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Contamination Source Review for Building E3642, Edgewood Area, Aberdeen Proving Ground, Maryland

Energy Systems Division
Argonne National Laboratory



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Contamination Source Review for Building E3642, Edgewood Area, Aberdeen Proving Ground, Maryland

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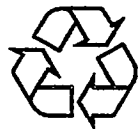
*Contamination Source Review
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September 1995

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**Contamination Source Review
for Building E3642, Edgewood Area,
Aberdeen Proving Ground, Maryland**

by

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A.K. Draugelis, J. Rueda, and R.E. Zimmerman

Summary

This report was prepared by Argonne National Laboratory (ANL) to document the results of a contamination source review of Building E3642 at the Aberdeen Proving Ground (APG) in Maryland. This report may be used to assist the U.S. Army in planning for the future use or disposition of this building. The review included a historical records search, physical inspection, photographic documentation, and geophysical investigation. The field investigations were performed by ANL during 1994 and 1995.

Building E3642 (APG designation) is part of the E3640 complex (old "Pilot Complex") in the Kings Creek Area of APG's Edgewood Area. Building E3642 was a support facility for Building E3640. It was used as a storage site and to house a caustic tank for the scrubbing system. The E3640 complex was constructed between 1951 and 1952 for process laboratory work.

The physical inspection and photographic documentation of Building E3642 were completed in November 1994. The two-story, rectangular structure contains two rooms. The building, which measures approximately 19 ft by 18 ft, is supported by a steel and wood frame. The building's walls are painted sheet metal. The gable roof/ceiling, made of corrugated transite, is supported by a structural steel frame. The building's second floor has a wooden floor supported by steel framing; the floor on the first floor is concrete. Piping is attached to the metal storage tank, and electrical conduit was observed throughout the building. No floor drains were discovered.

In December 1994, ANL staff conducted geophysical surveys in the immediate vicinity of Building E3642 by using several nonintrusive methods. Buried liquid waste lines and fresh water lines were identified by using these methods. No buried tanks were observed near Building E3642.

No information was available regarding air quality or underground storage tanks associated with Building E3642.

On the basis of information collected and reviewed for Building E3642, it is the authors' judgment that the anomalies identified in the vicinity of Building E3642 during the geophysical surveys warrant further investigation and evaluation. The transite roof is suspected asbestos-containing material and should be tested and properly disposed of. The contents of the approximately 3,000-gal tank on the first floor should also be tested.

1 Introduction

The U.S. Army Aberdeen Proving Ground (APG) commissioned Argonne National Laboratory (ANL) to conduct a contamination source review to identify and define areas of toxic or hazardous contaminants and to assess the physical condition and accessibility of APG buildings (Brubaker et al. 1994). The information obtained from the review may be used to assist the U.S. Army in planning for the future use or disposition of the buildings. The contamination source review consisted of the following tasks: historical records search, physical inspection, photographic documentation, geophysical investigation and review of available records regarding underground storage tanks associated with the building. This report provides the results of the contamination source review for Building E3642.

Located on Chesapeake Bay in Harford and Baltimore counties, Maryland, APG occupies approximately 30,000 acres. The facility is divided into the Aberdeen and Edgewood areas (Figure 1). The primary mission at APG has been the testing and evaluation of U.S. Army warfare materials. Since its beginning in 1917, the Edgewood Area of APG has been the principal location for chemical warfare agent research, development, and testing in the United States. APG was also used for producing chemical warfare agents during both world wars and has been a center for the storage of chemical warfare material (Nemeth 1989).

Many of the APG facilities constructed between 1917 and the 1960s are no longer used because of obsolescence and their poor state of repair. Because many of these buildings were used for research, development, testing, and/or pilot-scale production of chemical warfare agents and other military substances (such as incendiary materials or munitions containing these materials), the potential exists for portions of these buildings to be contaminated with these substances, their degradation products, and other laboratory or industrial chemicals. These buildings and associated structures or appurtenances (e.g., underground or aboveground storage tanks, pipes, sumps) may contribute to environmental concerns at APG.

