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U S A T H A M A

U.S. Army Toxic and Hazardous Materials Agency

Report of Sampling and Analysis Results

Davisville Army Housing Units North Kingstown, Rhode Island

August 1990

Prepared for:

U.S. ARMY TOXIC AND
HAZARDOUS MATERIALS AGENCY
Aberdeen Proving Ground
Maryland 21010-5401

Prepared by:

WESTON® MANAGERS DESIGNERS/CONSULTANTS

Under the supervision of:

Environmental Assessment and
Information Sciences Division
Argonne National Laboratory
Argonne, Illinois 60439

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Roy F. Weston, Inc. has conducted a sampling and analysis program of the Army housing property located in North Kingstown, Rhode Island. The objectives of this effort include further characterization of environmental contamination identified in an enhanced preliminary assessment carried out in 1989. The specific activities performed at this site were identification, evaluation of the condition, and collection of samples from specific suspected asbestos-containing materials, including floor tiles, pipe run and pipe fitting insulation, dust in the ductwork, and exterior siding, where present. These evaluations were necessary to clarify potential environmental issues identified in the earlier report, prior to the sale or realignment of the property.

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SAMPLING AND ANALYSIS AT THE U.S. ARMY FAMILY HOUSING UNIT (FHU) PROPERTY DAVISVILLE, RHODE ISLAND

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EXECUTIVE SUMMARY

The U.S. Army family housing units (FHUs) at Davisville, Rhode Island were inspected by Roy F. Weston, Inc. (WESTON) personnel during February 1990 to further evaluate the environmental concerns identified in the enhanced Preliminary Assessment reports prepared and submitted earlier by Argonne National Laboratory (ANL) for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA). Six of the 62 single-family housing units were examined on 09 February to investigate the possible presence of asbestos-containing materials (ACM).

The ANL Draft Sampling and Analysis Plan, Revision 1 (SAP) specified sampling the following materials, where present, which are suspected to contain asbestos, from ten per cent of the housing units or a minimum of three housing units, whichever is greater.

- Pipe run insulation.
- Vinyl floor tiles.

The WESTON personnel selected three housing units for inspection after review of maintenance records and drawings, discussions with housing management personnel, and determination that the units were in similar condition. The housing units chosen, Nos. 012, 015, 016, 039, 048, and 059 were considered to be representative of the other 56 units, but this was not confirmed by an examination of all the units.

Seventeen samples of vinyl floor tile and 12 samples of pipe run insulation were collected by WESTON and analyzed. These analyses revealed that asbestos is present at the six housing units examined. Asbestos was quantified at 1% or greater by polarized light microscopy (PLM) in nine of the floor tile samples, and quantified at less than 1% in four samples of the floor tile. Three other samples were qualitatively identified by transmission electron microscopy (TEM). No detectable fibers were found in one sample by both PLM and TEM. Asbestos was found at or greater than 15% by PLM in all 12 pipe run insulation samples. During the asbestos sampling activity, other suspect materials observed were white granular spray-applied paint on the ceilings, roof shingles, and felt.

The following practices should be observed with regard to the known and suspected asbestos-containing materials identified:

- The most significant risk of asbestos exposure to occupants is presented by the friable asbestos-containing pipe run insulation. All damaged material should be repaired or removed in a planned, properly executed program, as soon as practical. If repairs are made, rather than removal, an Operations and Maintenance (O&M) Plan should be developed and implemented. This plan must describe the locations of all known ACM, procedures for its maintenance, repair and removal, and personnel responsible for its implementation. The O&M plan must remain in force until such time as all ACM is removed from the facility.

- The vinyl floor tiles pose no significant risk as long as they are in good condition and are not damaged by excessive wear or misuse. They should be managed in place under an O&M program which describes procedures for the regular inspection of the floor tiles and the removal and replacement of any that become damaged.

SECTION 1. INTRODUCTION

SAMPLING AND ANALYSIS AT THE U.S. ARMY FAMILY HOUSING UNIT (FHU) PROPERTY DAVISVILLE, RHODE ISLAND

SECTION 1. INTRODUCTION

Roy F. Weston, Inc. (WESTON) was retained by Argonne National Laboratory (ANL) to provide assistance in gathering additional environmental data for the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) at 53 family housing unit (FHU) properties in 12 states. The Davisville, Rhode Island property is one of these FHUs.

1.1 PURPOSE AND SCOPE

The purpose of this project was to provide the Department of the Army with sound environmental data on the properties which are scheduled for sale or realignment as a result of the Defense Authorization Amendments and Base Closure and Realignment Act (Public Law 100-526). Environmental assessments of each property covered by the Act are required by the Secretary of Defense prior to their closure or realignment. Such actions must be performed in accordance with applicable provisions of the National Environmental Policy Act (NEPA) to ensure that any environmental hazards will be identified and mitigated where required.

Previously, ANL conducted enhanced preliminary assessments (PAs) for each property. These enhanced PAs made recommendations regarding sampling and analysis to determine (1) whether and in what quantities asbestos is present in certain building construction materials (including pipe run insulation, dust accumulated in heating ductwork, vinyl floor tile, and exterior siding shingles, where present), (2) in selected contexts, whether and in what concentration soils and groundwater may be contaminated, and (3) whether and in what range transformer oils at selected sites may contain polychlorinated biphenyls (PCBs). WESTON gathered this data by implementing ANL's Draft FHU Sampling and Analysis Plan, Revision 1 (SAP).

1.2 SITE DESCRIPTION

The Department of the Army's FHU property in Davisville, Rhode Island consists of 11 duplexes and 10 four-unit officers quarters located on 14.0 acres. The units are situated along Devils Foot Road. The areas surrounding this FHU property are woodlands to the south, east, and west, with Devils Foot Road as the northern boundary.

The 62 units at this FHU property, built in 1965 consist of three and four bedroom duplexes and four-unit townhomes. All of the units are two-story, wood-frame units constructed on solid concrete foundations with no basements or crawl spaces. There is no ductwork in the foundation. The domestic water lines are embedded with the concrete foundation. The heating system is an electric hot water system with baseboard radiation. The units have pitched-roofs surfaced with asphalt shingles and exteriors finished with vinyl siding.

1.3 REPORT ORGANIZATION

This report contains the results of the sampling and analysis program performed by WESTON. Section 2 contains a description of the asbestos sampling performed at the property and laboratory results for samples of suspected asbestos-containing material (ACM) collected. Copies of field notes and laboratory results pertaining to asbestos are provided in Appendices A.1 and A.2.

SECTION 2. ASBESTOS-CONTAINING MATERIALS

SECTION 2. ASBESTOS-CONTAINING MATERIALS

WESTON personnel inspected six of the 62 units at the Davisville family housing facility on 09 February 1990 for the presence of suspected ACM. Vinyl floor tile and pipe run insulation were the only suspect materials found within the buildings that were sampled. All sampling was done following the requirements of ANL's SAP. Additionally, all field work was performed in accordance with applicable Federal regulations, including 40 CFR Part 61 Subpart M, 40 CFR Part 763 Subpart E, and 29 CFR Part 1910.1001.

2.1 SAMPLING RATIONALE

The sampling rationale used by WESTON for this project followed the recommendations set forth by ANL. The type of suspect ACM to be sampled, the number of housing units to be examined at each FHU facility, and number of samples to be taken for each material found were described in the SAP. The plan for Davisville required sampling of the following materials, if present:

- Pipe run insulation.
- Vinyl floor tiles.

In accordance with the SAP, six units were examined at this facility. The sampling plan, however, did not identify specific units which were to be sampled. The task of determining which housing units were representative of the facility as a whole and, therefore, would be sampled was left to the WESTON field team. After reviewing all available maintenance records and drawings and discussing the facility with Directorate of Engineering and Housing (DEH) personnel, it was determined that all of the units at the Davisville FHU were similar in condition. Units 012, 015, 016, 039, 048, and 059 were chosen by the WESTON field team leader as representative units to be sampled.

The SAP specifies that a minimum of two pipe run insulation samples and one sample of each color of floor tile be collected from each of the housing units examined. Twelve samples of pipe run insulation and 17 samples of vinyl floor tiles were collected at the facility.

2.2 FIELD ACTIVITIES AND OBSERVATIONS

Each of the units was inspected to determine if suspect materials were present. Samples of the pipe run insulation were retrieved using disposable coring devices with one-half inch diameter tubes, designed such that the coring devices also serve as the sampling containers. Before the coring tool was inserted, the materials to be sampled were moistened to prevent asbestos fibers from becoming airborne. The coring devices were placed in their outer sample containers and secured by a tight fitting lid. These containers were labeled with sample numbers, and shipped to the lab. The sampling tools were wiped clean with a damp cloth and all debris resulting from the sampling activities as collected and placed into plastic bags. The small bore holes were sealed with an encapsulant.

Two samples of pipe run insulation were taken in each of six units. The pipe run insulation is friable, as defined in the EPA regulations, meaning that it can be crushed, crumbled, pulverized, or otherwise reduced to a powder using hand pressure. Friable ACM are considered to be more hazardous than non-friable ACM

since they are much more likely to release asbestos fibers. Because of its friability and instances of damage, the pipe run insulation is considered to be the most hazardous type of ACM in the Davisville FHU.

Two colors (black and purple) of 9" x 9" floor tile and three colors (tan, white, and a floral pattern) of 12" x 12" floor tile were sampled. All six units contained the floral patterned 12" x 12" floor tile. Units 59, 48, 39, 15, and 12 contained purple 9" x 9" floor tile. Units 59, 48, 39, and 16 contained white 12" x 12" floor tile. Unit 12 also contained tan 12" x 12" floor tile and Unit 16 contained black 9" x 9" floor tile. One sample was taken of each of the floor tiles found in each housing unit, resulting in a total of 17 samples for laboratory determination of asbestos content These samples were collected by breaking off a small piece of floor tile in an inconspicuous location. About one square inch of the tile surface area was taken for each sample. No effort was made to separate the mastic, which sometimes contains asbestos, from the floor tile samples themselves.

