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Certification Docket for the Remedial Action Performed at the Albany Research Center in Albany, Oregon, 1987-1988 and 1990-1991

Department of Energy
Former Sites Restoration Division
Oak Ridge Operations Office

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CERTIFICATION DOCKET FOR THE REMEDIAL ACTION PERFORMED AT THE ALBANY RESEARCH CENTER IN ALBANY, OREGON, 1987-1988 AND 1990-1991

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ACRONYMS

AEC	Atomic Energy Commission
ANL	Argonne National Laboratory
ARC	Albany Research Center
BNI	Bechtel National, Inc.
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	Department of Energy
ERDA	Energy Research and Development Administration
EPA	Environmental Protection Agency
FUSRAP	Formerly Utilized Sites Remedial Action Program
IVC	independent verification contractor
NEPA	National Environmental Policy Act
ORAU	Oak Ridge Associated Universities
PCB	polychlorinated biphenyl
PMC	project management contractor

UNITS OF MEASURE

cm	centimeter
cpm	counts per minute
dpm	disintegrations per minute
ft	foot
g	gram
h	hour
ha	hectare
in.	inch
km	kilometer
m	meter
mi	mile
µCi	microcurie
ml	milliliter
mrad	millirad
mrem	millirem
pCi	picocuries
ppm	parts per million
yd	yard
yr	year
WL	working level

INTRODUCTION

Description of the Formerly Utilized Sites Remedial Action Program at the Albany Research Center, Albany, Oregon

The U.S. Department of Energy (DOE), Off-Site Division, Office of Eastern Area Programs, Office of Environmental Restoration (and/or the predecessor agencies, offices, and divisions) implemented a remedial action project in Albany, Oregon. The work was administered by the Formerly Utilized Sites Remedial Action Program (FUSRAP) under the direction of the Off-Site Division.

In 1974, the Atomic Energy Commission initiated activities under authority of the Atomic Energy Act of 1954, as amended, to identify and assess the radiological condition of certain properties used in support of the nation's atomic energy programs. These activities, continued by successor organizations, are currently being accomplished by DOE under FUSRAP, along with additional, similar work being accomplished under Congressional mandate. The objectives of FUSRAP are to:

- Identify and assess all sites formerly utilized to support early Manhattan Engineer District/Atomic Energy Commission nuclear work to determine whether further decontamination and/or control is needed
- Decontaminate and/or apply controls to the sites, where needed, to permit conformance with current and applicable guidelines
- Dispose of and/or stabilize all generated residues in an environmentally acceptable manner
- Accomplish all work in accordance with appropriate landowner agreements and local and state environmental and land-use requirements to the extent permitted by federal law and applicable DOE orders, regulations, standards, policies, and procedures
- Certify, at the completion of the remedial action, that the radiological conditions of the sites comply with guidelines and that the sites are appropriate for future use

FUSRAP is currently managed by the DOE Oak Ridge Operations (ORO) Office, Former Sites Restoration Division.

Environmental Regulations Affecting FUSRAP

To assess the environmental impacts of federal actions, Executive Order 11991 empowered the Council on Environmental Quality (CEQ) to issue regulations to federal agencies for implementing the mandatory procedural provisions of the National Environmental Policy Act (NEPA). CEQ issued regulations containing guidance and specific requirements in June 1979. The DOE guidelines for implementing the NEPA process and satisfying the CEQ regulations became effective on March 28, 1980.

The NEPA process requires FUSRAP to identify and assess the environmental consequences of proposed actions before beginning remedial action activities, developing disposal sites, or transporting and emplacing radioactive wastes. After the enactment of the Superfund Amendments and Reauthorization Act, which amended the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), DOE established a policy to integrate the requirements of CERCLA and NEPA.

Documentation required by NEPA and CERCLA was prepared to support remedial action at the Albany Research Center (ARC), including preparation of a series of engineering studies of the remedial action under consideration. The remedial action alternative selected by DOE was subsequently implemented with consideration for public safety and in compliance with applicable federal, state, and local requirements.

For the remedial action activities discussed in this certification docket, the NEPA and CERCLA requirements were satisfied by the issuance of an action description memorandum and a memorandum to file documenting that the planned remedial action had no significant impact on the environment.

Work performed under FUSRAP is governed by the provisions of the DOE quality assurance program plan developed for the project in compliance with DOE Order 5700.6. FUSRAP work performed by the project management contractor (PMC) and by architect-engineers, construction and service subcontractors, and other project subcontractors is governed by the quality assurance program plan as specified in the FUSRAP quality assurance manual. Effectiveness of implementation is appraised on a regular basis by the PMC quality assurance organization and by DOE-ORO.

Property Identification

ARC is owned by the U.S. Department of the Interior and operated by the Bureau of Mines. The facility is located at 1450 Queen Avenue SW, Albany, Oregon.

Portions of 18 buildings and 37 exterior locations at ARC were designated as needing remedial action under FUSRAP. Eleven buildings and 31 exterior locations were remediated in 1987 and 1988; parts of 15 buildings, some of which were remediated in 1987 and 1988, and 5 exterior locations were remediated in 1990 and 1991. The remedial action activities performed from July 1987 to January 1988 and from August 1990 to April 1991 are referred to as Phase I and Phase II, respectively. Post-remedial action surveys have demonstrated and DOE has certified that the locations remediated during Phases I and II were in compliance with applicable DOE standards and criteria established to protect human health and safety and the environment. A notice of certification of the radiological condition of the site was published in the Federal Register on February 23, 1993.

Docket Contents

The purpose of this docket is to document the successful decontamination of radioactively contaminated areas remediated at ARC in 1987, 1988, 1990, and 1991. The material in this docket consists of documents supporting DOE certification that conditions

at the subject property are in compliance with radiological guidelines and standards determined to apply to the property. Furthermore, the use of the property will not result in any measurable radiological hazard to the general public that is attributable to the activities of DOE or its predecessor agencies.

Exhibit I is a summary of remedial action activities conducted at ARC. The exhibit provides a brief history of the origin of the contamination at ARC and descriptions of the radiological characterizations, remedial actions, and post-remedial action/ verification activities conducted at the site. Cost data covering all remedial action conducted at ARC is also included. Appendix A of Exhibit I contains applicable remedial action guidelines.

Exhibit II consists of the letters, memos, reports, and other documents that were produced during the entire remedial action process, from designation of the site under FUSRAP to the certification that no radiological restrictions limit the future use of ARC. Documents that are brief are included in Exhibit II. Lengthy documents are incorporated by reference only; the actual documents are provided as an attachment to the certification docket at publication.

Exhibit III provides diagrams of the radioactively contaminated areas that were remediated during the cleanup activities at ARC. The certification docket will be archived by DOE through the Assistant Secretary for Management and Administration. Copies will be available for public review between 9:00 a.m. and 4:00 p.m., Monday through Friday (except federal holidays) at the DOE Public Reading Room located in Room 1E-190 of the Forrestal Building, 1000 Independence Avenue, SW, Washington, D.C. Copies will also be available in the Public Document Room, U.S. Department of Energy, Oak Ridge Operations Office, Oak Ridge, Tennessee, and in the administrative record at the Albany Research Center library, 1450 Queen Avenue SW, Albany, Oregon, from 9:00 a.m. to 3:00 p.m., Monday through Friday.

Exhibit I

Summary of Remedial Action Activities at the Albany Research Center in Albany, Oregon, 1987-1988 and 1990-1991

EXHIBIT I

SUMMARY OF REMEDIAL ACTION ACTIVITIES AT THE ALBANY RESEARCH CENTER IN ALBANY, OREGON, 1987-1988 and 1990-1991

1.0 INTRODUCTION

Exhibit I summarizes the activities culminating in the certification that radiological conditions at the Albany Research Center (ARC) are in compliance with applicable guidelines and that future use of the site will result in no radiological exposure above Department of Energy (DOE) criteria and standards established to protect members of the general public and occupants of the site. These activities were conducted under the Formerly Utilized Sites Remedial Action Program (FUSRAP) (Ref. 1). This summary includes a discussion of the remedial action process at ARC: characterization of the radiological status of the site, designation of the property as requiring remedial action, performance of the remedial action, and verification that the radioactivity has been removed. Further detail on each activity can be found in the referenced documents.

The property addressed in this docket is a single property in Albany, Oregon, about 37 km (23 mi) south of Salem, Oregon (Figure I-1). The property is bounded on the north by Queen Avenue, on the east by Liberty Street, on the south by a tennis club, and on the west by Broadway Street. ARC consists of three main areas: ARC proper, which consists of a number of buildings in the northern and central sections of the site; a 0.8-ha (2-acre) inactive biomass research facility that occupies the center of the site; and a 5.7-ha (14-acre) open area identified as the "Back Forty," which occupies the southernmost end of the facility. A plan view of the site is shown in Figure I-2.

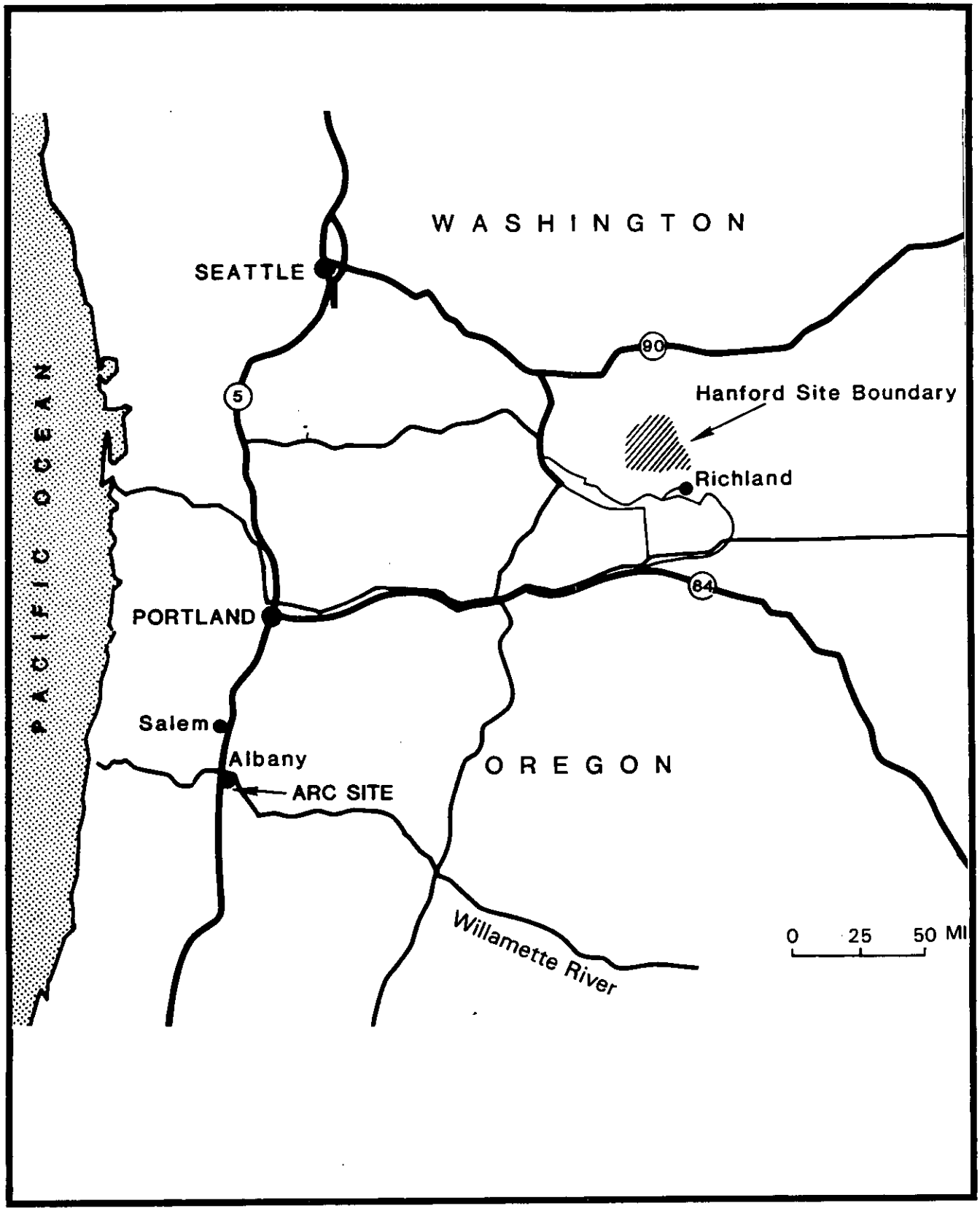

FIGURE I-1 LOCATION OF THE ALBANY RESEARCH CENTER IN ALBANY, OREGON

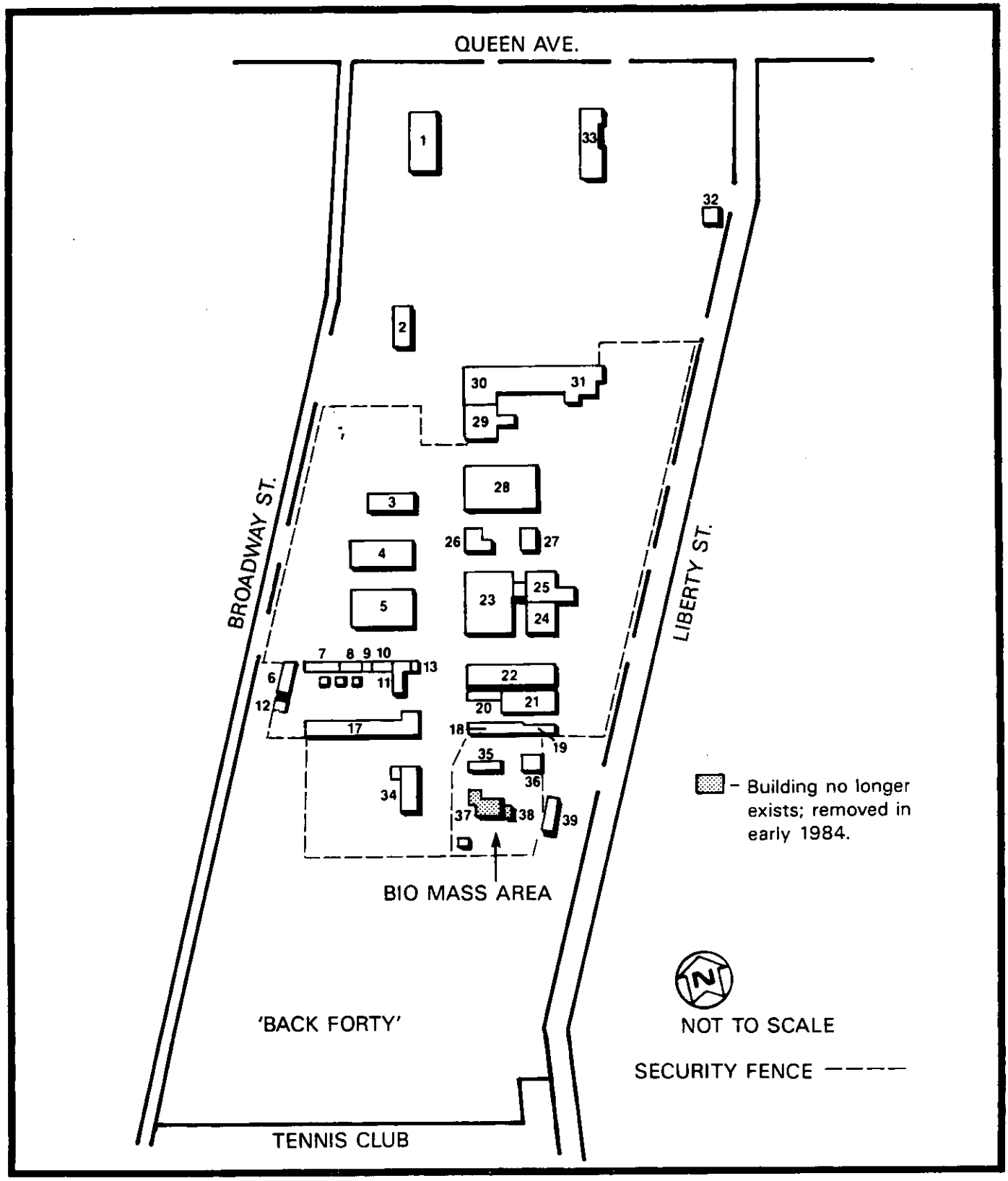

FIGURE I-2 PLAN VIEW OF THE ALBANY RESEARCH CENTER

2.0 SITE HISTORY

ARC was established in 1943 to investigate innovative approaches for developing strategic mineral resources in the United States, reducing costs for metallurgical manufacturing processes, developing materials to fight corrosion, and conducting other activities relevant to metallurgical research.

Various operations involving radioactive materials were conducted at ARC. From 1948 to 1956, the Bureau of Mines conducted work for the Atomic Energy Commission (AEC) that involved melting, machining, welding, and alloying thorium. Additional work with uranium and thorium was performed at ARC for the Energy Research and Development Administration (ERDA), a predecessor agency of DOE.

At various times during the era of AEC and ERDA contracts (1948-1978), process buildings and surrounding areas were decontaminated to guidelines applicable to AEC, ERDA, and DOE. Subsequent decontamination guidelines were stricter, and records relating to the previous decontamination effort were not adequate to determine whether the buildings and surrounding areas met the new stricter DOE radiological guidelines. A radiological assessment initiated in 1978 determined that further decontamination of the property was advisable even though the levels of contamination at ARC did not pose an immediate health hazard (Refs. 2 and 3). In early 1984, a radiological survey was conducted at ARC to determine actual levels of radioactive contamination in each area identified in 1978 and to define the locations and boundaries of above-guideline contamination (Ref. 4). This survey revealed that approximately 1,988 m^3 (2,600 yd^3) of contaminated material would need to be remediated to achieve compliance with DOE remedial action guidelines.

In June 1985, remedial action alternatives for the ARC site were evaluated (Ref. 5). Of the disposal options considered, transportation of the contaminated material to the DOE Hanford disposal facility near Richland, Washington (see Figure I-1) was selected for implementation.

A work plan for remediation of selected areas at ARC (Ref. 6) covered decontamination of buildings; excavation, backfilling, and seeding of excavated areas; and transportation of much of the waste, soil, and rubble to Hanford. Phase I remedial action was initiated in July 1987 and completed in January 1988. Collection of post-remedial action data was completed in February 1988.

Phase I remedial action resulted in decontamination of most of the areas at ARC originally designated as requiring remediation under FUSRAP. Subsequent surveys identified additional areas of radioactive contamination exceeding guidelines (Ref. 7). These areas, primarily building areas that had not been surveyed previously under FUSRAP, were remediated during Phase II activities conducted from August 1990 to April 1991. Table I-1 lists the buildings remediated at ARC and the phase during which remediation was accomplished; Figure I-2 shows the locations of the buildings.

During Phases I and II, the radioactively contaminated buildings requiring remedial action at ARC were Buildings 1, 2, 3, 4, 5, 17, 19, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, and 34, as identified in previous radiological survey reports. Exterior areas requiring remediation were located throughout the site and included a lime pit that was previously used to segregate heavy metals from waste residue. Figures showing the remediated areas are provided in Exhibit III of this certification docket.

Table I-1

Buildings Remediated at ARC

During Phases I and II of Remedial Action

Building Number[a]	Remediation Phase I	Remediation Phase II
1		X
2	X	
3		X
4	X	X
5	X	X
17	X	X
19		X
23	X	X
24		X
25		X
26		X
27	X	X
28	X	X
29	X	X
30	X	X
31	X	X
33		X
34		X

[a]See Figure I-2 for the locations of these buildings.

3.0 SITE DESCRIPTION

The ARC property (City of Albany, Deed Book 161, page 421, #17277) covers approximately 17 ha (42 acres) and is located at 1450 Queen Avenue SW, Albany, Oregon. It is bounded on the north by Queen Avenue, on the east by Liberty Street, on the south by a tennis club, and on the west by Broadway Street. To the north is a moderate-income housing area. The South Albany School Complex and adjacent private residences are located to the east beyond Liberty Street. The school complex consists of an elementary, middle, and high school. Beyond the tennis club to the south lies an established residential area. The area to the west, beyond Broadway Street, is mostly farm and pasture land, with some residences; some of this area is zoned for residential development.

The ARC site consists of three main areas: ARC proper, which consists of a number of buildings in the northern and central sections of the site; a 0.8-ha (2-acre) inactive biomass research facility that occupies the center of the site; and a grass- and weed-covered area known as the "Back Forty," which occupies approximately 5.7 ha (14 acres) at the southern end of the site (see Figure I-2). Portions of the "Back Forty" and the area now occupied by the biomass facility were contaminated with uranium and thorium and their associated daughters (Refs. 2 and 3).

4.0 RADIOLOGICAL HISTORY AND STATUS

4.1 RADIOLOGICAL SURVEYS

Specific buildings and grounds on the ARC site were surveyed to evaluate existing radiological conditions (Refs. 2 and 3). As a result of these surveys, it was determined that although the levels of contamination at ARC did not pose an immediate health hazard, further decontamination of the property was advisable.

Early in 1984, DOE initiated a radiological survey program to expand the data base developed during previous surveys. A thorough surface beta-gamma survey was conducted in all field areas at 2.5-m (8.2-ft) intervals, both at the soil surface and at approximately 0.3 m (1 ft) above the surface. Approximately 100 boreholes 0.15 m (0.5 ft) in diameter were drilled to permit surface and subsurface soil analyses and gamma logging activities. Surface water samples collected from standing water on the site and from the "Back Forty" drainage system were analyzed for radioactive constituents. Sediment samples from sewers, septic tanks, and drain lines were also analyzed. All soil, water, and sediment samples were analyzed for uranium-238, radium-226, and thorium-232.

Sixteen buildings were surveyed for alpha and beta-gamma contamination. Suspect areas were also monitored for removable alpha and beta-gamma contamination. Selection of buildings for characterization was based on previous findings and on information supplied by ARC personnel. Results of this survey (Ref. 4) were used to define the scope of remedial action implemented during 1987 and 1988.

Surveys conducted after the Phase I remedial action in 1987 and 1988 identified additional areas exhibiting radioactivity exceeding DOE remedial action guidelines. These areas were, primarily, building areas that had not been surveyed previously under FUSRAP.

Further characterization to delineate the boundaries of contamination was initiated in August 1990; subsequent remedial action was completed in April 1991.

PCB contamination was found in the lime pit during remedial action activities. Activities to further characterize the lime pit indicated no other organic or heavy metal contaminants.

4.2 REMEDIAL ACTION GUIDELINES

The radiological guidelines determined by DOE to be applicable to cleanup of radioactive material at ARC are summarized below.

- Remedial action guidelines for radium-226 and thorium-232 in soil are the same; there is no generic guideline for uranium in soil. Characterization data indicated that these radionuclides were in secular equilibrium (a condition in which a radionuclide and its decay-chain daughters have the same activity); therefore, compliance with the remedial action guidelines for radium-226 and thorium-232 ensured that the concentration of uranium-238 was acceptably low.

- Contaminated soil was removed if radium-226 or thorium-232 concentrations exceeded 5 pCi/g above background concentrations when averaged over the first 15 cm (6 in.) of soil below the surface or 15 pCi/g when averaged over any 15-cm- (6-in.-) thick soil layer below the surface layer.

- For surface contamination, remedial action was conducted if the beta-gamma measurement averaged over 1 m^2 (10.76 ft^2) exceeded 0.2 mrad/h, or if the maximum exposure rate in any 100-cm^2 (15.5-$in.^2$) area exceeded 1.0 mrad/h.

- For surface areas where thorium-232 was the primary contaminant, remedial action was conducted if direct surface measurements revealed levels greater than 1,000 dpm/100 cm^2 average or 3,000 dpm/100 cm^2 maximum and/or levels greater than 200 dpm/100 cm^2 for removable contamination.

- For surface areas where uranium-238 was the primary contaminant, remedial action was conducted if direct surface measurements revealed levels greater than 5,000 dpm/100 cm^2 average or 15,000 dpm/100 cm^2 maximum and/or levels greater than 1,000 dpm/100 cm^2 for removable contamination.

- For areas where uranium-238 was the primary contaminant, but in mixed ratios with thorium-232, supplemental guidelines were used. Table I-2 lists the supplemental guidelines. The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm (0.4 in.).

The guidelines also allowed for some flexibility through the use of supplemental standards that were used for areas where the standard guidelines were not appropriate. Review, on a case-by-case basis, determined that exposure in some areas of buildings 4, 17, 23, 28, 29, 30, and 31 was below the DOE dose limit to the general public (100 mrem/yr) and that these buildings could be released for use without radiological restrictions (Refs. 8 and 9). Table I-3 summarizes the radiological assessments of the contaminated materials in these buildings.

Table I-4 summarizes the DOE residual contamination guidelines; the complete guidelines are provided in Appendix A. The document containing FUSRAP design criteria also contains additional information regarding federal regulations (Ref. 10).

During remediation of the lime pit and adjacent areas at ARC, solid polychlorinated biphenyl (PCB) contamination was encountered in the soil. The Toxic Substances Control Act requires that materials containing PCB concentrations of 50 ppm and greater and PCB-contaminated surfaces with concentrations greater than 100 mg/100 cm^2 be managed as PCB-contaminated waste (40 CFR 761). To fully characterize the material in the lime pit, an onsite gas chromatograph was used. The surfaces of interior walls of the pit were broken up by scabbling, and contaminated materials were removed until the PCB levels were below 50 ppm. Mixed PCB-radioactive waste was placed in 55-gallon drums approved by the Department of Transportation (DOT 17-C) and stored onsite before being shipped to Hanford for disposal. Soil containing thorium at less than 15 pCi/g and PCBs at less than 50 ppm was used as backfill for other exterior areas. Clean soil (containing PCBs at less than 1 ppm) was placed back into the lime pit as fill.

Table I-2

Supplemental Guidelines for Selected Areas at ARC[a]

Building	Area	Average[b] Fixed Contamination (dpm/100 cm^2)
17	Lab 10 (floor)	5,000
17	Lab 10 (other)	4,000
17	Attic	5,000
31	Attic	2,500
30	Fab. room	4,000
28	First floor	5,000
	Lime pit walls	2,400[c,d]
4	Forklift	1,600

[a]Supplemental guidelines were used in place of routine residual contaminant guidelines (Table I-4) in areas where uranium-238 was the primary contaminant but in mixed ratios with thorium-232.

[b]Areas containing removable contamination were to meet thorium-232 criteria (200 dpm/100 cm^2).

[c]Soil containing thorium at concentrations of less than 5 pCi/g and polychlorinated biphenyls at less than 1 ppm was mixed with clean topsoil fill and placed back into the pit.

[d]This guideline was used for any contamination found within the top 15 cm (6 in.) of the walls; the criteria for any contamination below 15 cm (6 in.) was the soil guideline for residual thorium-232 (15 pCi/g).

Table I-3

Summary of Estimated Radiation Dose to a Present Worker in the Buildings and to a Future Worker Involved in Building Demolition at the Albany Research Center

Radiation Source	Levels From Which Dose Rates are Calculated (cpm)[a]	Present Worker[b] External Gamma Dose (mrem/yr)	Future Worker[c,d] Inhalation Dose (mrem/yr)
Building 4			
Piping from manholes	72[e]	2.0×10^{-3}	7.5×10^{-2}
Building 17			
Soil under subfloor	38,464[f]	7.2	3.8
Building 23			
Contaminated sumps and pipes in basement	80,000[e]	5.5×10^{-5}	9.3×10^{-1}
Main collection drain	488[e]	3.6×10^{-5}	5.1×10^{-2}
Trenches 1,2, and 18	2,800[e]	2.5×10^{-4}	3.6×10^{-1}
Transformer room drain	367.4[g]	5.6×10^{-5}	5.0×10^{-2}
Building 28			
Floor drains and drain pipes in basement	33,771[f]	4.7×10^{-1}	3.5×10^{-2}
Building 29			
Drain pipes under floor	10,965[f]	1.9×10^{-5}	3.1×10^{-2}
Building 30			
Floor drain and pipes	10,343[f]	5.8×10^{-1}	8.0×10^{-2}
Hydraulic press	14,212[e]	1.5×10^{-4}	1.6×10^{-1}
Baldwin press	85,500[e]	3.3×10^{-4}	8.0×10^{-2}
Lindberg furnace	13,435[e]	5.3×10^{-5}	7.6×10^{-2}
Building 31			
Drain header in hallway	11,522[f]	2.3×10^{-5}	3.6×10^{-2}

[a]Background has been subtracted from values.