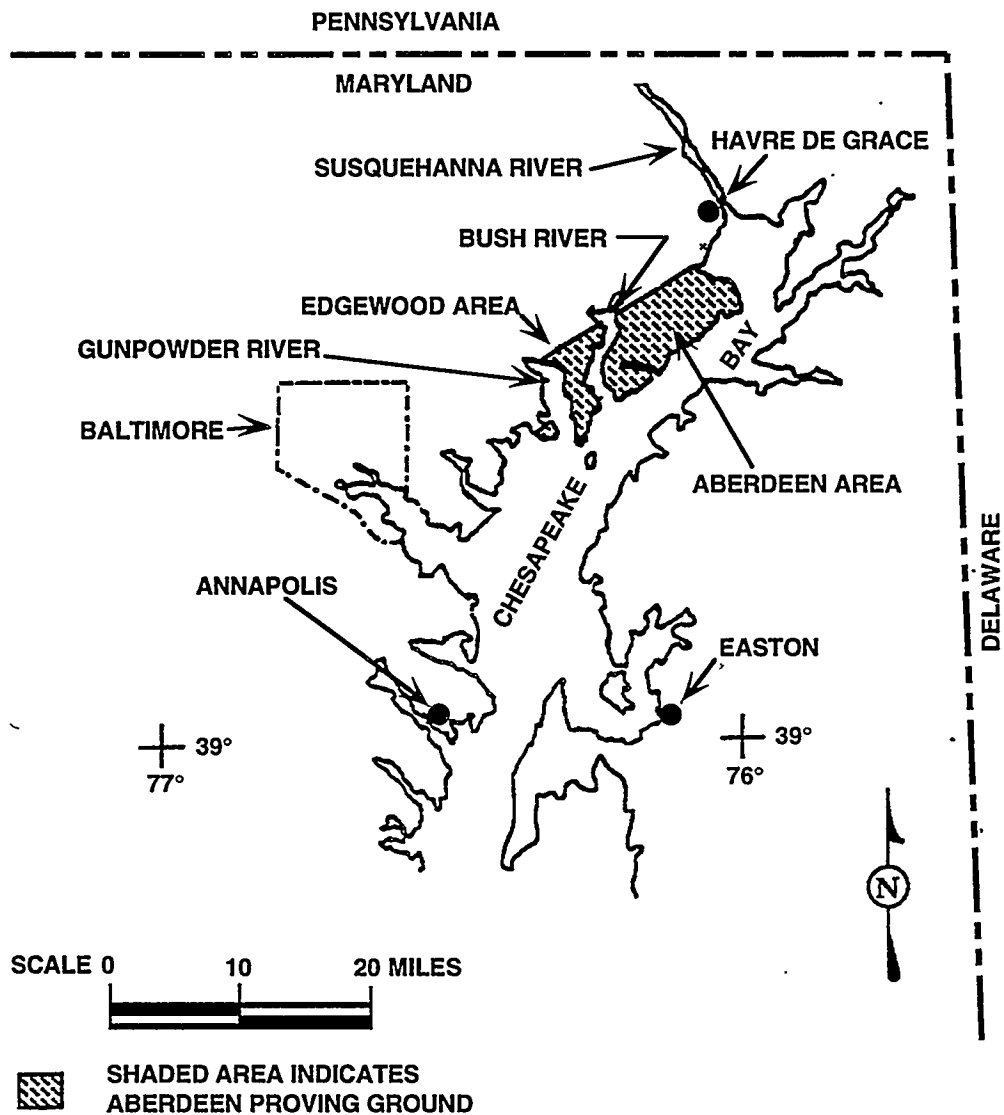


FIGURE 1 Map of Aberdeen Proving Ground Location

2 Methodology

Before the detailed building inspection, ANL personnel made a preliminary site visit to locate the building and obtain building records from APG, identify potential issues to be addressed in the health and safety plan, resolve any access restriction issues, and identify required support services.

Photographs were taken of the building's exterior and interior surfaces during the building inspection in November 1994. The photographs followed a set sequence whenever possible. The exterior was photographed starting on the north side and continuing clockwise around the building; walls were photographed starting in the north or northwest corner of each room and continuing clockwise until reaching the starting point. The ceiling and floor of each room were also photographed.

The area around Building E3642 was examined during December 1994 by using several nonintrusive geophysical survey methods, including magnetic gradiometry, total field magnetics, electrical conductivity (EM-31), time-domain electrical induction (EMF or EM-61), and ground-penetrating radar (GPR) techniques (McGinnis et al. 1995).

No air quality or underground storage tank information for Building E3642 was available.

3 Historical Record Search

Building E3642 (APG designation) is part of the Building E3640 Process Laboratory Complex located in the Kings Creek Area within APG's Edgewood Area (Figure 2). The Building E3640 Process Laboratory Complex consists four buildings and two drum storage areas. Buildings at the complex included Building E3640 (originally designated Building 2345), the process laboratory building; Building E3641 (2345A), used to house the caustic scrubber and associated equipment; Building E3642 (2345B), used as a storage facility and to house a caustic tank for the scrubbing system; and Building E3643 (2345C), used as an office, electrical shop, and for storage. Building E3643 was demolished in about 1980, according to Nemeth (1989). The complex includes a drum storage area west of Building E3640; a small structure designated as Building E3646 is located in this area. There is a second drum storage area east of Building E3641.

The Building E3640 Process Laboratory was constructed between 1951 and 1952, opened in 1952, and actively used until 1978 (Nemeth 1989). The complex was used as the developmental chemical process laboratory for surety items, as well as for conducting "one of a kind" experimental chemical projects in support of research and development at APG. Pilot lots of chemical agents were also made to support the installation's medical research effort. No more than five liters of an agent were made at any particular time (EAI Corporation 1989).