The vinyl floor tile in all six of the units inspected was in good condition. This material is considered to be a non-friable type of ACM, unless damaged. If significant damage occurs, such that the material becomes friable as defined in the asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP), the U. S. Environmental Protection Agency (EPA) would classify these tiles as friable materials. However, an EPA interpretation was recently released that changes certain previous interpretations regarding non-friable ACM. On 23 February 1990, a memorandum was written by the Director of Emissions Standards Division, the Director of Stationary Source Compliance Division, and the Associate Enforcement Counsel for Air Enforcement of the EPA Office of Air Quality Planning and Standards (OAQPS). This memorandum was circulated to other air quality officials and EPA regional offices in early March 1990. This latest position states that floor tiles and certain other non-friable materials do not have to be removed from a facility prior to demolition, unless they are severely damaged and thus are considered friable, or unless the demolition may cause fiber release through grinding or abrasion of the tiles. Floor tile removal shall be done if demolition is to be accomplished by burning, either of the unit or of the debris from demolition. However, if the floors in the housing units are to be renovated, special care must be taken during the process to prevent the release of asbestos fibers.

The WESTON field team was directed, as a part of the project scope contained in the SAP, to perform sampling and analysis of specific suspect ACM. Other suspect materials observed were white granular spray-applied paint on the ceilings, roof shingles, and felt. Copies of the field notes are included in Appendix A.1.

2.3 LABORATORY PROCEDURES AND RESULTS

The bulk samples of building materials were analyzed for asbestos content by WESTON's optical microscopy laboratory in Auburn, Alabama. This laboratory is accredited by the American Industrial Hygiene Association (AIHA) and the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). The bulk samples were analyzed by Polarized Light Microscopy (PLM) using the EPA's "Interim Method for the Determination of Asbestos in Bulk Insulation Samples", EPA 600/M4-82-020, December 1982. Copies of the laboratory reports are included in Appendix A.2.

Vinyl floor tile samples for which no asbestos was found using PLM methods were analyzed qualitatively for the presence of asbestos by Transmission Electron Microscopy (TEM) at WESTON's NVLAP

accredited electron microscopy laboratory in Auburn, Alabama. Copies of these laboratory reports are also included in Appendix A.2.

All analyses were performed in accordance with protocols set forth in the Laboratory Accreditation package submitted by WESTON under NVLAP. This document includes standard procedures for sample analysis and quality assurance / quality control (QA/QC) which were acceptable to NIST. The QA/QC protocols for the laboratory differ significantly from those commonly found in chemical analysis procedures, due to the nature of the analytical procedure. Since there are no reagents, digestions, or other steps in the process that provide significant opportunities for sample contamination or analyte loss, lot blanks and sample spikes are not performed. Instead, all analyses are performed using the following steps:

- Incoming samples are divided into lots of ten for analysis.
- One sample is selected at random to serve as the QC check and divided into two containers.
- The sample lot is assigned to an analyst who determines the asbestos content of each sample.
- The QC sample is analyzed by a different analyst, designated by the sample custodian.
- The results of both analysts are submitted to the QC Coordinator for review, and comparison to the laboratory QC chart.
- The results are reviewed and approved, based on the written QC review procedures, or rejected. If rejected, the sample lot and QC sample are reanalyzed.

The WESTON laboratory routinely runs blank checks to ensure that equipment and refractive index oils are not contaminated, collects and analyzes samples of the air in the work areas to document that airborne asbestos fibers do not threaten worker health or contaminate samples, and analyzes samples submitted by NIST to document precision of results as required by the NVLAP program. Samples provided in past rounds of proficiency checks are used for analyst training and to document analyst proficiency. The use of third party laboratory comparisons is often done, and is accomplished by sending duplicates of samples to an outside laboratory and comparing the results obtained by the two facilities.

In interpreting the asbestos results, it should be noted that the definition of asbestos presence differs between the EPA and some state agencies. According to the EPA definition, any materials that contain greater than one per cent (>1%) asbestos are classified as ACM by the 1977 NESHAP regulations. However, California has recently implemented state regulations that consider all materials containing 0.1 per cent or more asbestos as asbestos-containing. It is believed that several other states will soon follow the lead of California in lowering the threshold limit to 0.1 per cent, including some in which properties under review in this study are located. Currently, the State of Rhode Island continues to abide by the EPA definition, hence, all samples containing >1% asbestos are considered to be ACM.

The matter is further complicated by the fact that the PLM method was developed specifically for friable materials, but not for non-friable types of suspect ACM such as vinyl floor tiles, vinyl sheeting, and siding. In fact, no specific method has been developed and promulgated to date for such samples, so laboratories use PLM as the only available documented procedure for their analysis. PLM has an inherent

limitation on fiber resolution of about 0.25 micrometer (um) in diameter, while reliable detection and quantification of fibers smaller than 1 um in diameter is difficult. The manufacturing process for vinyl floor tiles, for example, often produces the very small fiber diameters which cannot be seen by PLM. WESTON's experience is that frequently such samples do, in fact, contain significant quantities of asbestos. WESTON has developed a qualitative technique using TEM to detect the presence of such small fibers and minimize false negatives in the laboratory results. This technique, however, does not allow a good quantitative estimate of asbestos content.

For these reasons, the WESTON laboratories have implemented a policy of reporting asbestos presence as follows:

- Asbestos determined by PLM to be present at greater than 1% is reported as the quantity detected.
- If asbestos is estimated to be less than 1% by PLM, it is reported as "<1%". This estimate of asbestos content may be made when only one asbestos structure is observed.
- If asbestos is not detected in certain non-friable materials by PLM, then the samples are subjected to TEM analysis. The results are reported as positive if asbestos is detected by TEM.

Recommendations made in this report are based on the >1% regulatory limit, except for floor tiles as discussed earlier and except as otherwise noted. However, all samples in which asbestos was detected are discussed. This represents a conservative approach to the assessment of asbestos presence at the facility.

Table 2.1 contains a summary of all samples collected at the Davisville FHU, including sample locations, material descriptions, and laboratory results. PLM results are quantitative while TEM results are qualitative. Quantity estimates for materials sampled that were suspected to contain asbestos are presented in Table 2.2. The field notes describing the observations are provided in Appendix A.1, while copies of the original laboratory reports are included as Appendix A.2.

Ten of the 12 samples of pipe run insulation were found to contain the chrysotile type of asbestos in a friable form at or greater than 15% using the PLM technique for analysis. Based on these observations, the pipe run insulation should be considered to contain asbestos.

Nine of the floor tile samples were found by PLM to contain asbestos at or greater than the 1% level. WESTON considers the 1% value reported for samples AP-526-09-RI-059-AFT and AP-528-09-RI-059-AFT to be sufficient to define the samples as asbestos-containing, due to the analytical uncertainty of the PLM method when applied to floor tile, previously discussed. Four other samples were found by PLM to contain asbestos, but as a concentration of <1%. Three of the samples, for which no asbestos was reported following PLM analysis, was found to contain asbestos fibers by the TEM procedure. While this results is qualitative in nature, consideration of the process through which floor tiles were manufactured leads to the conclusion that this material should be treated as ACM. No detectable asbestos fibers were found in one sample by both PLM and TEM. Thus 16 of the 17 floor tile samples were found to contain asbestos. The 56 units not inspected should be considered to have ACM present in the floor tiles unless additional sampling and analysis is performed and shows that no asbestos is present in these units.

TABLE 2.1
BULK SAMPLE SUMMARY
DAVISVILLE FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	ASBESTOS CONTENT PCM ANALYSIS	CONFIRMATION TEM ANALYSIS
Unit 059				
AP524-09-RI-059-API	Pipe run insulation	Hot water tank room	Chrysotile, 30%	
AP524-09-RI-059-API	Pipe run insulation	Hot water tank room	Chrysotile, 45%	
AP526-09-RI-059-AFT	White 12" x 12" floor tile	First floor bath	Chrysotile, 1%	
AP527-09-RI-059-AFT	Purple 9" x 9" floor tile	Living/Dining/Bedrooms	Chrysotile, 12%	
AP528-09-RI-059-AFT	Floral pattern 12" x 12" floor tile	Kitchen	Chrysotile, 1%	
Unit 048				
AP529-09-RI-048-AFT	White 12" x 12" floor tile	First floor bath	None Detected	Negative
AP530-09-RI-048-AFT	Floral pattern 12" x 12" floor tile	Kitchen	Chrysotile, <1%	
AP531-09-RI-048-AFT	Purple 9" x 9" floor tile	Living/Dining/Bedrooms	Chrysotile, 3%	
AP532-09-RI-048-API	Pipe run insulation	Hot water tank room	Chrysotile, 25%	
AP533-09-RI-048-API	Pipe run insulation	Hot water tank room	Chrysotile, 15%	
Unit 039				
AP534-09-RI-039-API	Pipe run insulation	Hot water tank room	Chrysotile, 25%	
AP535-09-RI-039-API	Pipe run insulation	Hot water tank room	Chrysotile, 20%	
AP536-09-RI-039-AFT	White 12" x 12" floor tile	First floor bath	Chrysotile, <1%	
AP537-09-RI-039-AFT	Purple 9" x 9" floor tile	Living/Dining/Bedrooms	Chrysotile, 3%	
AP538-09-RI-039-AFT	Floral pattern 12" x 12" floor tile	Kitchen	Chrysotile, <1%	
Unit 015				
AP539-09-RI-015-API	Pipe run insulation	Heater room	Chrysotile, 25%	
AP540-09-RI-015-API	Pipe run insulation	Heater room	Chrysotile, 20%	
AP541-09-RI-015-AFT	Floral pattern 12" x 12" floor tile	Kitchen/First floor bath	None Detected	Positive
AP542-09-RI-015-AFT	Purple 9" x 9" floor tile	Living/Dining/Bedrooms	Chrysotile, 10%	
Unit 012				
AP543-09-RI-012-AFT	Floral pattern 12" x 12" floor tile	Kitchen/First floor bath	None Detected	Positive
AP544-09-RI-012-AFT	Tan 12" x 12" floor tile	Living/Dining rooms	Chrysotile, 2%	
AP545-09-RI-012-AFT	Purple 9" x 9" floor tile	Second floor	Chrysotile, 10%	
AP546-09-RI-012-API	Pipe run insulation	Heater room	None Detected	
AP547-09-RI-012-API	Pipe run insulation	Heater room	None Detected	
Unit 016				
AP548-09-RI-016-AFT	Floral pattern 12" x 12" floor tile	Kitchen	Chrysotile, <1%	
AP549-09-RI-016-AFT	White 12" x 12" floor tile	First floor bath	None Detected	Positive
AP550-09-RI-016-AFT	Black 9" x 9" floor tile	All rooms except kitchen and bath	Chrysotile, 3%	
AP551-09-RI-016-API	Pipe run insulation	Heater room	Chrysotile, 15%	
AP552-09-RI-016-API	Pipe run insulation	Heater room	Chrysotile, 25%	