[b]It is assumed that the worker spends 40 hours per week at a distance of 1 m (3 ft) from the maximum contamination level found in the area assessed.

[c]Conservative doses were estimated assuming that the future worker spends all of the demolition time enshrouded in a particulate cloud composed entirely of contaminated material.

[d]Inhalation dose is estimated for the cumulative exposure resulting from demolition of all areas within a building covered in this assessment.

[e]A Geiger-Mueller probe was used for these measurements.

[f]A scintillometer was used for these measurements.

[g]The measurement is based on laboratory analysis.

TABLE 1-4
SUMMARY OF RESIDUAL CONTAMINATION GUIDELINES

BASIC DOSE LIMITS

The basic limit for the annual radiation dose (excluding radon) received by an individual member of the general public is 100 mrem/yr. In implementing this limit, DOE applies as low as reasonably achievable principles to set site-specific guidelines.

SOIL GUIDELINES

Radionuclide	Soil Concentration (pCi/g) Above Background[a,b,c]
Radium-226 Radium-228 Thorium-230 Thorium-232	5 pCi/g when averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over any 15-cm-thick soil layer below the surface layer.
Other Radionuclides	Soil guidelines will be calculated on a site-specific basis using the DOE manual developed for this use.

STRUCTURE GUIDELINES

Airborne Radon Decay Products

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that has no radiological restrictions on its use; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR 192) is: In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL[d]. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive materials are not the cause.

External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site that has no radiological restrictions on its use shall not exceed the background level by more than 20 μR/h and will comply with the basic dose limits when an appropriate-use scenario is considered.

Indoor/Outdoor Structure Surface Contamination

	Allowable Surface Residual Contamination[e] (dpm/100 cm²)		
Radionuclide[f]	Average[g,h]	Maximum[h,i]	Removable[h,i]
Transuranics, Ra-226, Ra-228, Th-230, Th-228 Pa-231, Ac-227, I-125, I-129[k]	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224 U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay products	5,000 α	15,000 α	1,000 α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above[l]	5,000 β - γ	15,000 β - γ	1,000 β - γ

TABLE 1-4
(CONTINUED)

[a]These guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If either thorium-230 and radium-226 or thorium-232 and radium-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that (1) the dose for the mixtures will not exceed the basic dose limit, or (2) the sum of ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1 ("unity").

[b]These guidelines represent allowable residual concentrations above background averaged across any 15-cm-thick layer to any depth and over any contiguous 100-m^2 surface area.

[c]If the average concentration in any surface or below-surface area less than or equal to 25-m^2 exceeds the authorized limit or guideline by a factor of $(100/A)^{1/2}$, where A is the area of the elevated region in square meters, limits for "hot spots" shall also be applicable. Procedures for calculating these hot spot limits, which depend on the extent of the elevated local concentrations, are given in the DOE Manual for Implementing Residual Radioactive Materials Guidelines, DOE/CH/8901. In addition, every reasonable effort shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.

[d]A working level (WL) is any combination of short-lived radon decay products in 1 liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha energy.

[e]As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[f]Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

[g]Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

[h]The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

[i]The maximum contamination level applies to an area of not more than 100 cm^2.

[j]The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping tehniques to measure removable contamination levels if direct scan surveys indicate that total residual surface cotamination levels are within the limits for removable contamination.

[k]Guidelines for these radionuclides are not given in DOE Order 5400.5; however, these guidelines are considered applicable until guidance is provided.

[l] This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

Sources: U.S. Department of Energy, DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, Office of Environment, Safety and Health (February 1990).

U.S. Department of Energy, *FUSRAP Management Requirements and Policies Manual*, Appendix D-1, FUSRAP Summary Protocol (March 24, 1986).

4.3 POST-REMEDIAL ACTION STATUS

As shown in the hazard assessments (Refs. 8 and 9) and in the post-remedial action reports (Refs. 11 and 12) for the subject property, all remediated areas meet DOE guidelines or supplemental standards. The remedial action activities performed on the property have been reviewed by the independent verification contractor (IVC), Oak Ridge Associated Universities (ORAU) environmental survey team. The purpose of this review was to independently verify data supporting the adequacy of the remedial action and to confirm that the site is in compliance with applicable remedial action guidelines (Refs. 13 through 17). Based on all data collected, the property conforms to all applicable radiological guidelines established for release of the property.

5.0 SUMMARY OF REMEDIAL ACTION

The following subsections briefly describe the remedial action process and measures taken to protect the public and the environment.

5.1 PRE-REMEDIAL ACTION ACTIVITIES

Based on survey results that indicated the presence of radioactive contamination (Refs. 2 and 3), DOE designated the site for remedial action (Ref. 18). To determine the appropriate actions necessary to clean up the radioactive contamination on this property, DOE performed an engineering evaluation of selected remedial action alternatives. The evaluation concluded that removing the contaminated materials and transporting them to the Hanford disposal facility was the best approach (Ref. 5). Based on an action description memorandum (Ref. 19) to assess the environmental impact, DOE determined that this action would have no adverse environmental impact (Ref. 20).

Engineering design work and a survey of the property were performed to more accurately define the boundaries of contamination.

5.2 REMEDIAL ACTION ACTIVITIES

After the remedial design work was completed, 2,276 m^3 (2,977 yd^3) of soil from an area of 6,050 m^2 (7,236 yd^2), approximately 306 m^3 (400 yd^3) of building material, and 51 m^3 (67 yd^3) of equipment were removed. Table I-5 contains a description of the remedial action techniques used at ARC. Contaminated soil and building debris were placed in covered dump trucks and transported to the disposal facility.

Remedial action performed on exterior areas involved excavation of contaminated soil; the excavated areas were backfilled and restored. Remedial action was performed in 18 buildings, and, with the exception of Room 107 in Building 4, remediated areas were

Table I-5

Cleanup/Decontamination Techniques

Technique	Description
Hand wiping	Small areas or equipment that had loose dirt, dust, greasy film, etc., were wiped with a dry cloth or a cloth wetted with a detergent solution to remove the loose surface contamination.
Vacuuming	Large areas, items, and pieces of equipment (e.g., floors, shelves, cabinets, rafters) that had large amounts of dust in or on them were vacuumed with a high-efficiency particulate air- (HEPA-) filtered vacuum to remove the loose surface contamination.
Wire brushing/ grinding	Hard, nonporous surfaces (e.g., steel plate, pipes, equipment) could often be decontaminated by using a wire brush to remove loosely adherent dirt, scale, rust, etc. A power hand grinder was used to remove the surface layer of more adherent contamination.
Using needle gun	The needle gun is a hand-held device with abrasive needles that abrade a surface; it is used on hard surfaces where wire brushing or grinding is not practical.
Scabbling	Reciprocating pistons on the scabbler head were used to break up the surface layers of concrete or asphalt so that loose material could be vacuumed.
Jackhammering	A conventional jackhammer was used to remove larger layers or chunks of concrete and asphalt.
Planing	A conventional table-top or hand-held wood planer was used to remove the surface layer of wood.
Excavation	Contaminated concrete, asphalt, and soil were removed from exterior areas by using backhoes and shovels.

restored. In Room 107, the floor was restored, but the remainder of the room was not restored, by agreement with ARC management.

During the cleanup, several measures were implemented to protect workers from exposure to radiation in excess of applicable standards and to control the migration of radioactive materials to adjacent properties. The primary pathway by which local residents could have been exposed to radiation was through airborne dust generated during the remedial action activities. To prevent such exposure during interior scabbling operations, plastic sheeting and a local HEPA-filter ventilation system were installed around the work areas to control dust migration. During remediation of exterior areas, adequate soil moisture was maintained to prevent excessive generation of airborne dust in the work areas.

During the exterior and interior cleanups, monitoring devices were placed near the excavation areas to provide continuous monitoring of the concentrations of airborne alpha-emitting radionuclides. All concentrations measured during Phases I and II were below applicable DOE guidelines for airborne thorium-232 (1.0×10^{-12} μCi/ml) (Refs. 11 and 12).

During Phase I remedial action, haul trucks were lined with plastic before they were loaded to prevent free water and dirt from escaping. Absorbent material was placed in the rear of the truck beds to help contain any free water that might drain from contaminated equipment. The liner was large enough to drape over the sides of the truck to keep the truck bed exterior from becoming contaminated during loading. Finally, before shipment of the radioactive soil to the Hanford facility, the liner was folded over the top and sealed, and the truck bed was covered to prevent soil from falling or blowing out of the truck. Truck tailgates were equipped with watertight gaskets to prevent leakage. During Phase II, all contaminated materials were placed in sealed boxes and transported on flatbed trucks.

Personnel trained in radiation protection observed all operations to ensure that work was conducted following established health and safety procedures designed to minimize the exposure of workers and residents.

5.3 POST-REMEDIAL ACTION MEASUREMENTS

After remedial action was completed, a radiological survey of the remediated areas was conducted. Measurements and soil samples were taken to confirm that no radioactive contamination exceeding DOE guidelines remained in remediated areas. The interior measurements consisted primarily of direct alpha and beta-gamma measurements.

5.3.1 Outdoor Areas

Analytical results for soil samples taken after the completion of remedial action activities indicate that no radioactivity in excess of DOE remedial action guidelines remains in these areas. Analytical results for soil include background levels: 1.0 pCi/g for thorium-232, 0.8 pCi/g for radium-226, and 1.6 pCi/g for total uranium. (Uranium-238 accounts for 48.9 percent of total uranium, or 0.8 pCi/g.) A site-specific guideline was not derived for uranium-238 because the characterization data indicate that uranium-238 and its decay-chain daughters have the same activity, a condition of secular equilibrium. Compliance with the remedial action guidelines for radium and thorium in soil ensures that the residual concentration of uranium-238 is also acceptably low.

5.3.2 Building Interiors

Remediated areas in the buildings were radiologically surveyed to determine whether remedial action guidelines had been met. Direct contact beta-gamma measurements were obtained with a Geiger-Mueller counter. Direct contact alpha measurements were obtained with an alpha scintillation detector. Removable contamination was surveyed by wiping a 100-cm^2 (15.5-$in.^2$) area and then analyzing the wipe.

If no contamination above allowable residual radioactivity guidelines was found after the surfaces were remediated, they were restored.

5.4 VERIFICATION ACTIVITIES

After remedial action activities were completed, the IVC (ORAU) conducted a survey to verify that the site was remediated to levels below DOE guidelines. The objective of the independent verification survey was to confirm that surveys, sampling, and analysis conducted during the remedial action process provided an accurate and complete description of the radiological status of the property.

The IVC's activities included reviewing the published radiological survey reports and the post-remedial action reports, visually inspecting the site, and performing radiological survey and sampling activities. The surveys were conducted in accordance with DOE-approved verification and certification protocol (Ref. 21). Upon completion of the verification activities, the IVC prepared verification reports and submitted them to DOE (Refs. 13 through 17).

5.5 PUBLIC AND OCCUPATIONAL EXPOSURE

5.5.1 Public Exposure

The total potential radiological dose to nearby residents following remedial action at ARC was less than 100 mrem/yr above the background radiation level. To avoid potential increased radiological exposure to the general public during cleanup activities, all removal actions were controlled to reduce the amount of dust generated and prevent its migration outside the work area. Particulate air monitoring devices were placed near the work area to provide continuous air monitoring and to ensure that contamination was not being spread outside the work area. All concentrations of airborne contaminants were compared to the DOE

guideline of 1.0×10^{-12} μCi/ml for thorium-232. Measurements in the general area ranged from 5.05×10^{-15} to 3.19×10^{-12} μCi/ml and averaged 5.73×10^{-14} μCi/ml. The single sample that exceeded the guideline was not of concern because it was in an enclosed attic of Building 17 and was for a duration of less than 9 hours.

5.5.2 Occupational Exposure

During all phases of remediation, all employees working at ARC were monitored for beta-gamma radiation exposure. Measurements by thermoluminescent dosimeters indicated that the highest dose received during the 8 months of Phase II remediation (19 mrem above background) is less than 0.4 percent of the limiting value of annual effective dose equivalent of 5,000 mrem established in DOE Order 5480.11. During remedial action activities that had the potential for generating airborne contamination, workers were required to wear lapel pins to indicate the concentration of thorium-232. All concentrations of airborne contaminants were compared to the DOE guideline of 1.0×10^{-12} μCi/ml for thorium-232. Measurements from lapel pins worn by the workers ranged from 8.41×10^{-14} to 3.78×10^{-11} μCi/ml and averaged 8.58×10^{-13} μCi/ml. In all cases where lapel pin measurements exceeded guidelines, workers were wearing protective equipment, including masks. Health and safety issues were documented in the site health and safety plan (Ref. 22).

5.6 COSTS

The final costs associated with the remedial action performed at the subject property are given in Table I-6.

Table I-6

Cost of Remedial Action at the Albany Research Center

Description	Amount
Characterization	$513,000
Preliminary Engineering and Environmental Evaluation	26,000
Environmental Compliance	5,000
Design Engineering	64,000
Site Access	1,000
Remedial Action Operations	4,106,000
Waste Transportation	1,536,000
Site Surveillance and Maintenance	24,000
Final Engineering Reports	89,000
Project Management	2,884,000
TOTAL	$9,248,000

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APPENDIX A

U.S. DEPARTMENT OF ENERGY

GUIDELINES FOR RESIDUAL RADIOACTIVE MATERIAL AT FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM

AND

REMOTE SURPLUS FACILITIES MANAGEMENT PROGRAM SITES

U.S. DEPARTMENT OF ENERGY GUIDELINES FOR RESIDUAL RADIOACTIVE MATERIAL AT FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM AND REMOTE SURPLUS FACILITIES MANAGEMENT PROGRAM SITES

(Revision 2, March 1987)

A. INTRODUCTION

This document presents U.S. Department of Energy (DOE) radiological protection guidelines for cleanup of residual radioactive materials and management of the resulting wastes and residues. It is applicable to sites identified by the Formerly Utilized Sites Remedial Action Program (FUSRAP) and remote sites identified by the Surplus Facilities Management Program (SFMP).* The topics covered are basic dose limits, guidelines and authorized limits for allowable levels of residual radioactive material, and requirements for control of the radioactive wastes and residues.

Protocols for identification, characterization, and designation of FUSRAP sites for remedial action; for implementation of the remedial action; and for certification of a FUSRAP site for release for unrestricted use are given in a separate document (U.S. Department of Energy 1986) and subsequent guidance. More detailed information on applications of the guidelines presented herein, including procedures

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* A remote SFMP site is one that is excess to DOE programmatic needs and is located outside a major operating DOE research and development or production area.

for deriving site-specific guidelines for allowable levels of residual radioactive material from basic dose limits, is contained in "A Manual for Implementing Residual Radioactive Material Guidelines" (U.S. Department of Energy 1987) referred to herein as the "supplement".

"Residual radioactive material" is used in these guidelines to describe radioactive materials derived from operations or sites over which the Department of Energy has authority. Guidelines or guidance to limit the levels of radioactive material to protect the public and environment are provided for: (1) residual concentrations of radionuclides in soil material, (2) concentrations of airborne radon decay products, (3) external gamma radiation level, (4) surface contamination levels, and (5) radionuclide concentrations in air or water resulting from or associated with any of the above.

A "basic dose limit" is a prescribed standard from which limits for quantities that can be monitored and controlled are derived; it is specified in terms of the effective dose equivalent as defined by the International Commission on Radiological Protection (ICRP 1977, 1978). The basic dose limits are used for deriving guidelines for residual concentrations of radionuclides in soil material. Guidelines for residual concentrations of thorium and radium in soil, concentrations of airborne radon decay products, allowable indoor external gamma radiation levels, and residual surface contamination concentrations are based on existing radiological protection standards or guidelines (U.S. Environmental Protection Agency 1983; U.S. Nuclear Regulatory Commission 1982; and Departmental Orders). Derived guidelines or limits based on the basic dose limits for those quantities are only used when the guidelines provided in the existing standards cited above are shown to be inappropriate.

A "guideline" for residual radioactive material is a level of radioactivity or of the radioactive material that is acceptable if the use of the site is to be unrestricted. Guidelines for residual radioactive material presented herein are of two kinds: (1) generic,

site-independent guidelines taken from existing radiation protection standards, and (2) site-specific guidelines derived from basic dose limits using site-specific models and data. Generic guideline values are presented in this document. Procedures and data for deriving site-specific guideline values are given in the supplement. The basis for the guidelines is generally a presumed worst case plausible scenario for a site.

An "Authorized Limit" is a level of residual radioactive material or radioactivity that must not be exceeded if the remedial action is to be considered completed and the site is to be released for unrestricted use. The Authorized Limit for a site will include limits for each radionuclide or group of radionuclides, as appropriate, associated with the residual radioactive material in the soil or in surface contamination of structures and equipment, and in the air or water, and, where appropriate, a limit on external gamma radiation resulting from the residual material. Under normal circumstances, expected to occur at most sites, Authorized Limits for residual radioactive material or radioactivity are set equal to guideline values. Exceptional conditions for which Authorized Limits might differ from guideline values are specified in Sections D and F. A site may be released for unrestricted use only if the conditions do not exceed the Authorized Limits or approved supplemental limits as defined in Section F.1 at the time remedial action is completed. Restrictions and controls on use of the site must be established and enforced if the site conditions exceed the approved limits, or if there is potential to exceed the dose limit if the site use was not restricted (Section F.2). The applicable controls and restrictions are specified in Section E.

DOE policy requires that all exposures to radiation be limited to levels that are as low as reasonably achievable (ALARA). For sites to be released for unrestricted use, the intent is to reduce residual radioactive material to levels that are as far below Authorized Limits as reasonable considering technical, economic, and social factors. At sites where the residual material is not reduced to levels that permit release for unrestricted use, ALARA policy is implemented by establishing controls to reduce exposure to levels that are as low as reasonably achievable. Procedures for implementing ALARA policy are discussed in the supplement. ALARA policies,

procedures, and actions shall be documented and filed as a permanent record upon completion of remedial action at a site.

B. BASIC DOSE LIMITS

The basic dose limit for the annual radiation dose received by an individual member of the general public is 100 mrem/year. The internal committed effective dose equivalent, as defined in ICRP Publication 26 (ICRP 1977) and calculated by dosimetry models described in ICRP Publication 30 (ICRP 1978), plus dose from penetrating radiation sources external to the body shall be used for determining the dose. This dose shall be described as the "Effective Dose Equivalent". Every effort shall be made to ensure that actual doses to the public are as far below the dose limit as is reasonably achievable.

Under unusual circumstances it will be permissible to allow potential doses to exceed 100 mrem/year where such exposures are based upon scenarios which do not persist for long periods and where the annual life time exposure to an individual from the subject residual radioactive material would be expected to be less than 100 mrem/year. Examples of such situations include conditions that might exist at a site scheduled for remediation in the near future or a possible, but improbable, one-time scenario that might occur following remedial action. These levels should represent doses that are as low as reasonably achievable for the site. Further, no annual exposure should exceed 500 mrem.

C. GUIDELINES FOR RESIDUAL RADIOACTIVE MATERIAL

C.1 Residual Radionuclides in Soil

Residual concentrations of radionuclides in soil shall be specified as above-background concentrations averaged over an area of 100 sq meters. Generic guidelines for thorium and radium are specified below. Guidelines for residual concentrations of other radionuclides shall be derived from the basic dose limits by means of an environmental pathway analysis using

site-specific data where available. Procedures for these derivations are given in the supplement.

If the average concentration in any surface or below surface area less than or equal to 25 sq meters exceeds the Authorized Limit or guideline by a factor of $(100/A)^{1/2}$, where A is the area of the elevated region in square meters, limits for "Hot Spots" shall also be applicable. These Hot Spot Limits depend on the extent of the elevated local concentrations and are given in the supplement. In addition, every reasonable effort shall be made to remove any source of radionuclide that exceeds 30 times the appropriate soil limit irrespective of the average concentration in the soil.

Two types of guidelines are provided, generic and derived. The generic guidelines for residual concentrations of the Ra-226, Ra-228, Th-230, and Th-232 are:

- 5 pCi/g, averaged over the first 15 cm of soil below the surface
- 15 pCi/g, averaged over 15-cm-thick layers of soil more than 15 cm below the surface

These guidelines take into account ingrowth of Ra-226 from Th-230 and of Ra-228 from Th-232, and assume secular equilibrium. If either Th-230 and Ra-226 or Th-232 and Ra-228 are both present, not in secular equilibrium, the appropriate guideline is applied as a limit to the radionuclide with the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that 1) the dose for the mixtures will not exceed the basic dose limit, or 2) the sum of the ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1 ("unity"). Explicit formulas for calculating residual concentration guidelines for mixtures are given in the supplement.

C.2 Airborne Radon Decay Products

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property

that are intended for unrestricted use; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR 192) is: In any occupied or habitable building, the objective of remedial action shall be, and a reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL.* In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions by DOE are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive materials are not the cause.

C.3 External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site to be released for unrestricted use shall not exceed the background level by more than 20 μR/h and shall comply with the basic dose limit when an appropriate use scenario is considered. This requirement shall not necessarily apply to structures scheduled for demolition or to buried foundations. External gamma radiation levels on open lands shall also comply with the basic dose limit considering an appropriate use scenario for the area.

C.4 Surface Contamination

The generic guidelines provided in the Table 1, Surface Contamination Guidelines are applicable to existing structures and equipment. These guidelines are adapted from standards of the U.S. Nuclear Regulatory

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* A working level (WL) is any combination of short-lived radon decay products in one liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha energy.

TABLE 1 SURFACE CONTAMINATION GUIDELINES

Radionuclides [2]	Allowable Total Residual Surface Contamination (dpm/100 cm^2) [1]		
	Average [3, 4]	Maximum [4, 5]	Removable [4, 6]
Transuranics, Ra-226, Ra-228, Th-230 Th-228, Pa-231, Ac-227, I-125, I-129	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay products	5,000 α	15,000 α	1,000 α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 β-γ	15,000 β-γ	1,000 β-γ

1 As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

2 Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

3 Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

4 The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at 1 cm.

5 The maximum contamination level applies to an area of not more than 100 cm^2.

6 The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. The numbers in this column are maximum amounts.

Commission (1982)* and will be applied in a manner that provides a level of protection consistent with the Commission's guidance. These limits apply to both interior and exterior surfaces. They are not directly intended for use on structures to be demolished or buried, but, should be applied to equipment or building components that are potentially salvageable or recoverable scrap. If a building is demolished, the guidelines in Section C.1 are applicable to the resulting contamination in the ground.

C.5 Residual Radionuclides in Air and Water

Residual concentrations of radionuclides in air and water shall be controlled to levels required by DOE Environmental Protection Guidance and Orders, specifically DOE Order 5480.1A and subsequent guidance. Other Federal and/or state standards shall apply when they are determined to be appropriate.

D. AUTHORIZED LIMITS FOR RESIDUAL RADIOACTIVE MATERIAL

The Authorized Limits shall be established to: 1) ensure that, as a minimum, the Dose Limits specified in Section B will not be exceeded under the worst case plausible use scenario consistent with the procedures and guidance provided, or 2) where applicable generic guidelines are provided, be consistent with such guidelines. The Authorized Limits for each site and vicinity properties shall be set equal to the generic or derived guidelines except where it can be clearly established on the basis of site specific data, including health, safety and socioeconomic considerations, that the guidelines are not appropriate for use at the specific site. Consideration

* These guidelines are functionally equivalent to Section 4 - Decontamination for Release for Unrestricted Use of NRC Regulatory Guide 1.86, but are applicable to Non-Reactor facilities.

should also be given to ensure that the limits comply with or provide an equivalent level of protection as other appropriate limits and guidelines (i.e., state, or other Federal). Documentation supporting such a decision should be similar to that required for supplemental limits and exceptions (Section F), but should be generally more detailed because it covers an entire site.

Remedial actions shall not be considered complete unless the residual radioactive material levels comply with the Authorized Limits. The only exception to this requirement will be for those special situations where the supplemental limits or exceptions are applicable and approved as specified in Section F. However, the use of supplemental limits and exceptions should only be considered if it is clearly demonstrated that it is not reasonable to decontaminate the area to the Authorized Limit or guideline value. The Authorized Limits are developed through the project offices in the field (Oak Ridge Technical Services Division for FUSRAP) and approved by the headquarters program office (the Division of Facility and Site Decommissioning Projects).

E. CONTROL OF RESIDUAL RADIOACTIVE MATERIAL AT FUSRAP AND REMOTE SFMP SITES

Residual radioactive material above the guidelines at FUSRAP and remote SFMP sites must be managed in accordance with applicable DOE Orders. The DOE Order 5480.1A and subsequent guidance or superceding orders require compliance with applicable Federal, and state environmental protection standards.

The operational and control requirements specified in the following DOE Orders shall apply to interim storage, interim management, and long-term management.

a. 5440.1C, Implementation of the National Environmental Policy Act

b. 5480.1A, Environmental Protection, Safety, and Health Protection Program for DOE Operations as revised by DOE 5480.1 change orders and the 5 August 1985 memorandum from Vaughan to Distribution

c. 5480.2, Hazardous and Radioactive Mixed Waste Management

d. 5480.4, Environmental Protection, Safety, and Health Protection Standards

e. 5482.1A, Environmental Safety, and Health Appraisal Program

f. 5483.1A, Occupational Safety and Health Program for Government-Owned Contractor-Operated Facilities

g. 5484.1, Environmental Protection, Safety, and Health Protection Information Reporting Requirements

h. 5000.3, Unusual Occurrence Reporting System

i. 5820.2, Radioactive Waste Management

E.1 Interim Storage

a. Control and stabilization features shall be designed to ensure, to the extent reasonably achievable, an effective life of 50 years and, in any case, at least 25 years.

b. Above-background Rn-222 concentrations in the atmosphere above facility surfaces or openings shall not exceed: (1) 100 pCi/L at any given point, (2) an annual average concentration of 30 pCi/L over the facility site, and (3) an annual average concentration of 3 pCi/L at or above any location outside the facility site (DOE Order 5480.1A, Attachment XI-1).

c. Concentrations of radionuclides in the groundwater or quantities of residual radioactive materials shall not exceed existing Federal, or state standards.

d. Access to a site shall be controlled and misuse of onsite material contaminated by residual radioactive material shall be prevented through appropriate administrative controls and physical barriers--active and passive controls as described by the U.S. Environmental Protection Agency (1983--p. 595). These control features should be designed to ensure, to the extent reasonable, an effective life of at least 25 years. The Federal government shall have title to the property or shall have a long-term lease for exclusive use.

E.2 Interim Management

a. A site may be released under interim management when the residual radioactive material exceeds guideline values if the residual radioactive material is in inaccessible locations and would be unreasonably costly to remove, provided that administrative controls are established to ensure that no member of the public shall receive a radiation dose exceeding the basic dose limit.

b. The administrative controls, as approved by DOE, shall include but not be limited to periodic monitoring as appropriate, appropriate shielding, physical barriers to prevent access, and appropriate radiological safety measures during maintenance, renovation, demolition, or other activities that might disturb the residual radioactivity or cause it to migrate.

c. The owner of the site or appropriate Federal, state, or local authorities shall be responsible for enforcing the administrative controls.

E.3 Long-Term Management

Uranium, Thorium, and Their Decay Products

a. Control and stabilization features shall be designed to ensure, to the extent reasonably achievable, an effective life of 1,000 years and, in any case, at least 200 years.

b. Control and stabilization features shall be designed to ensure that Rn-222 emanation to the atmosphere from the waste shall not: (1) exceed an annual average release rate of 20 $pCi/m^2/s$, and (2) increase the annual average Rn-222 concentration at or above any location outside the boundary of the contaminated area by more than 0.5 pCi/L. Field verification of emanation rates is not required.

c. Prior to placement of any potentially biodegradable contaminated wastes in a long-term management facility, such wastes shall be properly conditioned to ensure that (1) the generation and escape of biogenic gases will not cause the requirement in paragraph b. of this section (E.3) to be exceeded, and (2) biodegradation within the facility will not result in premature structural failure in violation of the requirements in paragraph a. of this section (E.3).

d. Groundwater shall be protected in accordance with Appropriate Departmental orders and Federal and state standards, as applicable to FUSRAP and remote SFMP sites.

e. Access to a site should be controlled and misuse of onsite material contaminated by residual radioactive material should be prevented through appropriate administrative controls and physical barriers--active and passive controls as described by the U.S. Environmental Protection Agency (1983--p. 595). These controls should be designed to be effective to the extent reasonable for at least 200 years. The Federal government shall have title to the property.