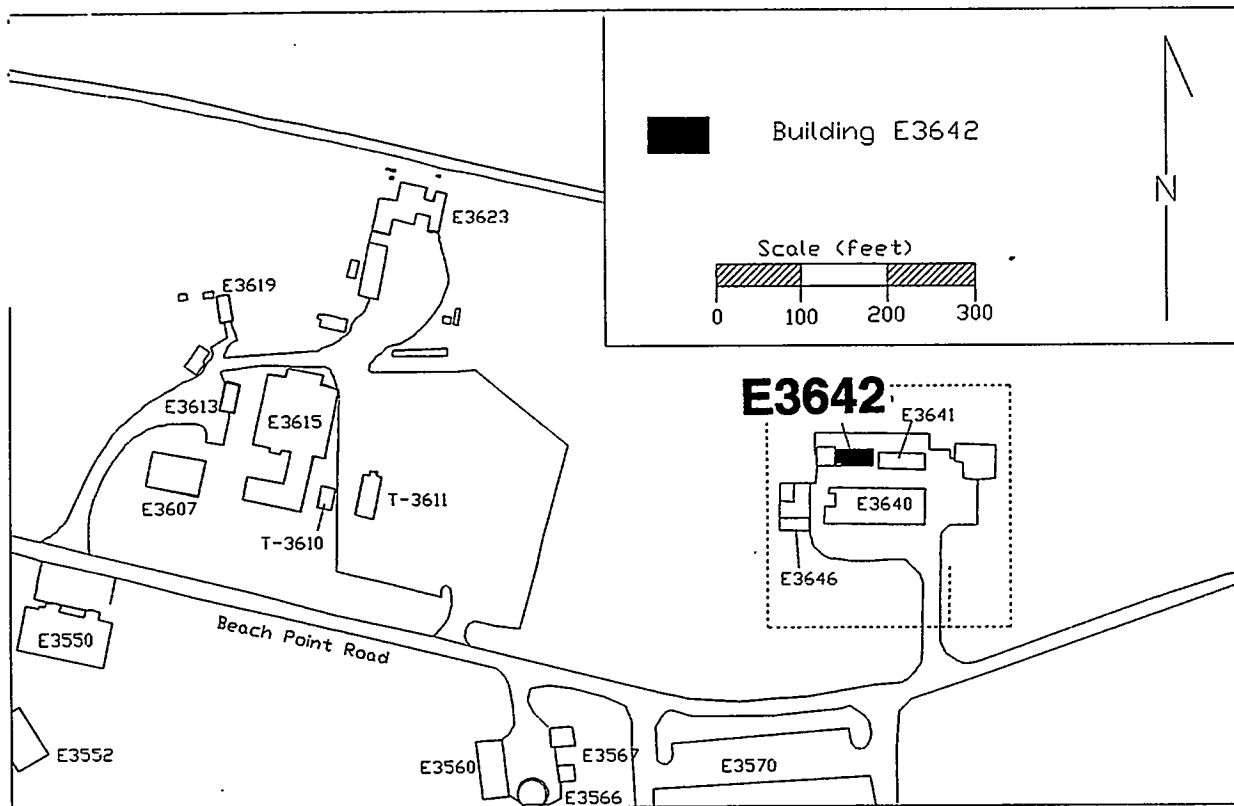


FIGURE 2 Map of Building E3642 Location

4 Building Description

This section presents a physical description of Building E3642 and the surrounding site as they appeared at the time of the ANL's November 1994 inspection. The physical description includes an account of the condition of the exterior walls, the roof, and each interior room. Figure 2 shows the location of the building in relation to other facilities in the Edgewood Area at APG.

4.1 Site Description

4.1.1 Location

The Building E3640 Process Laboratory Complex, which includes Building E3642, is located about 200 ft north of Beach Point Road and approximately 725 ft west of the intersection of Beach Point Road and 57th Street (Figure 2).

4.1.2 Proximity to Other Buildings

Building E3642 is approximately 10 ft west of Building E3641 and approximately 40 ft north of Building E3640, as shown in Figure 2.

4.1.3 Building Structure

Building E3642 is a two-story storage structure; the first floor is open to the exterior on all sides. The roof is supported by a wooden frame positioned on the building's structural steel frame. Figures 3 and 4 present the floor plans of the first and second floors of the building, as surveyed at the time of the ANL inspection. Building E3642 has no windows. Figure 5 provides photographs of the exterior of the building.

4.1.4 Exterior Dimensions

The exterior horizontal dimensions are 18 ft 10 in. along the west wall by 17 ft 6 in. along the north wall. The building measures 21 ft 8 in. high from the foundation to the top of the gable (Figure 5).