TABLE 2.2
ASBESTOS CONTAINING MATERIALS
DAVISVILLE FAMILY HOUSING

SAMPLE IDENTIFICATION	MATERIAL TYPE	LOCATION	QUANTITY	UNITS
Unit 059				
AP524-09-RI-059-API	Pipe run insulation	Hot water tank room	N/A	
AP524-09-RI-059-API	Pipe run insulation	Hot water tank room	N/A	
AP526-09-RI-059-AFT	White 12" x 12" floor tile	First floor bath	55	Square ft
AP527-09-RI-059-AFT	Purple 9" x 9" floor tile	Living/Dining/Bedrooms	870	Square ft
AP528-09-RI-059-AFT	Floral pattern 12" x 12" floor tile	Kitchen	65	Square ft
Unit 048				
AP530-09-RI-048-AFT	Floral pattern 12" x 12" floor tile	Kitchen	65	Square ft
AP531-09-RI-048-AFT	Purple 9" x 9" floor tile	Living/Dining/Bedrooms	870	Square ft
AP532-09-RI-048-API	Pipe run insulation	Hot water tank room	1	Square ft
AP533-09-RI-048-API	Pipe run insulation	Hot water tank room	N/A	
Unit 039				
AP534-09-RI-039-API	Pipe run insulation	Hot water tank room	1	Linear ft
AP535-09-RI-039-API	Pipe run insulation	Hot water tank room	N/A	
AP536-09-RI-039-AFT	White 12" x 12" floor tile	First floor bath	55	Square ft
AP537-09-RI-039-AFT	Purple 9" x 9" floor tile	Living/Dining/Bedrooms	870	Square ft
AP538-09-RI-039-AFT	Floral pattern 12" x 12" floor tile	Kitchen	65	Square ft
Unit 015				
AP539-09-RI-015-API	Pipe run insulation	Heater room	N/A	
AP540-09-RI-015-API	Pipe run insulation	Heater room	N/A	
AP541-09-RI-015-AFT	Floral pattern 12" x 12" floor tile	Kitchen/First floor bath	120	Square ft
AP542-09-RI-015-AFT	Purple 9" x 9" floor tile	Living/Dining/Bedrooms	1,155	Square ft
Unit 012				
AP543-09-RI-012-AFT	Floral pattern 12" x 12" floor tile	Kitchen/First floor bath	120	Square ft
AP544-09-RI-012-AFT	Tan 12" x 12" floor tile	Living/Dining rooms	600	Square ft
AP545-09-RI-012-AFT	Purple 9" x 9" floor tile	Second floor	550	Square ft
Unit 016				
AP548-09-RI-016-AFT	Floral pattern 12" x 12" floor tile	Kitchen	60	Square ft
AP549-09-RI-016-AFT	White 12" x 12" floor tile	First floor bath	35	Square ft
AP550-09-RI-016-AFT	Black 9" x 9" floor tile	All rooms except kitchen and bath	1,250	Square ft
AP551-09-RI-016-API	Pipe run insulation	Heater room	1	Linear ft
AP552-09-RI-016-API	Pipe run insulation	Heater room	N/A	

2.4 CONCLUSIONS AND RECOMMENDATIONS

The sample analyses performed by WESTON have revealed that asbestos is present in most floor tile collected in the six housing units examined and that pipe run insulation contains asbestos. Other materials including granular spray-applied ceiling finish, roofing shingles, and roofing felt, which sometimes contain asbestos, were noted in the house. These units are thought to be representative of the other 56 at the site, but this was not confirmed by sampling all units.

Analytical results of the pipe run and fitting insulation confirmed that asbestos is present in 10 of the 12 samples taken. The insulation should be remediated in those units where asbestos-containing pipe run insulation and fitting insulation is damaged by repairing damaged areas and encapsulating the friable materials, or by complete removal prior to realignment. If repairs are made, rather than removal, an Operations and Maintenance (O&M) Plan should be developed and implemented. An O&M plan must address the following:

- The locations of all known and suspected ACM.
- The procedures and frequency for periodically assessing the ACM in the facility.
- The procedures for safely handling the ACM during maintenance or removal activities.
- Designation of an asbestos coordinator for the facility.
- The responsibilities and requirements for training of personnel involved with maintenance and renovation of the facility.
- The record-keeping program for the facility.

All of the asbestos-containing pipe run insulation must be removed prior to a planned renovation of the plumbing system or demolition of the units.

The vinyl floor tiles in the six housing units inspected were in good condition, but, should they become broken or damaged, asbestos fibers may be released. The recent EPA clarification of the definition for damaged non-friable materials apparently removes some concerns about the status of these materials at the time of renovation or demolition. Inspection of these normally non-friable materials prior to demolition is required, but, if they are in good condition at the time, they may be left in place as long as planned demolition procedures will not release a significant amount of asbestos fibers. However, if demolition will subject these non-friable materials to grinding, sanding, or abrading, or if demolition involves burning of the structure or debris from the structure, all forms of ACM, including these floor tiles, must be removed in advance.

The vinyl floor tiles should be left in place and managed under an O&M plan until they must be removed during a planned renovation of the units or another activity that may disturb them. The vinyl floor tiles should be removed in accordance with regulations applicable at the time.

Although granular spray-applied paint on the ceilings, roof shingles, and felt were the only suspect materials noted, care should be taken during renovations or demolition to identify suspect materials that may have been hidden from the view of the assessment team and determine the asbestos content of all suspect materials.

APPENDIX A.1. FIELD DATA, ASBESTOS SAMPLING

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SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. DAVISVILLE RI, 59 NAVY DRIVE

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert Lynch

TECHNICIAN NAME STAN ADELMAN SIGNATURE Stan Adelman

TIME ARRIVED 0930 TIME DEPARTED 1000 DATE 09 FEB 90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a two 3 bedroom, 2 bath house with tan aluminum siding. There are no floor vents present. The furnace room has residual air cell type insulation in the foundation. There are 3 types of floor tile present. There is speckled (white decorative type) in all the rooms. The roofing shingles and felt are asbestos. This is a type C, 3 bedroom town home. It was chosen because it is vacant and based upon available drawings, maintenance records, and discussions with maintenance personnel. This is one of three types of homes present. It is

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	5
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	2	Exp. Assess. Form Init.	✓

Q.A. Check _____ SIGNATURE _____ DATE ___/___/90
dd mmm yy

M:\ADMNFORM\SSL.frm

WESTON

SITE SURVEY LOG

(Continued)

the predominant type of home.

ASBESTOS SURVEY DATA

0163

BLDG. NO.: 0519
INSTALLATION 0019

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: DAVISVILLE FAMILY HSG
BLDG. DESCRIPTION: TYPE C TOWNHOME

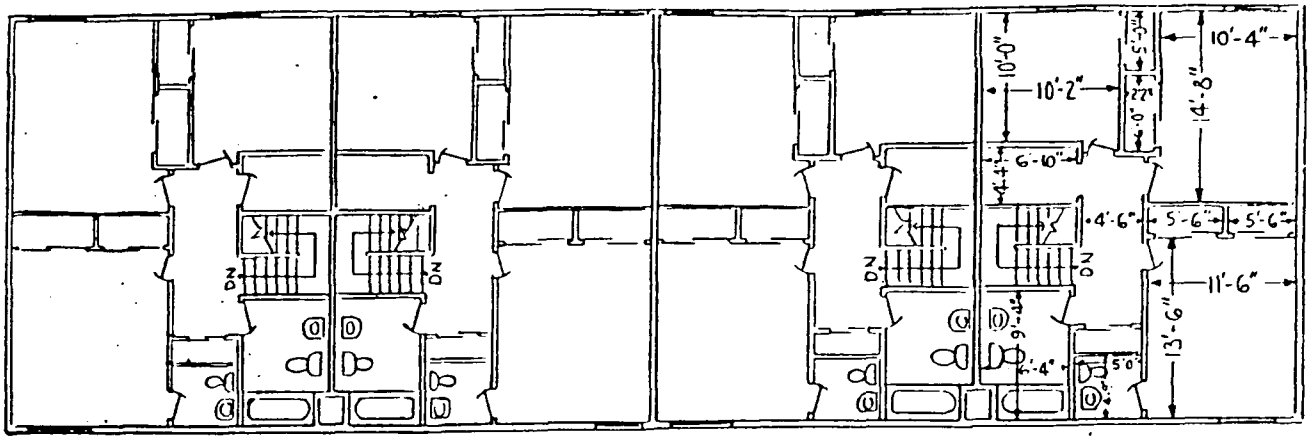
DATE (dd/mm/yy): 09/02/90
TIME ARRIVED: 0930

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AP5014-09-RE-0519-AIRE					HIGH WATER TANK ROOM	1M/A	✓	09193A	C1
2.	AP5015-09-RE-0519-AIPE					HIGH WATER TANK ROOM	M/A	✓	09193A	C1
3.	AP5016-09-RE-0519-AIFT					1ST FLOOR BATH	155	-	09193B	02
4.	AP5017-09-RE-0519-AIFT					LIVING/DINING/BEDROOMS	870	-	09193C	03
5.	AP5018-09-RE-0519-AIFT					KITCHEN	165	-	09193D	04
6.	____-_-_-__-AI_						___	-	____	_
7.	____-_-_-__-AI_						___	-	____	_
8.	____-_-_-__-AI_						___	-	____	_
9.	____-_-_-__-AI_						___	-	____	_
10.	____-_-_-__-AI_						___	-	____	_
11.	____-_-_-__-AI_						___	-	____	_
12.	____-_-_-__-AI_						___	-	____	_