Other Radionuclides

f. Long-term management of other radionuclides shall be in accordance with Chapters 2, 3, and 5 of DOE Order 5820.2, as applicable.

F. SUPPLEMENTAL LIMITS AND EXCEPTIONS

If special site specific circumstances indicate that the guidelines or Authorized Limits established for a given site are not appropriate for a portion of that site or a vicinity property, then the field office may request that supplemental limits or an exception be applied. In either case, the field must justify that the subject guidelines or Authorized Limits are not appropriate and that the alternative action will provide adequate protection giving due consideration to health and safety,

environment and costs. The field office shall obtain approval for specific supplemental limits or exceptions from headquarters as specified in Section D of these guidelines and shall provide to headquarters those materials required for the justification as specified in this section and in the FUSRAP and SFHP protocols and subsequent guidance documents. The field office shall also be responsible for coordination with the state or local government of the limits or exceptions and associated restrictions as appropriate. In the case of exceptions, the field office shall also work with the state and/or local governments to insure that restrictions or conditions of release are adequate and mechanisms are in place for their enforcement.

F1. Supplemental Limits

The supplemental limits must achieve the basic dose limits set forth in this guideline document for both current and potential unrestricted uses of the site and/or vicinity property. Supplemental limits may be applied to a property or portion of a property or site if, on the basis of a site specific analysis, it is determined that certain aspects of the property or portion of the site were not considered in the development of the established Authorized Limits and associated guidelines for the site, and as a result of these unique characteristics, the established limits or guidelines either do not provide adequate protection or are unnecessarily restrictive and costly.

F2. Exceptions

Exceptions to the Authorized Limits defined for unrestricted use of the site may be applied to a portion of a site or a vicinity property when it is established that the Authorized Limits cannot be achieved and restrictions on use of the site or vicinity property are necessary to provide adequate protection of the public and environment. The field office must clearly demonstrate that the exception is necessary, and the restrictions will provide the necessary degree of protection and that they comply with the requirements for control of residual radioactive material as set forth in Part E of these guidelines.

F3. Justification for Supplemental Limits and Exceptions

Supplemental limits and exceptions must be justified by the field office on a case by case basis using site specific data. Every effort should be made to minimize the use of the supplemental limits and exceptions. Examples of specific situations that warrant the use of supplemental standards and exceptions are:

a. Where remedial actions would pose a clear and present risk of injury to workers or members of the general public, notwithstanding reasonable measures to avoid or reduce risk.

b. Where remedial actions--even after all reasonable mitigative measures have been taken--would produce environmental harm that is clearly excessive compared to the health benefits to persons living on or near affected sites, now or in the future. A clear excess of environmental harm is harm that is long-term, manifest, and grossly disproportionate to health benefits that can reasonably be anticipated.

c. Where it is clear that the scenarios or assumptions used to establish the Authorized Limits do not under plausible current or future conditions, apply to the property or portion of the site identified and where more appropriate scenarios or assumptions indicate that other limits are applicable or necessary for protection of the public and the environment.

d. Where the cost of remedial actions for contaminated soil is unreasonably high relative to long-term benefits and where the residual radioactive materials do not pose a clear present or future risk after taking necessary control measures. The likelihood that buildings will be erected or that people will spend long periods of time at such a site should be considered in evaluating this risk. Remedial actions will generally not be necessary where only minor quantities of residual radioactive

materials are involved or where residual radioactive materials occur in an inaccessible location at which site-specific factors limit their hazard and from which they are costly or difficult to remove. Examples are residual radioactive materials under hard-surface public roads and sidewalks, around public sewer lines, or in fence-post foundations. A site-specific analysis must be provided to establish that it would not cause an individual to receive a radiation dose in excess of the basic dose limits stated in Section B, and a statement specifying the residual radioactive material must be included in the appropriate state and local records.

e. Where there is no feasible remedial action.

G. SOURCES

Limit or Guideline	Source
Basic Dose Limits	
Dosimetry Model and Dose Limits	International Commission on Radiological Protection (1977, 1978)
Generic Guidelines for Residual Radioactivity	
Residual Concentrations of Radium and Thorium in Soil Material	40 CFR 192
Airborne Radon Decay Products	40 CFR 192
External Gamma Radiation	40 CFR 192
Surface Contamination	Adapted from U.S. Nuclear Regulatory Commission (1982)
Control of Radioactive Wastes and Residues	
Interim Storage	DOE Order 5480.1A and subsequent guidance
Long-Term Management	DOE Order 5480.1A and subsequent guidance; 40 CFR 192; DOE order 5820.2

H. REFERENCES

International Commission on Radiological Protection, 1977. Recommendations of the International Commission on Radiological Protection (Adopted January 17, 1977). ICRP Publication 26. Pergamon Press, Oxford. [As modified by "Statement from the 1978 Stockholm Meeting of the ICRP." Annals of the ICRP, Vol. 2, No. 1, 1978.]

International Commission on Radiological Protection, 1978. Limits for Intakes of Radionuclides by Workers. A Report of Committee 2 of the International Commission on Radiological Protection. Adopted by the Commission in July 1978. ICRP Publication 30. Part 1 (and Supplement), Part 2 (and Supplement), Part 3 (and Supplements A and B), and Index. Pergamon Press, Oxford.

U.S. Evironmental Protection Agency, 1983. Standards for Remedial Actions at Inactive Uranium Processing Sites; Final Rule (40 CFR 192). Federal Register 48(3):590-604 (January 5, 1983).

U.S. Department of Energy, 1984. Formerly Utilized Sites Remedial Action Program. Summary Protocol: Identification - Characterization - Designation - Remedial Action - Certification. Office of Nuclear Energy, Office of Terminal Waste Disposal and Remedial Action, Division of Remedial Action Projects. April 1984.

U.S. Department of Energy, 1987. Supplement to U.S. Department of Energy Guidelines for Residual Radioactivity at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites. A Manual for Implementing Residual Radioactivity Guidelines. Prepared by Argonne National Laboratory, Los Alamos National Laboratory, Oak Ridge National Laboratory, and Pacific Northwest Laboratory for the U.S. Department of Energy.

U.S. Nuclear Regulatory Commission, 1982. Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material. Division of Fuel Cycle and Material Safety, Washington, D.C. July 1982.

U.S. Atomic Energy Commission, 1974. Regulatory Guide 1.86, Termination of Operating Licenses for Nuclear Reactors, June 1974

Exhibit II

Documents Supporting the Certification of the Remedial Action Performed at the Albany Research Cener in Albany, Oregon, 1987-1988 and 1990-1991

EXHIBIT II

DOCUMENTS SUPPORTING THE CERTIFICATION OF THE REMEDIAL ACTION PERFORMED AT THE ALBANY RESEARCH CENTER IN ALBANY, OREGON, 1987-1988 and 1990-1991

1.0 CERTIFICATION PROCESS

The purpose of this certification docket is to provide a consolidated and permanent record of DOE activities at the Albany Research Center and of the radiological and chemical conditions of this property at the time of certification. A summary of the remedial action activities conducted at the site was provided in Exhibit I. Exhibit II contains or cites the documents that were produced to encompass the entire remedial action process, from designation of the site under FUSRAP to certification that no radiologically based restrictions limit future use of the site.

2.0 SUPPORTING DOCUMENTATION

For the convenience of the reader, Subsections 2.1 through 2.11 will be paginated continuously for the final draft of this certification docket. Each page number begins with the designator "II-" to distinguish the numbering systems used in the supporting documentation that constitutes Exhibit II. These page numbers will be listed in the table of contents at the beginning of this docket and in Subsections 2.1 through 2.11. Lengthy documents are incorporated by reference only and will be designated as such with the abbreviation "ref."; the actual documents will be provided as attachments to the certification docket at the time of publication. The number following the term "ref." corresponds to the number in the reference list on Pages I-23 and I-24 of this certification docket.

2.1 DECONTAMINATION OR STABILIZATION CRITERIA

The following documents contain the guidelines that determine the need for remedial action. The subject property has been decontaminated to comply with these guidelines. The first document listed is included as Appendix A of Exhibit I, the next three documents are included here by reference, and the remaining documents are included in this section.

	Page
U.S. Department of Energy. "U.S. Department of Energy Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites," Rev. 2, March 1987.	App. I-A
U.S. Department of Energy. Design Criteria for Formerly Utilized Sites Remedial Action Program (FUSRAP) and Surplus Facilities Management Program (SFMP), 14501-00-DC-01, Rev. 2, Oak Ridge, Tenn., March 1986.	Ref. 10
Bechtel National, Inc. Hazard Assessment for Radioactive Contamination in and Beneath Certain Buildings at the Albany Research Center, Oak Ridge, Tenn., September 1989.	Ref. 8

071385

United States Government

Department of Energy

memorandum

DATE: SEP 12 1990

1990 SEP 18 AM 11:41

REPLY TO ATTN OF: EM-421

SUBJECT: Approval of Supplemental Limits at the Albany Research Center

TO: Lester K. Price, Director
Technical Services Division
Oak Ridge Operations Office

We have reviewed the Hazard Assessment for Radicactive Contamination in and Beneath Certain Buildings at the Albany Research Center, dated September 1989, related to drains, subfloor pipes and subfloor soils in buildings 4, 17, 28, 29, 30 and 31 and approve your request for the application of supplemental limits. This approval is based on the fact that potential doses to workers and the general public from the residual thorium-232 found in the drains, subfloor pipes and subfloor soils in these buildings are insignificant, and additional remedial action at the subject buildings would not be cost beneficial.

The hazard assessment indicates that a present worker in the buildings could receive doses from a fraction of a mrem up to 7 mrem/yr. A future decommissioning worker that would be involved in the decommissioning of all of the subject buildings could receive up to 4 mrem/yr. The hazard assessment also states that when the buildings are demolished, the debris generated from demolition (calculated data from both contamination and uncontaminated areas) will be below DOE generic guidelines for thorium-232 in soil. These estimates are in the range of doses typical of levels that are being considered as "below regulatory concern" and represent a level that is as low as reasonably achievable, and on that basis, justify approval of the request for supplemental limits.

We generally believe that the estimates provided in the hazard assessment are conservative and would like verification measurements made to document actual conditions at some locations. During the remedial action effort, please make a number of PIC measurements in Building 17 (where the calculated doses are highest) and provide us a comparison to the doses calculated by the methodology of Appendix A of the above report. To make this comparison, PIC measurements will also be required in uncontaminated areas of the site to establish an estimate of the site background.

071385

If you have any questions regarding this action, please call me at FTS 233-4937.

James W. Wagoner II
Acting Chief
Off-Site Branch
Division of Eastern Area Programs
Office of Environmental Restoration

cc:
D. Adler, OR-TSD

073288

Bechtel

Jackson Plaza Tower
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
Mail Address:
P.O. Box 350
Oak Ridge, TN 37831-0350
Telex: 3789879

Job No. 14501, FUSRAP Project
DOE Contract No. DE-AC05-81OR20722
Code: 7340/WBS: 102

DEC 4 1990

U. S. Department of Energy
Oak Ridge Operations
P. O. Box 2001
Oak Ridge, TN 37831-8723

Attention: David G. Adler, Site Manager
Former Sites Restoration Division

Subject: Cleanup Criteria for Building 17, Room 10 at the Albany Research Center

Dear Mr. Adler:

Prior to remedial action at the Albany Research Center (ARC), Bechtel National, Inc. (BNI) and the independent verification contractor, Oak Ridge Associated Universities (ORAU), agreed that the thorium-232 cleanup guideline would be followed as the allowable surface residual contamination guideline. A letter addressed to you, dated July 3, 1990, indicated this guideline would apply across the site with the exception of the rafters in Building 17, where data indicated the uranium guideline should apply.

Recently collected data from the floor of Room 10 in Building 17 indicate that the uranium cleanup guideline rather than the thorium cleanup guideline should apply in this area. BNI has discussed this approach with ORAU and we are in agreement. If you have any questions, please call me or Karen Noey at 576-2364.

Very truly yours,

SD Liedle

S. D. Liedle
Project Manager - FUSRAP

cc: J. D. Berger, ORAU

Concurrence: K. C. Noey @ KCN

069313

Bechtel

Jackson Plaza Tower
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830
Mail Address:
P.O. Box 350
Oak Ridge, TN 37831-0350
Telex: 3785873

Job. No. 14501, FUSRAP Project
DOE Contract No. DE-AC05-81OR20722
Code: 7340/WBS: 102

JUL 3 1990

U. S. Department of Energy
Oak Ridge Operations
P. O. Box 2001
Oak Ridge, TN 37831-8723

Attention: David G. Adler, Site Manager
Technical Services Division

Subject: Cleanup Criteria for the Albany Research Center

Dear Mr. Adler:

Upon review of the radiological characterization data from the Albany Research Center (ARC) surveys performed by Bechtel National, Inc. (BNI) and Argonne National Laboratory, the thorium-232 cleanup guideline will be followed during remedial action at this site. The thorium-232 guideline for allowable surface residual contamination in disintegrations per minute per 100 square centimeters (dpm/100 cm^2) is 1,000 average, 3,000 maximum, and 200 removable. This guideline will apply across the site with the exception of the rafters in Building 17, where data indicate the uranium guideline should apply.

BNI has discussed this approach with the independent verification contractor, and we are in agreement. If you have any questions, please call me or Karen Noey at 576-2364.

Very truly yours,

SD Liedle

S. D. Liedle
Project Manager - FUSRAP

cc: J. D. Berger, ORAU

Concurrence: K. C. Noey @ KCN

Bechtel

Jackson Plaza Tower
800 Oak Ridge Turnpike
Oak Ridge, Tennessee 37830

Mail Address:
P.O. Box 350
Oak Ridge, TN 37831-0350

Telex: 3785873

Job. No. 14501, FUSRAP Project
DOE Contract No. DE-AC05-81OR20722
Code: 7340/WBS: 102

MAY 8 1991

U. S. Department of Energy
Oak Ridge Operations
P. O. Box 2001
Oak Ridge, TN 37831-8723

Attention: David G. Adler, Site Manager
Former Sites Restoration Division

Subject: Cleanup Criteria for the Albany Research Center

Dear Mr. Adler:

The purpose of this letter is to provide you with a listing of all the areas at the Albany Research Center (ARC) at which the cleanup criteria deviated from the thorium-232 allowable surface residual contamination guideline. A letter addressed to you, dated July 3, 1990, stated that the thorium-232 guideline would apply across the ARC site with the exception of the rafters (attic) in Building 17, where data indicated the uranium guideline should apply. Another letter addressed to you, dated December 4, 1990, stated that recently collected data from the floor of Room 10 (Laboratory) in Building 17 indicated that the uranium cleanup guideline rather than the thorium cleanup guideline should apply in this area. Oak Ridge Associated Universities (ORAU), the independent verification contractor, and Bechtel National, Inc. (BNI) were in agreement on both occasions.

The cleanup criteria changed during remedial action in several additional areas at ARC. In all cases, BNI and ORAU discussed what approach to follow during the remedial action and were in agreement. In general, cleanup guidelines changed from the thorium-232 allowable surface residual contamination guideline based on analytical results of samples collected from each of the areas. The ratios of the radionuclide concentrations were calculated and these ratios were applied to the surface residual contamination guidelines. The cleanup criteria changed from the thorium-232 guideline in the following areas:

- Building 17, Lab 10 - the average allowable surface residual contamination guideline, excluding the floor area, was established at 4,000 disintegrations per minute per 100 square centimeters (dpm/100 cm^2), and the maximum guideline was set at 12,000 dpm/100 cm^2. Any removable contamination was cleaned up following the thorium-232 guideline of 200 dpm/100cm^2.

- Building 30, wooden mezzanine - the uranium-238 allowable surface residual contamination guidelines were used during remedial action.

- Building 30, floor in the fabrication room - the average and maximum allowable surface residual contamination guidelines were established at 4,000 and 12,000 dpm/100cm^2, respectively. Any removable contamination was cleaned up following the thorium-232 guideline of 200 dpm/100cm^2.

- Building 31, attic - the guidelines used during remedial action were as follows: 2,500 dpm/100cm^2 average, 5,000 dpm/100cm^2 maximum, and 500 dpm/100cm^2 removable.

- Building 28, floor - the uranium-238 guidelines were used during cleanup.

- Lime pit walls - the guideline used during remedial action was 2,400 dpm/100cm^2 average, within the top six inches of the walls. For any contamination below the top six inches, the soil criterion of 15 picocuries per gram for residual thorium-232 was used. The concrete walls were crumbling during the cleanup; therefore, the soil criterion was employed.

If you have any questions or comments, please notify me or Karen Noey at 576-2364.

Very truly yours,

SD Liedle

S. D. Liedle
Project Manager - FUSRAP

cc: J. D. Berger, ORAU

Concurrence: K. C. Noey @ KCN

2.2 DESIGNATION OR AUTHORIZATION DOCUMENTATION

The following documents designated or authorized the remedial action at ARC. A copy of each follows.

JAN 25 15 13 - 1071 -

E-11650 DRAFT

NOTE FOR: ED DELANEY

FROM: STEVEN R. MILLER

RE: REMEDIAL ACTION AUTHORITY FOR ALBANY, OREGON AND SENECA ARMY DEPOT SITES

This note is in response to your questions regarding DOE's authority to undertake remedial actions at the above two sites.

Seneca Army Depot Site - This site was utilized by the Manhattan Engineer District in the early 1940's for the interim storage of Belgium Congo pitchblendes. Subsequently when the MED was abolished and the Atomic Energy Commission was created, the Army retained ownership of the site. The site continues to remain under Army ownership as of this date. Consequently, the authority to undertake remedial action to protect public health and safety would rest with the Department of the Army. DOE could also undertake such remedial action if a Memorandum of Understanding was entered into with the Department of Army, and the Army transferred sufficient funds to DOE to cover DOE's remedial action expenditures.

Albany, Oregon Site (Bureau of Mines) - This site was utilized by the Atomic Energy Commission in the 1950's for research and development work on uranium ores including metallurgical operations involving thorium. DOE would have the existing authority to undertake remedial action to remove residual radioactive materials generated under contract # AT(11-1)-599 if such action were required to protect public health and safety.

DOE F 1325.8
(7-79)

Keller

U.S. DEPARTMENT OF ENERG

memorandur

DATE: JUN 14 1983

810519

9184

REPLY TO ATTN OF: NE-24

SUBJECT: Designation of the Bureau of Mines Site at Albany, Oregon, for Remedial Action Under the Formerly Utilized Sites Remedial Action Program

TO: J. LaGrone, Manager
Oak Ridge Operations Office

Based on the data in the attached draft reports, it has been determined that the subject site is contaminated with residual radioactive material as a result of Manhattan Engineer District/Atomic Energy Commission operations at this site. The contamination is in excess of the acceptable guidelines and warrants some form of remedial action under the Formerly Utilized Sites Remedial Action Program. It should be noted that the attached reports are draft reports and although subject to change, the changes expected will not effect the designation of the site; therefore, the reports are suitable for designation and preliminary planning and scheduling purposes.

I am attaching two copies of each of the following draft reports. The final reports will be forwarded upon their receipt:

1. "Radiological Survey of the Albany Metallurgical Research Center, U.S. Bureau of Mines, Albany, Oregon" (DOE/EV-0005/40).

2. "Radiological Survey of the Albany Metallurgical Research Center, U.S. Bureau of Mines, Biomass Facility and 'Back Forty' Area, Albany, Oregon" (DOE/EV-0005/39).

If there are any questions, please call Mr. Arthur J. Whitman on FTS 233-5439.

Franklin E. Coffman, Director
Office of Terminal Waste Disposal
and Remedial Action
Office of Nuclear Energy

2 Attachments (2)

No Attachments with This Letter

18582

2.3 RADIOLOGICAL CHARACTERIZATION REPORTS

The pre-remedial action status of the ARC property is documented in Exhibit I (Refs. 2, 3, 4, and 7). Additional information on the "Back Forty" is included in the following letter and attachment.

E-104960

October 25, 1983

Bechtel National, Inc.
ATTN: R. L. Rudolph
PO Box 350
Oak Ridge, TN 37831

Gentlemen:

SUPPLEMENTAL INFORMATION ON "BACK FORTY" AREA OF BUREAU OF MINES SITE, ALBANY, OR

Enclosed is additional information on the "Back Forty" area of the Bureau of Mines site in Albany, OR. This supplements the information found in report number DOE/EV-0005/39 on the Albany site and should be used in developing plans and schedules for the site.

Sincerely,

/s/ R. L. KELLER

E. L. Keller, Director
Technical Services Division

CE-53:KFH

Enclosure:
As stated above

cc w/o encl:
G. W. Benedict

cc w/encl:
R. W. Vocke, ANL

CE-53:KFHarer:sb:64450:10/25/83

CONCURRENCES
RTG SYMBOL CE-53
INITIALS/SIG KFHarer
DATE 10/25
RTG SYMBOL CE-53
INITIALS/SIG ELKeller
DATE

Interim Letter Report for the Geohydrological and Radiological Assessment of the "Back Forty" Area, U. S. Bureau of Mines, Albany, Oregon

At the request of the DOE Office of Nuclear Energy's Division of Remedial Action Projects, a geohydrological study and an expanded radiological assessment of the "Back Forty" Area of the U. S. Bureau of Mines Site at Albany, Oregon, was conducted by the ANL Radiological Survey Group during the month of July 1983. Figure 1 depicts the U. S. Bureau of Mines Site and Figure 2 locates it with respect to the City of Albany.

The City of Albany has expressed an interest in acquiring the Back Forty area. This property was involved in MED/AEC activities. Previous radiological assessments[1] have identified certain areas of the Back Forty which contain low-level radioactive contamination.

The primary purpose of the expanded assessment effort, reported herein, was to determine the hydraulic gradient in the Back Forty area, to conduct a radiological assessment in areas peripherally related to the radioactive material dump area, and to study the impact of a drain tile field located immediately south of the dump area. The hydraulic gradient determination was undertaken to evaluate the potential migration of subsurface radioactive material from the dump site to surrounding areas. The radiological assessment, in the peripheral areas, was performed to assess lateral migration of any radioactive material that may already have occurred. The existing drain tile field, south of the dump site, was evaluated as a potential migratory pathway for radioactive materials.

This Interim Letter Report is being submitted to provide information based on the data analyses completed thus far. A final report will be submitted when the remaining analyses are completed.

The procedures employed, the results obtained and the conclusions with recommendations made therefrom, are delineated below.

Procedures

To assess the hydraulic gradient, four bore holes were drilled, one in each corner of the Back Forty area (see Fig. 3). The subsurface water was allowed to rise to a static level and was then measured for its depth with respect to grade level. Again, as previously reported[1], the subsurface water was initially encountered during drilling below the final static level. Due to a hydrostatic head, the water rose, in a relatively short time period, to a level ranging from 3 to 6½ ft. below grade for three of the four holes. Initially water had been encountered below the 8 ft. level.

Mean Sea Level (MSL) readings, for both grade and water levels, were determined by transit as referenced on a bench mark located at the northwest corner of the U. S. Bureau of Mines property (see Fig. 6). The MSL of this bench mark, as reported by the county surveyor for Linn County, was 225.341 ft. MSL.

For radiological assessment purposes, several additional bore holes were taken around the periphery of the dump (see Fig. 4). Of special interest were the bore holes from the ditch located just south of the dump area and the bore holes in the immediate area of the drain field's main tile, west of the dump area (see Fig. 5). Soil samples were taken, by means of a "split spoon" sampler, in 1 ft. continuous increments for all bore holes. Several bore holes were logged to ascertain any anomalous radiation readings below grade.

Soil, sludge and water samples were collected from areas along the main drain tile of the drain tile field and at several areas of the outfall on Queen Avenue (see Figs. 4 and 6). As depicted in the original drawing of the drain tile field (see Fig. 5), the outfall appears to be in the ditch paralleling Broadway Street. However, investigation revealed the outfall to actually be at Queen Avenue, some 1200 ft. west-southwest of the U. S. Bureau of Mines Site bench mark (see Fig. 6).

Soil samples, taken by split spoon sampling or by hand trowel, were measured with portable survey instruments to note any reading potentially above background and were returned to ANL where they were submitted for standard soil processing. This processing includes weighing wet, drying, weighing dry, milling, and sieving to 600 μm. Samples were loaded into plastic containers, 100 grams for gamma spectral analysis and 5 grams for uranium fluorometric. Gamma spectral and uranium fluorometric analyses are conducted by the ANL Analytical Chemistry Laboratory (ACL). For the ^{226}Ra series determination, samples require a 20-day storage prior to measurement, this is to allow for equilibrium and identification of the ^{214}Bi gamma ray.

Water and sludge samples are filtered to remove the suspended solids. The filtrate is evaporated to ascertain the dissolved solids. Gamma spectral and uranium fluorometric analyses are conducted on these samples.

The radionuclides of particular interest include the isotopes of uranium, thorium, and their daughters. Upon receipt of results from these various analyses, it is then determined if additional specific analyses need to be performed, e.g., mass spectrometric analysis to determine uranium isotopic ratios.

Geohydrological Results

The hydraulic gradient for the Back Forty area was based on the static water level results obtained from bore holes 7-S151 (located in the southeast quadrant) 7-S153 (located in the northwest quandrant) and 7-S154 (located in the northeast quadrant) (see Fig. 3). Bore hole 7-S152 (located in the southwest quadrant) was not used in the gradient determinations due to lack of subsurface infiltration, in spite of drilling to a depth of 25 ft. below grade level. An adjacent hole, 7-S166, was also drilled to a depth of 25 ft. below grade. It exhibited no subsurface infiltration.

Water levels in the three bore holes were measured to be as follows; (7-S151) 210.942 ft. MSL, (7-S153) 209.952 ft. MSL and (7-S154) 215.109 ft. MSL. These measured levels indicate a hydraulic gradient of approximately 9.5 inches per hundred feet in a southwesterly direction (see Fig. 3), thus indicating a flow from the contaminated area (dump site) through the southern

portion of the Back Forty which contains the drain tile field. Since the grade level of the dump site is elevated with respect to the southern part of the Back Forty, surface water will flow from the dump site, south to a ditch that runs in a westerly direction, and then discharges into the ditch paralleling Broadway Street (see Fig. 5).

A water-level contour map of the Albany area, obtained from the U. S. Geological Service, indicates a hydraulic gradient in a northwesterly direction, (see Fig. 7). One notes that this is in contradistinction to the local measured hydraulic gradient in the Back Forty area. The measured local gradient must take precedence over the larger area determinations.

Radiological Results

A total of 288 samples, which include soil, water and sludge, were taken from various areas of the site (see Fig. 4). These samples are in the process of being prepared and analyzed. Currently, results of analyses have been received for some 20% of the samples. These results have shown anomalies.

Sample No. 7-W145 was a sample of standing water taken from a ditch on the north side of Queen Avenue (see Fig. 6). This standing water is a result of discharge from the Back Forty drain field as well as local surface runoff. Gamma spectral analysis indicates 11 pCi/gram of ^{226}Ra plus daughters from the suspended solids. Uranium fluorometric analysis of this sample shows 4 µg uranium/gram of suspended solids. Therefore, the amount of ^{226}Ra plus daughters in excess of the amount in equilibrium with natural uranium equates to approximately 10 pCi ^{226}Ra/gram of suspended solids.

Sample 7-W149 is a water sample taken from a "sink" hole adjacent to the main drain from the tile field. This sink hole is located in a ditch paralleling Broadway Street (see Fig.4). At the time the sample was taken, water was discharging from the tile field drain, which in all probability caused the sink hole. Gamma spectral analysis indicates 2.1 pCi/gram of ^{110m}Ag from the suspended solids. The source of this radionuclide has not been determined, however, ^{110m}Ag was detected in the sludge of the API Oil Separator located in the Bio Mass Facility.[1]

Samples 7-S154-2, 7-S154-3 and 7-S158-1 taken in the vicinity of the dump site (see Fig. 4) revealed uranium concentrations of 77.8 µg/g, [illegible] µg/g and 6µg/g respectively. Gamma spectral analyses of these samples are in process.