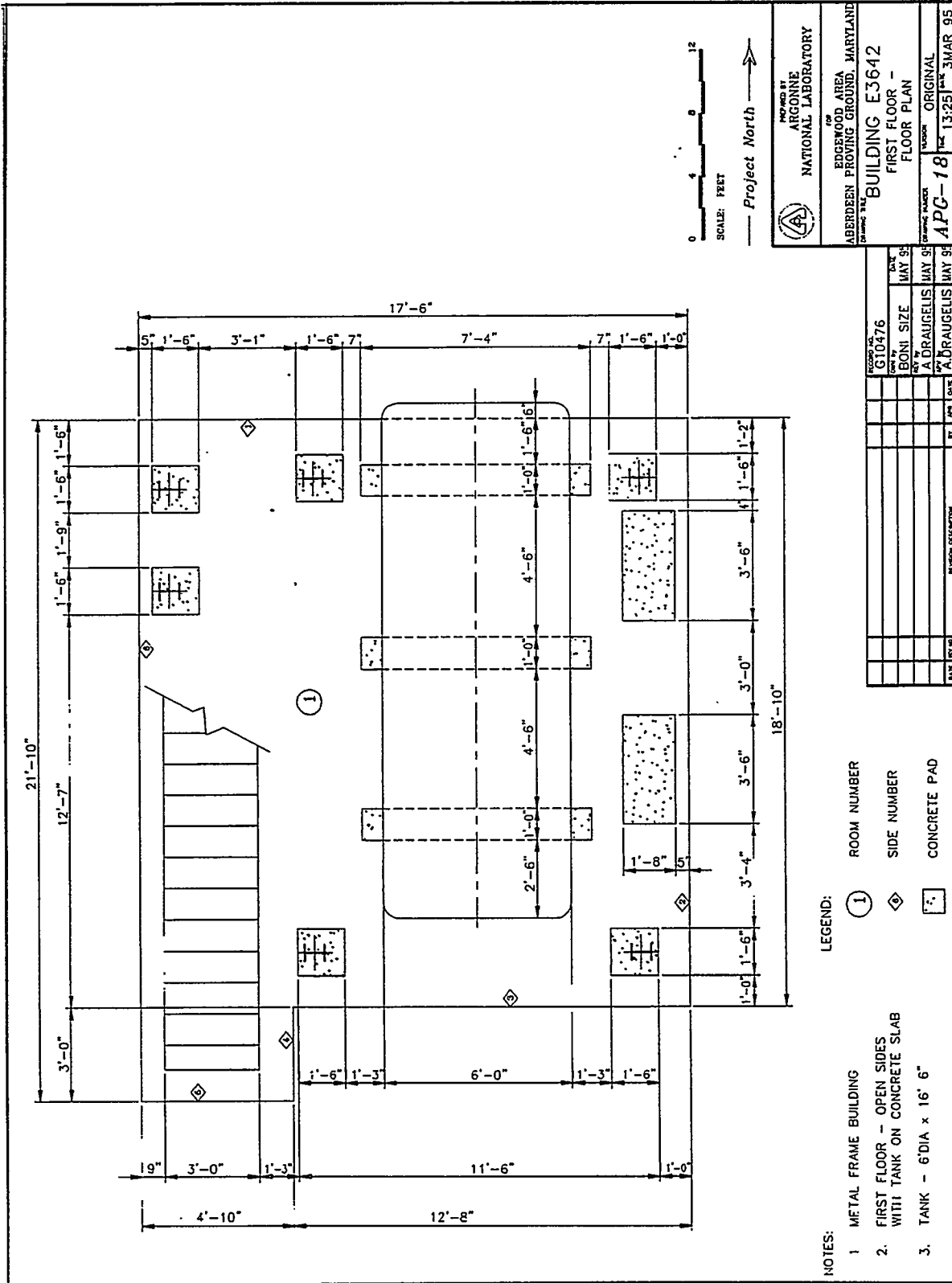


FIGURE 3 Building E3642 First Floor — Floor Plan

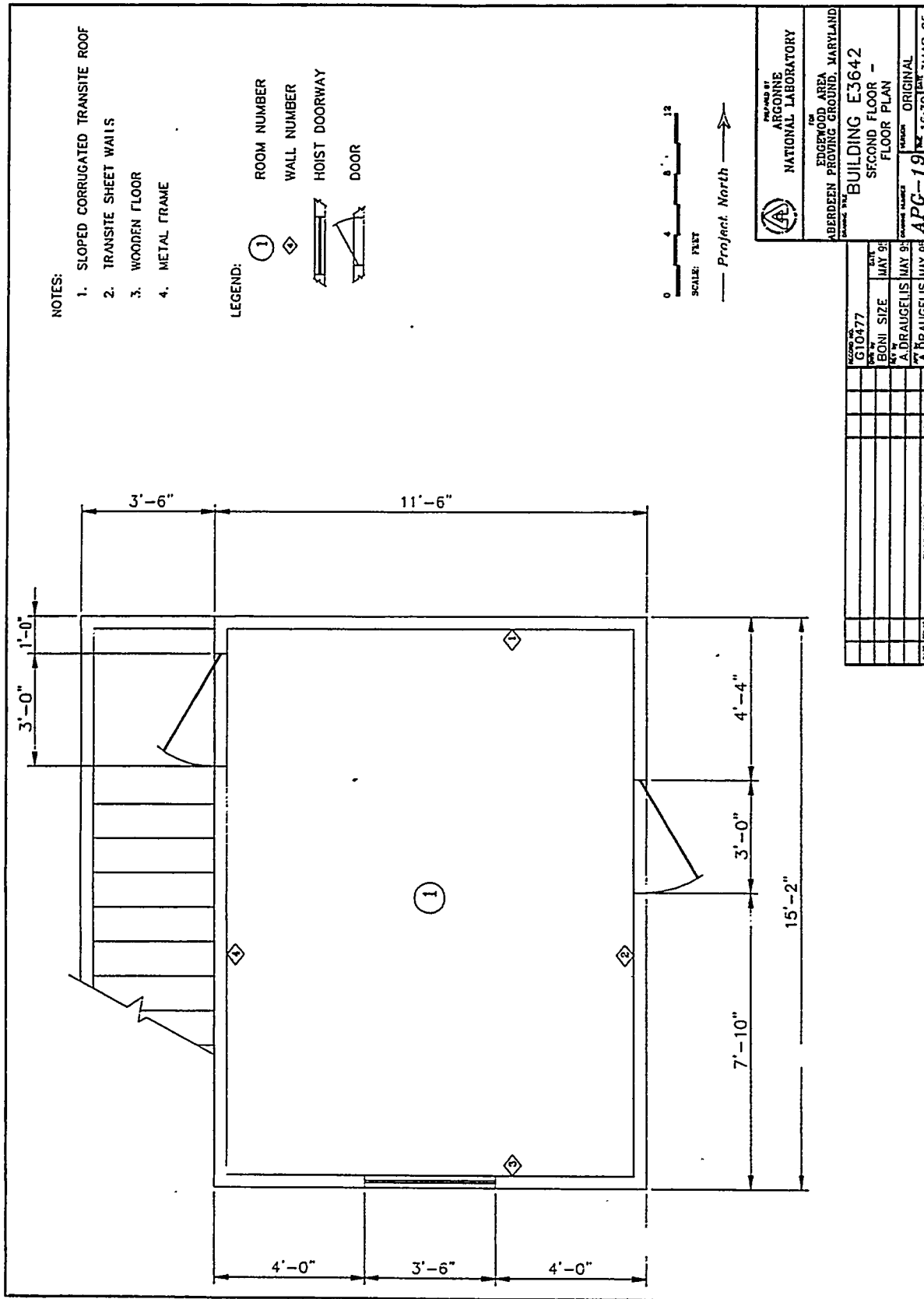
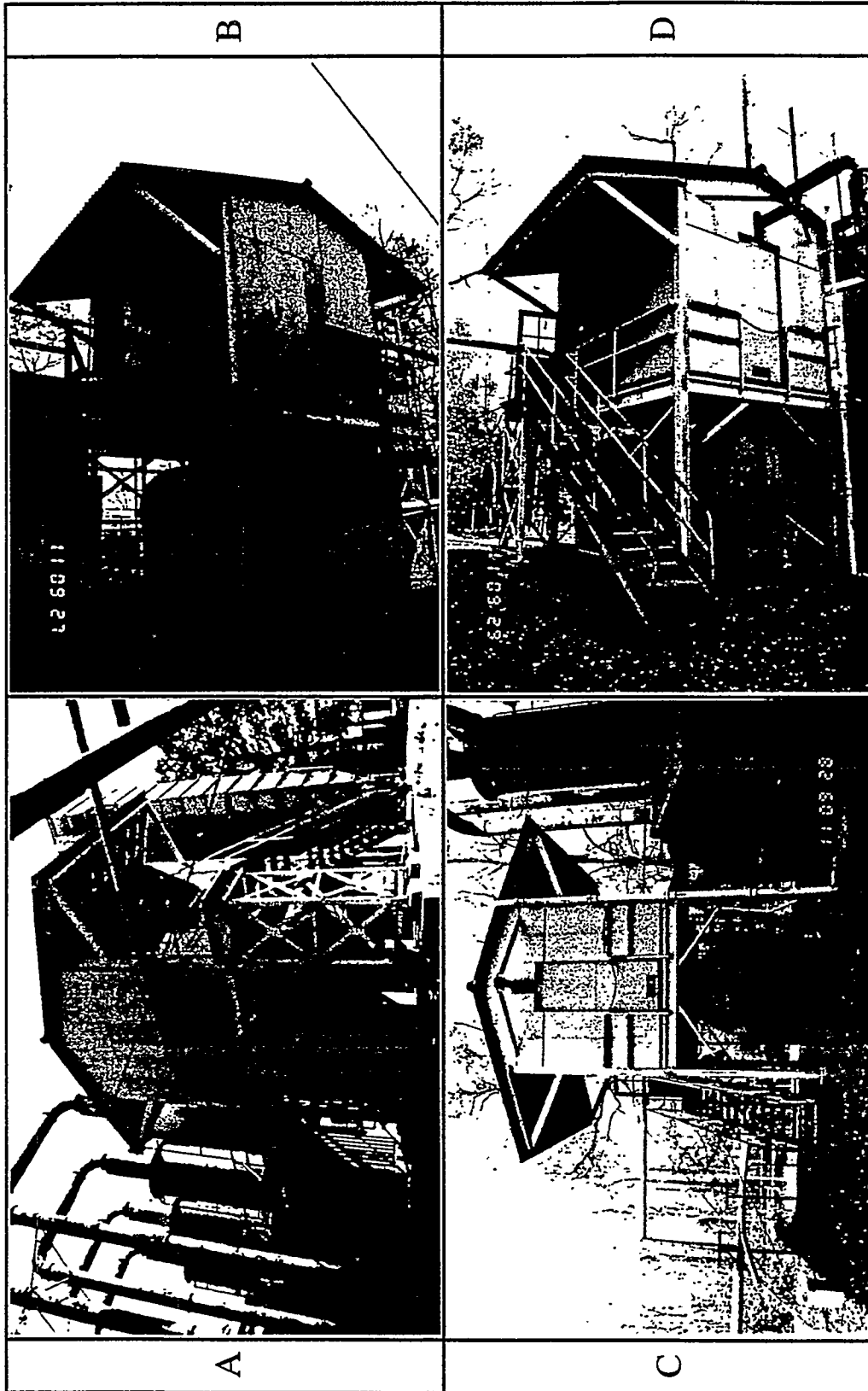