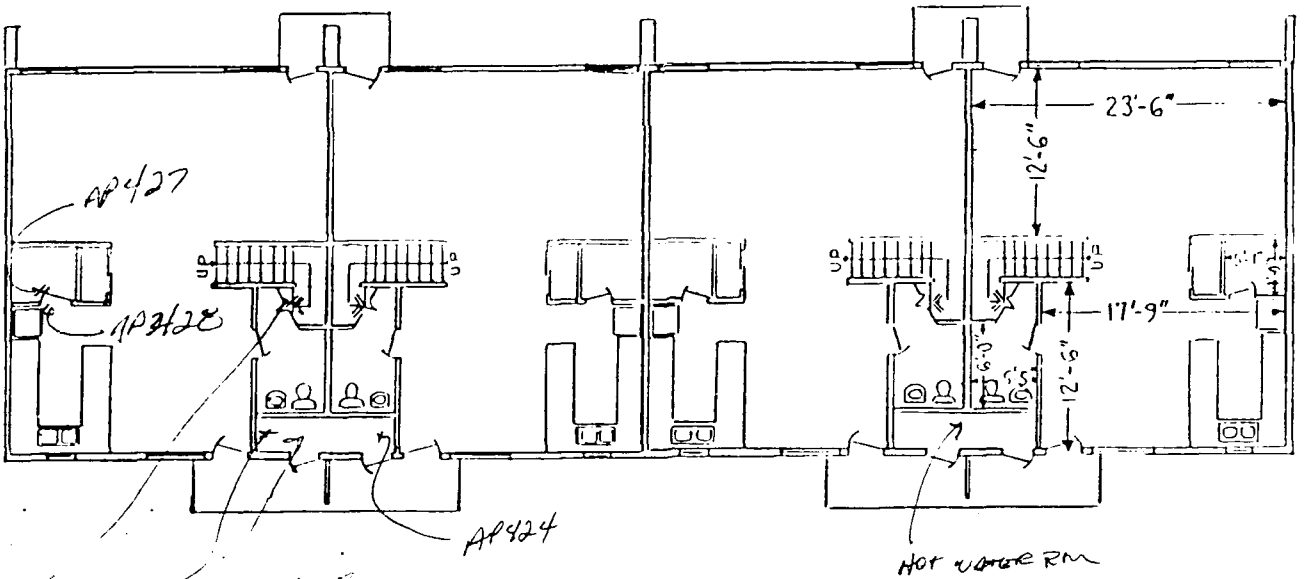
NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
C1	air cell type insulation, less than 4" size, insulation comes up through foundation and has been cut flush with foundation.
02	12x12 white with brown floor tile in 1st floor bath only.
03	9x9 purple floor tile in living/dining room and second floor bedrooms.
04	12x12 floral pattern floor tile in kitchen only.

TECHNICIAN SIGNATURE Robert L Lynch

QUALITY ASSURANCE SIGNATURE _____



SECOND FLOOR PLAN
TYPE "C" 3 BEDROOM TOWNHOUSE



FIRST FLOOR PLAN
TYPE "C" - 3 BEDROOM TOWNHOUSE

59 NAVY DRIVE

0165

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. DAVISVILLE RI, 48 NAVY DRIVE

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert Lynch

TECHNICIAN NAME [illegible] SIGNATURE [illegible]

TIME ARRIVED 1000 TIME DEPARTED 1020 DATE 09 ~~FEB~~ 1 90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a two story 3 bedroom 2 BATH home with tan aluminum siding. The roofing felt and shingles are suspect. There are 3 types of floor tile. There are no floor vents. The hot water tank room has a small amount of pipe insulation. There is decorative ceiling spray on in all the rooms. This is a type "C" town home and was chosen because it was vacant and based upon available drawings, maintenance records, and discussions with housing management personnel. This is one of three types of homes present. It is the predominant type at the site.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	5
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	2	Exp. Assess. Form Init.	✓

Q.A. Check ____ SIGNATURE ____ DATE ____ / ____ / 90
dd mmm yy

WESTON

ASBESTOS SURVEY DATA

0167

BLDG. NO.: 048
INSTALLATION 009

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: DAVISVILLE FAMILY HSG.
BLDG. DESCRIPTION: TYPE C TOWNHOMES

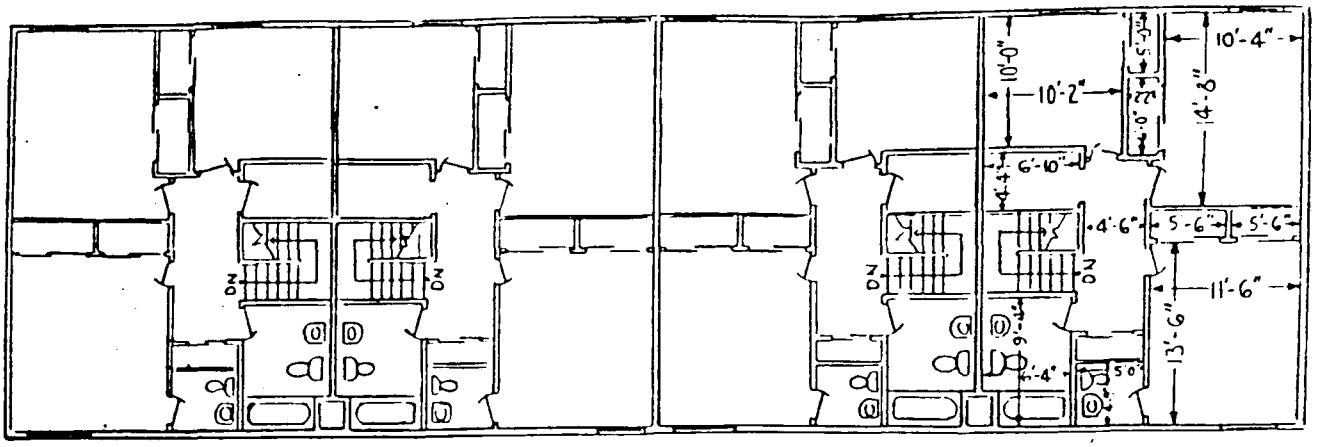
DATE (dd/mm/yy): 09/02/90
TIME ARRIVED: 1000

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AP5329	09	RI	0048	AFT	1ST FLOOR BATH	55	-	0994A	01
2.	AP5330	09	RI	0048	AFT	KITCHEN	65	-	0994B	02
3.	AP5331	09	RI	0048	AFT	LIVING/DINING/HALL/BEDROOMS	870	-	0994C	03
4.	AP5332	09	RI	0048	APE	HOT WATER TANK RM	1	✓	0994D	04
5.	AP5333	09	RI	0048	APE	HOT WATER TANK RM	N/A	✓	0994D	04
6.					A			-		
7.					A			-		
8.					A			-		
9.					A			-		
10.					A			-		
11.					A			-		
12.					A			-		

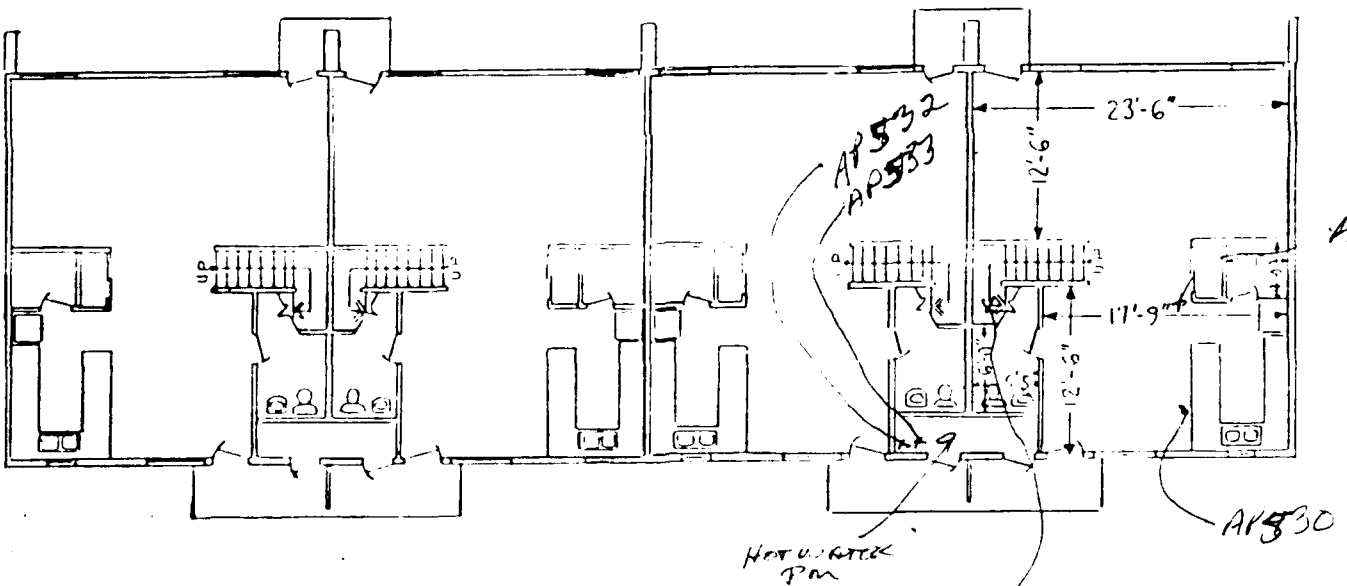
NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	12x12 white with brown floor tile in first floor bath only.
02	12x12 floral floor tile in kitchen only
03.	9x9 purple floor tile in living/dining and all three bedroom.
04	air cell type insulation coming up from the foundation, it has been cut flush with the foundation. it is ~~the~~ less than 4" size.

