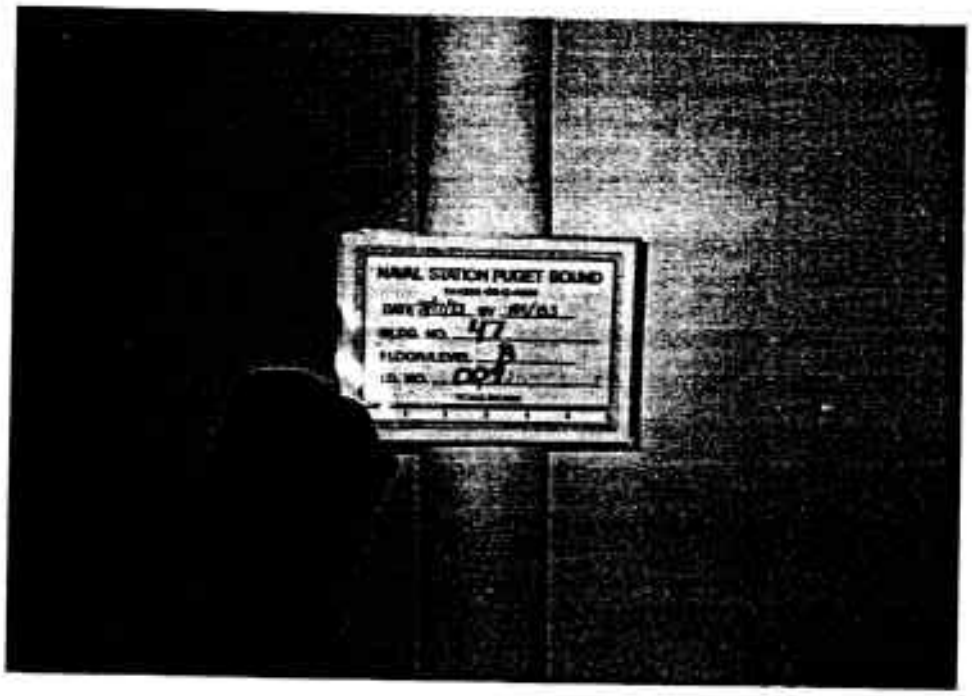
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSE-GRS |
| Material: CEILING TILE | Sample No: 008 | Location: Rm 108 |

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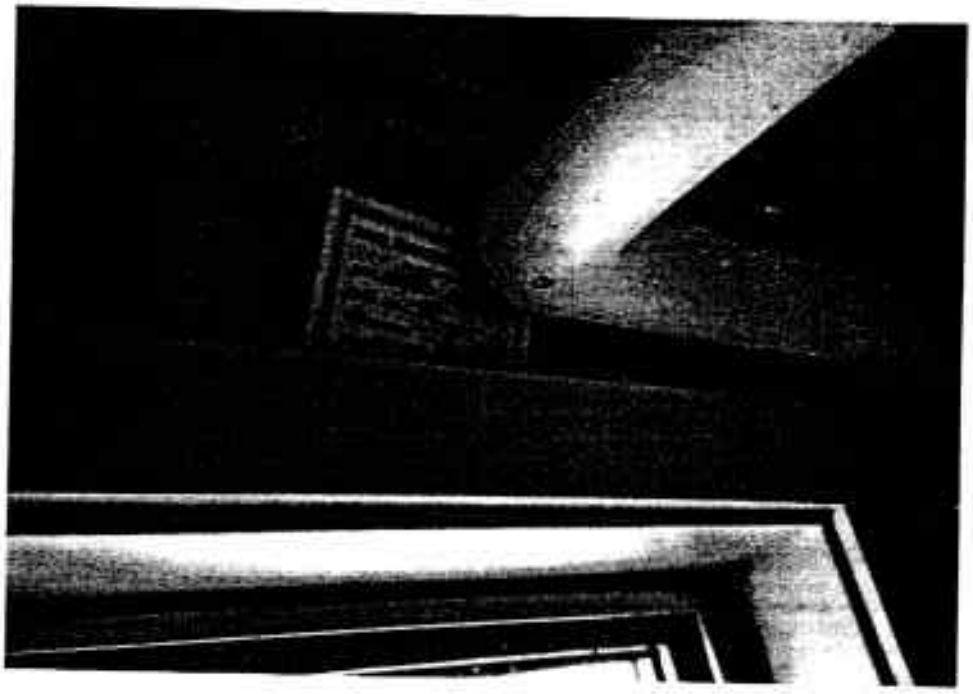
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: PIPE INSUL. | Sample No: 009 | Location: Rm 28 |



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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FITTING INSUL. | Sample No: 010 | Location: Rm 16 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 011 | Location: Rm 19 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: COVE MASTIC | Sample No: 012 | Location: Rm 20 |

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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: TARPAPER PIPE INSUL | Sample No: 013 | Location: Rm 3 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: DRYWALL | Sample No: 014 | Location: Rm 108 |

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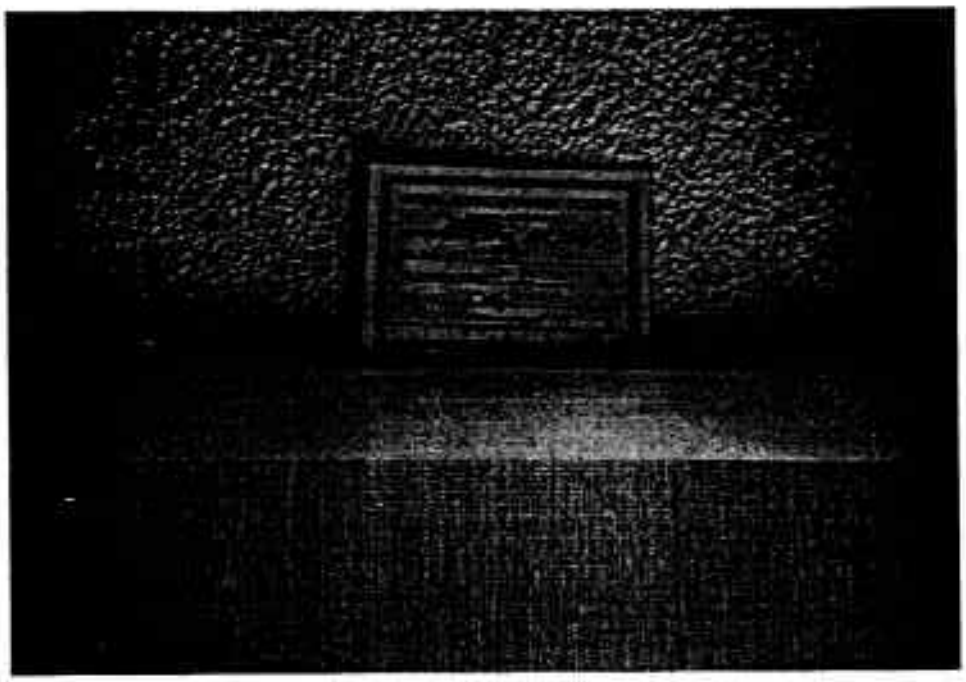
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: WINDOW PUTTY | Sample No: 015 | Location: Rm 108 |



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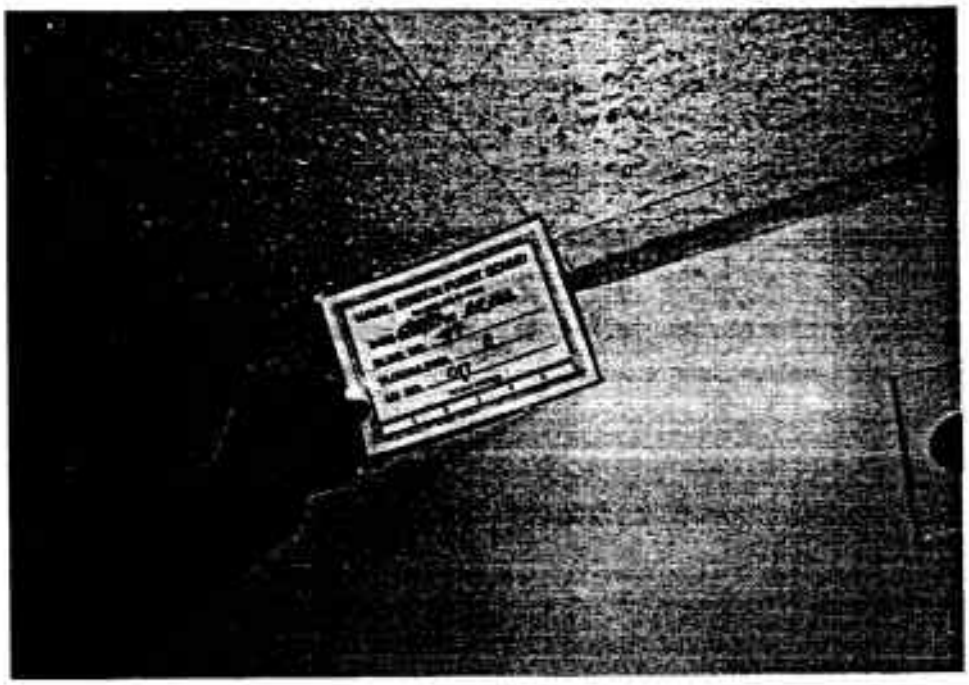
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: SPRAY ON MATL. | Sample No: 016 | Location: Rm 117 |



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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: CEILING TILE | Sample No: 017 | Location: Rm 24 |

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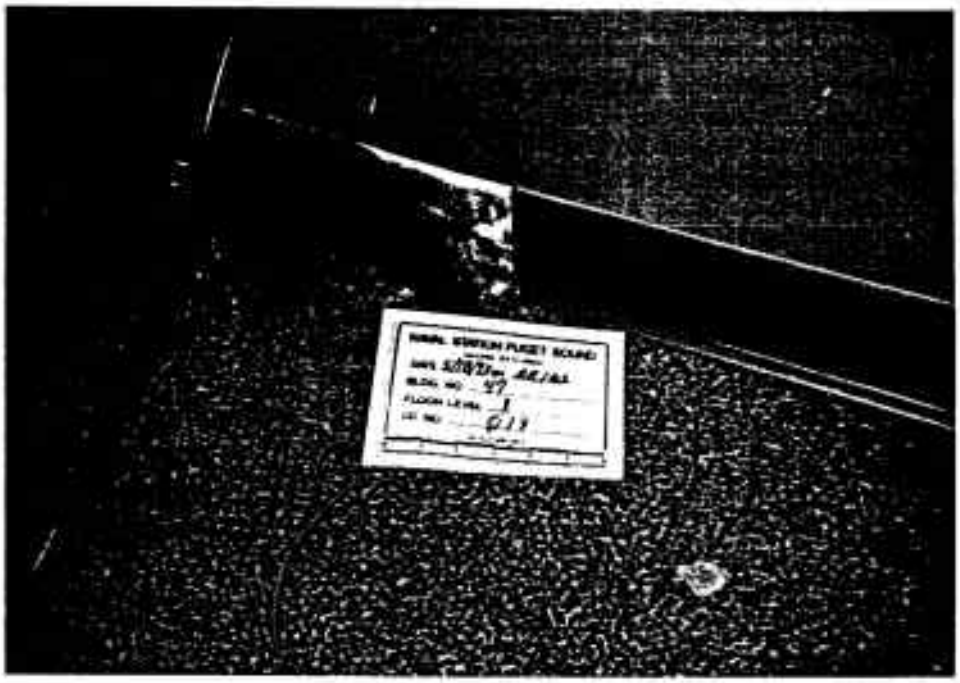
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 018 | Location: Rm 16 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSL-GRS |
| Material: COVE MASTIC | Sample No: 019 | Location: Rm 102A |