FIGURE 4 Building E3642 Second Floor — Floor Plan



A	North & West Elevation
C	South Elevation

B	East & North Elevation
D	West & South Elevation

FIGURE 5 Photographs of Building E3642 Exterior

4.1.5 Topography

The area directly surrounding Building E3642 is flat and dry.

4.1.6 Vegetation in the Immediate Vicinity

The areas surrounding Building E3642 on the north and west sides consist primarily of cut grass. The area to the south is covered by an asphalt drive. Some grass is located in the area to the east, between Buildings E3642 and E3641.

4.1.7 External Aboveground Structures or Equipment

None.

4.1.8 Connections with Adjacent Buildings

A wooden catwalk runs from the roof of Building E3641 to Building E3642. There are three other piping connections with Building E3641. According to the geophysical survey of the Pilot Plant Complex, no underground lineaments are associated with this building (McGinnis et al. 1994).

4.1.9 Underground Structures

None.

4.1.10 Surface Drainage System

None.

4.1.11 Utility Access Points

None.

4.1.12 Exterior Piping

The south exterior elevation of Building E3642 contains one pipe extending upward from the concrete foundation at the southeast corner to approximately 12 in. below the roof. An aboveground pipe runs from the second floor north elevation into the ground.

4.1.13 Nearby Roads and Sidewalks

An asphalt road runs west to east approximately 4 ft from the south side of Building E3642.

4.2 North Exterior Elevation

4.2.1 Dimensions

The north exterior elevation of Building E3642 measures 17 ft 6 in. long. The second-floor structure measures 11 ft 6 in. long (excluding the staircase) (Figures 3 and 4).

4.2.2 Construction Materials

The first floor of Building E3642 has no exterior walls. The second floor walls are sheet metal. Structural steel framing and steel columns support the building above the tank.

4.2.3 Doors and Windows

None.

4.2.4 Piping

The north exterior elevation of Building E3642 contains piping associated with the aboveground storage tank on the first floor and the heating system on the second floor (Figure 5).

4.2.5 Utility Connections

None.

4.2.6 External Equipment or Structures

The north end of a 3,000-gal aboveground tank extends beyond the north wall of the building.

4.2.7 Vegetation

An area of cut grass is located north of Building E3642 (Figure 5).

4.2.8 Overall Condition

Because of a lack of building maintenance, the north elevation shows signs of deterioration and weathering. Oxidized metals were observed at the time of the investigation.

4.3 East Exterior Elevation

4.3.1 Dimensions

Along the east exterior elevation of Building E3642, the first floor measures 18 ft 10 in. long. The second floor is 15 ft 2 in. long (Figures 3 and 4).

4.3.2 Construction Materials

The first floor of Building E3642 has no exterior walls. The second floor walls are sheet metal. Structural steel framing and steel columns support the building above the tank.