Conclusions

In light of the results revealed by the geohydrological study and the radiological analyses to date, the following conclusions can be made:

1. The hydraulic gradient (water flow) is from the radioactive dump site to the southern part of the Back Forty and through the drain tile field.

E=10497

2. Surface drainage from the dump site is in a southerly direction at least to the ditch that parallels the dump site, which in turn drains in a westerly direction (see Fig. 5).

3. Radioactive anomalies, albeit low level, have appeared in the outfall area of the drain tile system and in an area where the main drain tile was discharging.

4. Limited soil sample results indicate uranium concentrations clearly in excess of expected naturally occurring levels.

Recommendations

Based on the conclusions stated above, the following recommendations are made:

1. The Back Forty should not, at this time, be released for unrestricted use. Based on the results of the analyses of the remaining samples, a more definitive estimate of the migration can be made.

2. Evidence of radionuclides near the outfall and adjacent to the main drain tile, at least temporarily, precludes the release of the main drain tile for unrestricted use.

R. A. Wynveen
Associate Division Director

W. H. Smith
Senior Health Physicist

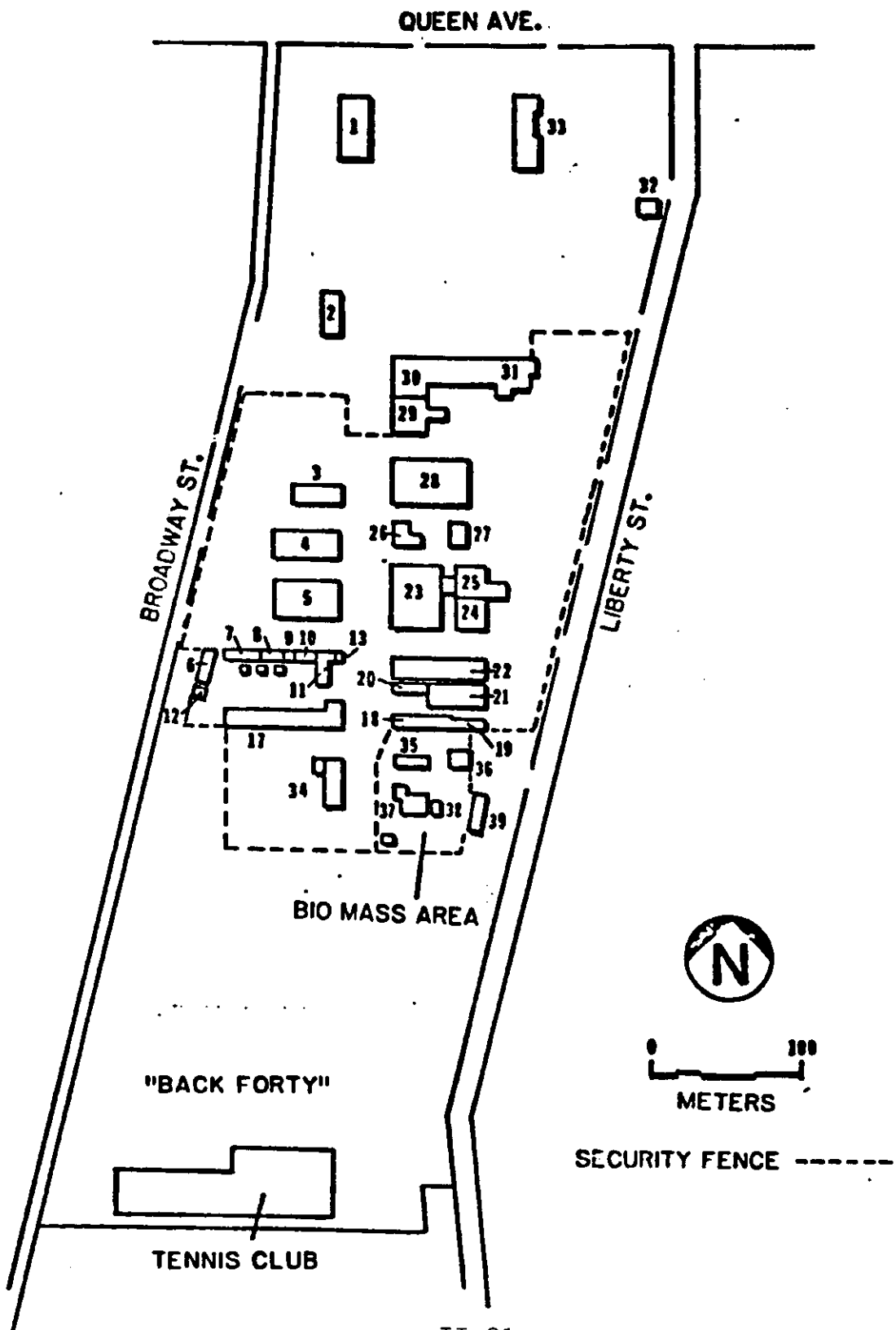
RAW:WHS:mp

REFERENCE

1. The Albany Metallurgical Research Center, United States Bureau of Mines, BioMass Facility and the "Back Forty" Area, Albany, Oregon DOE/EV-0005/39, ANL-OHS/HP-83-101.

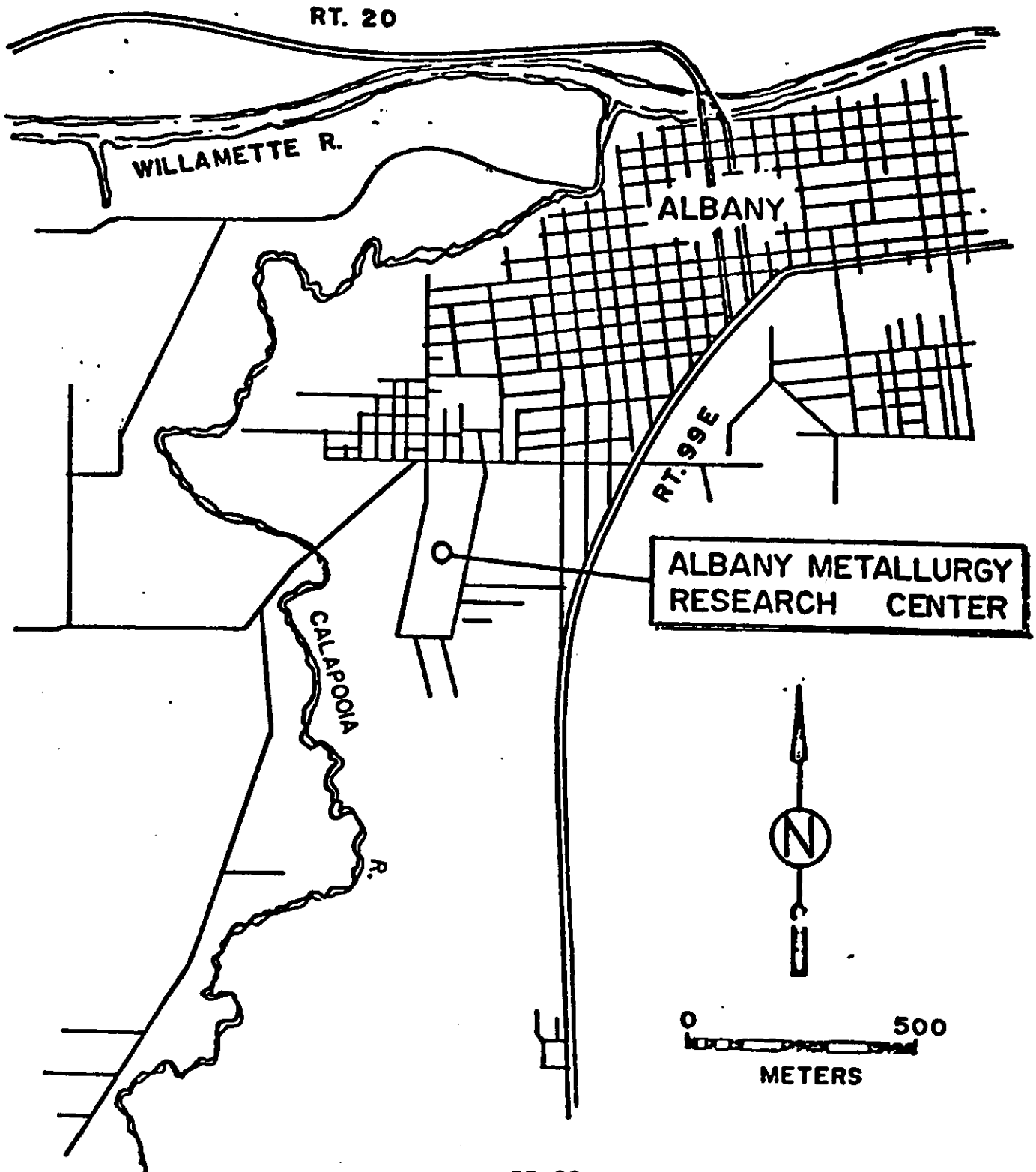
Albany Metallurgical Research Center Site

ANL-HP DWG. NO. 82-31



Albany Metropolitan Area

ANL- HP. DWG. NO. 79-77



HYDRAULIC GRADIENT

ANL-HP DWG. NO. 83-63

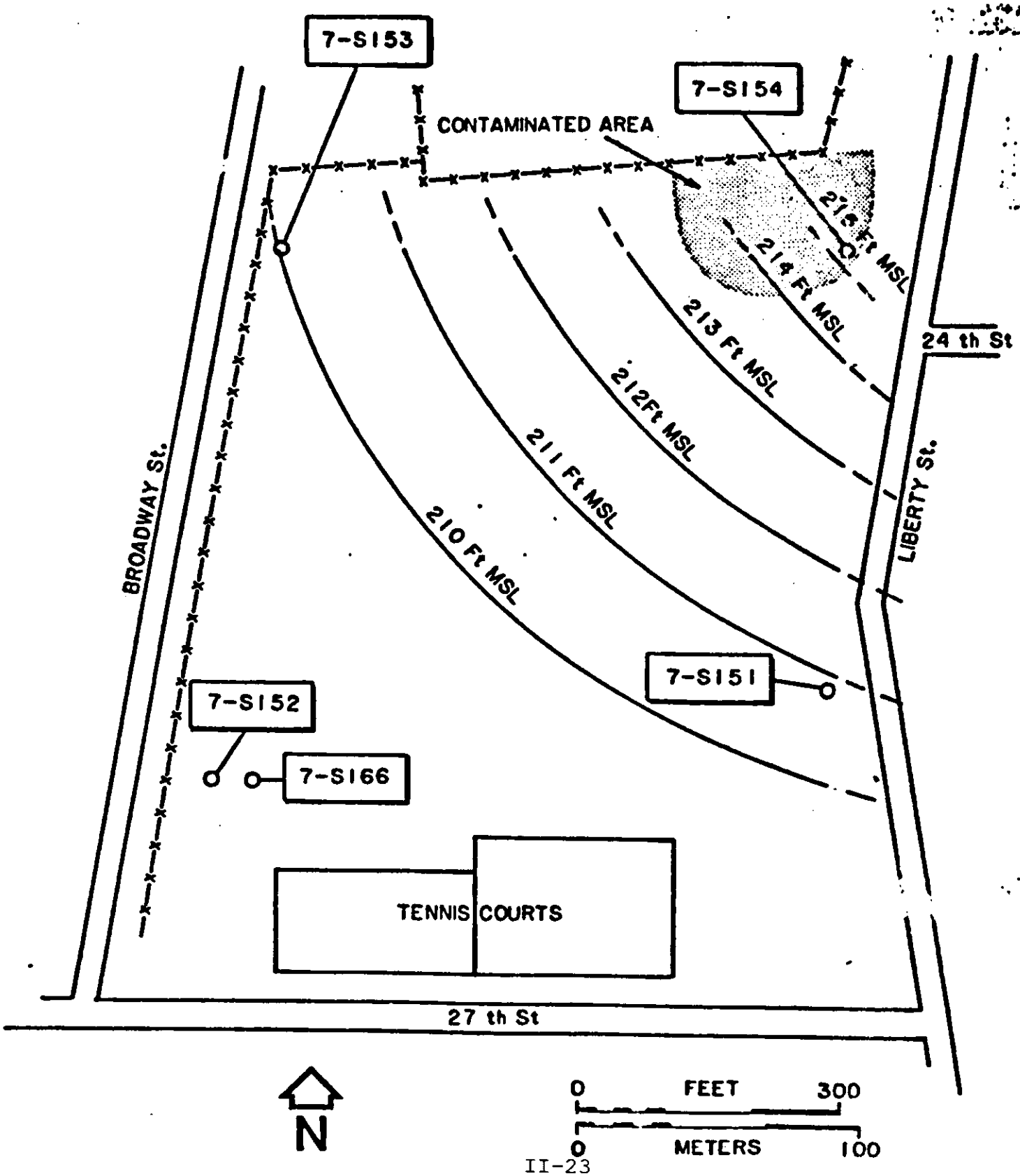


FIGURE 3

SAMPLE LOCATIONS

ANL-HP DWG. NO. 83-65

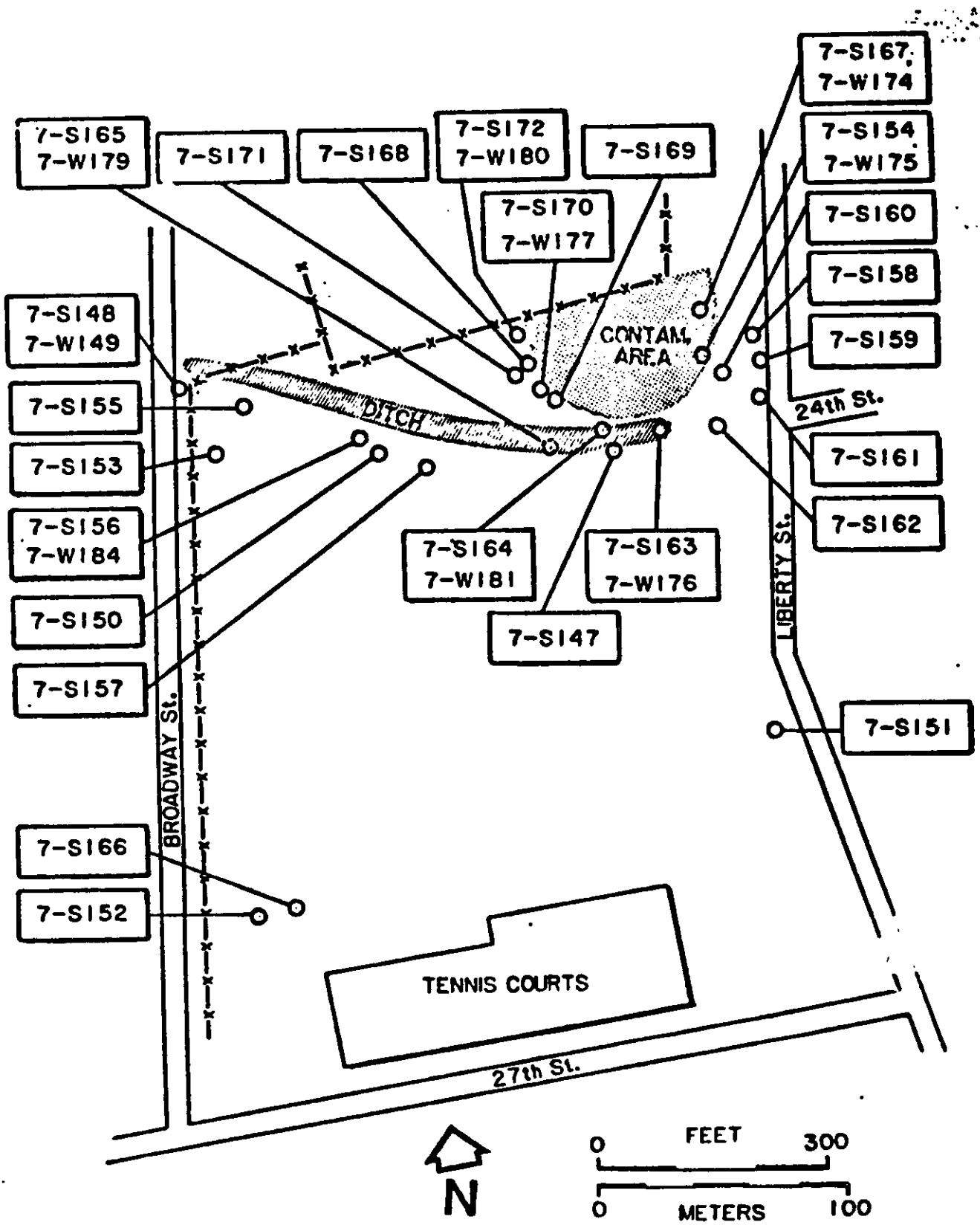


FIGURE 4

DRAIN TILE FIELD

ANL-HP DWG. NO. 83-62

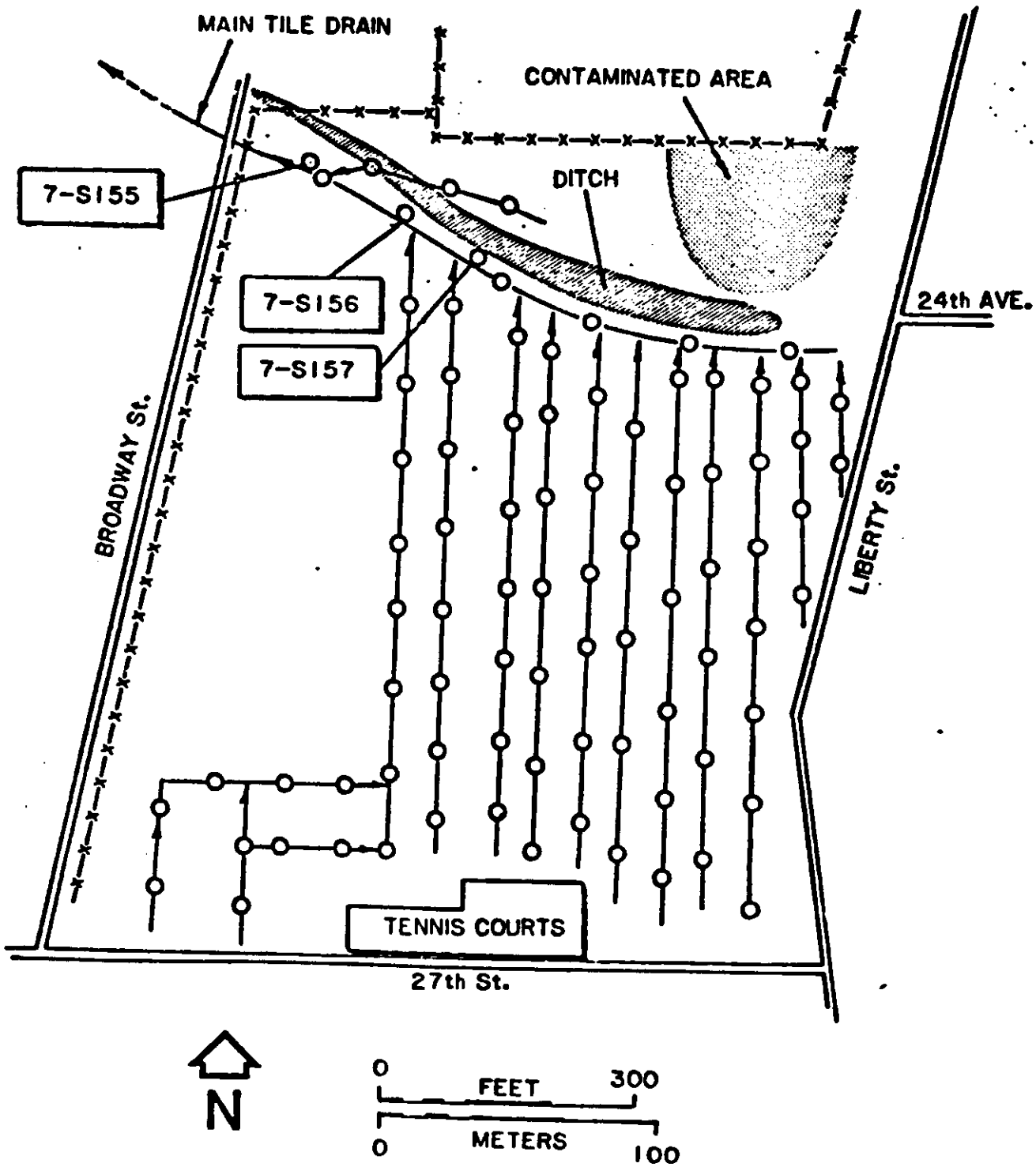
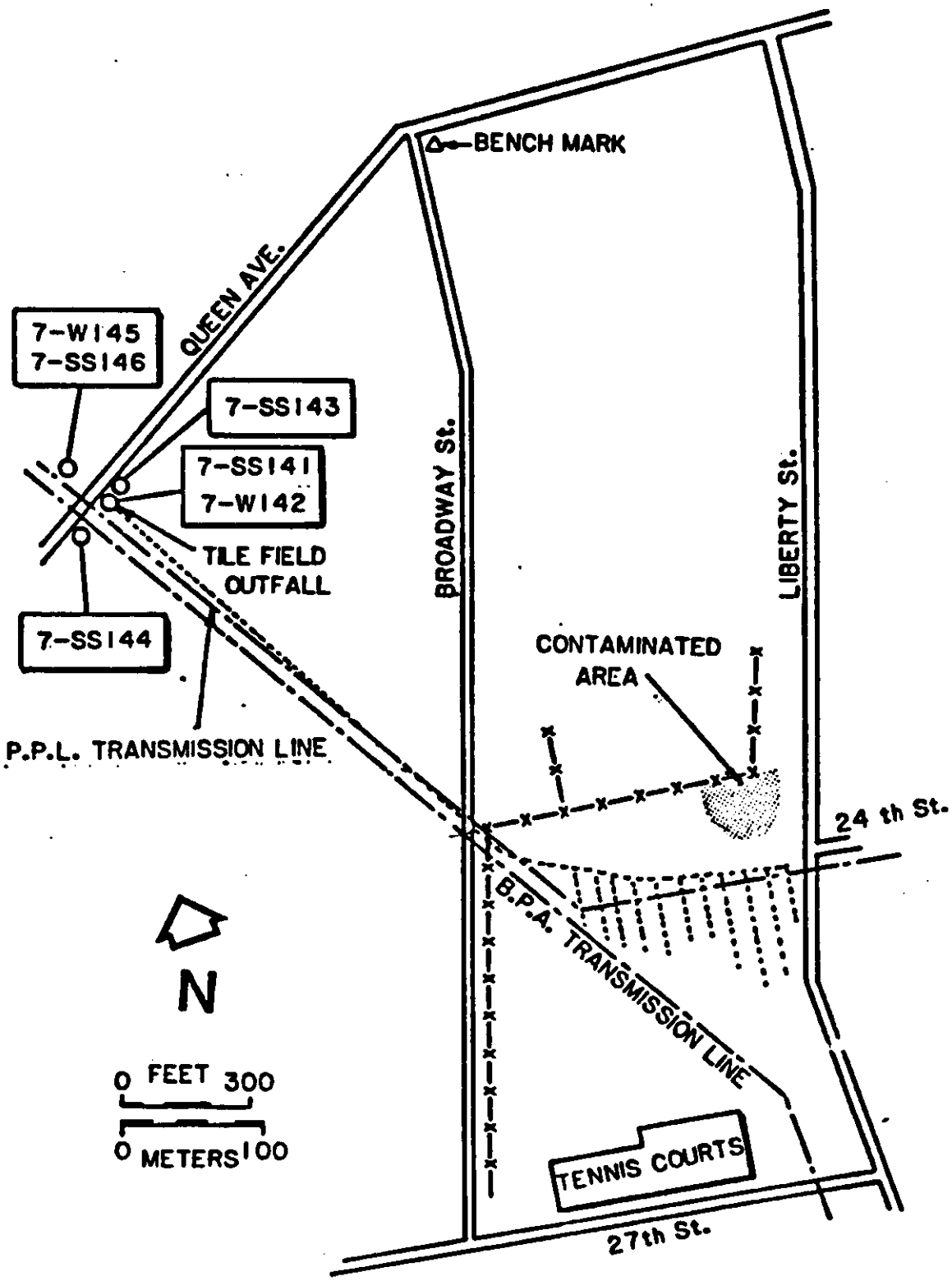


FIGURE 5

TRANSMISSION LINES AND TILE FIELD OUTFALL

ANL-HP DWG. NO. 83-62



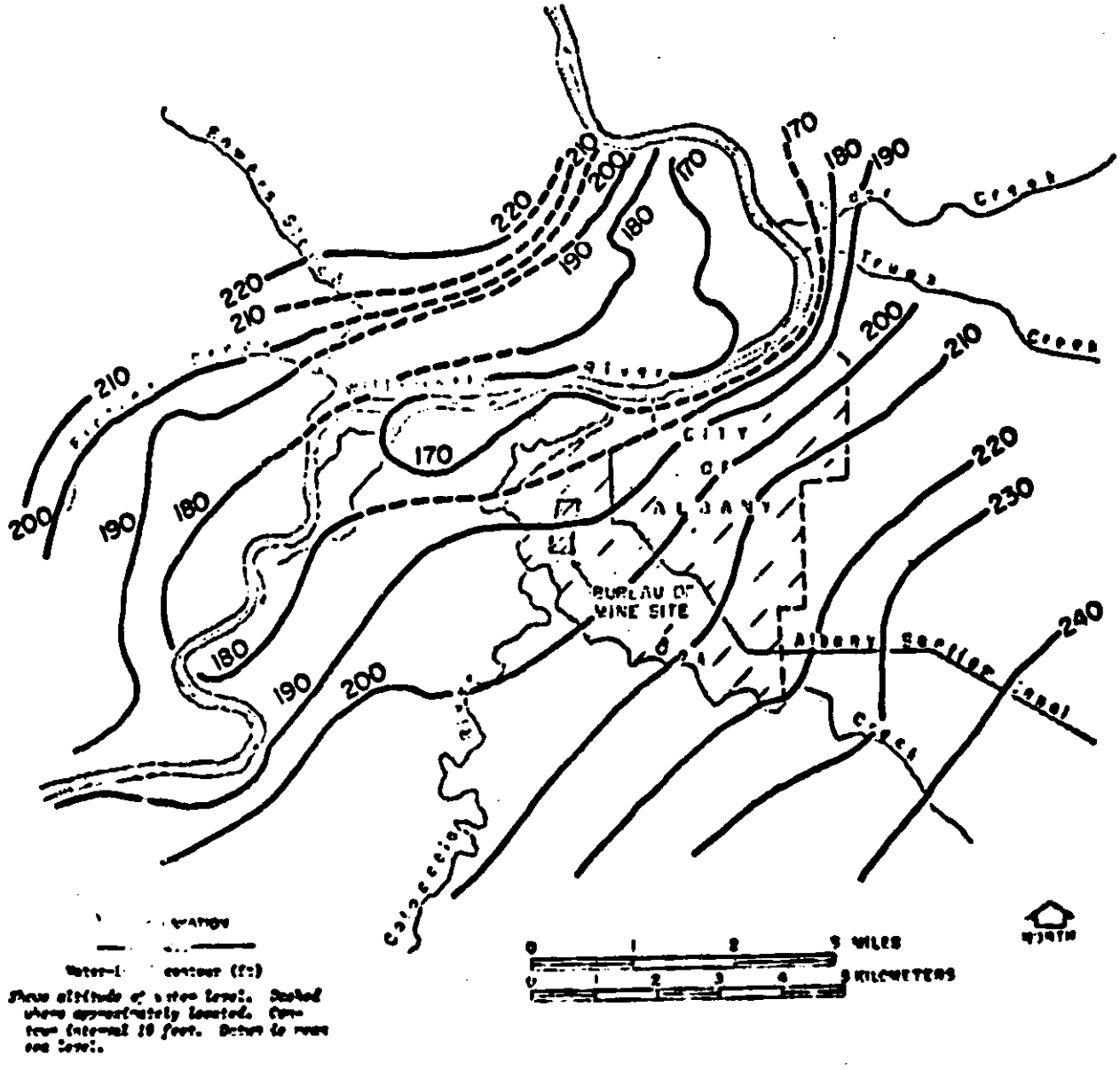


FIGURE 7

2.4 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) AND COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) DOCUMENTS

The documents listed in this section fulfill the NEPA and CERCLA requirements for the ARC site.