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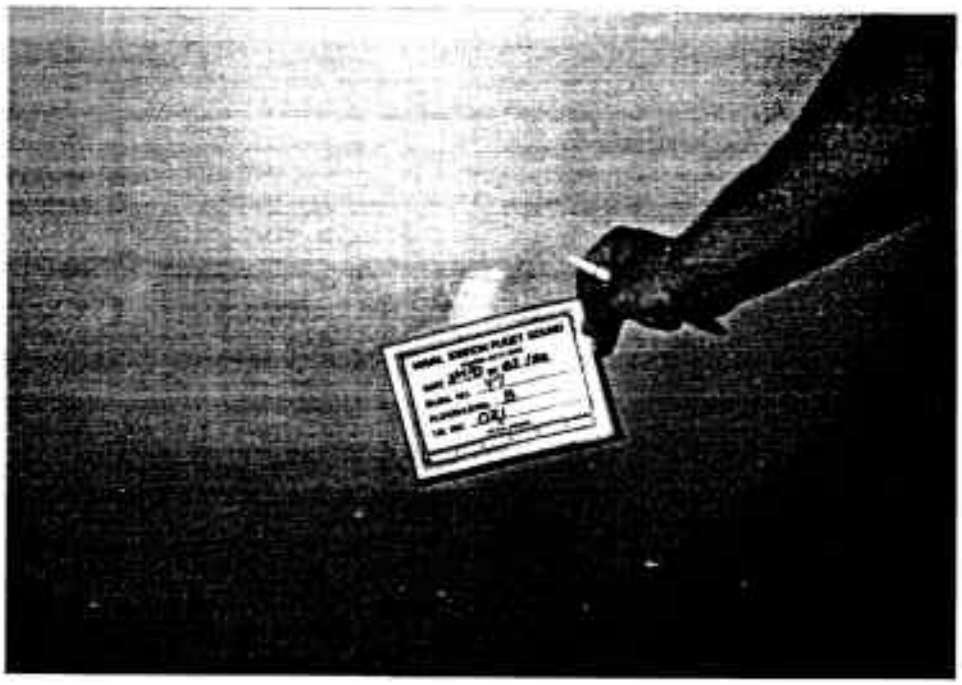
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSL-GRS |
| Material: TARPAPER PIPE INSUL | Sample No: 020 | Location: Rm 3 |



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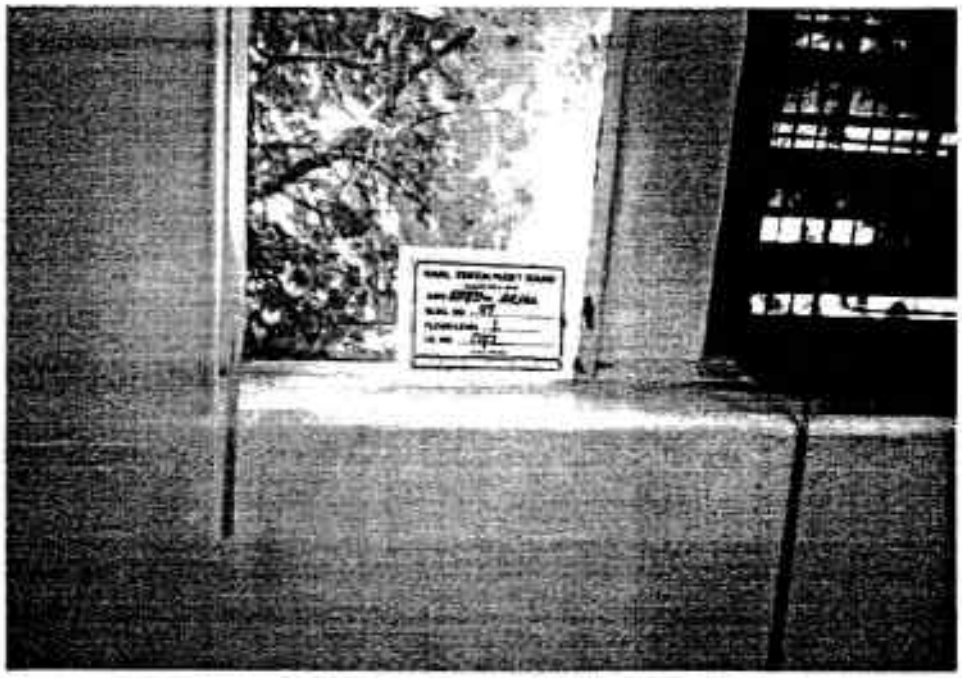
| Building: #47 RECREATION FACILITY | | Date: 5/19/93 By: RSR-GRS | |
| Material: DRYWALL | Sample No: 021 | Location: Rm 3 | |



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|---|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS | |
| Material: WINDOW PUTTY | Sample No: 022 | Location: Rm 108 | |

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| Building: #47 RECREATION FACILITY | | Date: 5/19/93 By: RSR-GRS |
| Material: CEILING TILE | Sample No: 023, 024 | Location: Rm 24 |

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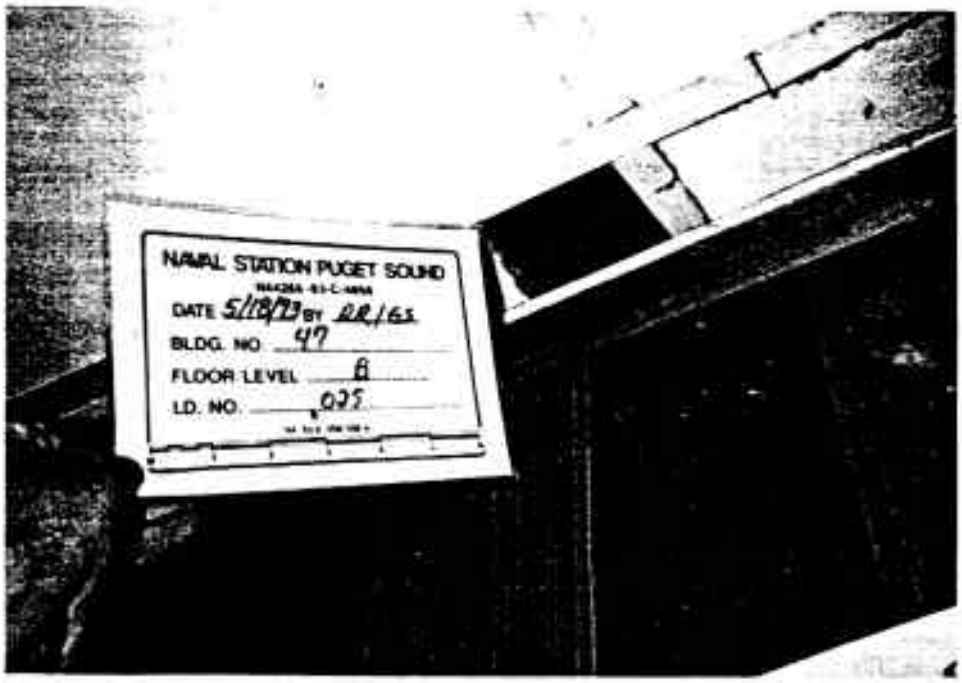
| Building: #47 RECREATION FACILITY | | Date: 5/19/93 By: RSR-GRS |
| Material: | Sample No: | Location: |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: CEILING TILE | Sample No: 025 | Location: Rm 17 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: BLACK MASTIC LAYER | Sample No: 026 | Location: Rm 111 |

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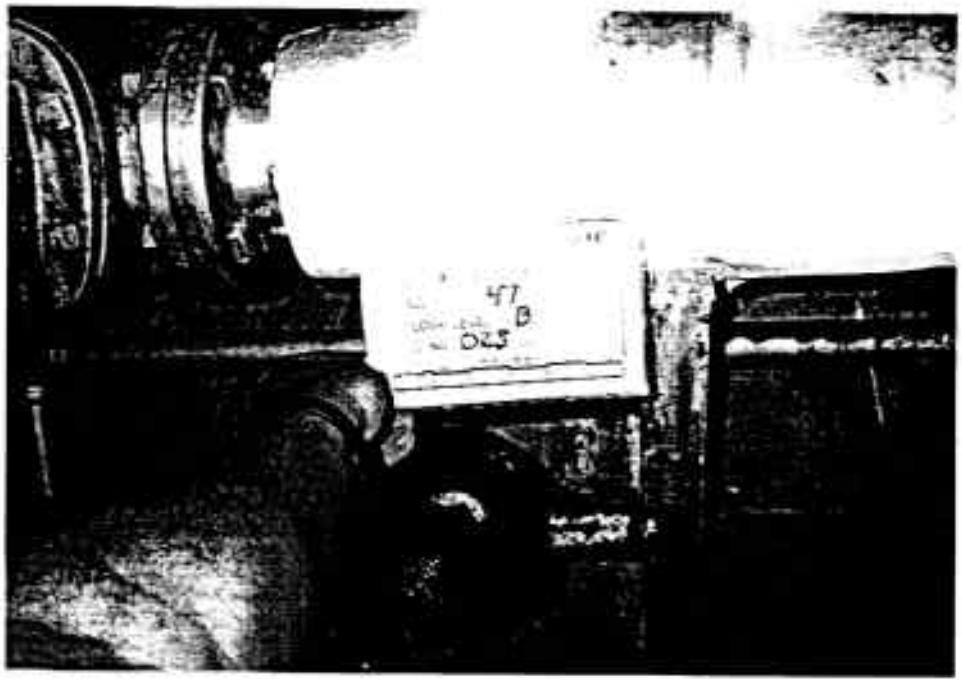
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 027 | Location: Rm 28 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: PIPE INSUL. | Sample No: 028 | Location: Rm 30 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: FITTING INSUL. | Sample No: 029 | Location: Rm 28 |

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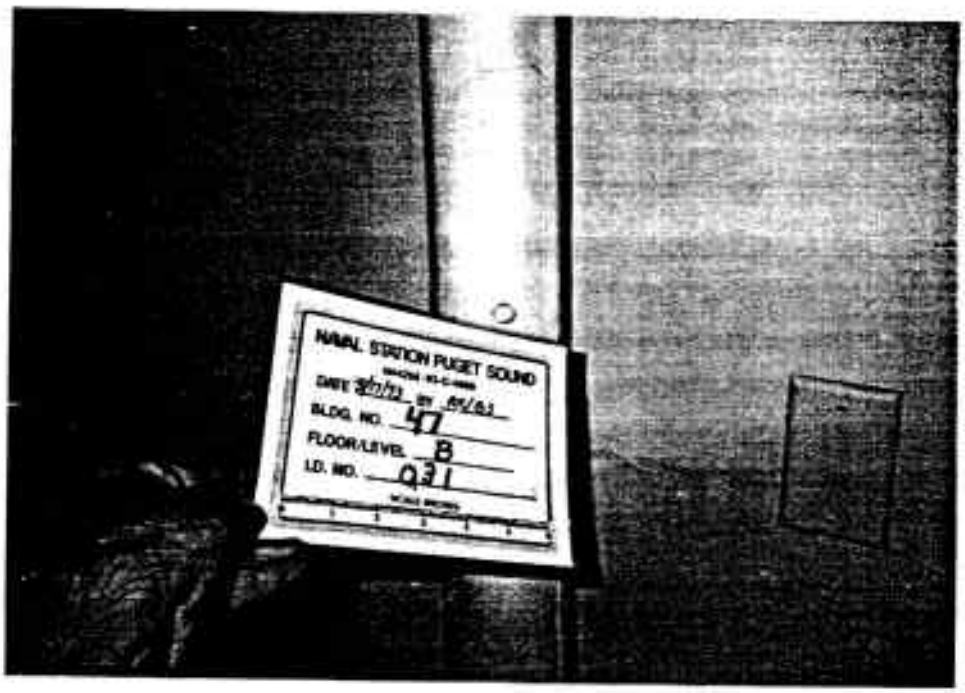
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/19/93 By: RSR-GRS |
| Material: FITTING INSUL. | Sample No: 030 | Location: Rm 16 |