TECHNICIAN SIGNATURE Robert Z Lynch.

QUALITY ASSURANCE SIGNATURE _____



SECOND FLOOR PLAN
TYPE "C" 3 BEDROOM TOWNHOUSE



FIRST FLOOR PLAN
TYPE "C" - 3 BEDROOM TOWNHOUSE

HEANNY DR.
DAVISVILLE, RI

0169

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. DAISVILLE RI, 39 NAVY DRIVE

FACILITY CONTACT JOHN CRAFTON TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert Lynch

TECHNICIAN NAME Stan Sadowski SIGNATURE Stan Sadowski

TIME ARRIVED 1020 TIME DEPARTED 1030 DATE 08/~~08~~/90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a two story 3 bedroom two bath home with green aluminum siding. There is a small amount of pipe insulation in the hot water tank room. There are 3 types of floor tile present. There are no floor vents. The shingles and felt are suspect. There is decorative siding spray on in all the rooms.

This is a type C townhome. It was chosen based upon available drawings, maintenance records, and discussions with town management personnel. It was also chosen because it was vacant. It is one of

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	5
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	2	Exp. Assess. Form Init.	✓

Q.A. Check ____ SIGNATURE ____ DATE ____/____/90
dd mmm yy

WESTON

SITE SURVEY LOG

(Continued)

three types of homes present. Det is the predominant type at the facility.

ASBESTOS SURVEY DATA

0171

BLDG. NO.: 039
INSTALLATION 019

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: DAVISVILLE FAMILY HSG
BLDG. DESCRIPTION: TYPE C TOWNHOUSE

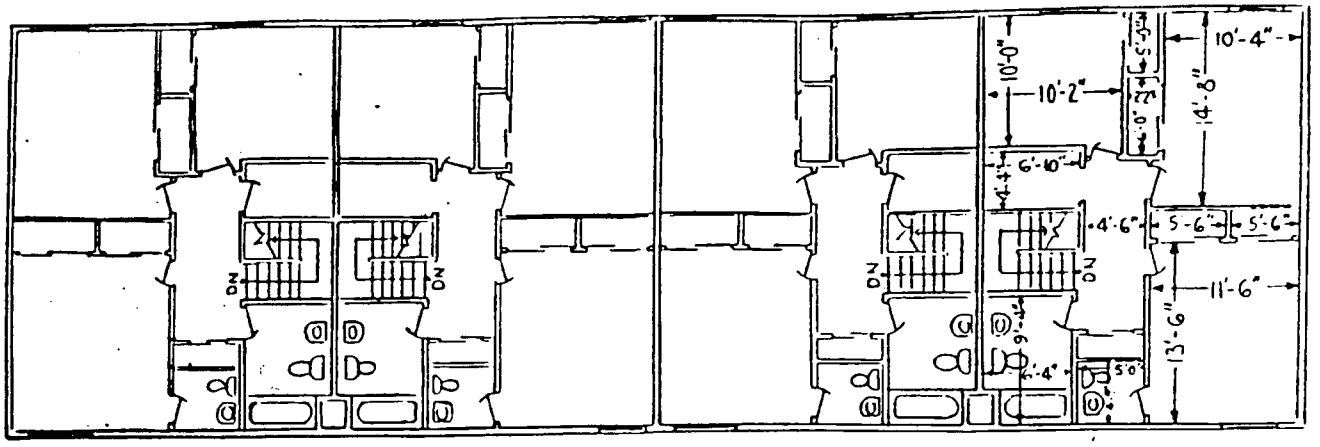
DATE (dd/mm/yy): 09/02/90
TIME ARRIVED: 1020

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AP1534-09-RI-039-A/E					HOT WATER TANK RM	1	✓	09195A	01
2.	AP1535-09-RI-039-A/E					HOT WATER TANK RM	N/A	✓	09195A	02
3.	AP1536-09-RI-039-AFT					1ST FLOOR BATH	1 SF		09195B	02
4.	AP1537-09-RI-039-AFT					LIVING/DINING BEDRMS	870		09195C	03
5.	AP1538-09-RI-039-AFT					KITCHEN	60 SF		09195D	04
6.					A					
7.					A					
8.					A					
9.					A					
10.					A					
11.					A					
12.					A					

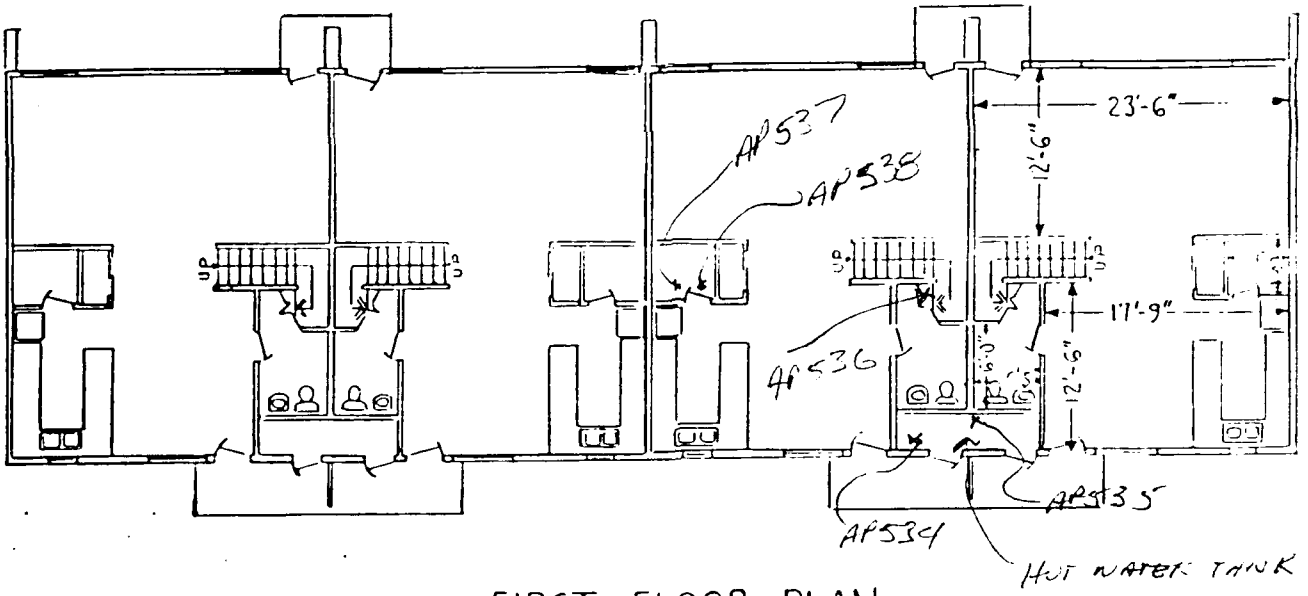
NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	air cell type insulation coming up through foundation, but is cut flush. less than 4" size
02	12x12 white with brown floor tile in 1st floor bath only
03	9x9 purple floor tile in living/dining and second floor bedrooms.
04	12x12 floral pattern floor tile in kitchen only.

TECHNICIAN SIGNATURE Robert Lynch

QUALITY ASSURANCE SIGNATURE _____



SECOND FLOOR PLAN
TYPE "C" 3 BEDROOM TOWNHOUSE



FIRST FLOOR PLAN
TYPE "C" - 3 BEDROOM TOWNHOUSE

39 NAVY DRIVE
DAVISVILLE, RI

0173

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. DAVISVILLE RI. 15 NAVY DRIVE

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (401) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert L Lynch

TECHNICIAN NAME Stan Anderson SIGNATURE Stan Anderson

TIME ARRIVED 1030 TIME DEPARTED 1100 DATE 09 FEB/90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a two story 4 bedroom home with gray aluminum siding. The roofing shingles and felt are suspect. There is a small amount of pipe insulation in the heater room. There are two types of floor tile. There are no floor air vents. The ceiling has decorative spray-on in all of the rooms.

This building was chosen based upon available drawings, maintenance records, and discussions with ~~the~~ ~~Hos~~ housing management personnel. This is one of three types of homes present. This

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	4
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	2	Exp. Assess. Form Init.	✓

Q.A. Check ____ SIGNATURE ____ DATE ____/____/90
dd mmm yy

WESTON

SITE SURVEY LOG

(Continued)

is the predominant type of home at the facility.

ASBESTOS SURVEY DATA

0175

BLDG. NO.: 015 / 039

INSTALLATION 0109

TASK TEAM MEMBERS
STAN ANDERSON
ROBERT LYNCH

W.O. No. 2104-13-01

CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: DAVENVILLE FAMILY HSG.