U.S. Department of Energy
ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue, Argonne, Illinois 60439
Telephone 312/972-7798

E2095/LC Campbell Cy. Alexander 1/23

Files

January 19, 1984

Mr. G. P. Crotwell
Bechtel National, Inc.
P. O. Box 350
Oak Ridge, Tennessee 37830

Dear Phil:

Subject: Schedule and Cost for Preparation of NEPA Documentation for the Albany, Oregon, FUSRAP Site

As requested, enclosed are tentative schedules for preparation of NEPA documentation for the two remedial action alternatives presently being evaluated for the Albany, Oregon, FUSRAP site.

Based on our past experience, an EIS probably should be prepared for on-site stabilization (Enclosure 1). However, an expanded Action Description Memorandum (ADM) probably would be sufficient for the removal and transport to the Hanford site (Enclosure 2).

The enclosed schedules are based on the assumption that the DOE preferred alternative will be selected by February 15, 1984. Also, it should be noted that we will require inputs in a timely manner from various parties (i.e., BNI and DOE) in order to maintain this schedule.

Please feel free to call if we can be of further assistance.

Sincerely,

Steve Y. Tsai
Project Leader - Albany Site
Environmental Research Division

SYT/amw
Enc.

cc: J. K. Alexander, DOE
L. F. Campbell, DOE
A. J. Dvorak, ANL
D. M. Gardiner, ANL
J. D. Jastrow, ANL
J. M. Peterson, ANL
R. L. Rudolph, BNI
R. W. Vocke, ANL

See 20385

E-20957

Enclosure 1

Milestones and Tentative Schedule for Preparation of EIS for Albany Center Project (On-Site Stabilization)
Start Date: February 15, 1984

January 18, 1984

Milestones	Schedule
FY84	
ADM Approved by DOE	April 16
DOE Issues NOI	May 15
Scoping Meetings Conducted by DOE	June 15
IP Delivered to OR	July 16
FY85	
Environmental and Engineering Data Received from BNI	October 5
PDEIS Delivered to OR and BNI (for review and revision)	March 15
Revised PDEIS Delivered to All Appropriate Organizations (for review and revision)	May 20
Camera Ready DEIS Delivered to OR	July 26
DEIS Issued by DOE	September 20
FY86	
Public Comment Period	November 20
Prepare PFEIS	January 2
Camera Ready FEIS Delivered to OR	February 14
FEIS Issued by DOE	March 14
Public Comment Period	April 15
DOE Issues ROD	May 16

E-20951

Enclosure 2

Milestones and Tentative Schedule for Preparation of Expanded ADM for Albany Center Project (Transport Wastes to Hanford)
Start Date: February 15, 1984

January 18, 1984

Milestones	Schedule
FY84	
Site Characterization Data Received from BNI	April 2
Engineering Data (Descriptions of Proposed Action) Received from BNI	May 4
Draft ADM	June 8
Final ADM	July 1

United States Government

Department of En

memorandum

DATE JUL 15 1987

REPLY TO ATTN OF: NE-20

SUBJECT: Review of Proposed Remedial Actions at the Albany Research Center, Oregon

TO: File

As part of its Formerly Utilized Sites Remedial Action Program (FUSRAP), the Department of Energy (DOE) proposes to carry out remedial actions at the Albany Research Center in Albany, Oregon. The proposed actions will serve to decontaminate those areas at the Albany site that are radioactively contaminated as a result of programs previously conducted by the U.S. Atomic Energy Commission.

The proposed actions will include removal of contaminated equipment, decontamination of buildings, and excavation of contaminated soils on the site. The estimated 3,000 cubic yards of contaminated material generated by these activities will be transported to the Hanford site near Richland, Washington, for disposal.

The radiological impacts of the proposed remedial actions both to the workers and members of the general public, surface and ground water impacts, and traffic impacts are reviewed in the Attachment. The project will clearly have no significant effects on the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act. Accordingly, neither an environmental assessment nor an environmental impact statement will be required.

William R. Voigt, Jr.
Director
Office of Remedial Action
and Waste Technology
Office of Nuclear Energy

Attachment

cc:
C. Osborne, EH-25 w/attach.
J. Wagoner, NE-23 w/o attach.
S. Ahrends, OR w/o attach.
R. Atkin, OR w/o attach.

074523 91-050

United States Government

Department of Energy

Oak Ridge Operations

memorandum

DATE: January 28, 1991

REPLY TO ATTN OF: EW-93:Adler

SUBJECT: ENVIRONMENTAL DOCUMENTATION AND COMMUNITY RELATION REQUIRED FOR THE ALBANY RESEARCH CENTER

TO: File

The purpose of this memorandum is to document the selected approach to satisfying environmental documentation and community relations requirements for the Albany Research Center Phase II cleanup effort. After review of the NEPA and CERCLA regulations applicable to this issue, I have concluded that the NEPA documentation prepared in advance of Phase I implementation, combined with additional documentation prepared to support Phase II waste shipments to the Hanford Disposal Facility, are sufficient to support full implementation of the Phase II effort. Accordingly, no additional documentation need be prepared.

My conclusion is based upon a finding that the Action Description Memorandum originally prepared to support cleanup of the ARC facility is essentially equivalent to an engineering evaluation/cost analysis (EE/CA) that would be prepared prospectively for future removal actions.

Community involvement measures implemented in support of the ARC cleanup effort include: public meetings on the nature of cleanup measures, waste management, and waste transportation routes, interviews and discussions with ARC employees and management, press releases in local newspaper, and maintenance of an administrative record in compliance with the National Contingency Plan.

As DOE Site Manager for the Phase II cleanup effort, it is my judgement that necessary documentation and community relations requirements have been met.

Sincerely,

David Adler, Site Manager
Former Sites Restoration Division

cc: Steve Liedle, BNI
William M. Seay, EW-93

2.5 ACCESS AGREEMENTS

An access agreement was obtained for the site before remedial action activities began. The letter from the Bureau of Mines granting access to ARC follows:

Page

E-06607

E-05180

Clark

United States Department of the Interior

BUREAU OF MINES

1450 QUEEN AVENUE SW
ALBANY, OREGON 97321-2198

June 22, 1987

Dr. S. W. Ahrends
Director, Technical Services Division
Department of Energy
Oak Ridge Operations
Post Office Box E
Oak Ridge, TN 37831

Dear Dr. Ahrends:

In response to your request for permission to carry out a remedial action plan related to residual radioactive contamination at the Albany Research Center, I grant my concurrence for this action. It is understood that the project will be managed by Bechtel National, Inc. under Contract No. DE-AC05-81OR20722, and funded by DOE.

Sincerely,

H. O. Poppleton

Howard O. Poppleton
Deputy Research Director
Albany Research Center

J05100

2.6 POST-REMEDIAL ACTION REPORT

The following reports document the remedial action activities and the post-remedial action radiological status for each of the remediated areas at the ARC site.

	Page
Bechtel National, Inc. Post-Remedial Action Report For The Albany Research Center, DOE/OR/20722-207, Oak Ridge, Tenn., April 1989.	Ref. 11
Bechtel National, Inc. Post-Remedial Action Report for Phase II Work Conducted During 1990-1991 at the Albany Research Center, DOE/OR/20722-302, Oak Ridge, Tenn., May 1992.	Ref. 12

2.7 VERIFICATION STATEMENT, INTERIM VERIFICATION LETTERS TO PROPERTY OWNERS, AND VERIFICATION REPORTS

This section references the documents related to the successful decontamination of the subject property, including the verification statement and the IVC's verification reports.

Page

Oak Ridge Associated Universities. Verification of Remedial Actions, Albany Research Center, Albany, Oregon, Oak Ridge, Tenn., October 1989. Ref. 13

Oak Ridge Associated Universities. Verification Survey of Phase II Remedial Actions, Albany Research Center, Albany, Oregon, Interim Report, Oak Ridge, Tenn., January 1991. Ref. 14

Oak Ridge Associated Universities. Verification Survey of Phase II Remedial Actions, Albany Research Center, Albany, Oregon, Interim Report II, Oak Ridge, Tenn., March 1991. Ref. 15

Oak Ridge Associated Universities. Verification Survey of Phase II Remedial Actions, Albany Research Center, Albany, Oregon, Interim Report III, Oak Ridge, Tenn., June 1991. Ref. 16

Oak Ridge Institute for Science and Education. Verification Survey of the Phase II Remedial Actions, Albany Research Center, Albany, Oregon, Final Report, ORISE 93/D-20, Oak Ridge, Tenn., April 1993. Ref. 17

2.8 STATE, COUNTY, AND LOCAL COMMENTS ON REMEDIAL ACTION

The State of Oregon, the City of Albany, and Linn County were kept fully informed of all DOE activities conducted at the ARC site.

Page

Bechtel National, Inc. Community Relations Plan for a Removal Action at the Albany Research Center Site, DOE/OR/21949-279, Oak Ridge Tenn., July 1991. Ref. 23

2.9 RESTRICTIONS

There are no radiologically based restrictions on the future use of the subject property.

2.10 FEDERAL REGISTER NOTICE

This section contains a copy of the notice published in the Federal Register. It documents the certification that the subject property is in compliance with all applicable decontamination criteria and standards.

modification request should be submitted to the Assistant Administrator for Fisheries, National Marine Fisheries Service, NOAA, U.S. Department of Commerce, 1335 East-West Hwy., room 7324, Silver Spring, Maryland 20910, within 30 days of the publication of this notice.

Documents submitted in connection with these Permits and modification requests are available for review, by appointment, in the Permits Division, Office of Protected Resources, National Marine Fisheries Service, 1335 East-West Hwy., suite 7324, Silver Spring, MD 20901 (301/713–2289);

(P368B)—Director, Southwest Region, National Marine Fisheries Service, NOAA, 501 West Ocean Boulevard, suite 4200, Long Beach, CA 90802–4213 (310/980–4015); and

(P66G)—Director, Alaska Region, National Marine Fisheries Service, NOAA, Federal Annex, 9109 Mendenhall Mall Rd., suite 6, Juneau, AK 99802 (907/586–7221).

Dated: February 12, 1993.

Nancy Foster,

Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 93–4098 Filed 2–22–93; 8:45 am]

BILLING CODE 3510–22–M

DEPARTMENT OF ENERGY

Certification of the Radiological Condition of The Albany Research Center In Albany, OR

AGENCY: Office of Environmental Restoration and Waste Management, Department of Energy.

ACTION: Notice of certification.

SUMMARY: The Department of Energy has completed radiological surveys and taken remedial action to decontaminate process buildings and surroundings at the Albany Research Center in Albany, Oregon. The property was found to contain quantities of radiological material from work performed for the Manhattan Engineer District, Atomic Energy Commission, and Energy Research and Development Administration.

FOR FURTHER INFORMATION CONTACT: James J. Fiore, Director, Office of Eastern Area Programs, Office of Environmental Restoration and Waste Management (EM–42), U.S. Department of Energy, Washington, DC 20585. (301) 903–8141.

SUPPLEMENTARY INFORMATION: The Department of Energy (DOE), Office of Environmental Restoration and Waste Management, Office of Eastern Area Programs, Division of Off-Site Programs, has implemented a remedial action project at the Albany Research Center (ARC) in Albany, Oregon (City of Albany, Deed Book 161, page 421, #17277), as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). The objective of the program is to identify and clean up or otherwise control sites where residual radioactive contamination remains from activities carried out under contract to DOE's statutory predecessor agencies, i.e., the Manhattan Engineer District (MED), the Atomic Energy Commission (AEC), and the Energy Research and Development Administration (ERDA). In June 1983, ARC was formally designated by DOE for cleanup under FUSRAP.

ARC was established in 1943 to investigate innovative approaches for developing strategic mineral resources in the United States, reducing costs for metallurgical manufacturing processes, developing materials to fight corrosion, and other activities relevant to metallurgical research.

Various operations involving radioactive materials have been conducted at ARC. From 1948 to 1956, ARC conducted work for AEC involving the melting, machining, welding, and alloying of thorium. Additional work with uranium and thorium was performed at ARC for the Energy Research and Development Administration (ERDA).

During the era of AEC and ERDA contracts (1946–1977), process buildings and surroundings were decontaminated at various times to guidelines then applicable to AEC, ERDA, and DOE. Subsequent decontamination guidelines were stricter, and records relating to the previous decontamination efforts were not adequate to determine whether the buildings and surrounding areas met the new stricter DOE radiological guidelines. As a result, a radiological assessment was initiated in 1978. Subsequent to this assessment, it was advised that although the levels of contamination at ARC did not pose an immediate health hazard, further decontamination of the property should occur. In early 1984, a radiological survey was conducted at ARC to determine actual levels of contamination in each area identified by the 1978 assessment and to define the locations and boundaries of above-guideline contamination.

From 1987 to 1991, the subject property was decontaminated. Post-remedial action surveys have demonstrated, and DOE has certified, that the subject property is in compliance with DOE decontamination criteria and standards established to protect members of the general public and occupants of the site and that future use of the property will result in no radiological exposure above applicable radiological guidelines to the general public or the site occupants. These findings are supported by the DOE Certification Docket for the Remedial Action Performed at The Albany Research Center in Albany, Oregon, 1987–1988 and 1990–1991. Accordingly, this property is released from FUSRAP.

The certification docket will be available for review between 9 a.m. and 4 p.m., Monday through Friday (except Federal holidays) in the U.S. Department of Energy Public Reading Room located in room IE–190 of the Forrestal Building, 1000 Independence Avenue, SW., Washington, DC. Copies of the certification docket will also be available in the DOE Public Document Room, U.S. Department of Energy, Oak Ridge Field Office, Oak Ridge, Tennessee, and in the administrative record at the Albany Research Center Library, 1450 Queen Ave., SW., Albany, Oregon, from 9 a.m. to 3 p.m., Monday through Friday.

The Department of Energy has issued the following statement of certification:

Statement of Certification: Albany Research Center, Former MED/AEC/ERDA Operations

The U.S. Department of Energy, Oak Ridge Field Office, Former Sites Restoration Division, has reviewed and analyzed the radiological data obtained following remedial action at the Albany Research Center site. Based on this analysis of all data collected, the Department of Energy (DOE) certifies that the following property is in compliance with DOE decontamination criteria and standards. This certification of compliance provides assurance that future use of the property will result in no radiological exposure above applicable guideline established to protect members of the general public or site occupants. Accordingly, the property specified below is released from DOE's Former Utilized Sites Remedial Action Program.

Property owned by The Bureau of Mines, U.S. Department of the Interior: Albany Research Center, 1450 Queen Avenue, SW., Albany, Oregon, 97321, described in the deed, City of Albany, Deed Book 161, page 421, #17277.

Paul D. Grimm,

Acting Assistant Secretary for Environmental Restoration and Waste Management.

[FR Doc. 93–4147 Filed 2–22–93; 8:45 am]

BILLING CODE 6450–01–M

2.11 APPROVED CERTIFICATION STATEMENT

The following memorandum and statement document the certification of the subject property for future use.

DOE F 1325.8
(8 89)
EFG (07-90)

United States Government **Department of Energy**

memorandum

DATE: FEB 11 1993

REPLY TO ATTN OF: EM-421 (W. A. Williams, 903-8149) 1993 APR 12 PM 2:09

SUBJECT: Recommendation for Certification of Remedial Action at the Albany Research Center Associated with the former MED/AEC Facility in Albany, Oregon

TO: Acting Assistant Secretary for
Environmental Restoration and Waste Management, EM-1

I am attaching for your signature a Federal Register notice concerning the cleanup of contamination associated with the former Manhattan Engineer District/Atomic Energy Commission (MED/AEC) activities at the Albany Research Center Site (ARC) in Albany, Oregon.

The Office of Eastern Area Programs has implemented a remedial action project at ARC as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). The objective of the program is to identify and clean up or otherwise control sites where residual radioactive contamination remains from activities carried out under contract to MED/AEC during the early years of the Nation's atomic energy program. In June 1983, ARC was formally designated by DOE for cleanup under FUSRAP.

ARC was established in 1943 to investigate innovative approaches for developing strategic mineral resources in the United States, reducing costs for metallurgical manufacturing processes, developing materials to fight corrosion, and other activities relevant to metallurgical research.

Various operations involving radioactive materials have been conducted at ARC. From 1948 to 1956, ARC conducted work for AEC involving the melting, machining, welding, and alloying of thorium. Additional work with uranium and thorium was performed at ARC for the Energy Research and Development Administration (ERDA).

During the era of AEC and ERDA contracts (1946-1977), process buildings and surroundings were decontaminated at various times to guidelines applicable to AEC, ERDA, and DOE. Subsequent decontamination guidelines were stricter, and records relating to the previous decontamination efforts were not adequate to determine whether the buildings and surrounding areas met the new stricter DOE radiological guidelines. As a result, a radiological assessment was initiated in 1978. Subsequent to this assessment, it was advised that although the levels of contamination at ARC did not pose an immediate health hazard, further decontamination of the property should occur. In early 1984, a radiological survey was conducted at ARC to determine actual levels of contamination in each area identified by the 1978 assessment and to define the locations and boundaries of above-guideline contamination.

From 1987 to 1991, the subject property was decontaminated. Post-remedial action surveys have demonstrated, and DOE's Oak Ridge Field Office has certified, that the subject property is in compliance with DOE decontamination criteria and standards established to protect members of the general public and occupants of the site and that future use of the property will result in no radiological exposure above applicable radiological guidelines to the general public or the site occupants.

Based on a review of all documents related to the subject property, we have concluded that the site is in compliance with the criteria and standards that were established to be in accordance with DOE Guidelines and Orders, to be consistent with other appropriate Nuclear Regulatory Commission and Environmental Protection Agency guidelines, and to protect the public health and environment.

The Office of Eastern Area Programs is preparing the certification docket for the subject property. The Federal Register notice will be part of the docket.

I recommend that you sign the attached Federal Register notice, as well as the transmittal memorandum to the Federal Liaison Officer. This office will notify interested State and local agencies, the public, local land offices, and the specific property owners of the certification actions by correspondence and local newspaper announcements, as appropriate. The documents transmitted with the certification statement and the Federal Register notice will be compiled in final docket form by the Office of Eastern Area Programs for retention in accordance with DOE Order 1324.2 (Disposal Schedule 25).

R. P. Whitfield
Deputy Assistant Secretary
for Environmental Restoration

2 Attachments

DOE F 1325.8
(8-85)
EFG (07-90)

United States Government **Department of Energy**

memorandum

DATE: FEB 16 1993

REPLY TO ATTN OF: EM-421 (W. A. Williams, 903-8149)

SUBJECT: Federal Register Notice for Certification of Cleanup at Albany, Oregon

TO: Federal Register Liaison Officer, AD-122

Attached are the original and three copies of the signed Federal Register Notice certifying the completion of remedial action at the Albany, Oregon, facility. This site was cleaned up by the Department's Formerly Utilized Sites Remedial Action Program. This attached notice has been reviewed by and concurred in by the Office of General Counsel (GC-11 and GC-41), and a copy of that concurrence is also attached for your information and use.

Please forward the attached notice to the Federal Register for publication.

Paul D. Grimm
Acting Assistant Secretary for Environmental Restoration and Waste Management

2 Attachments

[Docket No. 6450-01]
DEPARTMENT OF ENERGY

Certification of the Radiological Condition of
The Albany Research Center in Albany, Oregon

AGENCY: Office of Environmental Restoration and Waste Management, Department of Energy

ACTION: Notice of Certification

SUMMARY: The Department of Energy has completed radiological surveys and taken remedial action to decontaminate process buildings and surroundings at the Albany Research Center in Albany, Oregon. The property was found to contain quantities of radiological material from work performed for the Manhattan Engineer District, Atomic Energy Commission, and Energy Research and Development Administration.

FOR FURTHER INFORMATION CONTACT:

James J. Fiore, Director
Office of Eastern Area Programs
Office of Environmental Restoration
and Waste Management (EM-42)
U.S. Department of Energy
Washington, D.C. 20585
(301) 903-8141

SUPPLEMENTARY INFORMATION:

The Department of Energy (DOE), Office of Environmental Restoration and Waste Management, Office of Eastern Area Programs, Division of Off-Site Programs, has implemented a remedial action project at the Albany Research Center (ARC) in Albany, Oregon (City of Albany, Deed Book 161, page 421, #17277), as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP). The objective of the program is to identify and clean up or otherwise control sites where residual radioactive contamination remains from activities carried out under contract to DOE's statutory predecessor agencies, i.e., the Manhattan Engineer District (MED), the Atomic Energy Commission (AEC), and the Energy Research and Development Administration (ERDA). In June 1983, ARC was formally designated by DOE for cleanup under FUSRAP.

ARC was established in 1943 to investigate innovative approaches for developing strategic mineral resources in the United States, reducing costs for metallurgical manufacturing processes, developing materials to fight corrosion, and other activities relevant to metallurgical research.

Various operations involving radioactive materials have been conducted at ARC. From 1948 to 1956, ARC conducted work for AEC involving the melting, machining, welding, and alloying of thorium. Additional work with uranium and thorium was performed at ARC for the Energy Research and Development Administration (ERDA).

During the era of AEC and ERDA contracts (1946-1977), process buildings and surroundings were decontaminated at various times to guidelines then applicable to AEC, ERDA, and DOE. Subsequent decontamination guidelines were stricter, and records relating to the previous decontamination efforts were not adequate to determine whether the buildings and surrounding areas met the new stricter DOE radiological guidelines. As a result, a radiological assessment was initiated in 1978. Subsequent to this assessment, it was advised that although the levels of contamination at ARC did not pose an immediate health hazard, further decontamination of the property should occur. In early 1984, a radiological survey was conducted at ARC to determine actual levels of contamination in each area identified by the 1978 assessment and to define the locations and boundaries of above-guideline contamination.

From 1987 to 1991, the subject property was decontaminated. Post-remedial action surveys have demonstrated, and DOE has certified, that the subject property is in compliance with DOE decontamination criteria and standards established to protect members of the general public and occupants of the site and that future use of the property will result in no radiological exposure above applicable radiological guidelines to the general public or the site occupants. These findings are supported by the DOE Certification Docket for the Remedial Action Performed at The Albany Research Center in Albany, Oregon, 1987-1988 and 1990-1991. Accordingly, this property is released from FUSRAP.

The certification docket will be available for review between 9:00 a.m. and 4:00 p.m., Monday through Friday (except Federal holidays) in the U.S. Department of Energy Public Reading Room located in Room 1E-190 of the Forrestal Building, 1000 Independence Avenue, SW, Washington, D.C. Copies of the certification docket will also be available in the DOE Public Document Room, U.S. Department of Energy, Oak Ridge Field Office, Oak Ridge, Tennessee, and in the administrative record at the Albany Research Center Library, 1450 Queen Ave, SW, Albany, Oregon, from 9:00 a.m. to 3:00 p.m., Monday through Friday.

The Department of Energy has issued the following statement of certification:

STATEMENT OF CERTIFICATION: ALBANY RESEARCH CENTER
FORMER MED/AEC/ERDA OPERATIONS

The U.S. Department of Energy, Oak Ridge Field Office, Former Sites Restoration Division, has reviewed and analyzed the radiological data obtained following remedial action at the Albany Research Center site. Based on this analysis of all data collected, the Department of Energy (DOE) certifies that the following property is in compliance with DOE decontamination criteria and standards. This certification of compliance provides assurance that future use of the property will result in no radiological exposure above applicable guidelines established to protect members of the general public or site occupants. Accordingly, the property specified below is released from DOE's Formerly Utilized Sites Remedial Action Program.

Property owned by The Bureau of Mines, U.S. Department of the Interior:

Albany Research Center, 1450 Queen Avenue, SW, Albany, Oregon, 97321, described in the deed, City of Albany, Deed Book 161, page 421, #17277.

Issued in Washington, D.C., on _____ 1993.

Paul D. Grimm
Acting Assistant Secretary for Environmental
Restoration and Waste Management

bcc:
Booz, Allen and Hamilton, Inc.

Distribution:
EM-40 (2)
EM-42 (3)
EM-FOR
EM-GTN
Pat Suspense
Williams Reader

EM-421:wagoner:djn:903-8145:1/7/93:denniso2.waw

P. Hevner Review: ph 1/13 ph 1/26
M. White Review: mkw

bcc:
M. Sellers, EM-3

EMCC -
make sure a
copy of G.C.
Concurrence is
attached to memo
to AA-122
before dispatch
Bam

Williams
EM-421
1/7/93

Wagoner
EM-421
1/ /93

Fulmer
EM-42
1/ /93

Fiore
EM-42
1/ /93

Baublitz
EM-40
1/ /93

Whitfield
EM-40
1/11/93

Sellers
1/12/93

Grimm
EM-2
1/ /93

GC-11
GC-41
See Attached

Duffy
EM-1
1/ /93

9300333

STATEMENT OF CERTIFICATION: ALBANY RESEARCH CENTER
FORMER MED/AEC OPERATIONS

The U.S. Department of Energy, Oak Ridge Field Office, Former Sites Restoration Division, has reviewed and analyzed the radiological data obtained following remedial action at the Albany Research Center site. Based on this analysis of all data collected, the Department of Energy (DOE) certifies that the following property is in compliance with DOE decontamination criteria and standards. This certification of compliance provides assurance that future use of the property will result in no radiological exposure above applicable guidelines established to protect members of the general public or site occupants.

Property owned by The Bureau of Mines, U.S. Department of the Interior:

Albany Research Center, 1450 Queen Avenue SW, Albany, Oregon, 97321, described in the deed, City of Albany, Deed Book 161, page 421, #17277.

By: L. K. Price Date: 12/8/92

L. K. Price, Director
Former Sites Restoration Division
Oak Ridge Field Office
U.S. Department of Energy

Exhibit III

Diagrams of the Remedial Action Performed at the Albany Research Center in Albany, Oregon, 1987-1988 and 1990-1991

EXHIBIT III

DIAGRAMS OF THE REMEDIAL ACTION PERFORMED AT THE ALBANY RESEARCH CENTER IN ALBANY, OREGON, 1987-1988 AND 1990-1991

The figures provided on the following pages are taken from the post-remedial action reports; they illustrate the extent and types of remedial action performed at the subject property. Figures III-1 through III-14 represent Phase I remedial activities, and Figures III-15 through III-36 represent Phase II remedial activities.