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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: PIPE INSUL. | Sample No: 031 | Location: Rm 3 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/19/93 By: RSR-GRS |
| Material: FITTING INSUL | Sample No: 032 | Location: Rm 16 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: CEILING TILE | Sample No: 033 | Location: Rm 112 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: BLACK MASTIC LAYER | Sample No: 034 | Location: Rm 111A |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 035 | Location: Rm 111 |

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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: PIPE INSULATION | Sample No: 036 | Location: Rm 30 |

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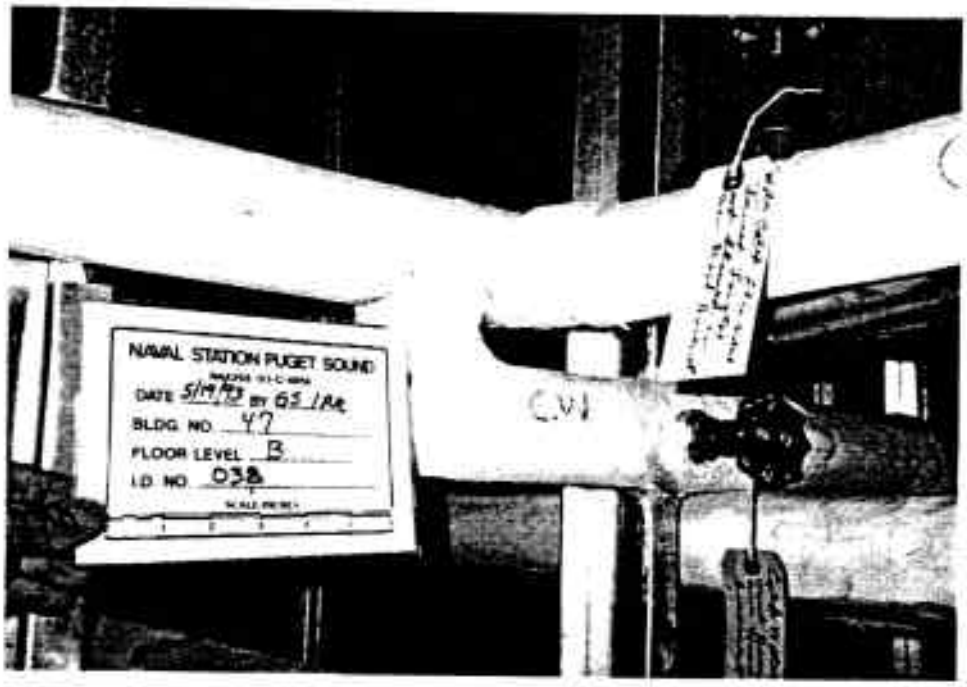
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: FITTING INSUL. | Sample No: 037 | Location: Rm 30 |

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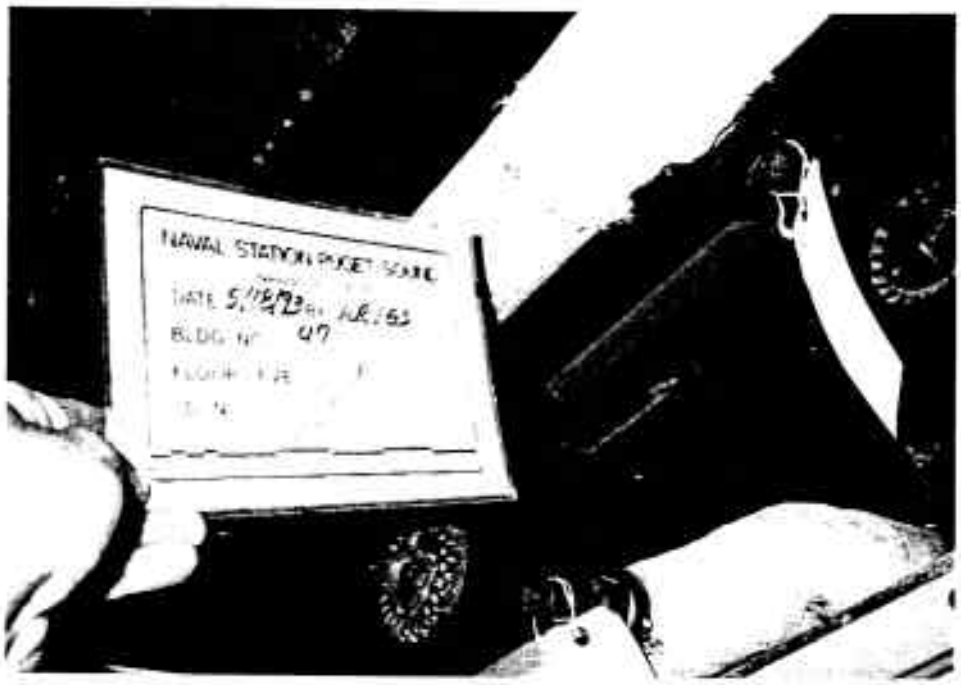
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: FITTING INSUL. | Sample No: 038 | Location: Rm 16 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: PIPE INSUL. | Sample No: 039 | Location: Rm 20 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FITTING INSUL. | Sample No: 040 | Location: Rm 20 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: DEBRIS | Sample No: 041 | Location: CRAWLSPACE I |

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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: LINOLEUM | Sample No: 042 | Location: Rm 129 |

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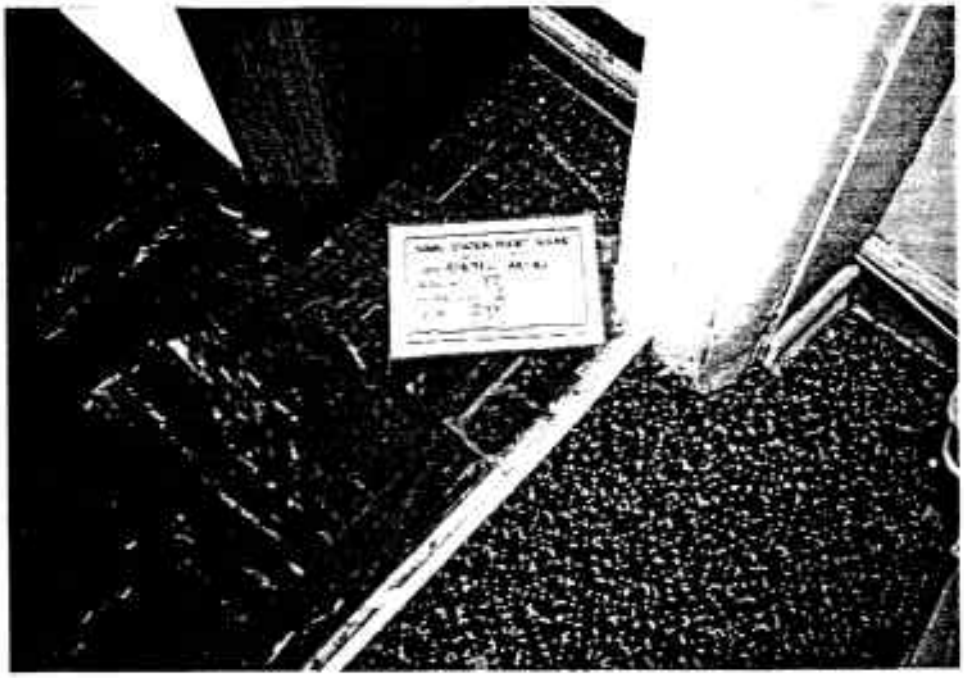
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: SPRAY ON MATL. | Sample No: 043 | Location: Rm 102 |



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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 044 | Location: Rm 122 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: LINOLEUM | Sample No: 045 | Location: Rm D |

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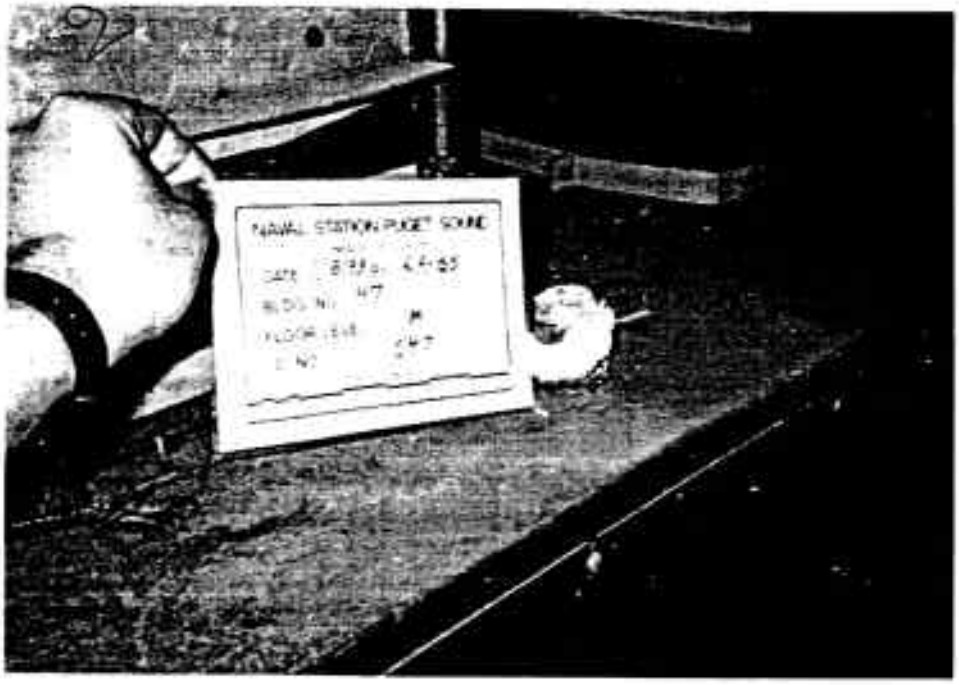
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 046 | Location: RM 111 |



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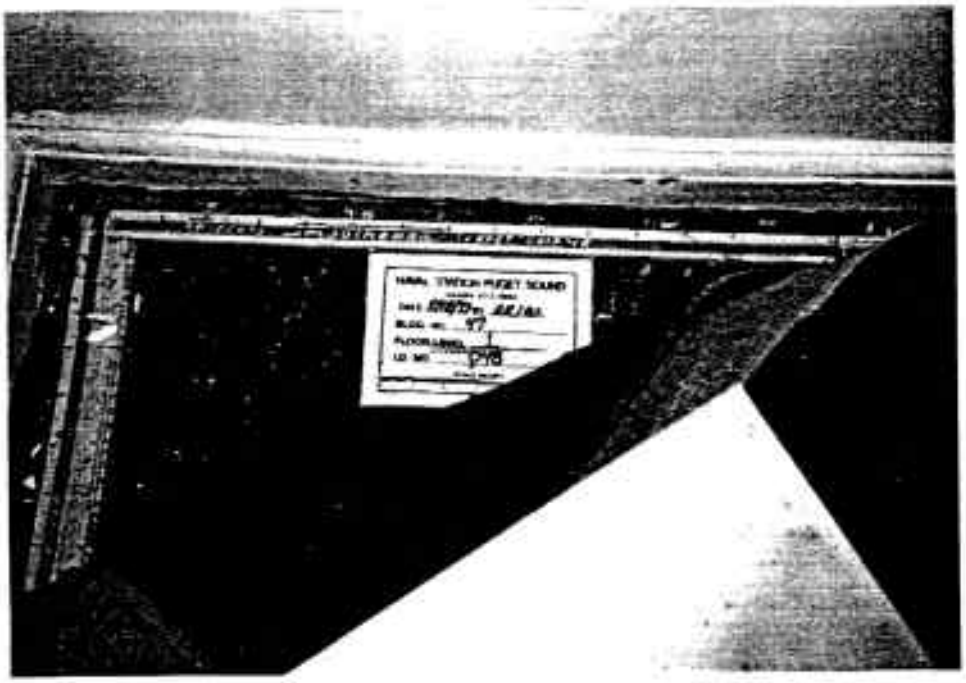
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: DEBRIS | Sample No: 047 | Location: Rm 203 |