BLDG. DESCRIPTION: TWO STORY, 4 BEDROOM

DATE (dd/mm/yy): 09/02/90

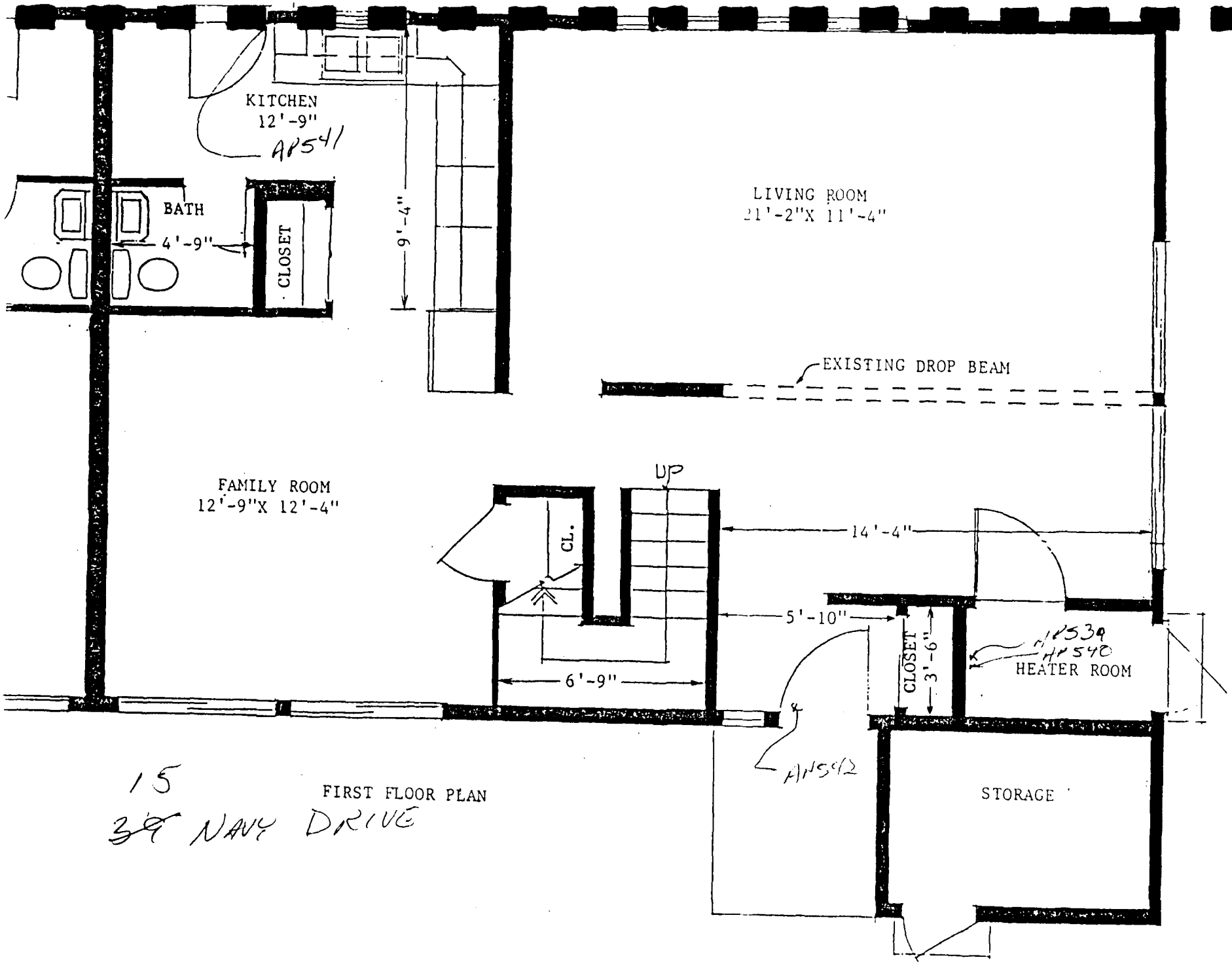
TIME ARRIVED: 1030

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AP5539-09-RI-015/039-AIRE					HEATER RM	N/A	✓	01996VA	01
2.	AP5540-09-RI-015/039-AIRE					HEATER RM	N/A	✓	01996VA	01
3.	AP5541-09-RI-015/039-AFT					KITCHEN/1ST FLOOR BATH	1240	—	01996VB	02
4.	AP5542-09-RI-015/039-AFT					LIVING/DINING/BEDROOMS	1165	—	01996VC	03
5.								—		
6.								—		
7.								—		
8.								—		
9.								—		
10.								—		
11.								—		
12.								—		

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	air cell type insulation that comes up through foundation, but is cut flush with foundation. less than 4" sq.
02	12x12 floral pattern floor tile in kitchen & 1st floor bath.
03	9x9 purple floor tile in all rooms except 1st floor bath and kitchen

TECHNICIAN SIGNATURE Robert L Lynch

QUALITY ASSURANCE SIGNATURE _____



15
39 NAVY DRIVE

FIRST FLOOR PLAN

DAVISVILLE RI.

0177

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. DAVISVILLE RI, 12 NAVY DRIVE

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert L Lynch Jr.

TECHNICIAN NAME Stan Anderson SIGNATURE Stan Anderson

TIME ARRIVED 1100 TIME DEPARTED 1130 DATE 09 FEB 90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This is a two story 4 bedroom home with blue aluminum siding. The roof shingles and felt are suspect. There are no floor vents. There are 3 types of floor tile present. There is a small amount of pipe insulation in the heater room. There is decorative spray-on ~~on~~ on ceiling in all rooms.

~~This is a two~~

It was chosen based upon available drawings, maintenance records, and discussion with housing management personnel. This is one of three types of homes present at Davisville, RI.

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	5
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	2	Exp. Assess. Form Init.	✓

Q.A. Check ____ SIGNATURE ____ DATE ____/____/90
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WESTON

ASBESTOS SURVEY DATA

0179

BLDG. NO.: 01/2
INSTALLATION 0109

TASK TEAM MEMBERS
STAN ANDERSON
ROBERT LYNCH

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: DANSVILLE FAMILY HSG.
BLDG. DESCRIPTION: TWO STORY, BLUE

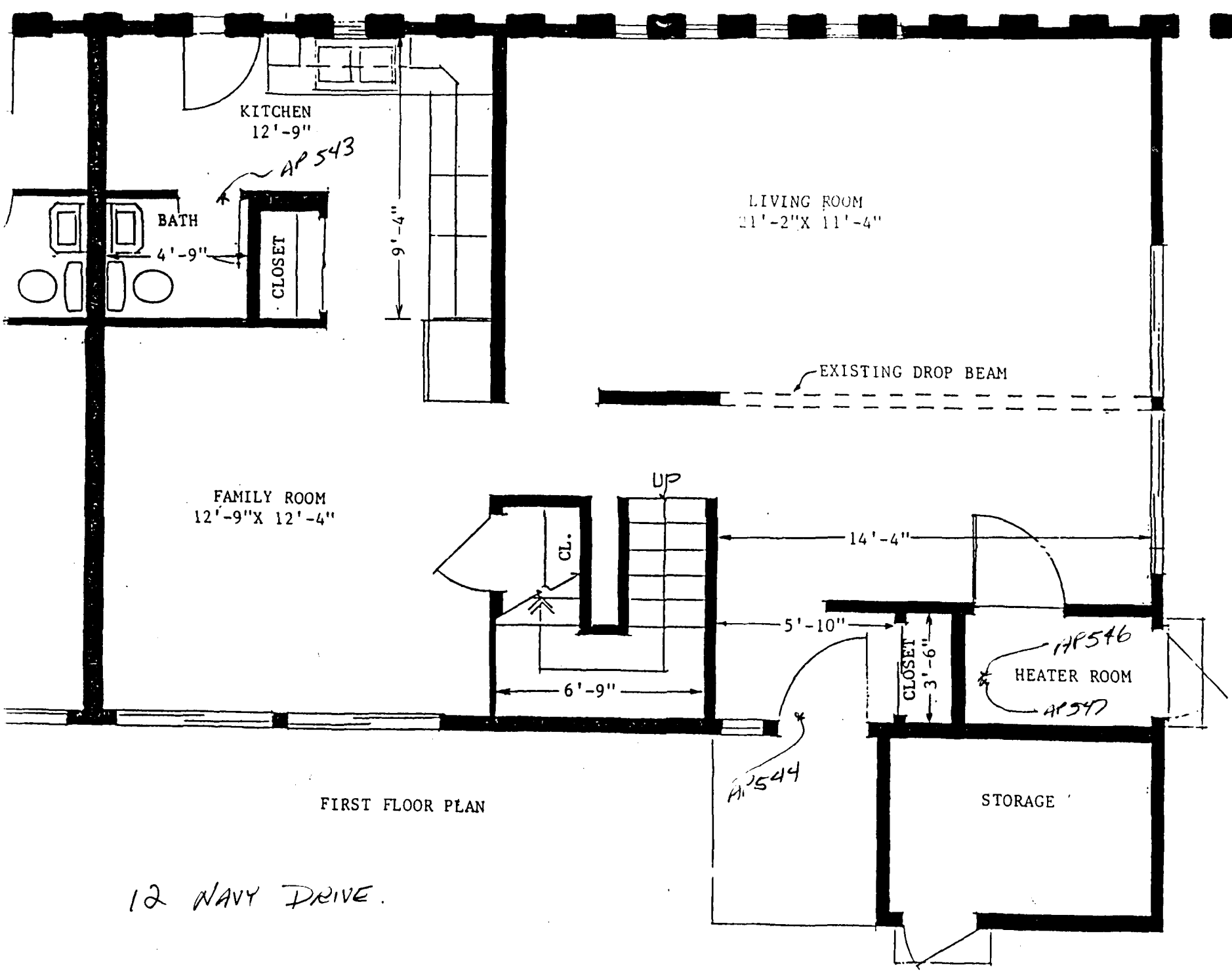
DATE (dd/mm/yy): 09/02/90
TIME ARRIVED: 1130

ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AP6443-09-RI-01/2-AIFT					KITCHEN/LIST FLOOR BATH	120	_	09917A	01
2.	AP6444-09-RI-01/2-AIFT					LEFT FLOORS DINING/LIVING	690	_	09917B	02
3.	AP6445-09-RI-01/2-AIFT					SECOND FLOORS	1350	_	09917C	03
4.	AP6446-09-RI-01/2-AIFT					HEATHER ROOM	1	✓	09917D	04
5.	AP6447-09-RI-01/2-AIFT					HEATHER ROOM	N/A	✓	09917D	04
6.								_		
7.								_		
8.								_		
9.								_		
10.								_		
11.								_		
12.								_		

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	12x12 floral pattern floor tile
02	12x12 Tan floor in living/dining rooms.
03	9x9 purple floor tile in second floor.
04	air cell type insulation coming up through foundation but it is cut flush with foundation, less than 4" size.