FIGURE III-1 AREAS AND DEPTHS OF EXCAVATION AT ARC DURING PHASE I

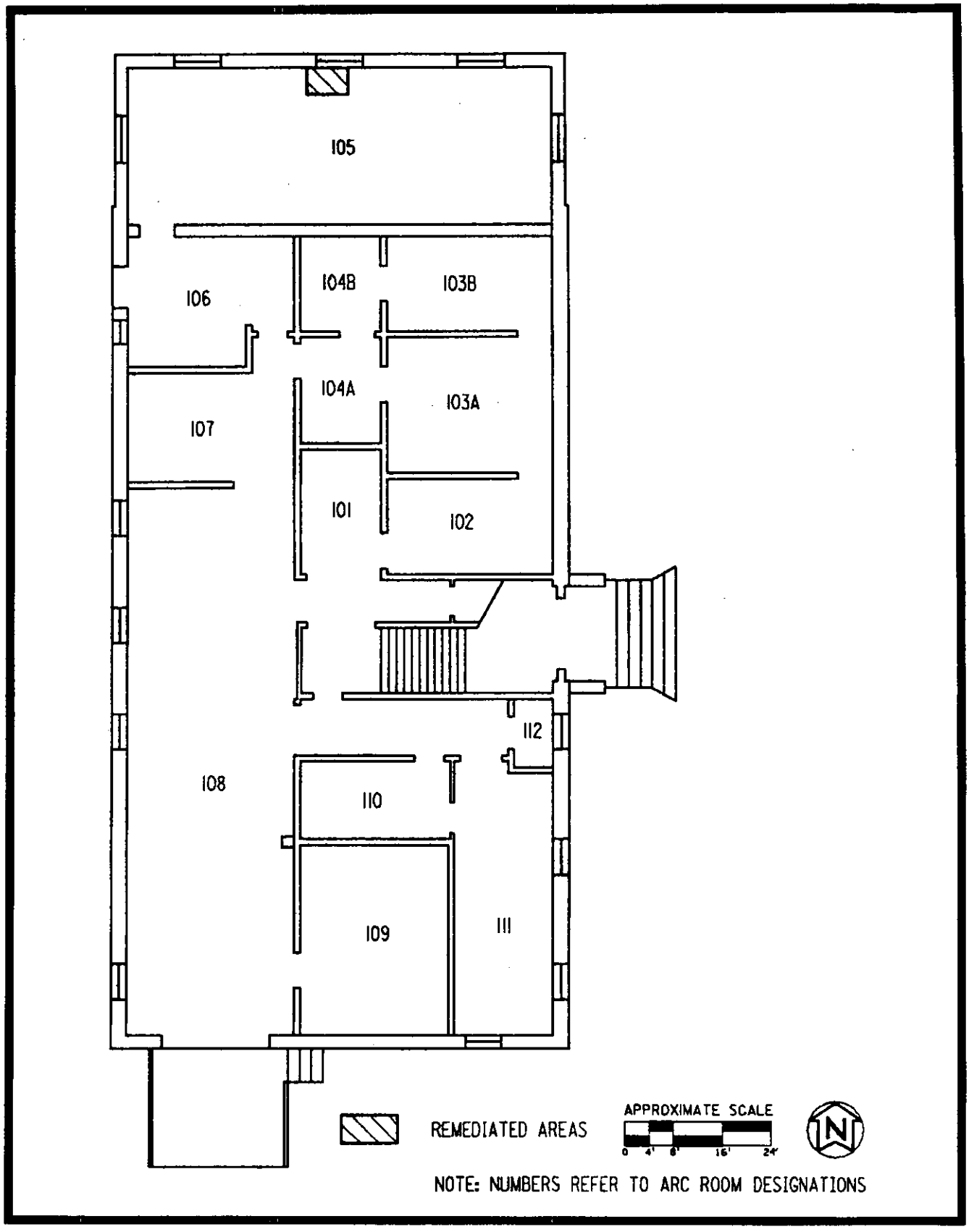


FIGURE III-2 BUILDING 2, FIRST FLOOR

GRB: (42,1) A02W9809.DGN JKL

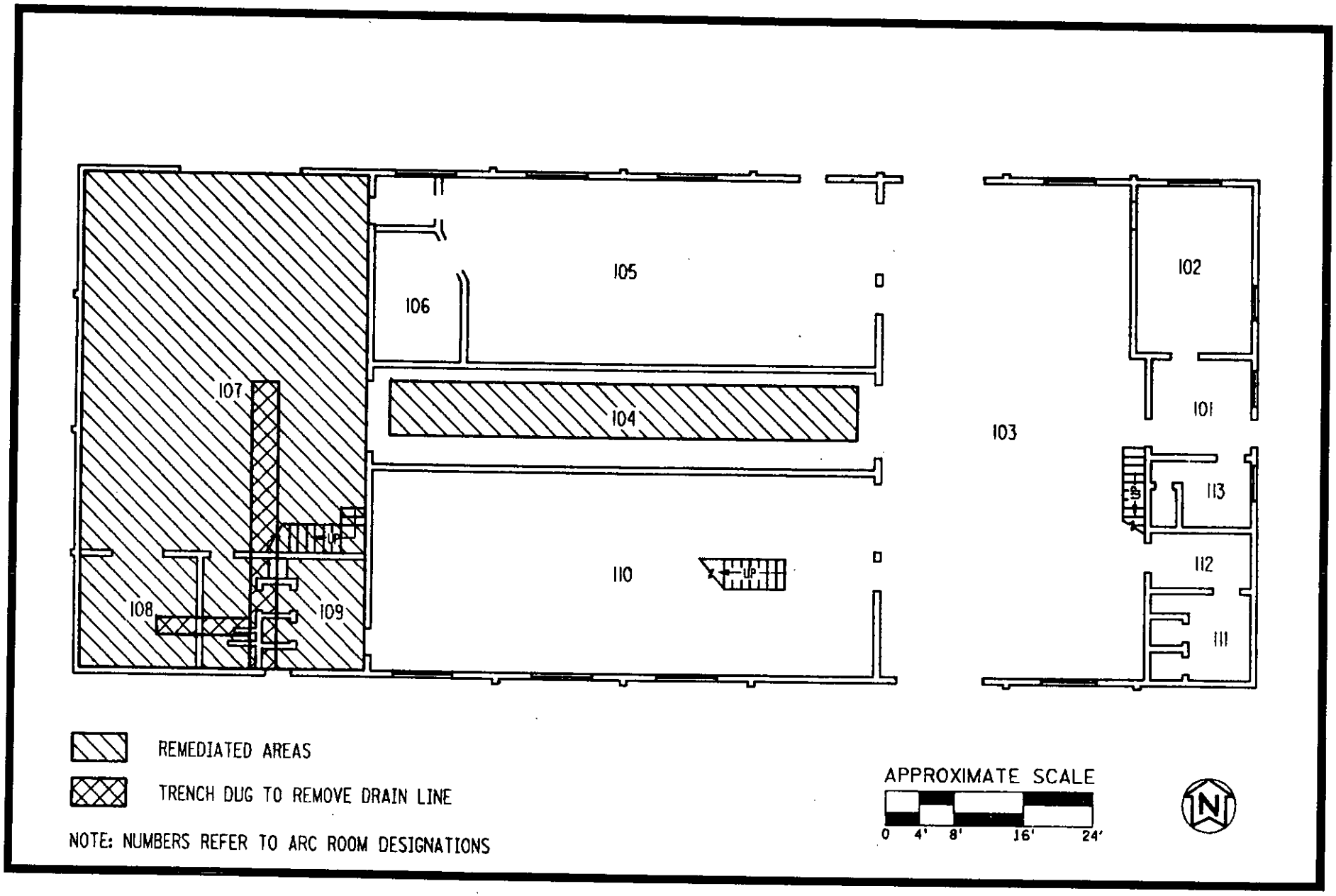


FIGURE III-3 BUILDING 4, FIRST FLOOR

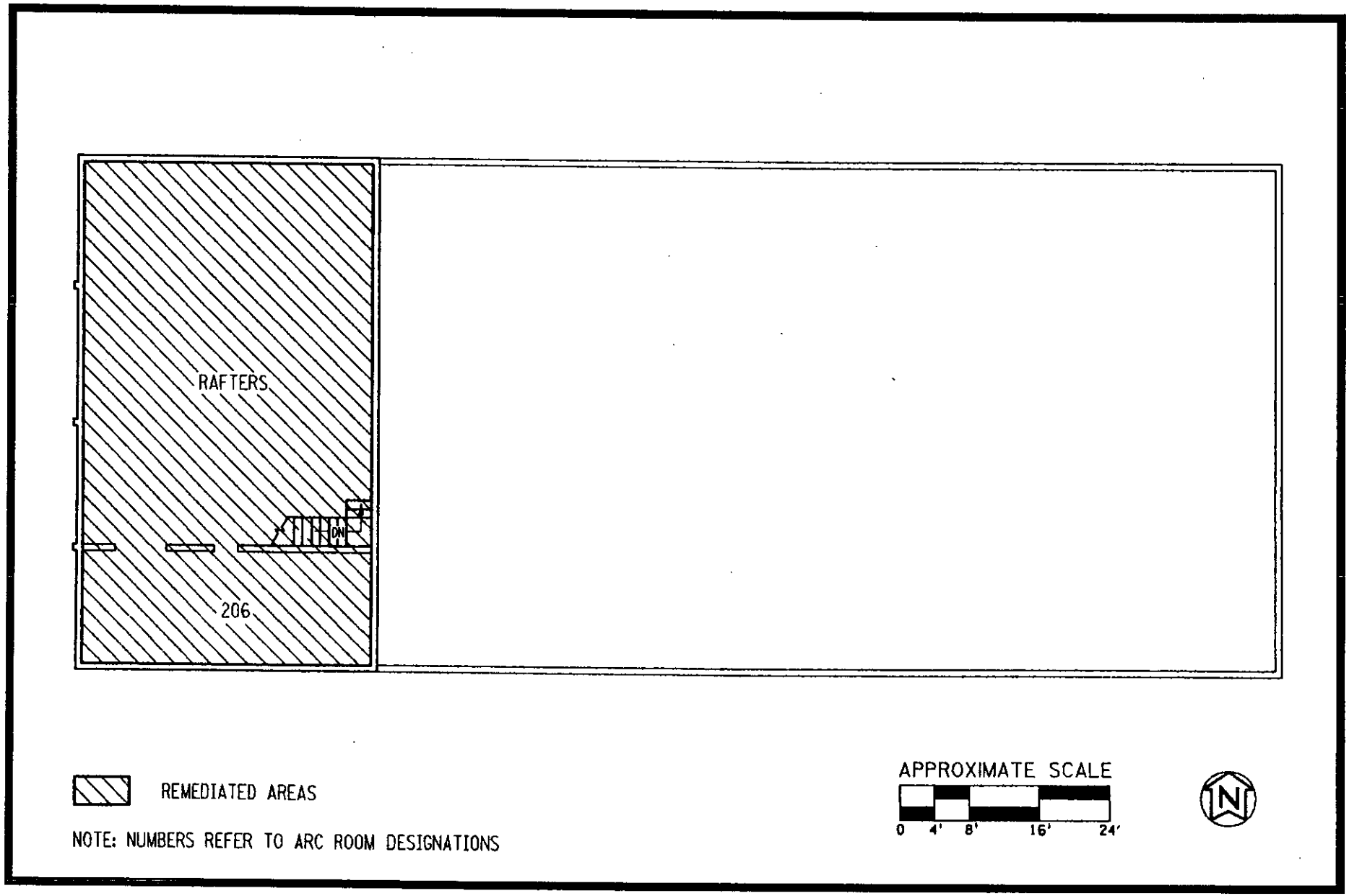


FIGURE III-4 BUILDING 4, SECOND FLOOR

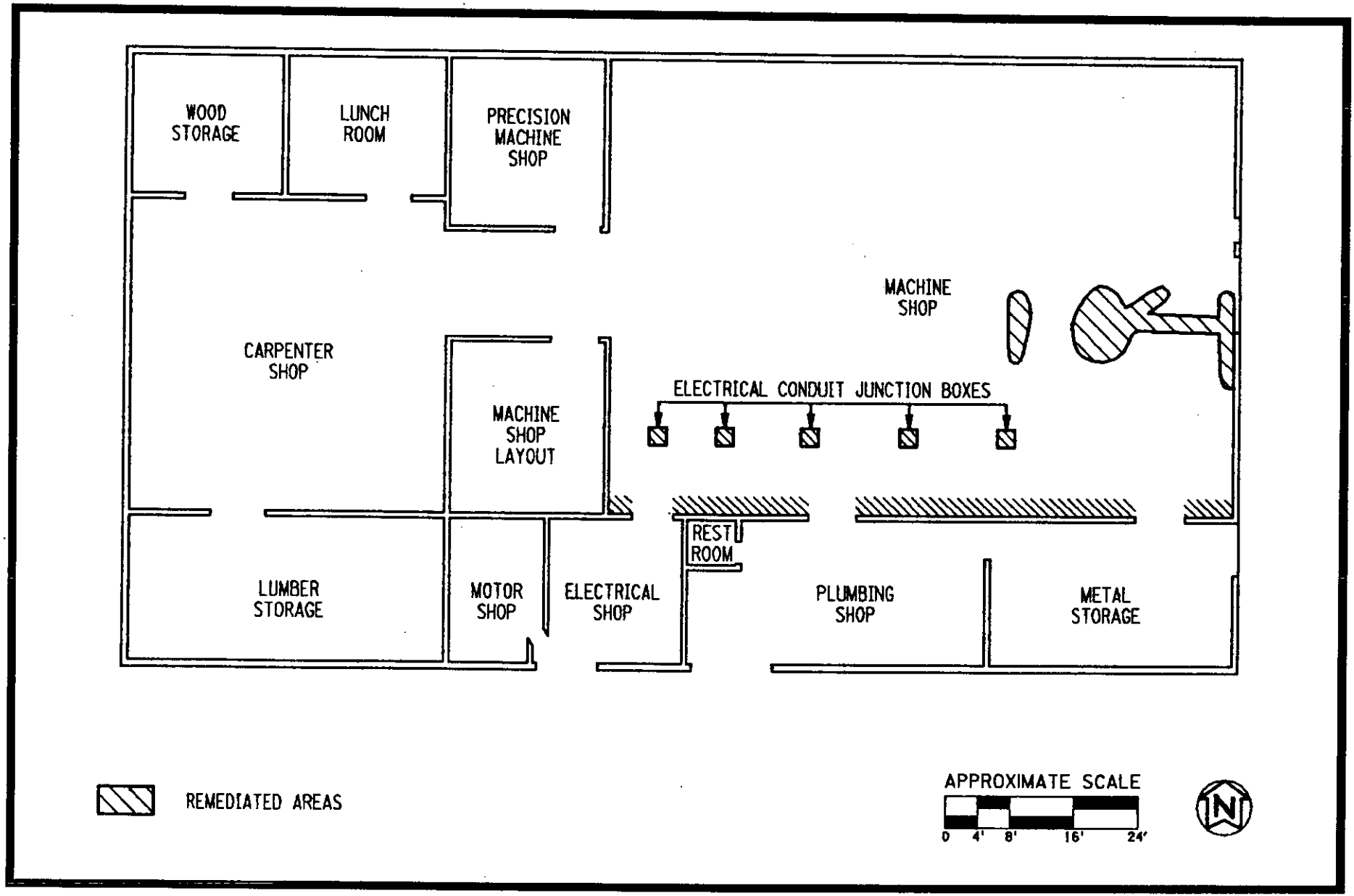


FIGURE III-5 BUILDING 5

GRB: [42,1] A02W9809.DGN JKL

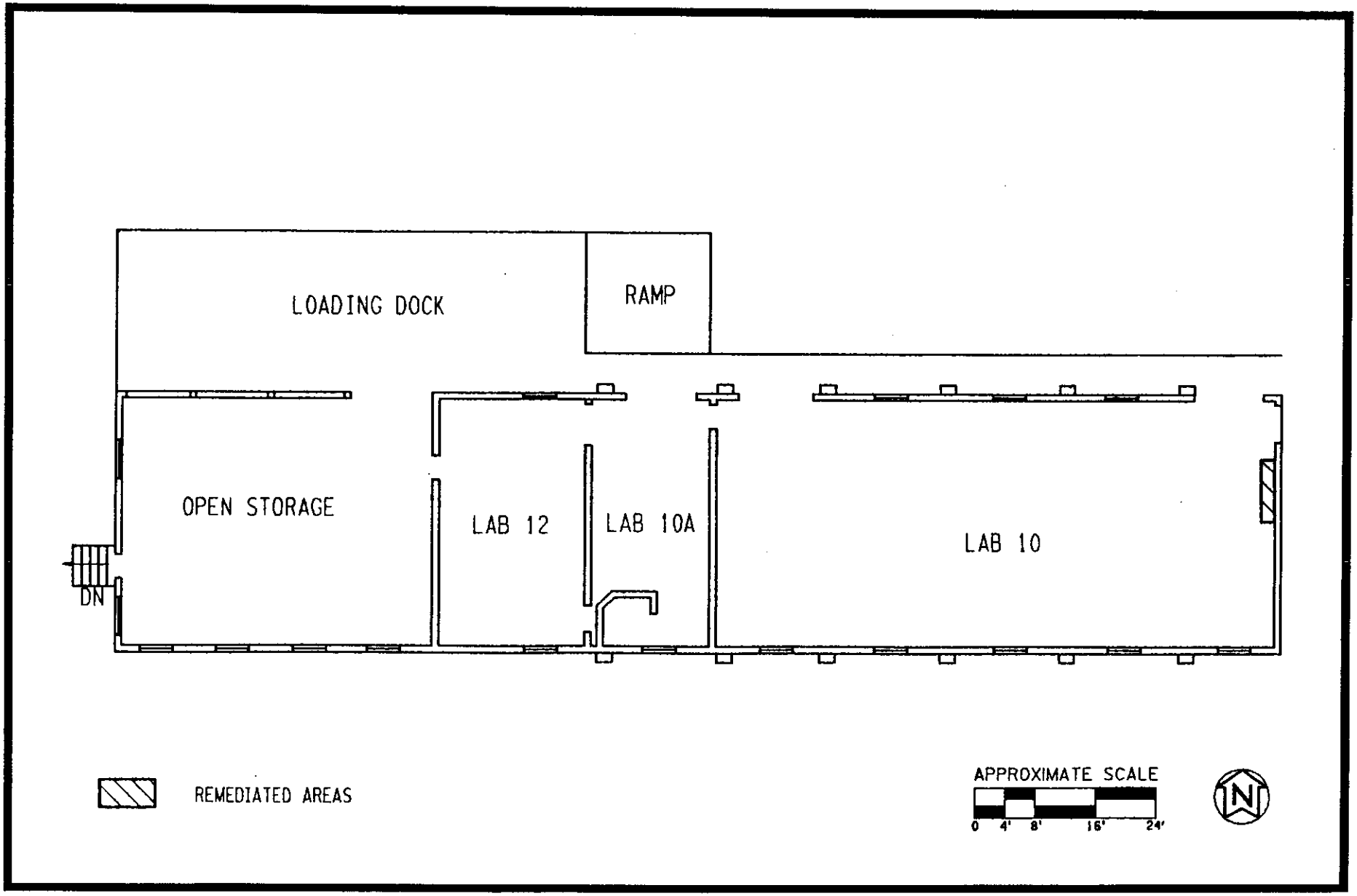


FIGURE III-6 BUILDING 17, WEST END

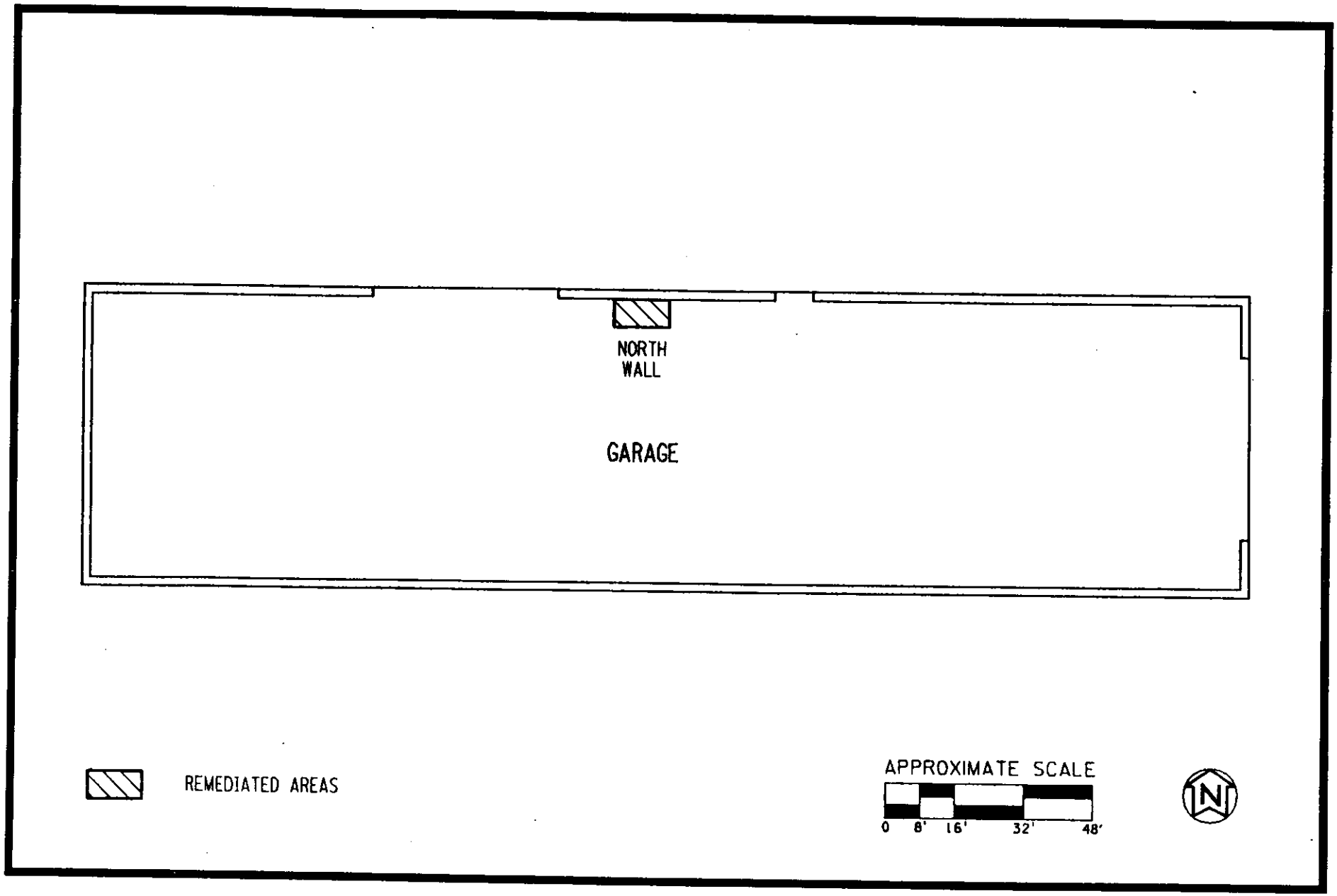


FIGURE III-7 BUILDING 19 (GARAGE)