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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: LINOLEUM | Sample No: 048 | Location: Rm 109 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: SPRAY ON MAT'L | Sample No: 049 | Location: Rm 117 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 050 | Location: Rm 125 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: LINOLEUM | Sample No: 051 | Location: Rm 102A |

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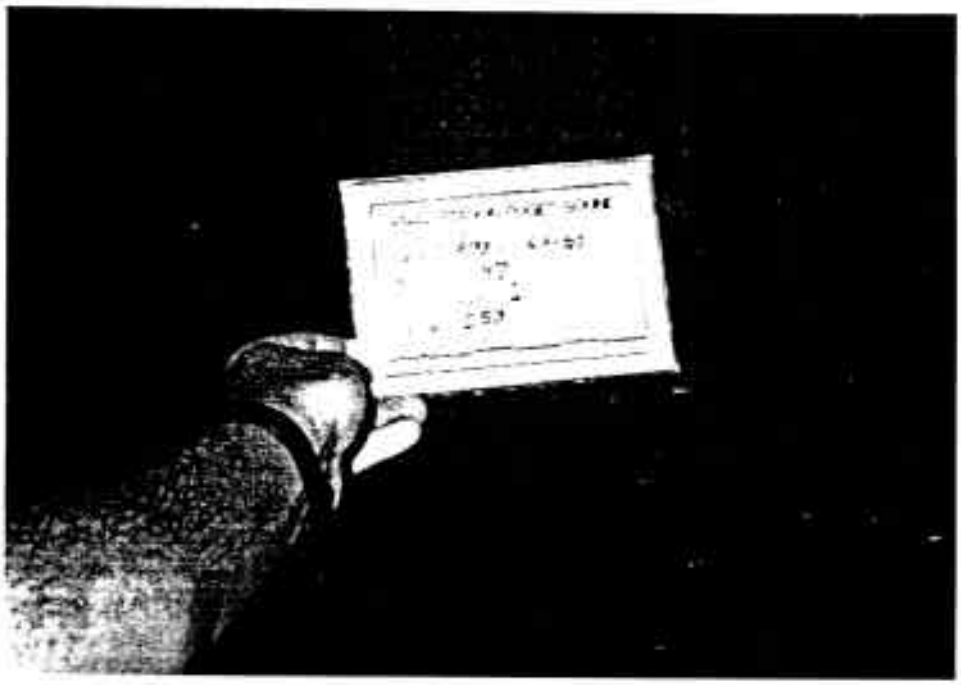
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 052 | Location: Rm 111 |



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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: STAGE CURTAIN | Sample No: 053 | Location: Rm 100 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: STAGE CURTAIN | Sample No: 054 | Location: Rm 100 |

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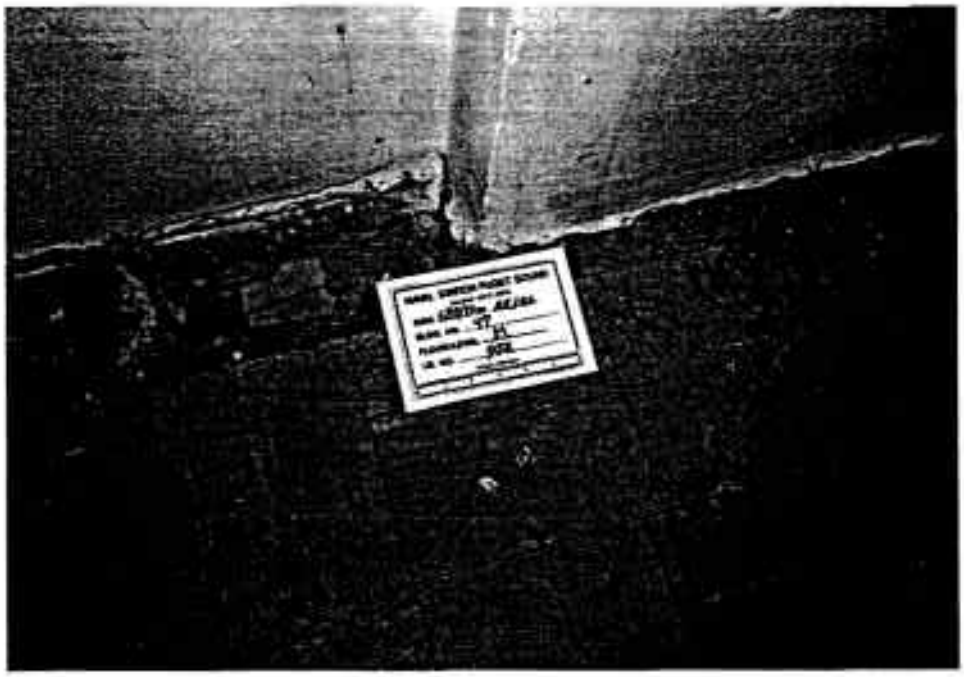
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 055 | Location: Rm 201 |



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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 056 | Location: Rm 302 |

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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSE-GRS |
| Material: VIBRATION CLOTH | Sample No: 057 | Location: Rm 203 |

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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSE-GRS |
| Material: ROOFING | Sample No: 058 | Location: ROOF |

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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: ROOFING | Sample No: 059 | Location: ROOF |

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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: SEALANT | Sample No: 060 | Location: ROOF |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSE-GRS |
| Material: CAB | Sample No: 061 | Location: ROOF |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSE-GRS |
| Material: STAGE CURTAIN | Sample No: 062 | Location: Rm 100 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: STAGE CURTAIN | Sample No: 063 | Location: Rm 100 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 064 | Location: Rm 202 |

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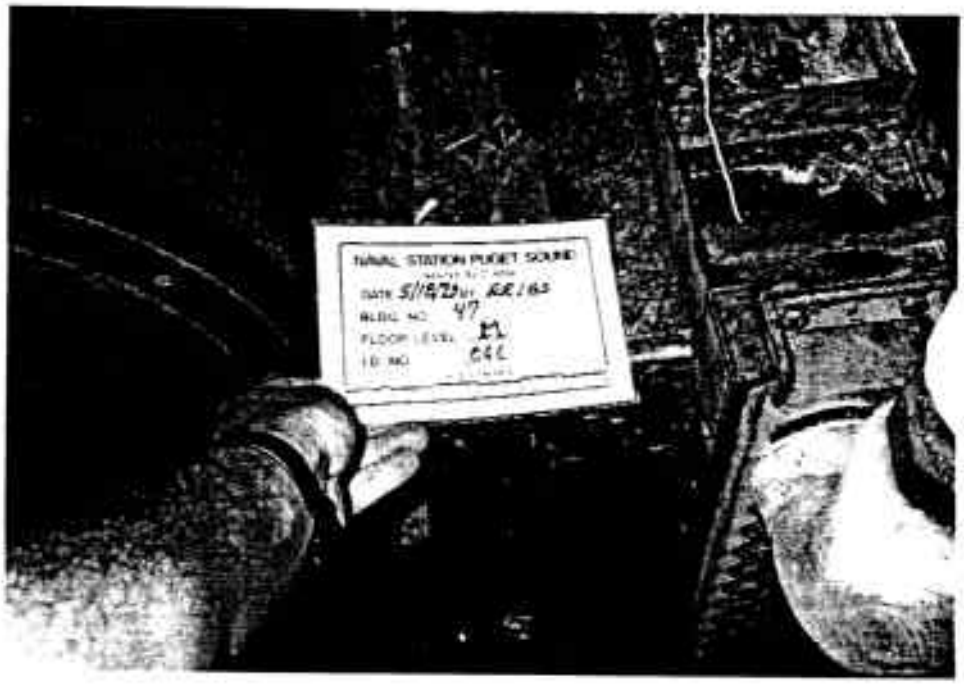
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 065 | Location: Rm 302 |

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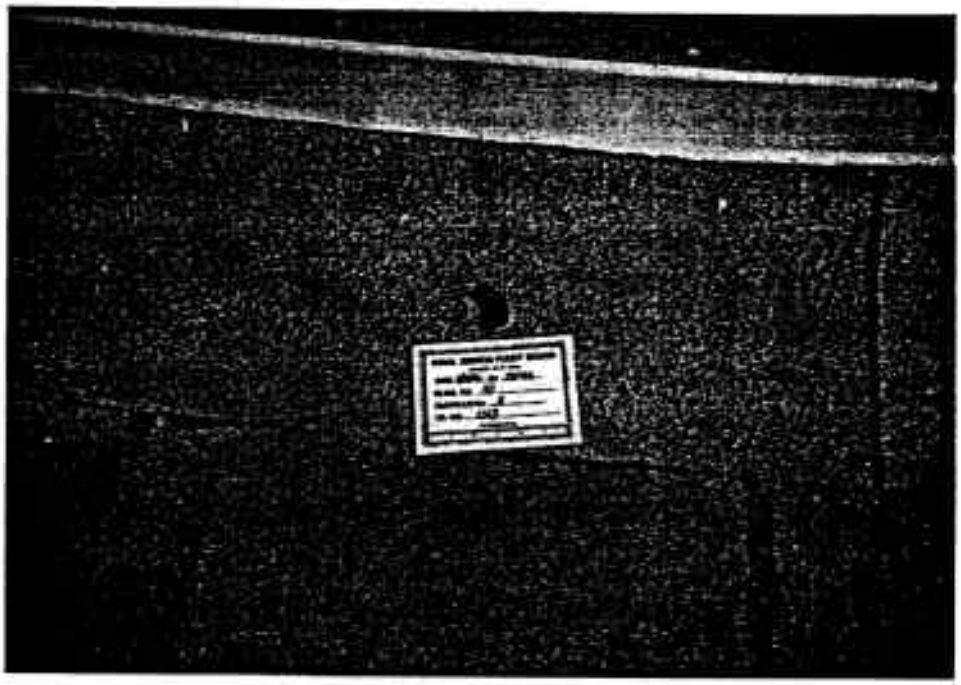
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: VIBRATION CLOTH | Sample No: 066 | Location: Rm 302E |



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| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: ROOFING | Sample No: 067 | Location: ROOF |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: ROOFING | Sample No: 068 | Location: ROOF |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: SEALANT | Sample No: 069 | Location: ROOF |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: CAB | Sample No: 070 | Location: ROOF |

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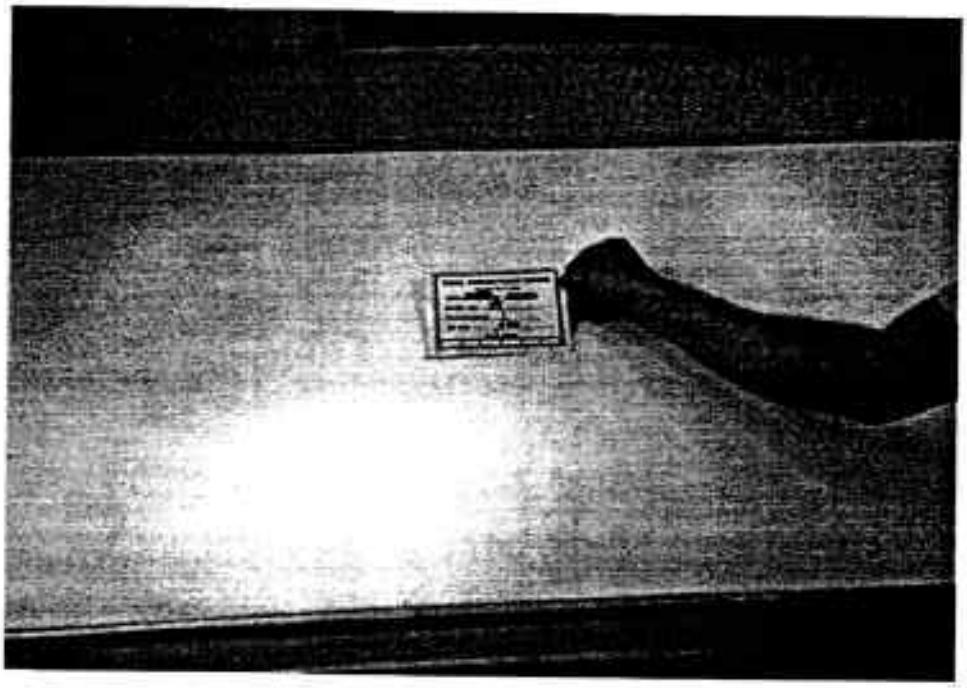
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: PLASTER | Sample No: 071 | Location: Rm 302 |