TECHNICIAN SIGNATURE Robert Lynch

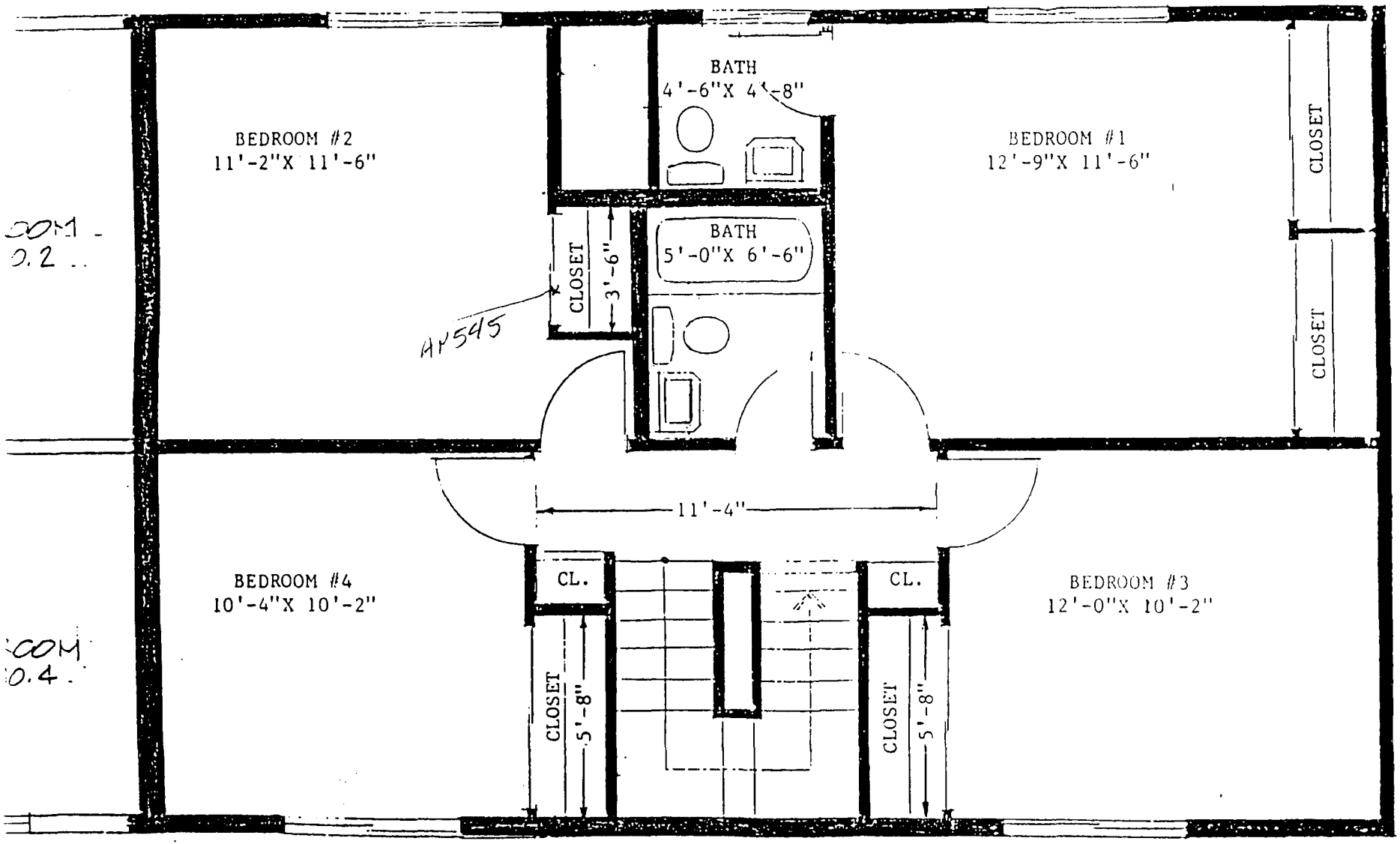
QUALITY ASSURANCE SIGNATURE _____



FIRST FLOOR PLAN

12 NAVY DRIVE.

DAVISVILLE RI.



SECOND FLOOR PLAN

0181

SITE SURVEY LOG

CLIENT Argonne National Labs WESTON WORK ORDER NO. 2104-13-01

FACILITY/BLDG. NO. DAVISVILLE RF, 16 NAVY DRIVE

FACILITY CONTACT JOHN GRAFTON TELEPHONE NUMBER (508) 796-3551

TECHNICIAN NAME ROBERT LYNCH SIGNATURE Robert J. Lynch.

TECHNICIAN NAME STAN ANDERSON SIGNATURE Stan C.

TIME ARRIVED 1130 TIME DEPARTED 1200 DATE 09/~~03~~/90
dd mmm yy

SPECIFIC SITE ACTIVITIES, COMMENTS, INTERVIEW RESULTS & BRIEF DESCRIPTION OF FACILITY

This a two story 3 bedroom home with tan aluminum siding. ~~There are two types of floor tile.~~ There is a textured ceiling in all rooms. There are 3 types of floor tile present. There are no floor vents present. There is a small amount of pipe insulation present.

This home was chosen based upon available drawings, maintenance records, and discussions with housing management personnel. It is also one of three types of homes present

ACTIVITY CHECKLIST

Interviews Completed	✓	Number of Samples	5
Drawings Reviewed	✓	Survey Form Completed	✓
Drawings Attached	✓	Site Log Completed	✓
Visual Inspection	✓	Chain-of-Custody Initiated	✓
Number of Photos	2	Exp. Assess. Form Init.	✓

Q.A. Check ____ SIGNATURE ____ DATE ____/____/90
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WESTON