GRB: [42,1] A02W9809.DGN JKL

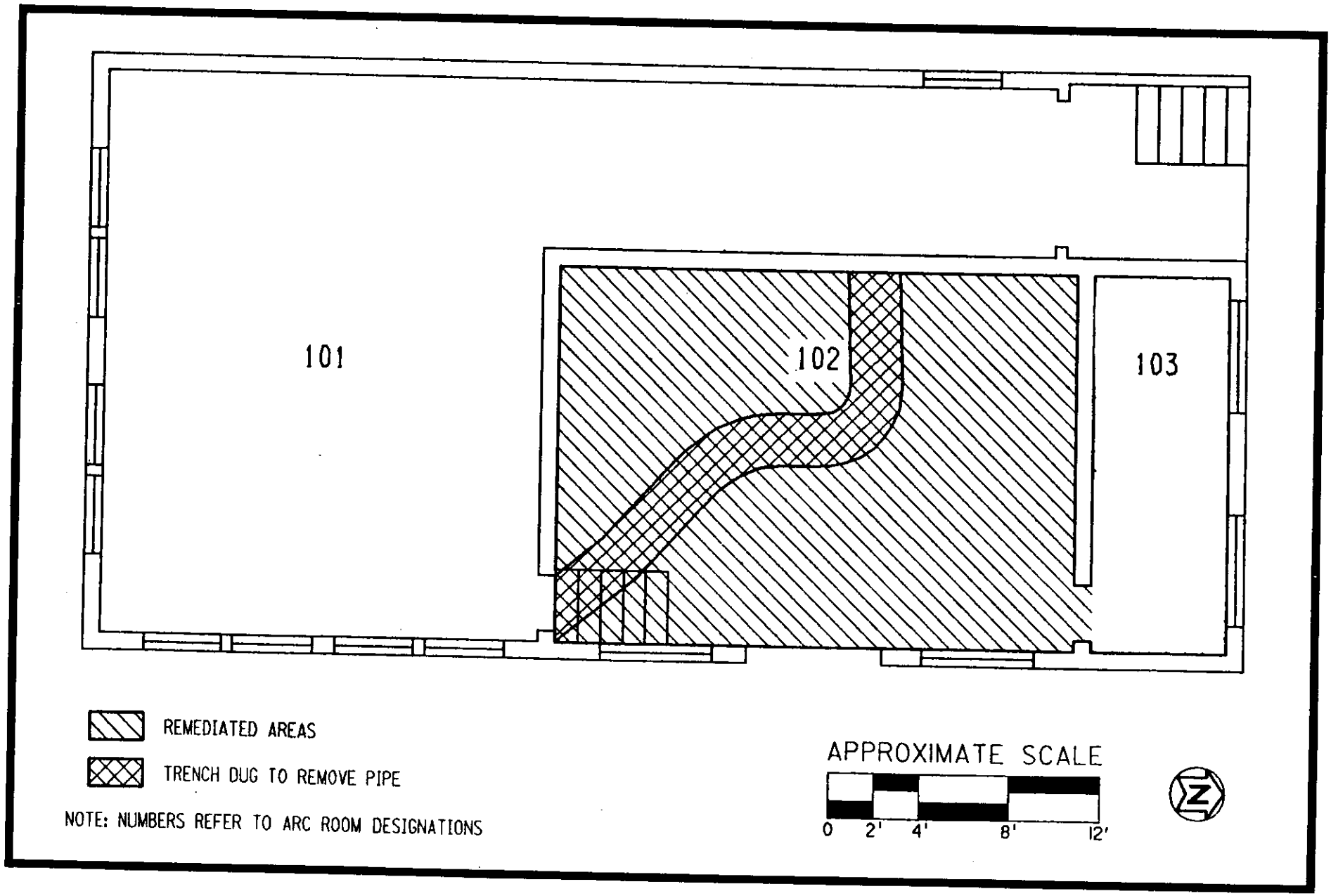


FIGURE III-8 BUILDING 27

GRB: [42,1] A02W9809.DGN JKL

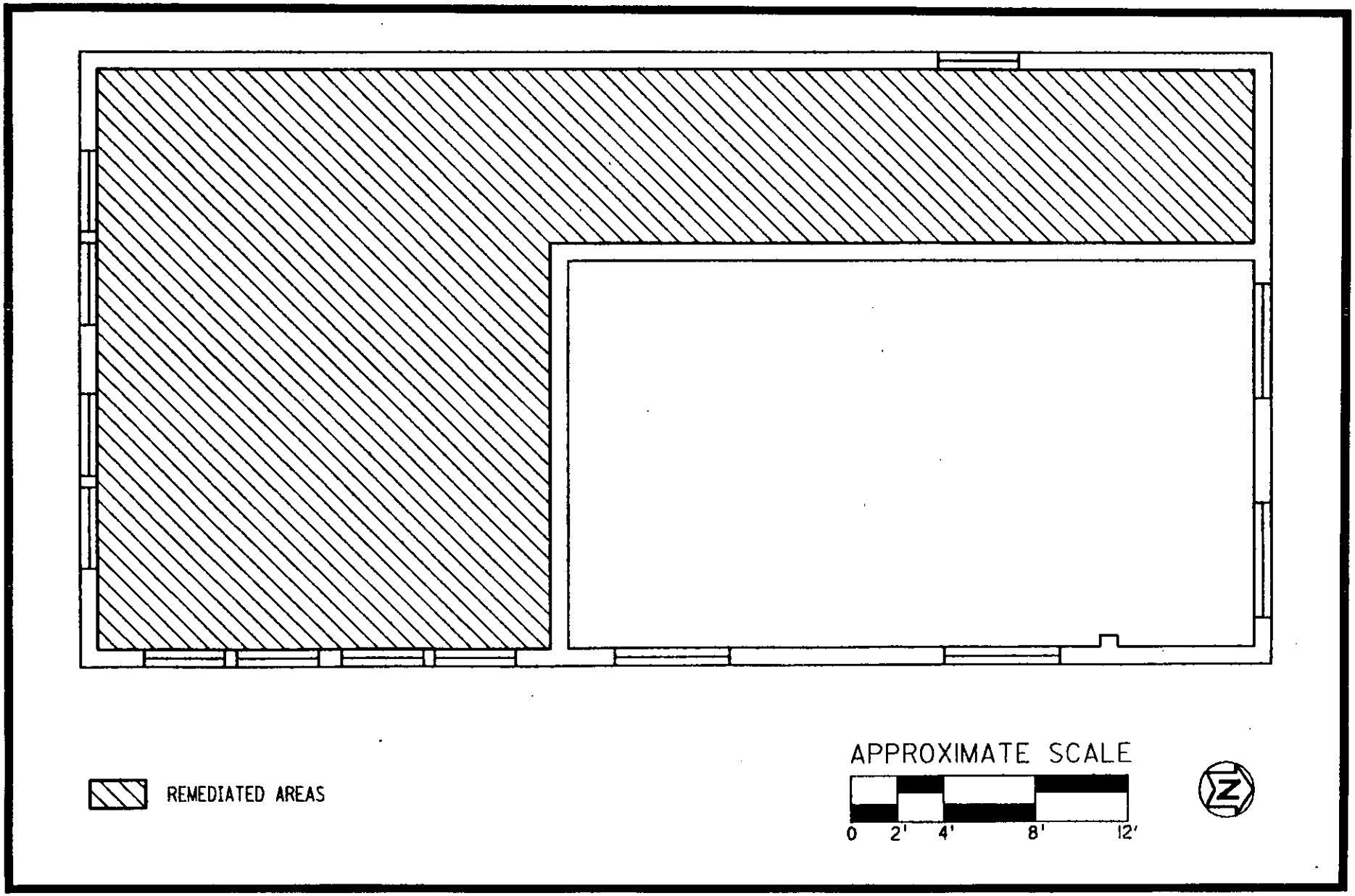


FIGURE III-9 BUILDING 27, CRAWL SPACE

GRID: [42,1] A02W9809.DGN JKL

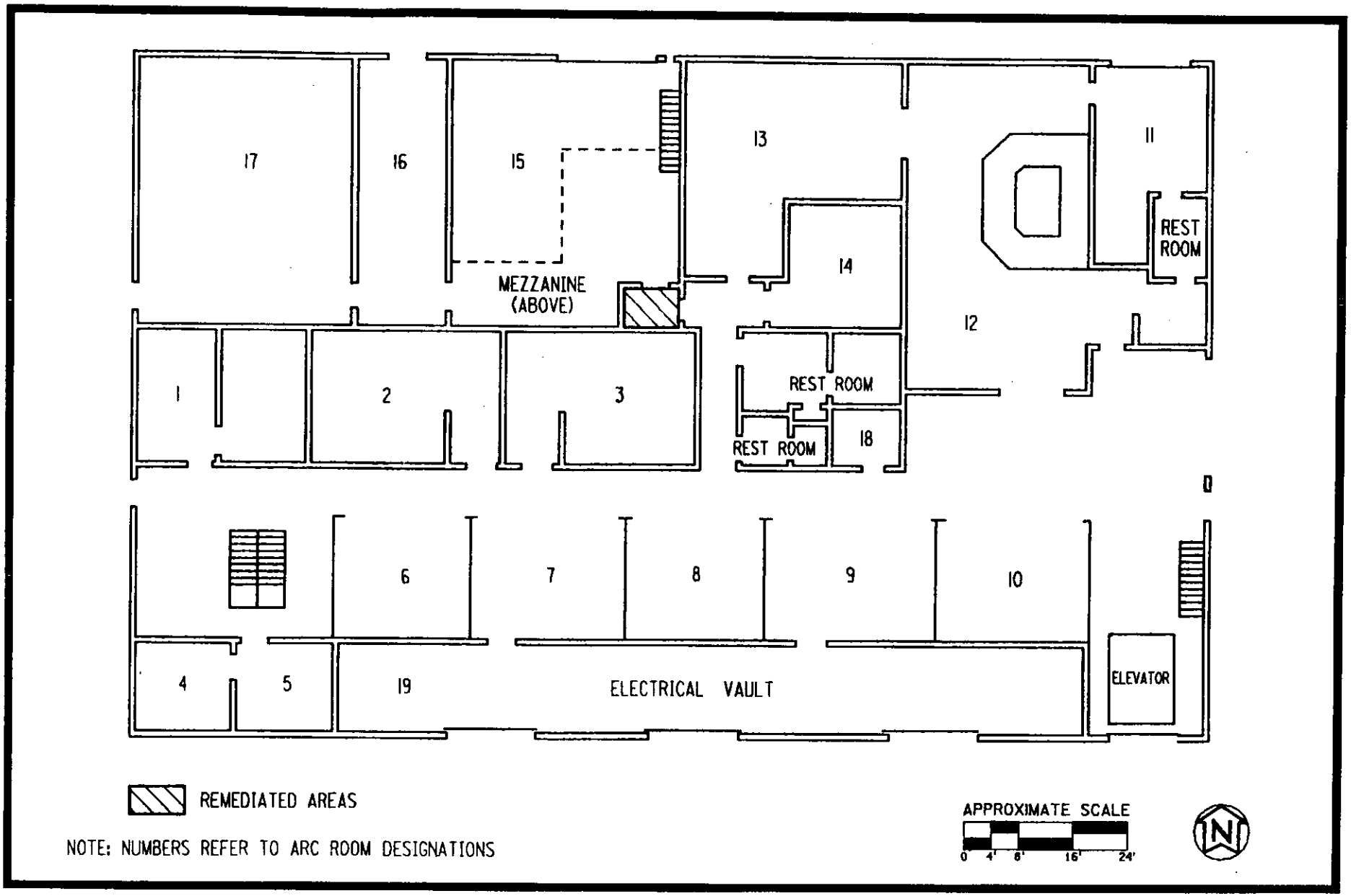


FIGURE III-10 BUILDING 28, FIRST FLOOR

GRB: (42,1) A02W9809.DGN JKL

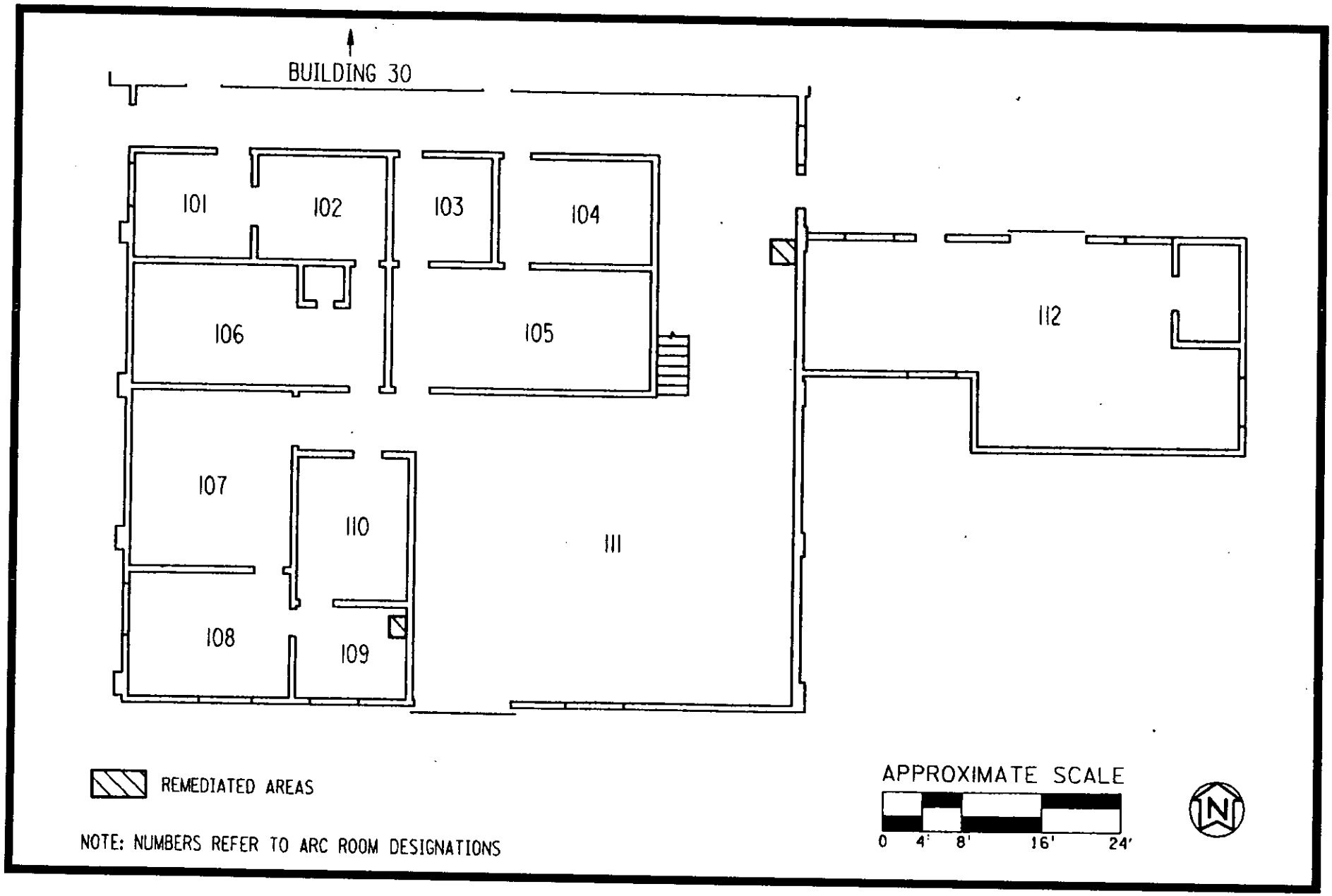


FIGURE III-11 BUILDING 29, FIRST FLOOR

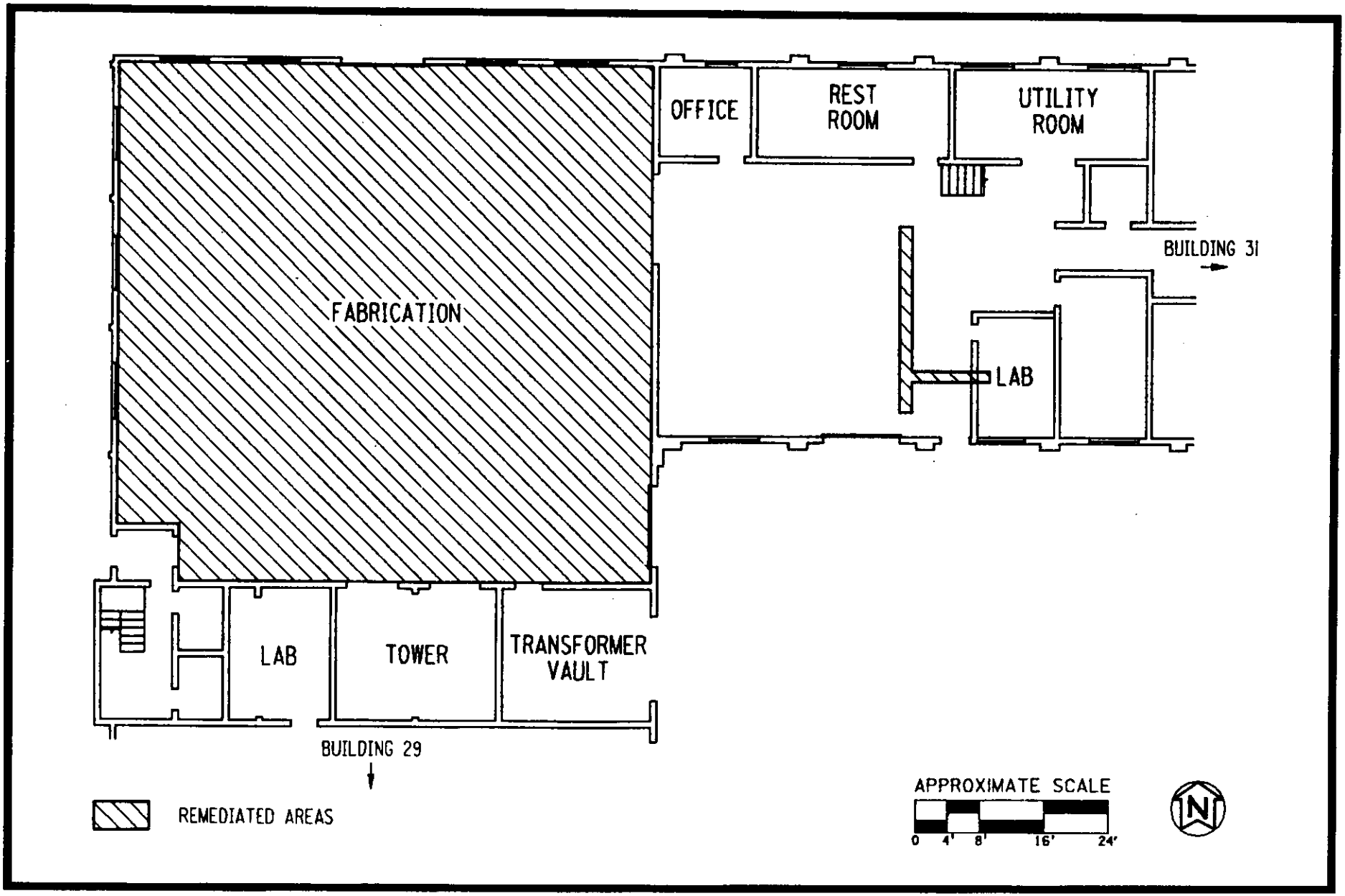


FIGURE III-12 BUILDING 30

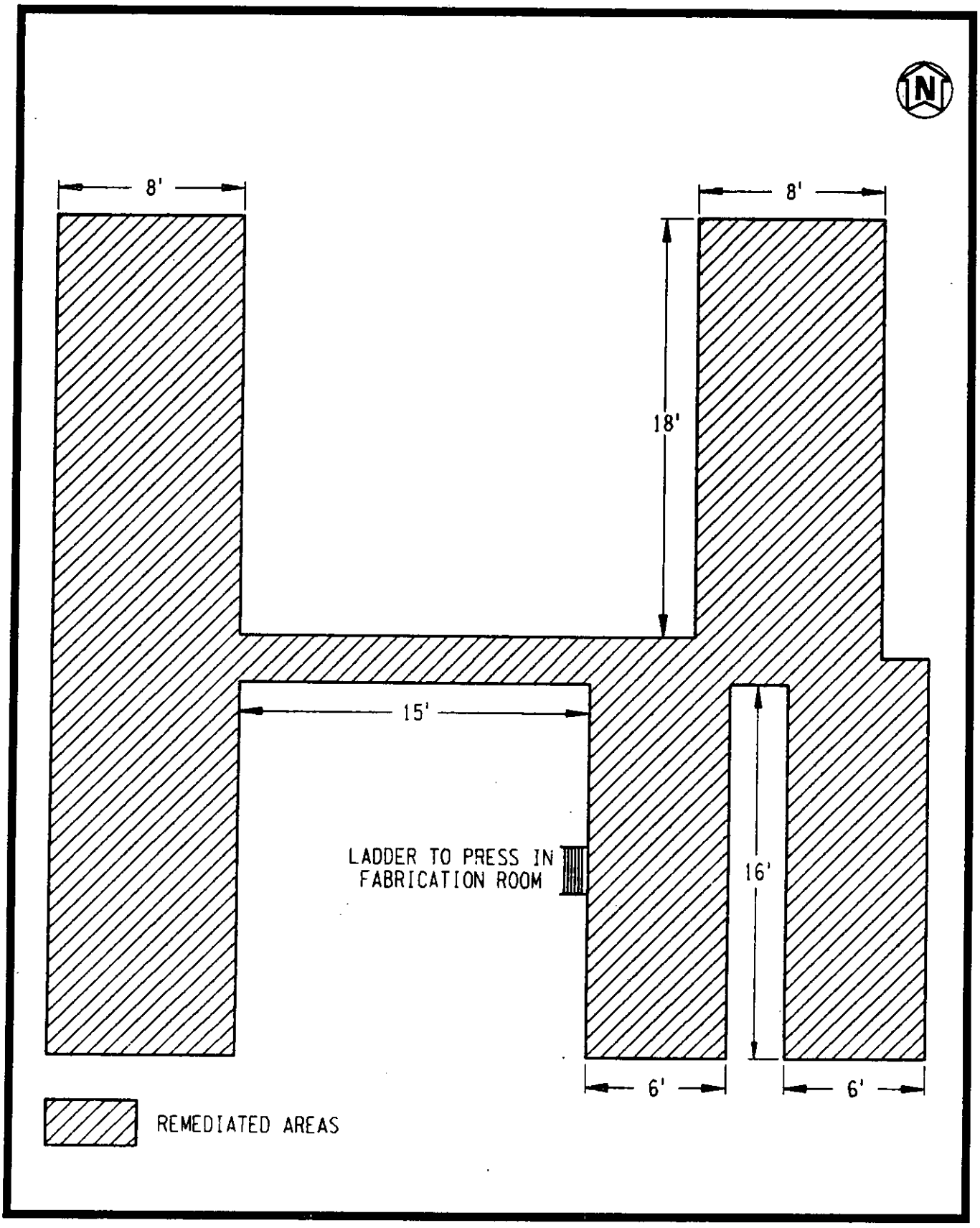


FIGURE III-13 BUILDING 30, MEZZANINE WALKWAY ABOVE FABRICATION ROOM

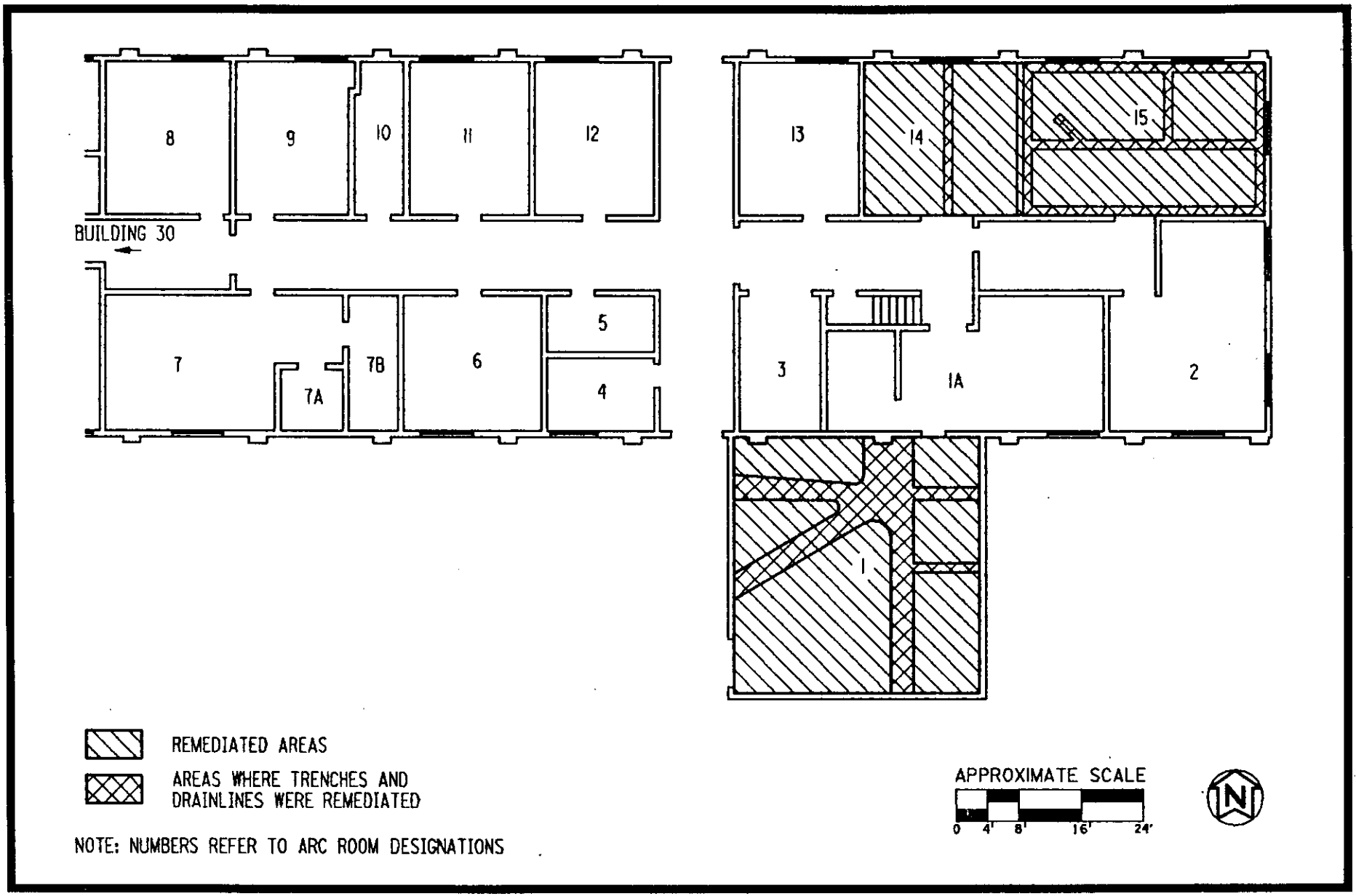
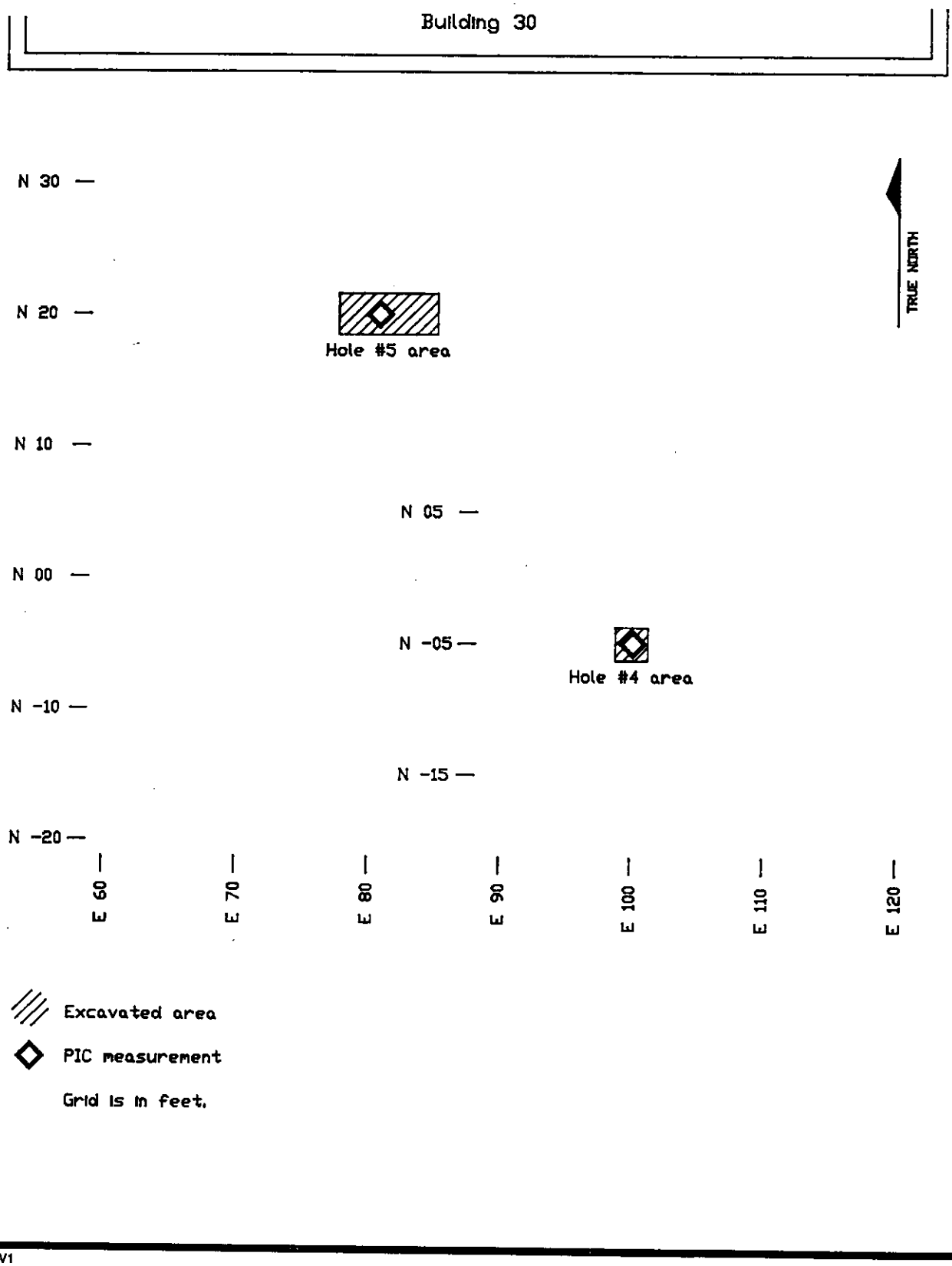


FIGURE III-14 BUILDING 31

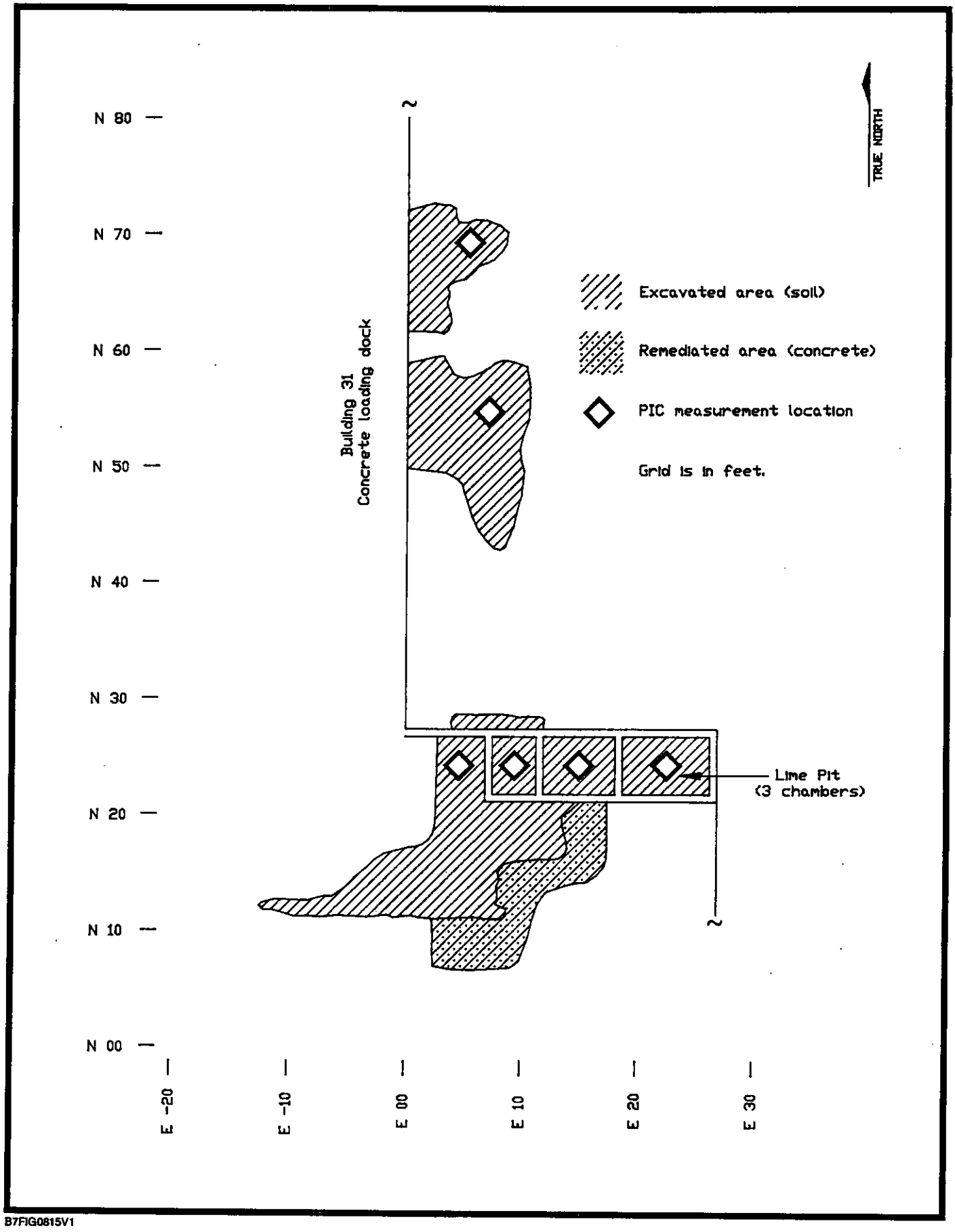
GRB: [42,1] A02W9809.DGN JKL



B7FIG08157V1

FIGURE III-15 REMEDIATED AREAS AT EXTERIOR AREA 1 (PARKING LOT)