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| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: DRYWALL | Sample No: 072 | Location: Rm 108 |

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|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: FLOOR TILE | Sample No: 073 | Location: Rm 19 |

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|---|---|---|
| Building #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: COVE MASTIC | Sample No: 074 | Location: Rm 102A |

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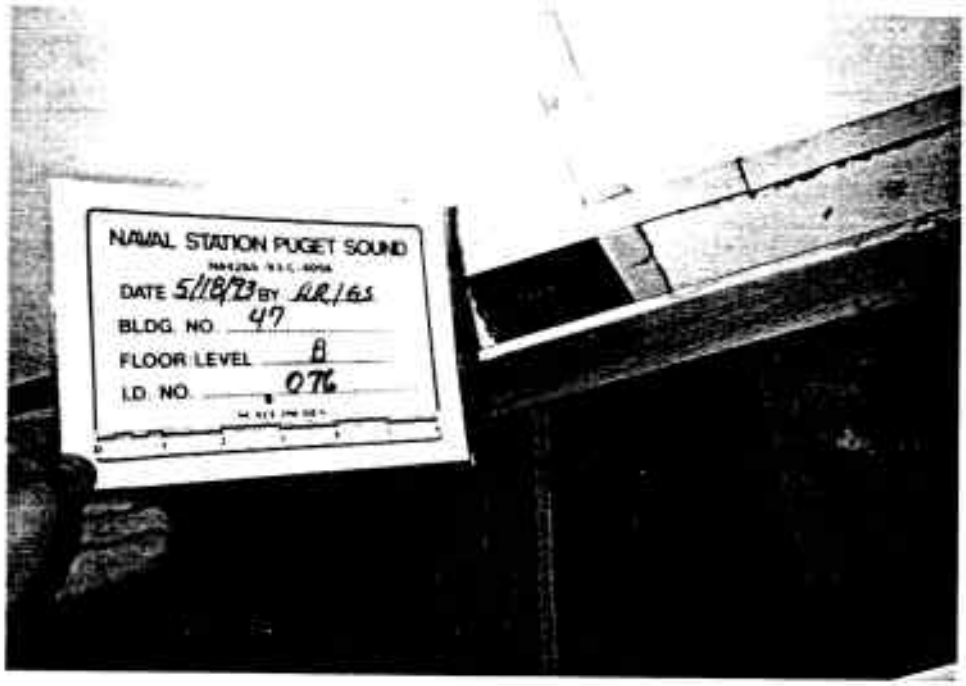
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: WINDOW PUTTY | Sample No: 075 | Location: Rm 108 |

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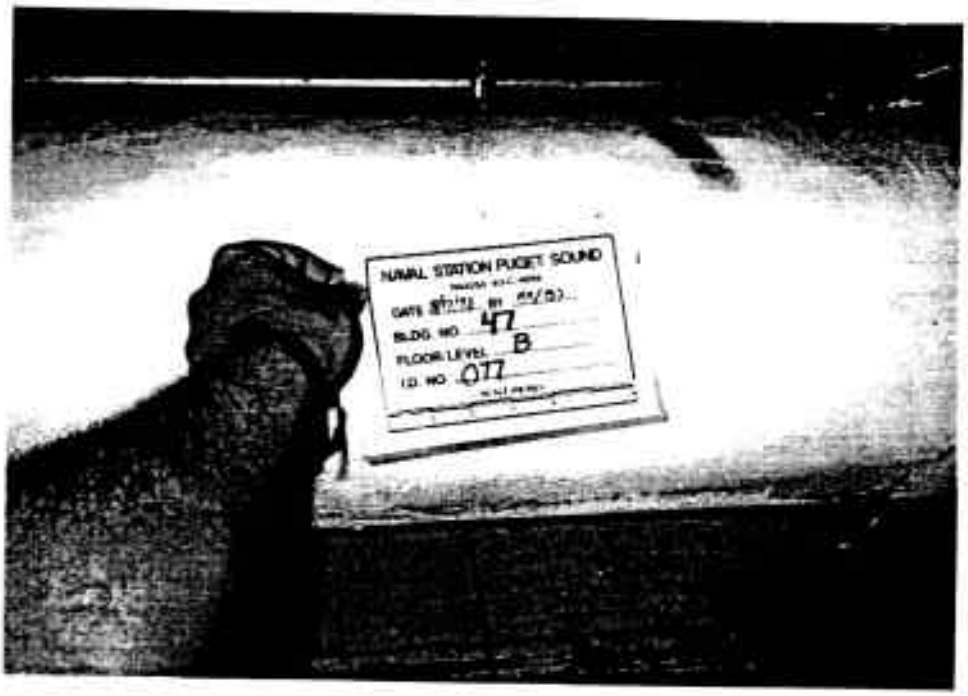
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: CEILING TILE | Sample No: 076 | Location: Rm 17 |

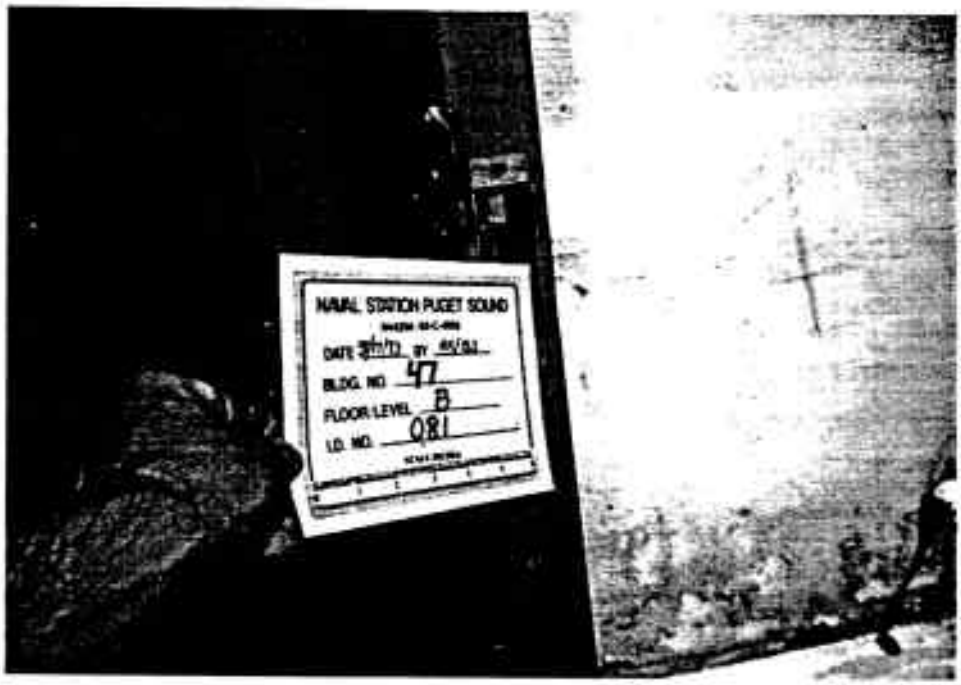



| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: TANK INSUL. | Sample No: 077 | Location: Rm 30 |

| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: TANK INSUL. | Sample No: 078 | Location: Rm 30 |

| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: STUCCO | Sample No: 079 | Location: EXTERIOR - EAST |

| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: STUCCO | Sample No: 080 | Location: EXTERIOR - EAST |




| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: FIREDOOR | Sample No: 081 | Location: Rm 31 |

| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/17/93 By: RSR-GRS |
| Material: FIREDOOR | Sample No: 082 | Location: Rm 31 |

| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: CARPET PAD | Sample No: 083, 084 | Location: CRAWLSPACE L |

NO PHOTO AVAILABLE

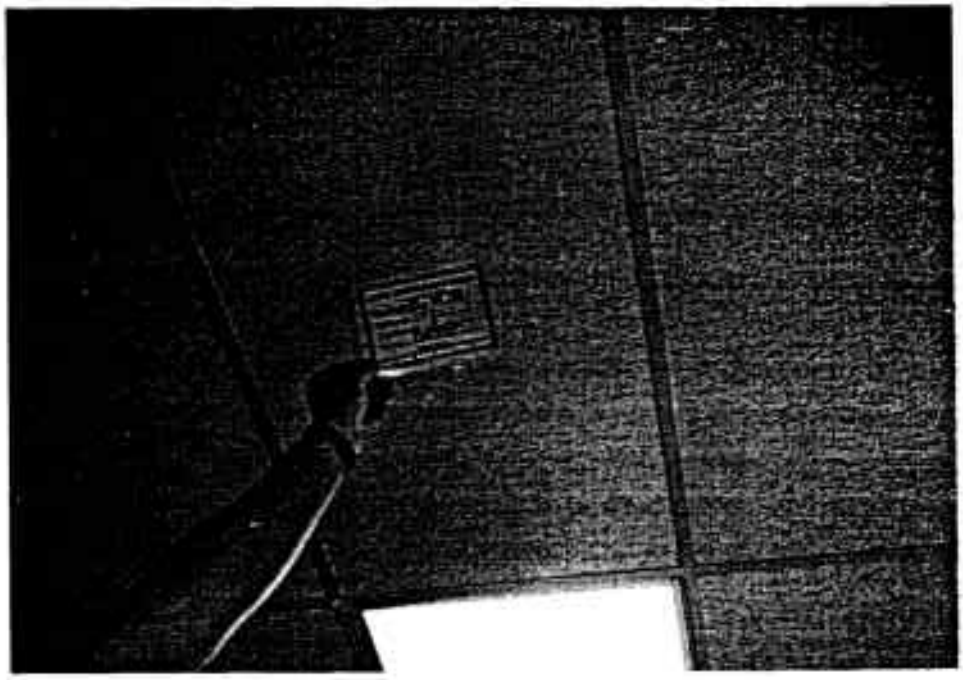
SEE PHOTO ABOVE

| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: | Sample No: | Location: |