4.3.3 Doors and Windows

One metal door containing four panes of glass is on the east elevation. This 36-in.-wide door leads to a platform that extends the length of Building E3641 (Figure 5).

4.3.4 Piping

The east exterior wall of Building E3642 contains piping associated with the aboveground storage tank on the first floor (Figure 5).

4.3.5 Utility Connections

None.

4.3.6 External Equipment or Structures

A wooden catwalk extends from the east doorway to Building E3641.

4.3.7 Vegetation

Weeds and patches of grass were observed between Buildings E3642 and E3641.

4.3.8 Overall Condition

Because of a lack of building maintenance, the east elevation shows signs of deterioration and weathering. Oxidized metals were observed at the time of the investigation.

4.4 South Exterior Elevation

4.4.1 Dimensions

The south exterior elevation of Building E3642 measures 17 ft 6 in. long. The second floor structure measures 11 ft 6 in. long (Figures 3 and 4).

4.4.2 Construction Materials

The first floor of Building E3642 has no exterior walls. The second floor walls are sheet metal. Structural steel framing and steel columns support the building above the tank.

4.4.3 Doors and Windows

One metal hoist door and one doorway are present along the south elevation. The 42-in.-wide doorway leads to the exterior (Figure 5).

4.4.4 Piping

The south exterior elevation of Building E3642 contains one pipe extending upward from the concrete foundation at the southeast corner to approximately 12 in. below the roof (Figure 5).

4.4.5 Utility Connections

None.

4.4.6 External Equipment or Structures

A steel I-beam centered above the doorway extends through the wall on the second floor. The beam may be associated with the hoist device (Figure 5).

4.4.7 Vegetation

None.

4.4.8 Overall Condition

Because of a lack of building maintenance, the south elevation shows signs of deterioration and weathering. Oxidized metals were observed at the time of this investigation.

4.5 West Exterior Elevation

4.5.1 Dimensions

The first floor on the west exterior elevation of Building E3642 measures 18 ft 10 in. long. The second floor is 15 ft 2 in. long (Figures 3 and 4).

4.5.2 Construction Materials

The first floor of Building E3642 has no exterior walls. The second floor walls are sheet metal. Structural steel framing and steel columns support the building above the tank.

4.5.3 Doors and Windows

One wooden door containing four glass panes is present on the west elevation. This 36-in.-wide door leads to the exterior of the building (Figure 5).

4.5.4 Piping

None.

4.5.5 Utility Connections

None.

4.5.6 External Equipment or Structures

The west elevation contains a metal staircase with a handrail made of metal tubing and wooden steps. The top platform for the staircase is supported by steel uprights fastened to cement aprons and held together with trusses.

4.5.7 Vegetation

West of Building E3642 is an expansive area of lawn, beyond which are brush and trees (Figure 5).

4.5.8 Overall Condition

Because of a lack of building maintenance, the west elevation shows signs of deterioration and weathering. Oxidized metals were observed at the time of the investigation.

4.6 Roof

4.6.1 Type and Dimensions

Building E3642 is covered by a sloping, corrugated transite roof measuring approximately 20 ft 4 in. long by 18 ft 10 in. wide and 0.25 in. thick (Figure 5).

4.6.2 Height

The height of the roof measures approximately 21 ft 8 in. from the foundation to the top of the gable and 18 ft 5 in. to the edge of the eaves.

4.6.3 Surface Materials

Building E3642 has a sloping, corrugated transite roof.

4.6.4 Support System

The roof of Building E3642 is supported by a structural steel framework. The concrete footings support the steel roof joist.

4.6.5 Condition

The roof of Building E3642 was intact; no leaks were observed.

4.6.6 Equipment Located on Roof

None.

4.6.7 Chimneys, Roof Vents, or Vent Stacks

None.

4.6.8 Piping

None.