ASBESTOS SURVEY DATA

0183

BLDG. NO.: 01/16
INSTALLATION EC19

TASK TEAM MEMBERS
ROBERT LYNCH
STAN ANDERSON

W.O. No. 2104-13-01
CLIENT: ARGONNE NATIONAL LAB

BLDG. NAME: DANBURY FAMILY HSG

DATE (dd/mm/yy): 09/FEB/90

BLDG. DESCRIPTION: TWO STORY WITH TAN SIDING

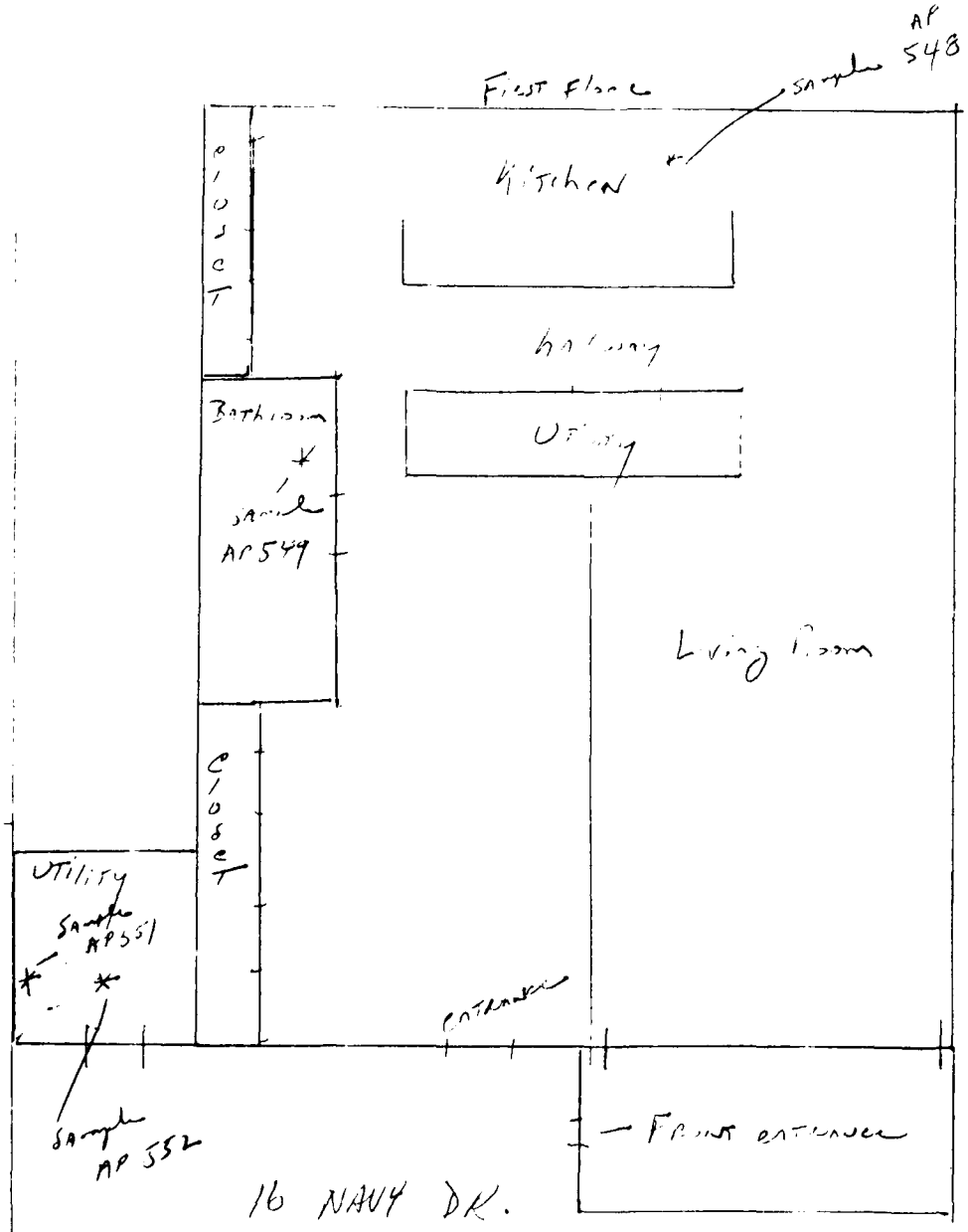
TIME ARRIVED: 1/2 E

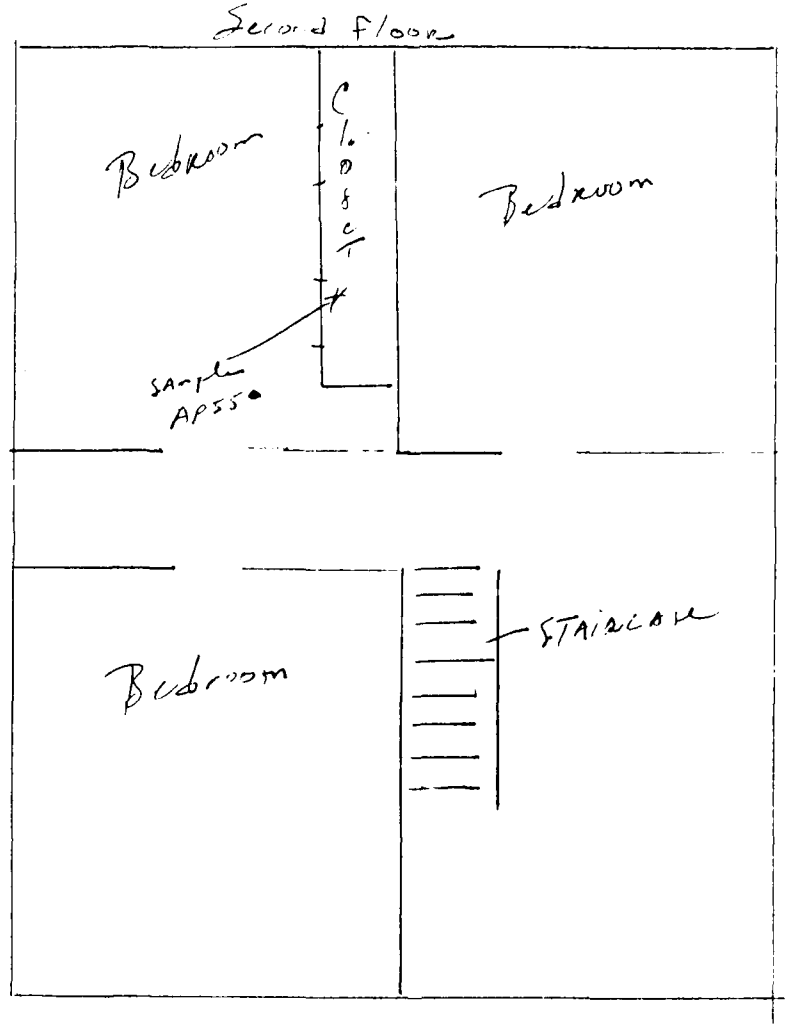
ITEM NO.	LAB SAMPLE NO.	BASE NO.	STATE	UNIT NO.	SAMPLE CODE	AREA	QUANTITY	PHOTO	E.A. FORM NO.	NOTES
1.	AI5518	09	RI	0116	AIFT	KITCHEN	16C	_	09986H	01
2.	AI5519	09	RI	0116	AIFT	1ST BATH	35	_	09986B	02
3.	AI5520	09	RI	0116	AIFT	ALL LIMS EXCEPT KIT/BATH	12510	_	09986C	03
4.	AI5521	09	RI	0116	AIPI	HEATI RM	1	✓	09986D	04
5.	AI5522	09	RI	0116	AIPI	HEATI RM	N/A	✓	09986D	04
6.					A			_		
7.					A			_		
8.					A			_		
9.					A			_		
10.					A			_		
11.					A			_		
12.					A			_		

NOTE NO.	NOTES/REMARKS/COMMENTS/DETAILS/OTHER MATERIALS, QUANTITY, ETC.
01	12x12 floral patten ~~tile~~ floor tile in kitchen only.
02	12x12 white in 1st floor bath only
03	9x9 black floor tile in all rooms except kitchen and 1st floor bath.
04	air cell type insulation ~~from~~ coming up from ~~floor~~ foundation, but it is cut flush with floor. It is less than 4" size.

TECHNICIAN SIGNATURE Robert L Lynch

QUALITY ASSURANCE SIGNATURE _____





16 NAVY DR.

DAVISVILLE RI.

APPENDIX A.2. LABORATORY DATA, ASBESTOS SAMPLES

BULK SAMPLE ANALYSIS SUMMARY

Weston W.O. No. 2104-13-01-0000

Sample Number AP524 through Sample AP552

AO LAB ID NO	CLIENT/CLIENT ID	LOCATION	MATERIAL DESCRIPTION*	DATE RECEIVED	RESULTS** CH	AM	CR	OT	TL	LAYERS	ANALYST
AP524	09-RI-059-API	TANKRM	F, INSULATION	02/12/90	30	ND	ND	ND	30	Yes	07323
AP525	09-RI-059-API	TANKRM	F, INSULATION	02/12/90	45	ND	ND	ND	45	Yes	07323
AP526	09-RI-059-AFT	BATH	NF, WH, 12X12 FT	02/12/90	1	ND	ND	ND	1	Yes	07323
AP527	09-RI-059-AFT	LIVNRM	NF, 9X9 FT	02/12/90	12	ND	ND	ND	12	Yes	07323
AP528	09-RI-059-AFT	KITCHN	NF, 12X12 FT	02/12/90	1	ND	ND	ND	1	Yes	07323
AP529	09-RI-048-AFT	BATH	NF, WH, 12X12 FT	02/12/90	ND	ND	ND	ND	ND	No	07323
AP530	09-RI-048-AFT	KITCHN	NF, 12X12 FT	02/12/90	<1	ND	ND	ND	<1	Yes	07323
AP531	09-RI-048-AFT	LIVNRM	NF, 9X9 FT	02/12/90	3	ND	ND	ND	3	No	06806
AP532	09-RI-048-API	TANKRM	F, INSULATION	02/12/90	25	ND	ND	ND	25	Yes	06806
AP533	09-RI-048-API	TANKRM	F, INSULATION	02/12/90	15	ND	ND	ND	15	Yes	06806
AP534	09-RI-039-API	TANKRM	F, INSULATION	02/12/90	25	ND	ND	ND	25	Yes	06806
AP535	09-RI-039-API	TANKRM	F, INSULATION	02/12/90	20	ND	ND	ND	20	Yes	06806
AP536	09-RI-039-AFT	BATH	NF, WH, 12X12 FT	02/12/90	<1	ND	ND	ND	<1	No	06806
AP537	09-RI-039-AFT	LIVNRM	NF, 9X9 FT	02/12/90	3	ND	ND	ND	3	No	06806
AP538	09-RI-039-AFT	KITCHN	NF, 12X12 FT	02/12/90	<1	ND	ND	ND	<1	No	06806
AP539	09-RI-039-API	HEATRM	F, INSULATION	02/12/90	25	ND	ND	ND	25	Yes	06072
AP540	09-RI-039-API	HEATRM	F, INSULATION	02/12/90	20	ND	ND	ND	20	Yes	06072
AP541	09-RI-039-AFT	KIT&BA	NF, 12X12 FT	02/12/90	ND	ND	ND	ND	ND	No	06072
AP542	09-RI-039-AFT	LIVNRM	NF, 9X9 FT	02/12/90	10	ND	ND	ND	10	No	06072
AP543	09-RI-012-AFT	KIT&BA	NF, 12X12 FT	02/12/90	ND	ND	ND	ND	ND	No	06072
AP544	09-RI-012-AFT	LIVNRM	NF, TN, 12X12 FT	02/12/90	2	ND	ND	ND	2	No	06072
AP545	09-RI-012-AFT	2NDFLR	NF, 9X9 FT	02/12/90	10	ND	ND	ND	10	No	06072
AP546	09-RI-012-API	HEATRM	F, INSULATION	02/12/90	ND	ND	ND	ND	ND	No	06072
AP547	09-RI-012-API	HEATRM	F, INSULATION	02/12/90	ND	ND	ND	ND	ND	No	06806
AP548	09-RI-016-AFT	KITCHN	NF, 12X12 FT	02/12/90	<1	ND	ND	ND	<1	No	06806
AP549	09-RI-016-AFT	BATH	NF, WH, 12X12 FT	02/12/90	ND	ND	ND	ND	ND	No	06806
AP550	09-RI-016-AFT	ALLRMS	NF, BK, 9X9 FT	02/12/90	3	ND	ND	ND	3	No	06806
AP551	09-RI-016-API	HEATRM	F, INSULATION	02/12/90	15	ND	ND	ND	15	Yes	06806
AP552	09-RI-016-API	HEATRM	F, INSULATION	02/12/90	25	ND	ND	ND	25	Yes	06806

* MATERIAL DESCRIPTION

Friable[1], Color[2], System[3], Type

** RESULTS

CH - Chrysotile
AM - Amosite
CR - Crocidolite
OT - Other
TL - Total

FRIABLE[1]

F - Friable
NF - Non-Friable

COLOR[2]

BK - Black
BL - Blue
BR - Brown
GR - Green
GY - Gray
RD - Red
TN - Tan
WH - White
YL - Yellow

SYSTEM[3]

CHW - Chilled Water
DOM - Domestic Water
HHW - Heating Hot Water
STM - Steam
UNK - Unknown

All analyses are performed in accordance with the methods set forth in U.S. EPA 600/M4-82-020, as ammended. Weston's Optical Microscopy Laboratory is accredited by the National Institute of Standards and Technology's National Voluntary Laboratory Accreditation Program for asbestos fiber analysis (Laboratory Code 1254).

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Transmission Electron Microscopy
Asbestos Summary Report

Client: Argonne National Laboratories Weston W.O. No.: 2104-13-01-0000

Sample Type: Floor Tiles Sampling Location: Davisville

QUALITATIVE ANALYSIS

FLOOR TILES: A 0.5 to 2.0 gram portion of each floor tile sample was ultrasonically disaggregated in four milliliters of deionized, 0.2 μm membrane filtered water. After the coarse fraction settled, a drop of the suspended, clay-sized fraction was placed on a Formvar coated 200 mesh Cu TEM grid and allowed to dry. The grid was carbon coated for thermal stability in the electron beam and examined with a Philips CM12 transmission electron microscope operating at 120 kilovolts accelerating voltage.

ANALYTICAL RESULTS

SAMPLE IDENTIFICATION	RESULTS
AP529-09-RI-048-AFT	Negative
AP541-09-RI-015-AFT	Positive
AP543-09-RI-012-AFT	Positive
AP549-09-RI-016-AFT	Positive

Barry Rayfield
(Approved for Transmittal)

3/14/90
(Date)

* This test report relates only to the specific items tested.
** These sample results may only be reproduced in full, and are valid only if approved for transmittal.