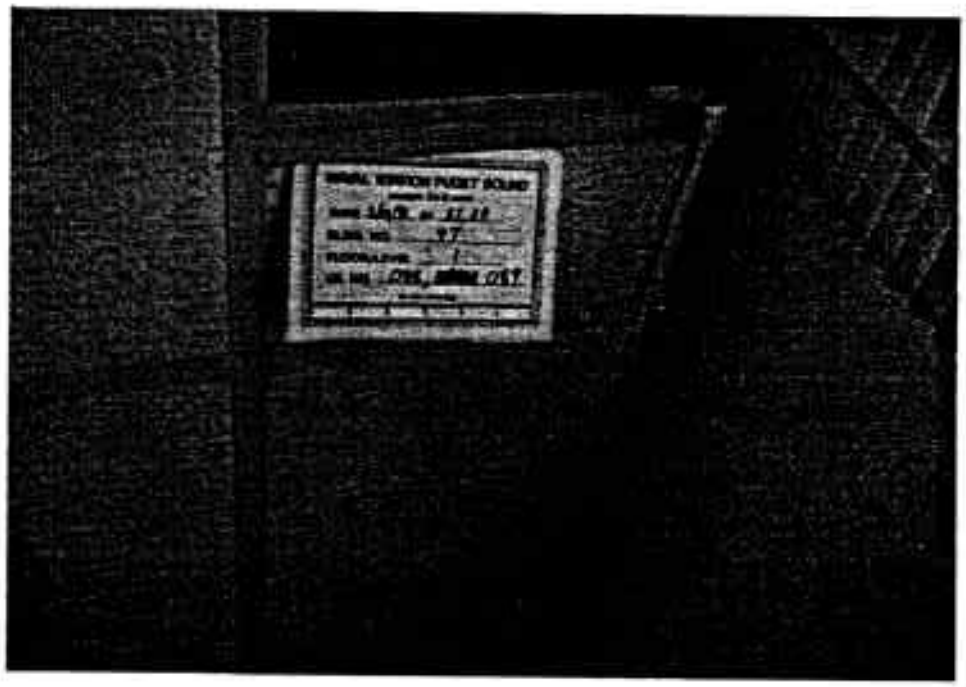
| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: GASKET ON BOX | Sample No: 085, 086 | Location: Rm 302E |

SEE PHOTO ABOVE

| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 5/18/93 By: RSR-GRS |
| Material: | Sample No: | Location: |

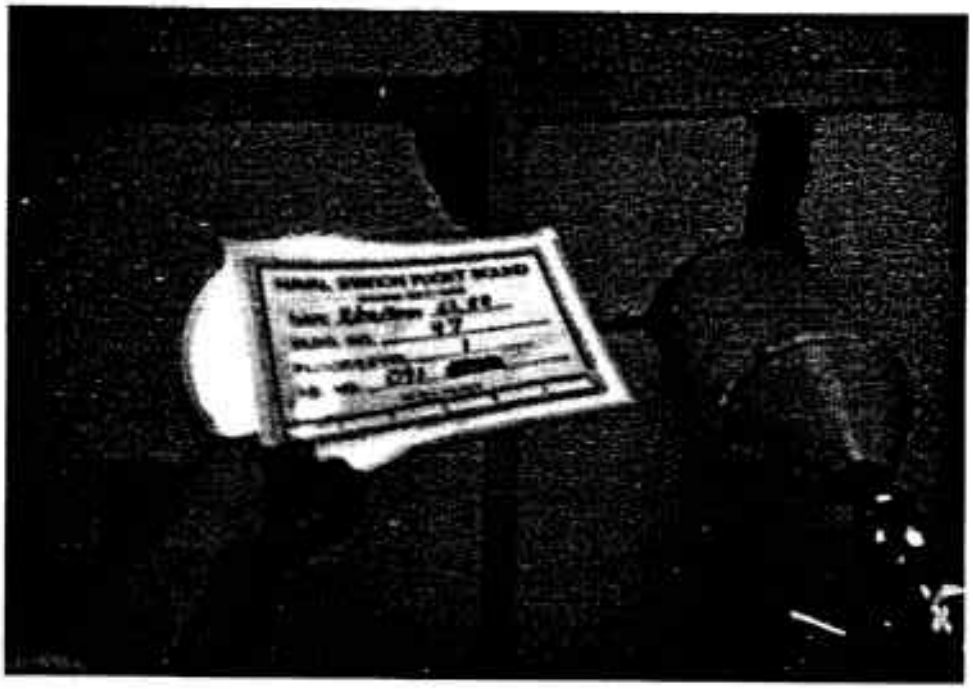


| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 3-10-93 By: GS, RR |
| Material: LAY IN CT | Sample No: 087 | Location: RM 108 LIBRARY |

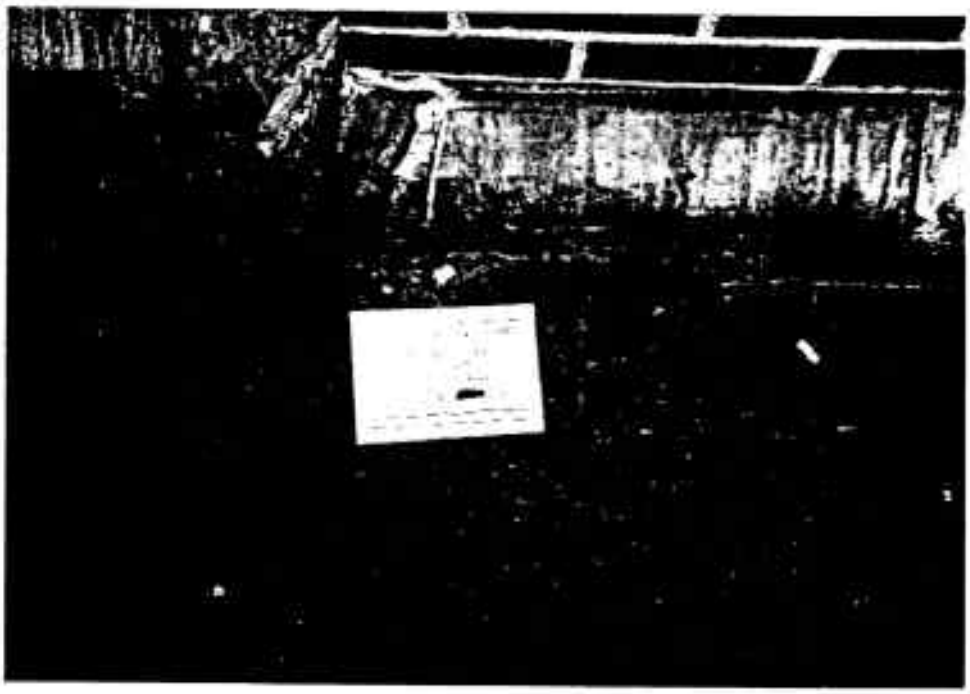


| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 3-10-93 By: GS, RR |
| Material: LAY IN CT | Sample No: 088, 089 | Location: RM 108 LIBRARY |

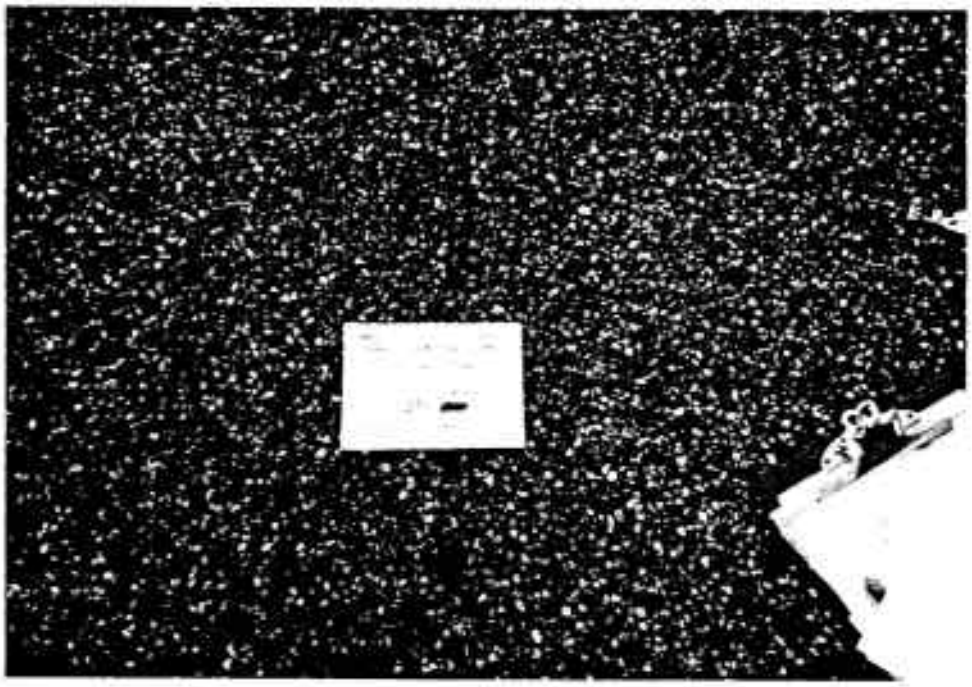
| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 8-10-93 By: GS, JH |
| Material: LAY IN CT | Sample No: 090 | Location: Rm 14 |




| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 8-16-93 By: GS, JH |
| Material: LAY IN CT | Sample No: 091 | Location: Rm 14 |



| | | |
|---|---|---|
| Building: #47, RECREATION FACILITY | | Date: 8-10-93 By: GS, RR |
| Material: ROOFING | Sample No: 092, 093 | Location: ROOF |



| | | |
|---|---|---|
| Building: #47, RECREATION FACILITY | | Date: 8-10-93 By: GS, RR |
| Material: ROOFING | Sample No: 094 | Location: ROOF |

| | | |
|---|---|---|
| Building: #47 RECREATION FACILITY | | Date: 8-16-93 By: GS, RR |
| Material: VFT | Sample No: 095, 096 | Location: RM 25 |

| | | |
|---|---|---|
| Building: | | Date: By: |
| Material: | Sample No: | Location: |

# APPENDIX 7

# LAB TEST RESULTS

ALPHA Engineering Group, Inc.

# CHAIN OF CUSTODY RECORD

2-6509
30530

**Environmental Engineering Department**
22232 17th Ave S.E. #300
Bothell, WA 98021
(206) 488-3400 Fax (206) ~~483-7360~~ 522-5477

**To:** Analytica Solutions **Job No.:** 17-3830-11

**Address:** 18000 W. Hwy 72
Golden, CO 80403-8699 **VIA:** Fed. Ex

**Attn:** Jeff Lyons

| SAMPLE TYPE | ANALYSIS REQUESTED | TURN AROUND |
|---|---|---|
| ☐ Air # ____ | ☐ Phase Contrast Microscopy | ☐ 2 hour |
| ☒ Bulk # ____ | ☒ Polarized Light Microscopy | ☐ 24 hour |
| ☐ Soil # ____ | ☐ Transmission Electron Microscopy | ☐ 48 hour |
| ☐ ____ | ☐ ____ | ☒ 5 day turnaround |
| | | Date/Time required |

**Notification of analysis:** ☐ Telephone ☒ FAX ☒ Written
**Notification to:** ____ ____

**Description/Comments:**
Total number of samples: 11, Bldg #'s 47 and 193, see Bulk Sample Data Sheets for sample descriptions and locations

| Relinquished by: (Signature/Company) | Received by: (Signature/Company) | Date/Time |
|---|---|---|
| Gary Stensland | | 7/10/13 |
| 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

ANALYTICA
SOLUTIONS
an Analytica Group company

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

June 7, 1993

RECEIVED
JUN 16 1993
ALPHA Engineering Group, Inc.
Bothell

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

Re: LGN 305792 Project: 17383011, Bldg. 47

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

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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: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 001 | 05/17/93 | Wht. and tan linoleum/rm. 1 |
| 002 | 05/17/93 | Plaster/rm. 302 |
| 003 | 05/17/93 | 2'x4' lay-in CT/rm. 108 |
| 004 | 05/17/93 | <6" block PI/rm. 31 |
| 005 | 05/17/93 | HMF A/W <6" block PI/rm. 31 |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 001 | 002 | 003 | 004 | 005 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | 30 | 25 |
| Anthophyllite | | | | | |
| Chrysotile | 30 | Trace <1% | 7 | 5 | 10 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 30 | Trace <1% | 7 | 35 | 35 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | 80 | | |
| Cellulose | 3 | | 5 | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 67 | 99 | 8 | 65 | 65 |