4.7 Interior Floor Plan

4.7.1 Room Numbers and Dimensions

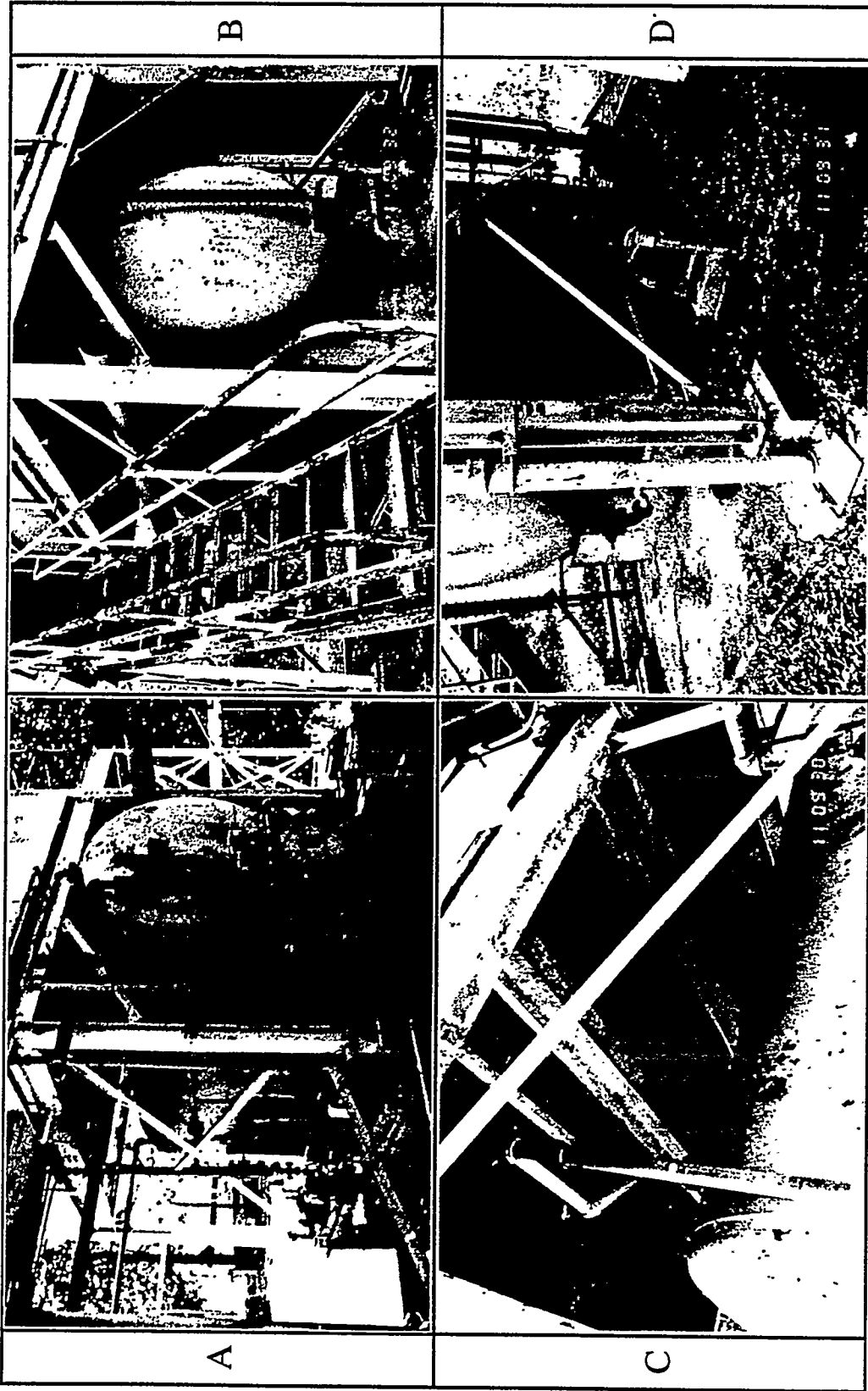
Building E3642 is a two-story, two-room storage building. Interior dimensions are provided in Sections 4.2, 4.3, 4.4, and 4.5. Figures 3 and 4, respectively, show the floor plans of the first and second floors of Building E3642.

4.7.2 Walls

Figures 6, 7, and 8 provide photographs of all four walls as well as the floors and ceilings of the building.

4.7.3 Floor

The first floor of Building E3642 is concrete. The floor of the second story is wood. The floors are intact and in good condition.



A	Side 2, 1
C	Ceiling

Side 6, 5, 4, 3	B
Floor	D

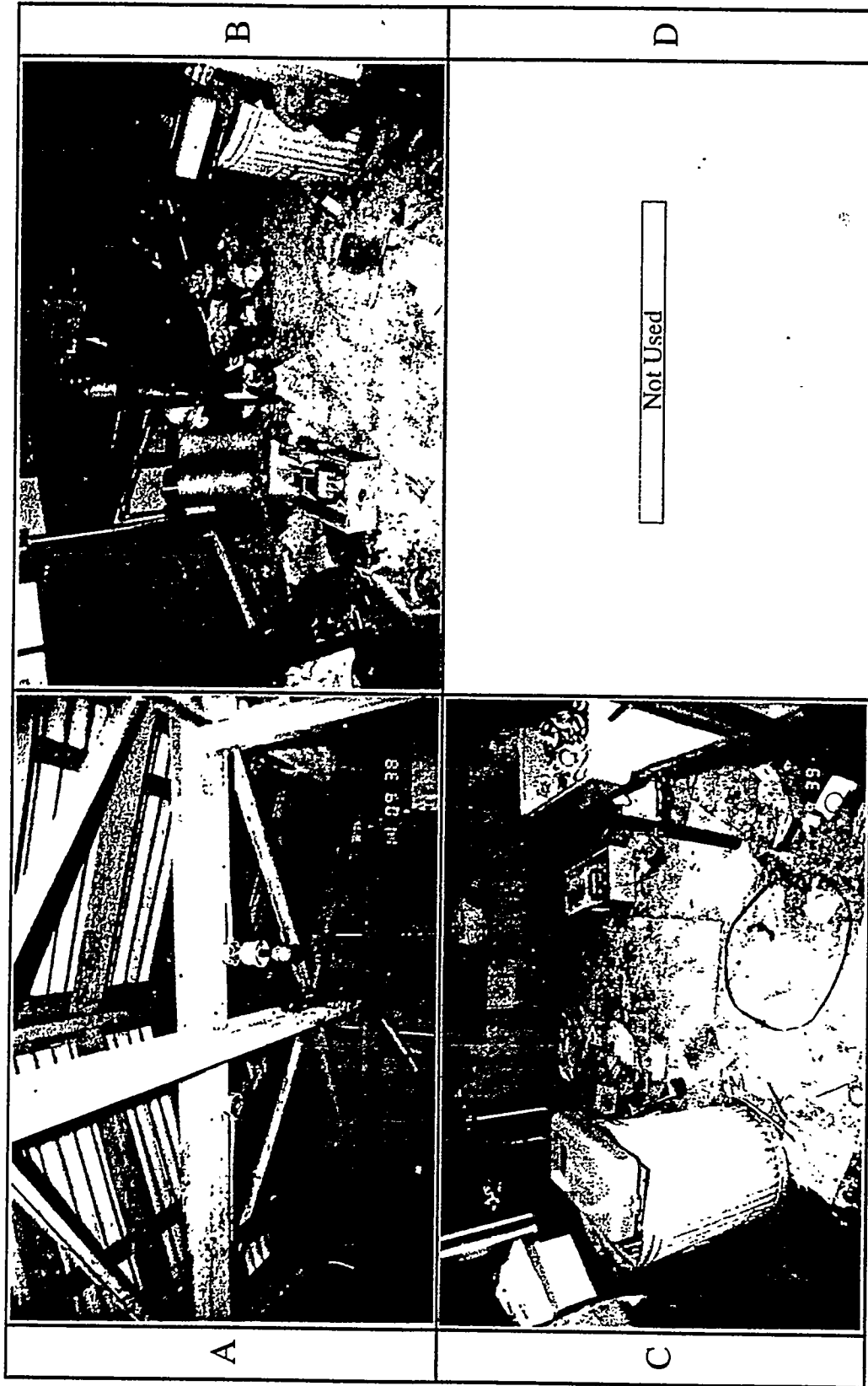
FIGURE 6 Photographs of First Floor, Room 1