Analyst: Fritz Fischer

Fritz Fischer

Date: 06/04/93

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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: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 006 | 05/17/93 | Wht. and tan linoleum/rm 1 |
| 007 | 05/17/93 | Plaster/rm. 28 |
| 008 | 05/17/93 | 2'x4' lay-in CT/rm. 108 |
| 009* | 05/17/93 | <6" block PI/rm. 28 [with wrap] |
| 009 [A] | 05/17/93 | [pipe insulation] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 006 | 007 | 008 | 009* | 009 [A] |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | 18 | 20 |
| Anthophyllite | | | | | |
| Chrysotile | 30 | Trace <1% | 7 | 5 | 5 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 30 | Trace <1% | 7 | 23 | 25 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | 80 | | |
| Cellulose | 2 | 1 | 5 | 10 | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 68 | 98 | 8 | 67 | 75 |

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

Analyst: Fritz Fischer
Fritz Fischer

Date: 06/04/93

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

Client: **ALPHA ENGINEERING GROUP ***

LGN: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 009 [B] | 05/17/93 | [wrap] |
| 010 | 05/17/93 | BMF A/W <6" block PI/rm. 16 |
| 011* | 05/17/93 | 12" beige VFT/rm. 119 [with mastic] |
| 011 [A] | 05/17/93 | [floor tile] |
| 011 [B] | 05/17/93 | [mastic] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 009 [B] | 010 | 011* | 011 [A] | 011 [B] |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | Trace <1% | | | |
| Anthophyllite | | | | | |
| Chrysotile | | 25 | 2 | 2 | 25 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 26 | 2 | 2 | 25 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | 97 | | | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 3 | 74 | 98 | 98 | 75 |

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

Analyst: Fritz Fischer Craig B. Bruno

Date: 06/04/93

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

Client: **ALPHA ENGINEERING GROUP ***

LGN: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 012 | 05/17/93 | Cove base mastic/rm. 120 |
| 013* | 05/17/93 | Tarpaper PI/rm. 3 [with cloth] |
| 013 [A] | 05/17/93 | [tarpaper] |
| 013 [B] | 05/17/93 | [cloth] |
| 014 | 05/17/93 | Drywall/rm. 108 |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 012 | 013* | 013 [A] | 013 [B] | 014 |
|---|---|---|---|---|---|
| **Asbestiform Minerals:** | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | Trace <1% | | | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | Trace <1% | 0 | 0 | 0 | 0 |
| **Other Fibrous Materials:** | | | | | |
| Fibrous Glass | | | | | Trace <1% |
| Cellulose | | 27 | 15 | 92 | 10 |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 99 | 73 | 85 | 8 | 89 |

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

Analyst: Fritz Fischer

Fritz Fischer

Date: 06/04/93

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

Client: ALPHA ENGINEERING GROUP *

LGN: 305792

Project ID: 17383011, Bldg. 47



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 015 | 05/17/93 | Window putty/rm. 108 |
| 016 | 05/17/93 | Spray-on mat'l/rm. 117 |
| 017 | 05/17/93 | 12" spline CT/rm. 24 |
| 018* | 05/17/93 | 12" beige VFT/rm. 16 [with mastic] |
| 018 [A] | 05/17/93 | [floor tile] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 015 | 016 | 017 | 018* | 018 [A] |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | Trace <1% | | | 4 | 3 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | Trace <1% | 0 | 0 | 4 | 3 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | 40 | | |
| Cellulose | 1 | | 30 | | |
| Synthetics | | 5 | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 98 | 95 | 30 | 96 | 97 |

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

Analyst: Fritz Fischer

Date: 06/04/93

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16000 W. Highway 72
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FAX: (303) 420-1434

August 17, 1993

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

Re: LGN 306771 Project: 17383011, Bldg. 47, Recreation, Re-Analysis of LGN 305792

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

ANALYTICA SOLUTIONS
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: **306771**

Project ID: **17383011, Bldg. 47, Recreation, Re-Analysis of LGN 305792** Page: 1 of 1

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 015 | 05/17/93 | Window putty/rm. 108 [with inseparable paint] |
| 022 | 05/17/93 | Window putty/rm. 108 [with inseparable paint] |
| | | |
| | | |
| | | |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 015 | 022 | | | |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | 1 | | | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 1 | 0 | | | |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | Trace <1% | | | |
| Cellulose | Trace <1% | Trace <1% | | | |
| Synthetics | | | | | |
| Other: | | Trace <1% Hair | | | |
| Percent Nonfibrous Material | 98 | 99 | | | |

Analyst: Mike Scales

Mike Scales

Date: 08/17/93

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an Analytica Group company

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Golden, CO 80403-8299
(303) 420-4449
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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: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 018 [B] | 05/17/93 | [mastic] |
| 019 | 05/17/93 | Cove base mastic/rm. 102A |
| 020 | 05/17/93 | Tarpaper PI/rm. 3 |
| 021 | 05/17/93 | Drywall/rm. 3, racquetball stairwell |
| 022 | 05/17/93 | Window putty/rm. 108 [with inseparable paint] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 018 [B] | 019 | 020 | 021 | 022 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| mosite | | | | | |
| nthophyllite | | | | | |
| Chrysotile | 25 | | | | |
| rocidolite | | | | | |
| remolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 25 | 0 | 0 | 0 | 0 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| ellulose | | | 45 | 10 | Trace <1% |
| ynthetics | | | 3 | | |
| Other: | | | 2 Wool | | |
| ercent Nonfibrous Material | 75 | 100 | 50 | 90 | 99 |

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

nalyst: Fritz Fischer

Fritz Fischer

Date: 06/04/93

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an Analytica Group company

18000 W. Highway 72
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(303) 420-4449
(800) 873-8707
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**RESULTS OF BULK ASBESTOS SAMPLE ANALYSIS BY POLARIZED LIGHT MICROSCOPY (PLM) EPA-600/M4-82-020**

Client: **ALPHA ENGINEERING GROUP ***

LGN: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 023 | 05/17/93 | 12" spline CT/rm. 24 |
| 024 | 05/17/93 | 12" spline CT/rm. 24 |
| 025 | 05/17/93 | 2'x4' lay-in CT, smooth/rm. 17 |
| 026 | 05/17/93 | Black mastic, tar/rm. 111 |
| 027* | 05/17/93 | 12" brn. VFT/rm. 28 (with mastic) |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 023 | 024 | 025 | 026 | 027* |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | | | | 10 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 0 | 0 | 0 | 10 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | 40 | 40 | | Trace <1% | Trace <1% |
| Cellulose | 30 | 30 | 95 | 75 | Trace <1% |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 30 | 30 | 5 | 24 | 89 |

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

Analyst: Fritz Fischer

Date: 06/04/93

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an Analytica Group company

18000 W. Highway 72
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(303) 420-4449
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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: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 027 [A] | 05/17/93 | [floor tile] |
| 027 [B] | 05/17/93 | [mastic] |
| 028 | 05/17/93 | 6"-10" block PI/rm. 30 |
| 029* | 05/17/93 | HMF A/W 6"-10" block PI/rm. 28 [with wrap] |
| 029 [A] | 05/17/93 | [pipe insulation] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 027 [A] | 027 [B] | 028 | 029* | 029 [A] |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| mosite | | | | 27 | 30 |
| nthophyllite | | | | | |
| Chrysotile | 10 | | 20 | 18 | 20 |
| rocidolite | | | 10 | | |
| remolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 10 | 0 | 30 | 45 | 50 |
| ther Fibrous Materials: | | | | | |
| Fibrous Glass | | Trace <1% | | | |
| ellulose | | 2 | | 10 | |
| nthetics | | | | | |
| Other: | | | | | |
| ercent Nonfibrous Material | 90 | 97 | 70 | 45 | 50 |

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

nalyst: Fritz Fischer

Date: 06/04/93

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

Client: ALPHA ENGINEERING GROUP *

LGN: 305792

Project ID: 17383011, Bldg. 47



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 029 [B] | 05/17/93 | [wrap] |
| 030 | 05/17/93 | HMF A/W <6" fbgl. PI/rm. 16, inside wall |
| 031 | 05/17/93 | <6" corr. PI/rm. 3 |
| 032 | 05/17/93 | HMF A/W <6" corr. PI/rm. 16, above ceiling (crawlspace) |
| 033 | 05/17/93 | 2'x4' lay-in CT, smooth/rm. 112 |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 029 [B] | 030 | 031 | 032 | 033 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| mosite | | | | 1 | |
| nthophyllite | | | | | |
| Chrysotile | | | 40 | 20 | |
| rocidolite | | | | | |
| remolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 0 | 40 | 21 | 0 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | 35 | | | |
| ellulose | 97 | 5 | 40 | 2 | 75 |
| ynthetics | | | | | |
| Other: | | | | | |
| ercent Nonfibrous Material | 3 | 60 | 20 | 77 | 25 |

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

nalyst: Fritz Fischer

Fritz Fischer

Date: 06/04/93

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

Client: **ALPHA ENGINEERING GROUP** •

LGN: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 034 | 05/17/93 | Black mastic, tar/rm. 111A |
| 035* | 05/17/93 | 12" brn. VFT/rm. 111 (with mastic) |
| 035 (A) | 05/17/93 | (floor tile) |
| 035 (B) | 05/17/93 | (mastic) |
| 036 | 05/17/93 | 6"-10" block PI/rm. 30 |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 034 | 035* | 035 (A) | 035 (B) | 036 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| mosite | | | | | |
| nthophyllite | | | | | |
| hrysotile | | 26 | 25 | 15 | 15 |
| rocidolite | | | | | 5 |
| remolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 26 | 25 | 15 | 20 |
| Other Fibrous Materials: | | | | | |
| ibrous Glass | | | | | |
| ellulose | 45 | Trace <1% | | 5 | |
| ynthetics | | | | | |
| ther: | | Trace <1% | | Trace <1% Talc | |
| ercent Nonfibrous Material | 55 | 73 | 75 | 79 | 80 |

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

nalyst: Fritz Fischer
Fritz Fischer

Date: 06/04/93

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

Client: **ALPHA ENGINEERING GROUP** *

LGN: **305792**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 037 | 05/17/93 | HMF A/W 6"-10" block PI/rm. 30 |
| 038 | 05/17/93 | HMF A/W <6" fbgl. PI/rm. 16, above ceiling (crawlspace) |
| 039 | 05/17/93 | <6" corr. PI/crawlspace above rm. 20 |
| 040 | 05/17/93 | HMF A/W <6" corr. PI/crawlspace above rm. 20 |
| 041 | 05/17/93 | Debris/crawlspace I (basement) |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 037 | 038 | 039 | 040 | 041 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Crocidolite | Trace <1% | | | | 35 |
| Anthophyllite | | | | | |
| Chrysotile | 20 | | | 15 | 20 |
| Amosite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 21 | 0 | 0 | 15 | 55 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | 20 | | Trace <1% | |
| Cellulose | 3 | 4 | 95 | 3 | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 76 | 76 | 5 | 81 | 45 |

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

Analyst: Fritz Fischer

Date: 06/04/93

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

Client: ALPHA ENGINEERING GROUP *

LGN: 305792

Project ID: 17383011, Bldg. 47



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 042 | 05/17/93 | Red linoleum/rm. 129 |
| 043 | 05/17/93 | Spray-on surf. mat./rm. 102 [with inseparable paint] |
| 044* | 05/17/93 | 9" red FT/rm. 122 [with mastic] |
| 044 [A] | 05/17/93 | [floor tile] |
| 044 [B] | 05/17/93 | [mastic] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 042 | 043 | 044* | 044 [A] | 044 [B] |
|---|---|---|---|---|---|
| asbestiform Minerals: | | | | | |
| osite | | | | | |
| thophyllite | | | | | |
| hrysotile | | 10 | 13 | 12 | 25 |
| ocidolite | | | | | |
| emolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 10 | 13 | 12 | 25 |
| her Fibrous Materials: | | | | | |
| ibrous Glass | | | | | |
| llulose | 30 | 1 | Trace <1% | | 1 |
| nthetics | | | | | |
| ther: | | | | | |
| rcent Nonfibrous Material | 70 | 89 | 86 | 88 | 74 |