A	Walls 4, 1, 2
C	Walls 3, 4

Walls 2, 3	B
Walls 4, 1	D

FIGURE 7 Photographs of Second Floor, Room 1 — Walls



A	Ceiling
C	Floor

Floor	B
Not Used	D

FIGURE 8 Photographs of Second Floor, Room 1 — Ceiling and Floor

4.7.4 Floor Penetrations

None.

4.7.5 Interior Partitions

None.

4.7.6 Equipment or Supplies

See Sections 4.8.4 and 4.9.4.

4.8 First Floor — Room 1

4.8.1 Walls

None.

4.8.2 Finish Materials

None.

4.8.3 Piping

Piping was observed east of the aboveground storage tank at the time of the ANL inspection.

4.8.4 Equipment

One approximately 3,000-gal aboveground storage tank rests on concrete supports on the first floor of the building (Nemeth 1989). Piping associated with the tank is still attached. Two pumps are located on raised concrete pads along the south side of the tank. Along the west side of the room is a metal staircase with a handrail made of metal tubing and wooden steps.

4.8.5 Doors and Windows

None.

4.8.6 Ceiling and Floor

No floor drains are located in room 1. A raised metal cylinder was observed on the floor near the west side of the room. The ceiling (the underside of the second floor room 1) consists of wooden planks supported by a structural steel frame.

4.9 Second Floor — Room 1

4.9.1 Walls

Walls are constructed of sheet metal attached to a wooden frame (Figure 6).

4.9.2 Finish Materials

The interior walls are painted light blue.

4.9.3 Piping

The north wall contains piping, possibly for heating. Electrical conduit along the east and west walls leads to switch boxes and outlets.

4.9.4 Equipment

Wooden shelves on a steel frame were observed along both the east and west walls. Miscellaneous equipment is located on the shelves and floor of the room. A steel I-beam that extends through the center of the room and exits the south wall is associated with a hoist device.

4.9.5 Doors and Windows

This room contains three doors: one on the east wall, one (hoist door) on the south wall, and one on the west wall. All three doors lead outside. There are no windows in this room.

4.9.6 Ceiling and Floor

The floor in room 1 consists of plywood. No floor drains were identified. The ceiling is the underside of the roof, which is corrugated transite. One light fixture is located beneath the I-beam in the center of the room.

5 Geophysical Investigation

ANL geophysical staff surveyed the area around the Building E3640 Process Laboratory Complex, including areas near Building E3642, by using several nonintrusive geophysical survey methods during the winter of 1993-1994 (McGinnis et al. 1995). Nonintrusive methods used included magnetic gradiometer, magnetometer, conductivity meter (EM-31), millivolt meter (EM-61), and ground-penetrating radar (GPR).

Complex and large-amplitude anomalies caused by aboveground metal objects in the survey areas obscured many smaller features produced by subsurface sources. Images of all buried liquid waste lines and fresh water lines were identified by one or more of the techniques. No underground storage tanks were observed during the surveys; however, point sources remain unidentified.

Major geophysical anomalies produced by subsurface features are described below.

- An EM-61 and EM-31 lineament, caused by a water line, extends north from the south fence to a hydrant southwest of the southwest corner of Building E3640. An EM-61 anomaly caused by overhead pipes, an apparent continuation of the first anomaly, extends north to the north fence. This line is approximately 40 ft west of the west side of Building E3641.
- A broad positive magnetic anomaly north of the northeast drum storage area is caused by the presence of ferric materials. This area is about 75 ft northeast of the northeast corner of Building E3641.
- A 30-ft-wide band of EM-31 anomalies extends from the front gate of the complex to the southeast corner of Building E3640. This band of anomalies is caused by roadbed materials, underground utilities, and a nearby security fence. This area is southeast of Building E3640, and is not near Building E3642.
- An EM-61 anomaly is produced by buried utilities coincident with the EM-31 anomaly at the location described above.
- Three GPR lines extend from the exterior sump located northeast of Building E3640 about 190 ft to the eastern fence. This may be a portion of the Building E3640 storm drain system that discharged into the Kings Creek marshes. The exterior sump is about 80 ft east of the east end of Building E3640.

- Smaller, unidentified, localized anomalies were observed throughout the survey area.

The geophysical surveys indicate the presence of some underground objects in the Building E3640 Process Laboratory Complex. None of the major geophysical anomalies observed in the surveyed areas are within about 40 ft of Building E3642. However, areas immediately adjacent to Building E3642 were not surveyed and may contain certain underground objects not identified by the geophysical surveys. Details of the geophysical surveys for the Building E3640 Process Laboratory Complex are given in McGinnis et al. (1995).

6 Air Quality Monitoring

No air quality monitoring information is available for Building E3642.

7 Underground Storage Tanks

No information on underground storage tanks associated with Building E6891 was available.

8 Conclusions

On the basis of information collected and reviewed by ANL for Building E3642, it is the authors' judgment that the anomalies identified in the vicinity of Building E3642 during the geophysical surveys warrant further investigation and evaluation. The transite roof is suspected to contain asbestos-containing material and should be tested and properly disposed of. The contents of the approximately 3,000-gal tank on the first floor should also be tested.

9 References

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