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

alyst: Fritz Fischer

Fritz Fischer

Date: 06/04/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 045 | 05/17/93 | Gray-red linoleum/rm. D |
| 046* | 05/17/93 | 9" green FT/rm. 111 [with mastic] |
| 046 [A] | 05/17/93 | [floor tile] |
| 046 [B] | 05/17/93 | [mastic] |
| 047 | 05/17/93 | Debris/rm. 203 |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 045 | 046* | 046 [A] | 046 [B] | 047 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | 20 |
| Anthophyllite | | | | | |
| Chrysotile | | 5 | 5 | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 5 | 5 | 0 | 20 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | 2 | | | | |
| Cellulose | 20 | | | | |
| Synthetics | 3 | | | | |
| Other: | 1 Wollastonite | | | | |
| Percent Nonfibrous Material | 74 | 95 | 95 | 100 | 80 |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 048 | 05/17/93 | Red linoleum/rm. 109 |
| 049 | 05/17/93 | Spray-on surf. mat./rm. 117 |
| 050* | 05/17/93 | 9" red FT/rm. 125 [with mastic] |
| 050 [A] | 05/17/93 | [floor tile] |
| 050 [B] | 05/17/93 | [mastic] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 048 | 049 | 050* | 050 [A] | 050 [B] |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | 3 | 6 | 5 | 3 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 3 | 6 | 5 | 3 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | 15 | | | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 85 | 97 | 94 | 95 | 97 |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 051 | 05/17/93 | Gray-red linoleum/rm. 102A |
| 052* | 05/17/93 | 9" green FT/rm. 111 [with mastic] |
| 052 [A] | 05/17/93 | [floor tile] |
| 052 [B] | 05/17/93 | [mastic] |
| 053 | 05/17/93 | Red stage curtain/rm. 100 |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 051 | 052* | 052 [A] | 052 [B] | 053 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | 5 | 5 | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 5 | 5 | 0 | 0 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | 2 | | | | |
| Cellulose | 15 | | | | 100 |
| Synthetics | 2 | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 81 | 95 | 95 | 100 | |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 054 | 05/17/93 | Blue stage curtain/rm. 100 |
| 055* | 05/17/93 | 12" dk. beige FT/rm. 201 [with mastic] |
| 055 [A] | 05/17/93 | [floor tile] |
| 055 [B] | 05/17/93 | [mastic] |
| 056* | 05/17/93 | 9" gray FT/rm. 302 [with mastic] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 054 | 055* | 055 [A] | 055 [B] | 056* |
|---|---|---|---|---|---|
| **Asbestiform Minerals:** | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | 2 | 2 | | 3 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 2 | 2 | 0 | 3 |
| **Other Fibrous Materials:** | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | 100 | | | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | | 98 | 98 | 100 | 97 |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 056 [A] | 05/17/93 | [floor tile] |
| 056 [B] | 05/17/93 | [mastic] |
| 057 | 05/17/93 | Vibration joint cloth/room 203 |
| 058 | 05/17/93 | Rolled roofing/roof |
| 059 | 05/17/93 | Asphalt, gravel, over rolled roofing/roof |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 056 [A] | 056 [B] | 057 | 058 | 059 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | 2 | 5 | | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 2 | 5 | 0 | 0 | 0 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | 5 | 1 |
| Cellulose | | | 100 | 5 | 3 |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 98 | 95 | | 90 | 96 |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 060 | 05/17/93 | Weatherproofing sealant/roof |
| 061 | 05/17/93 | CAB/roof |
| 062 | 05/17/93 | Red stage curtain/rm. 100 |
| 063 | 05/17/93 | Blue stage curtain/rm. 100 |
| 064* | 05/17/93 | 12" dk. beige FT/rm. 202 [with mastic] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 060 | 061 | 062 | 063 | 064* |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | 20 | 20 | | | 2 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 20 | 20 | 0 | 0 | 2 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | | | 100 | 50 | |
| Synthetics | | | | 50 | |
| Other: | | | | | |
| Percent Nonfibrous Material | 80 | 80 | | | 98 |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 064 [A] | 05/17/93 | [floor tile] |
| 064 [B] | 05/17/93 | [mastic] |
| 065* | 05/17/93 | 9" gray FT/rm. 302 [with mastic] |
| 065 [A] | 05/17/93 | [floor tile] |
| 065 [B] | 05/17/93 | [mastic] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 064 [A] | 064 [B] | 065* | 065 [A] | 065 [B] |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | 2 | | 13 | 12 | 10 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 2 | 0 | 13 | 12 | 10 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | | | Trace <1% | Trace <1% | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 98 | 100 | 86 | 87 | 90 |

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

Analyst: Mark Cooperrider Mike Scales Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 066 | 05/17/93 | Vibration joint cloth/rm. 302E |
| 067 | 05/17/93 | Rolled roofing/roof |
| 068 | 05/17/93 | Asphalt, gravel over rolled roofing/roof |
| 069 | 05/17/93 | Weatherproofing sealant/roof |
| 070 | 05/17/93 | CAB/roof |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 066 | 067 | 068 | 069 | 070 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | 2 | 5 | | 20 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 2 | 5 | 0 | 20 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | 1 | Trace <1% | 1 | |
| Cellulose | 100 | 20 | Trace <1% | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | | 77 | 94 | 99 | 80 |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** Page: 9 of 12

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 071 | 05/17/93 | Plaster/rm. 302 |
| 072 | 05/17/93 | Drywall/rm. 108 |
| 073* | 05/17/93 | 12" beige VFT/rm. 119 [with mastic] |
| 073 [A] | 05/17/93 | [floor tile] |
| 073 [B] | 05/17/93 | [mastic] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 071 | 072 | 073* | 073 [A] | 073 [B] |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | | 3 | 2 | 10 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 0 | 3 | 2 | 10 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | | 10 | | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 100 | 90 | 97 | 98 | 90 |

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

Analyst: Mark Cooperrider Date: 06/07/93

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Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 074 | 05/17/93 | Cove base mastic/rm. 102A |
| 075 | 05/17/93 | Window putty/rm. 108 |
| 076 | 05/17/93 | 2'x4' lay-in CT, smooth/rm. 17 |
| 077 | 05/17/93 | Tank insulation/rm. 30 |
| 078 | 05/17/93 | Tank insulation/rm. 30 |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 074 | 075 | 076 | 077 | 078 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | 50 | Trace <1% |
| Anthophyllite | | | | | |
| Chrysotile | | 2 | | | 40 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 2 | 0 | 50 | 41 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | | Trace <1% | | 5 | 5 |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 100 | 97 | 100 | 45 | 54 |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 079 | 05/17/93 | Stucco/exterior, east |
| 080 | 05/17/93 | Stucco/exterior, east |
| 081 | 05/17/93 | Firedoor/rm. 31 |
| 082 | 05/17/93 | Firedoor/rm. 31 |
| 083 | 05/18/93 | Carpet pad/crawlspace L |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 079 | 080 | 081 | 082 | 083 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | | | | 15 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 0 | 0 | 0 | 15 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | 3 | | | |
| Cellulose | | | | | 85 |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 100 | 97 | 100 | 100 | |

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

Analyst: Mark Cooperriner Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP** LGN: **305793**

Project ID: **17383011, Bldg. 47,** 

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 084 | 05/18/93 | Carpet pad/crawlspace L |
| 085 | 05/18/93 | Gasket, on box/rm. 302E |
| 086 | 05/18/93 | Gasket, on box/rm. 302E |
| | | |
| | | |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 084 | 085 | 086 | | |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | 15 | 85 | 85 | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 15 | 85 | 85 | | |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | 85 | | | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | | 15 | 15 | | |

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

Analyst: Mark Cooperrider Date: 06/07/93

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

Client: **ALPHA ENGINEERING GROUP *** LGN: **306808**

Project ID: **17383011, Bldg. 47, Recreation** Page: 1 of 2

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 087 | 08/10/93 | 2'x4' lay-in CT/library side of rm. 108 |
| 088 | 08/10/93 | 2'x4' lay-in CT/library side of rm. 108 |
| 089 | 08/10/93 | 2'x4' lay-in CT/library side of rm. 108 |
| 090 | 08/10/93 | 2'x4' lay-in CT/rm. 14 |
| 091 | 08/10/93 | 2'x4' lay-in CT/rm. 14 |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 087 | 088 | 089 | 090 | 091 |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | 4 | 5 | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | 4 | 5 | 0 | 0 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | 40 | 70 | 70 | 70 | 70 |
| Cellulose | 30 | | | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 30 | 26 | 25 | 30 | 30 |

Analyst: Craig B. Bruno
Craig B. Bruno

Date: 08/20/93

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

Client: **ALPHA ENGINEERING GROUP** * LGN: **306808**

Project ID: **17383011, Bldg. 47, Recreation** Page: 2 of 2

**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 092 | 08/10/93 | Tar patch only/roof |
| 093 | 08/10/93 | Tar patch only/roof |
| 094 | 08/10/93 | Asphalt and gravel over rolled roof/roof [inseparable] |
| | | |
| | | |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 092 | 093 | 094 | | |
|---|---|---|---|---|---|
| **Asbestiform Minerals:** | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | 10 | 15 | | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 10 | 15 | 0 | | |
| **Other Fibrous Materials:** | | | | | |
| Fibrous Glass | 5 | 3 | 8 | | |
| Cellulose | 5 | | 5 | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 80 | 82 | 87 | | |

Analyst: Craig B. Bruno
Craig B. Bruno

Date: 08/20/93

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

Client: **ALPHA ENGINEERING GROUP ***

LGN: **307049**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 095* | 08/16/93 | 12" black VFT/rm. 25 [and adhesive with inseparable foam] |
| 095 [A] | 08/16/93 | [floor tile] |
| 095 [B] | 08/16/93 | [adhesive with inseparable foam] |
| 096* | 08/16/93 | 12" black VFT/rm. 25 [with inseparable mastic and adhesive with inseparable foam] |
| 096 [A] | 08/16/93 | [floor tile with inseparable mastic] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 095* | 095 [A] | 095 [B] | 096* | 096 [A] |
|---|---|---|---|---|---|
| Asbestiform Minerals: | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | 10 | 10 | | 12 | 12 |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 10 | 10 | 0 | 12 | 12 |
| Other Fibrous Materials: | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | Trace <1% | | 1 | Trace <1% | Trace <1% |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 89 | 90 | 99 | 87 | 87 |

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

Analyst: Mike Scales

Date: 08/31/93

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

Client: **ALPHA ENGINEERING GROUP** *

LGN: **307049**

Project ID: **17383011, Bldg. 47**



**Sample Description:**

| Sample Number | Sample Date | Description |
|---|---|---|
| 096 [B] | 08/16/93 | [adhesive with inseparable foam] |

**Results of PLM Analysis:** Visual Area Estimation: Percentages Detected

| Sample Number: | 096 [B] | | | | |
|---|---|---|---|---|---|
| **Asbestiform Minerals:** | | | | | |
| Amosite | | | | | |
| Anthophyllite | | | | | |
| Chrysotile | | | | | |
| Crocidolite | | | | | |
| Tremolite-Actinolite | | | | | |
| TOTAL ASBESTOS | 0 | | | | |
| **Other Fibrous Materials:** | | | | | |
| Fibrous Glass | | | | | |
| Cellulose | 1 | | | | |
| Synthetics | | | | | |
| Other: | | | | | |
| Percent Nonfibrous Material | 99 | | | | |

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

Analyst: Mike Scales

Date: 08/31/93

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# 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 seperate 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 AIHA 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 achived 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.