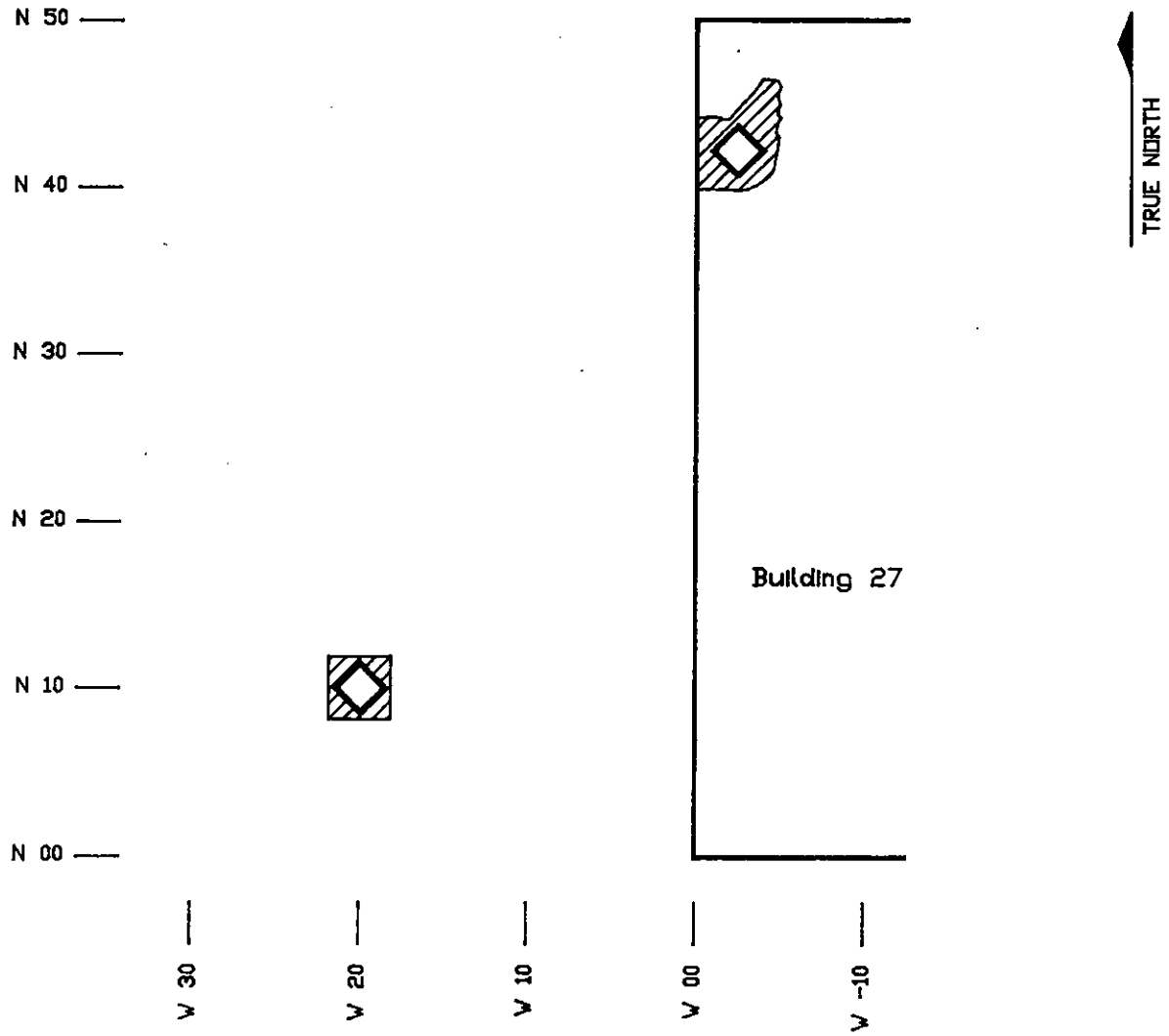
4.80 5894.1



B7FIG0815V1

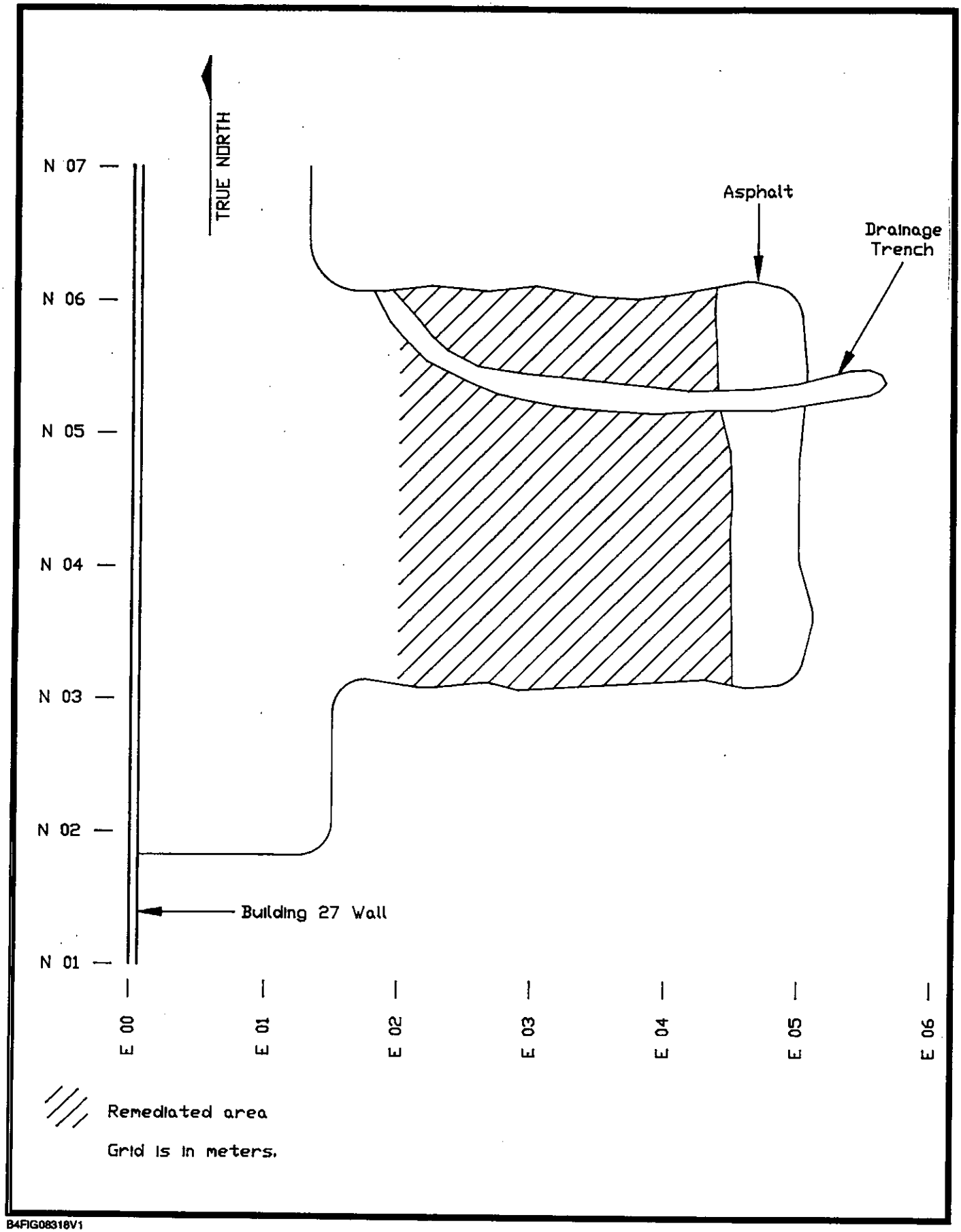
FIGURE III-16 REMEDIATED AREAS AT EXTERIOR AREA 2

4.80 5894.2



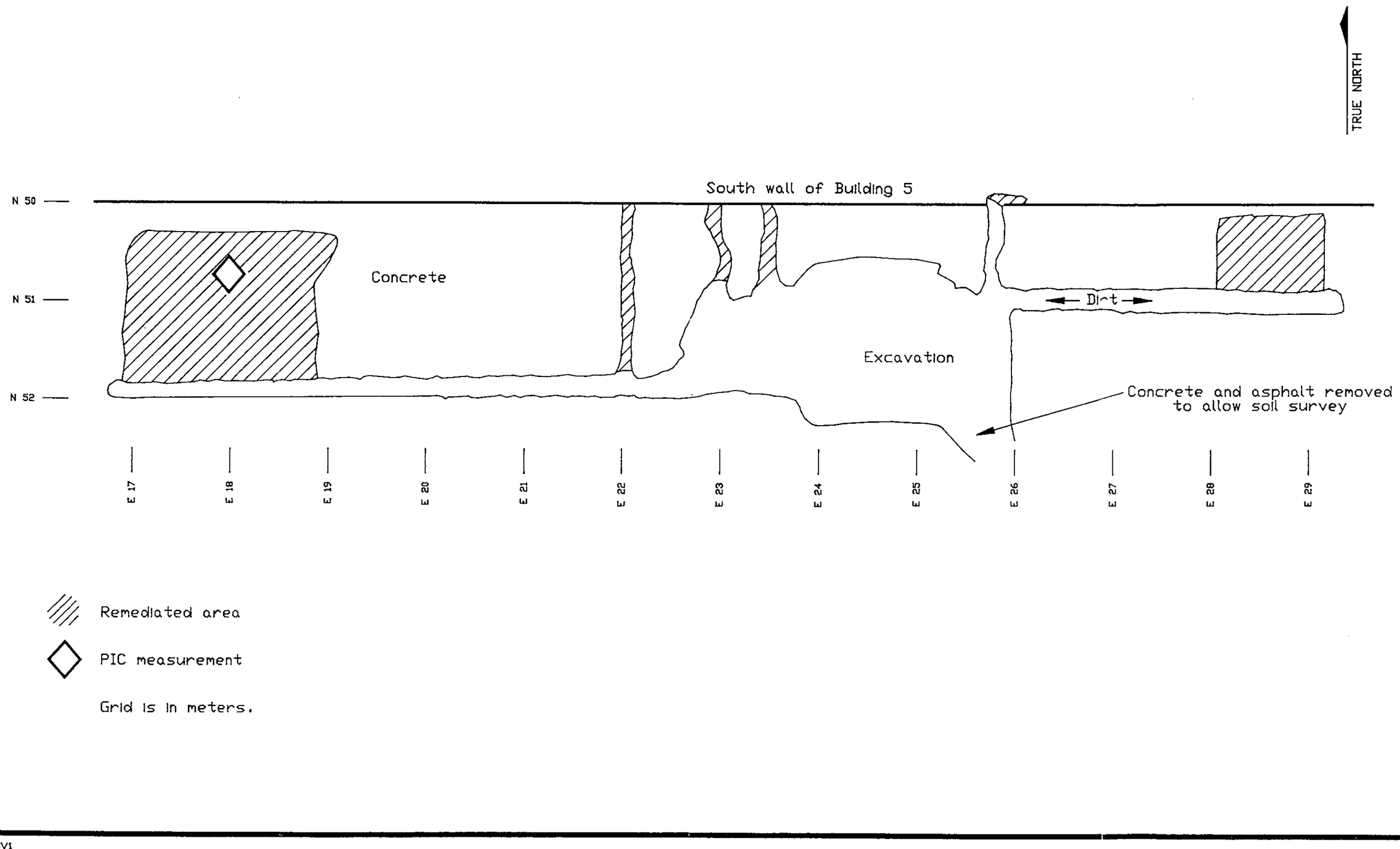
B4N00V1

FIGURE III-17 REMEDIATED AREAS AT EXTERIOR AREA 3



B4FIG08318V1

FIGURE III-18 REMEDIATED AREAS AT EXTERIOR AREA 4 (PARKING LOT)



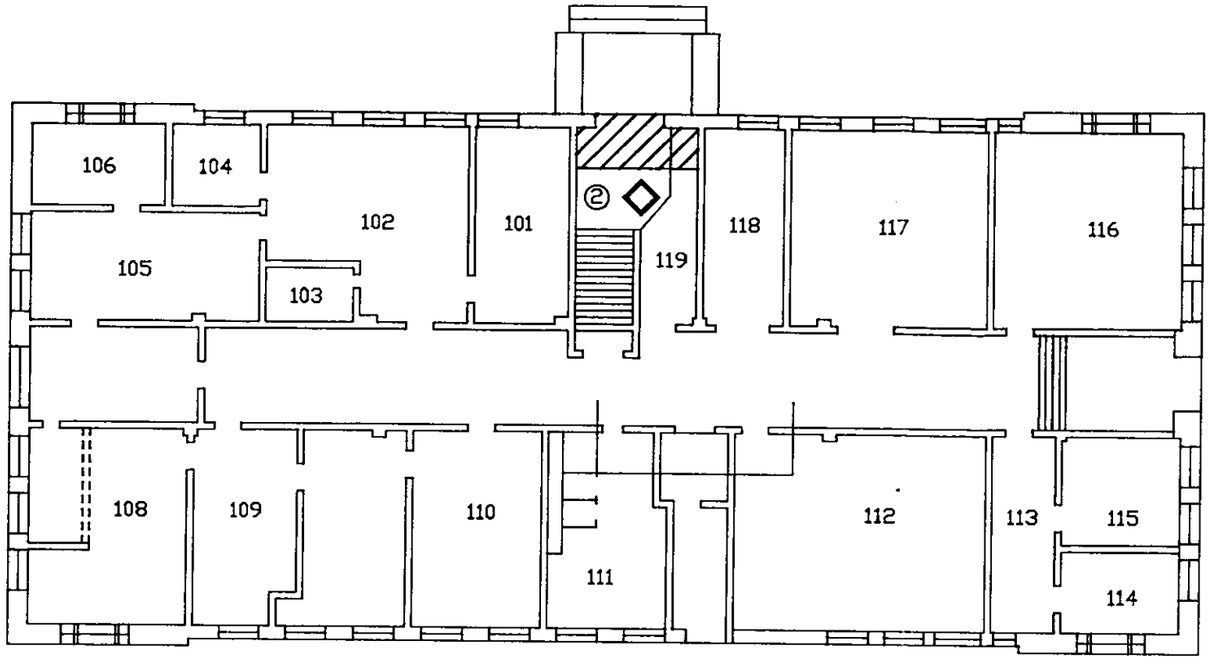
B4-PLUMB-V1

FIGURE III-19 REMEDIATED AREAS AT EXTERIOR AREA 5

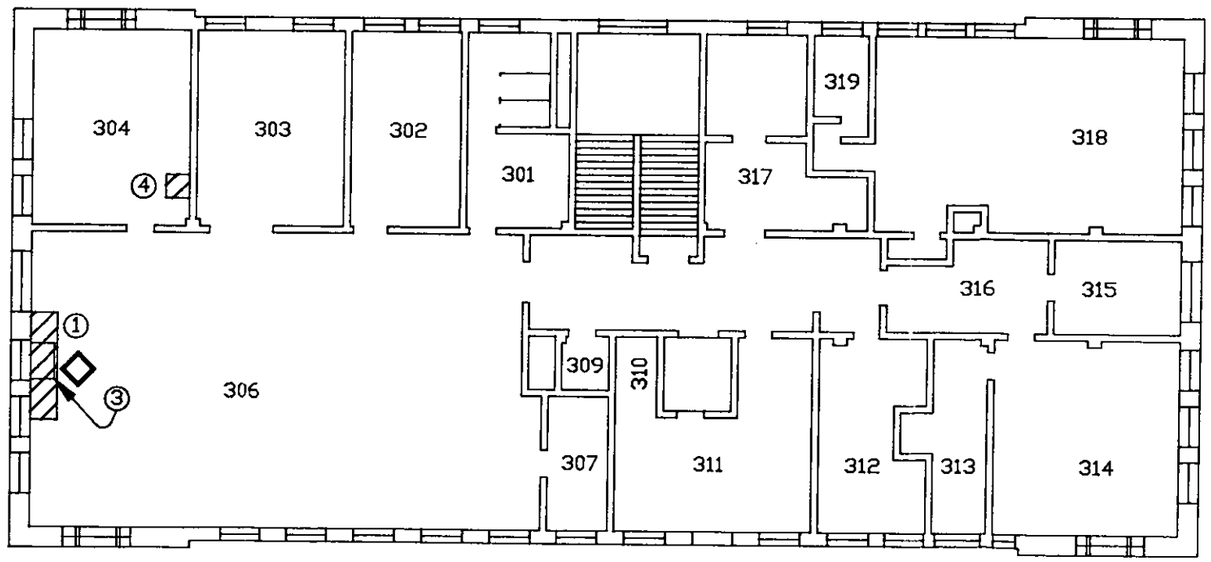
TRUE NORTH

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
306	①	Floor area under sink in cabinet	Scabbled
119	②	Floor	Scabbled, jackhammered
306	③	Sink, counter top, drain	Removed
304	④	Uranium ore samples	Removed by ARC personnel

First floor



Third floor



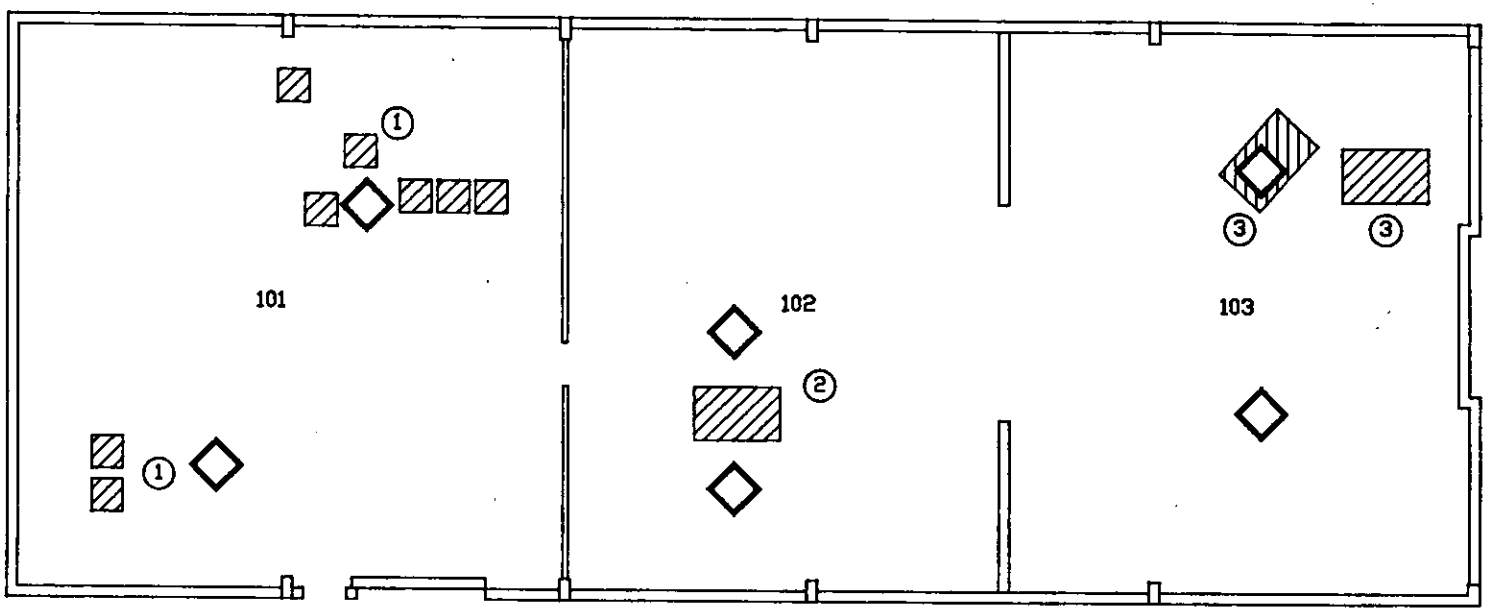
0 12 24
Scale in feet

Remediated area

PIC measurement location

B4PLANNB:V1

FIGURE III-20 REMEDIATED AREAS IN BUILDING 1



ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
101	①	Floor	Scabbled
102	②	Hydraulic press and motor	Wire brush and hand wiped) motor removed
103	③	Crusher[a]	Removed
103	③	Floor areas where crusher was located[b]	Scabbled

[a] Large machine used in metallurgical research. It was not replaced.

[b] The crusher was moved.

Remediated area

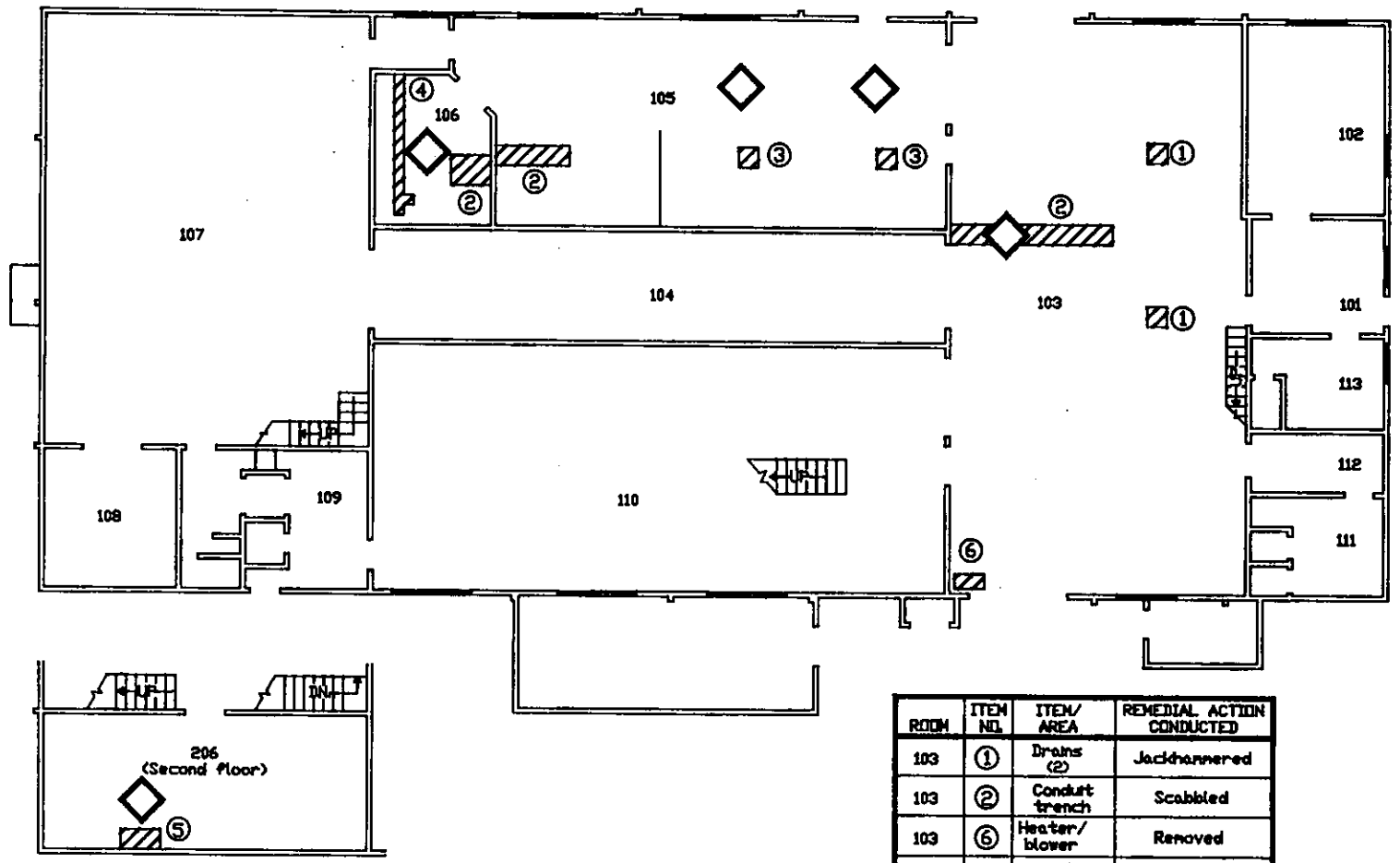
PIC measurement location

0 6 12
Scale in feet

B4PLAN10V1

FIGURE III-21 REMEDIATED AREAS IN BUILDING 3

1.80 5894.10

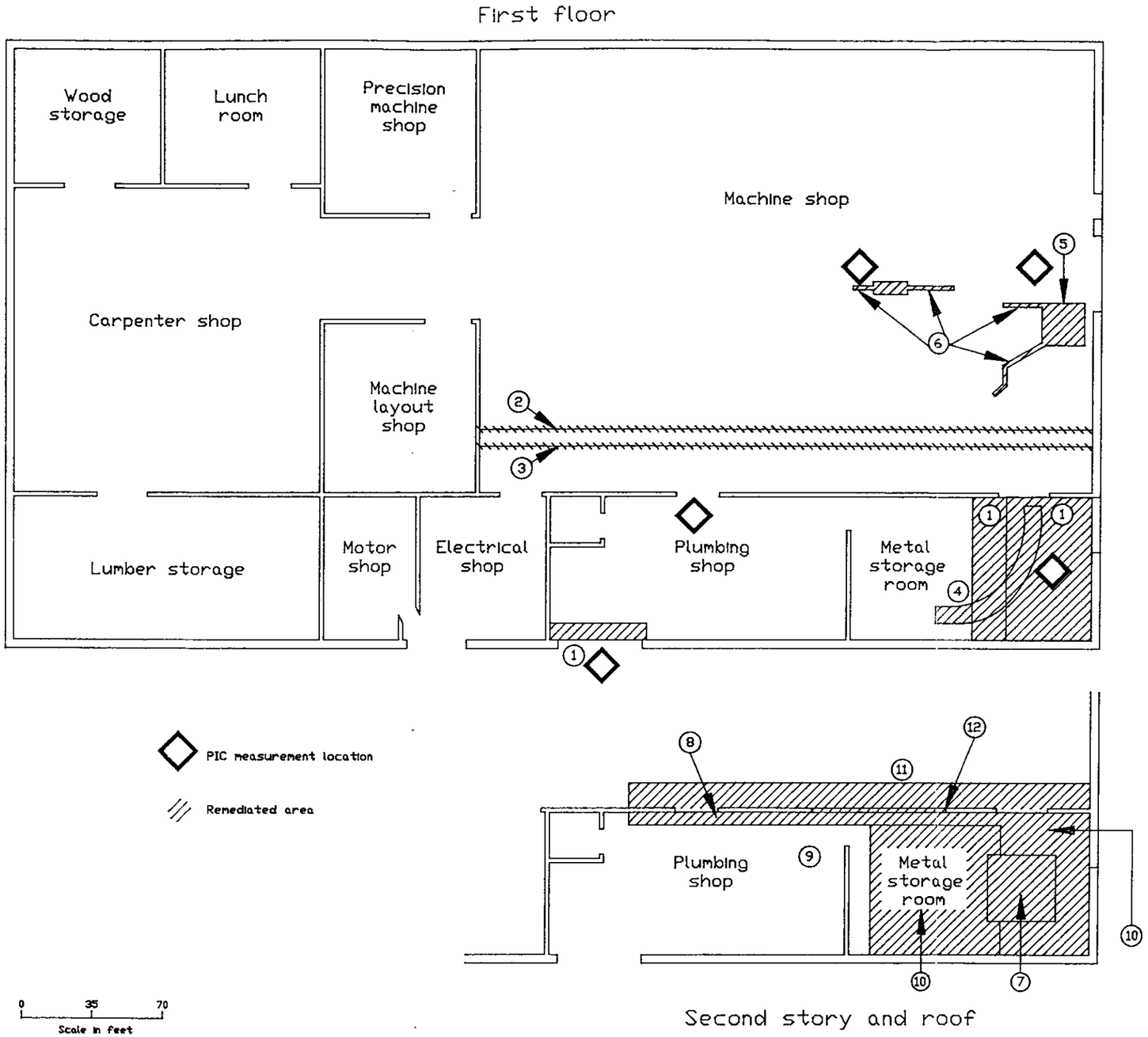


ROOM	ITEM NO.	ITEM/ AREA	REMEDIAL ACTION CONDUCTED
103	①	Drains (2)	Jackhammered
103	②	Conduit trench	Scabbled
103	⑥	Heater/ blower	Removed
105	②	Conduit trench	Scabbled; some conduit removed
105	③	Ventilation sumps (2)	Scabbled, scrubbed with wire brush
106	③	Pipes	Removed or vacuumed
106	②	Concrete trench	Scabbled, scrubbed with wire brush
106 (Mezz.)	④	Vent duct	Removed
206	⑤	Exhaust fan[a]	Removed

[a] The heater/blower/exhaust fan unit was not replaced, at the request of the Department of Interior.

B4PLANN9V1

FIGURE III-22 REMEDIATED AREAS IN BUILDING 4



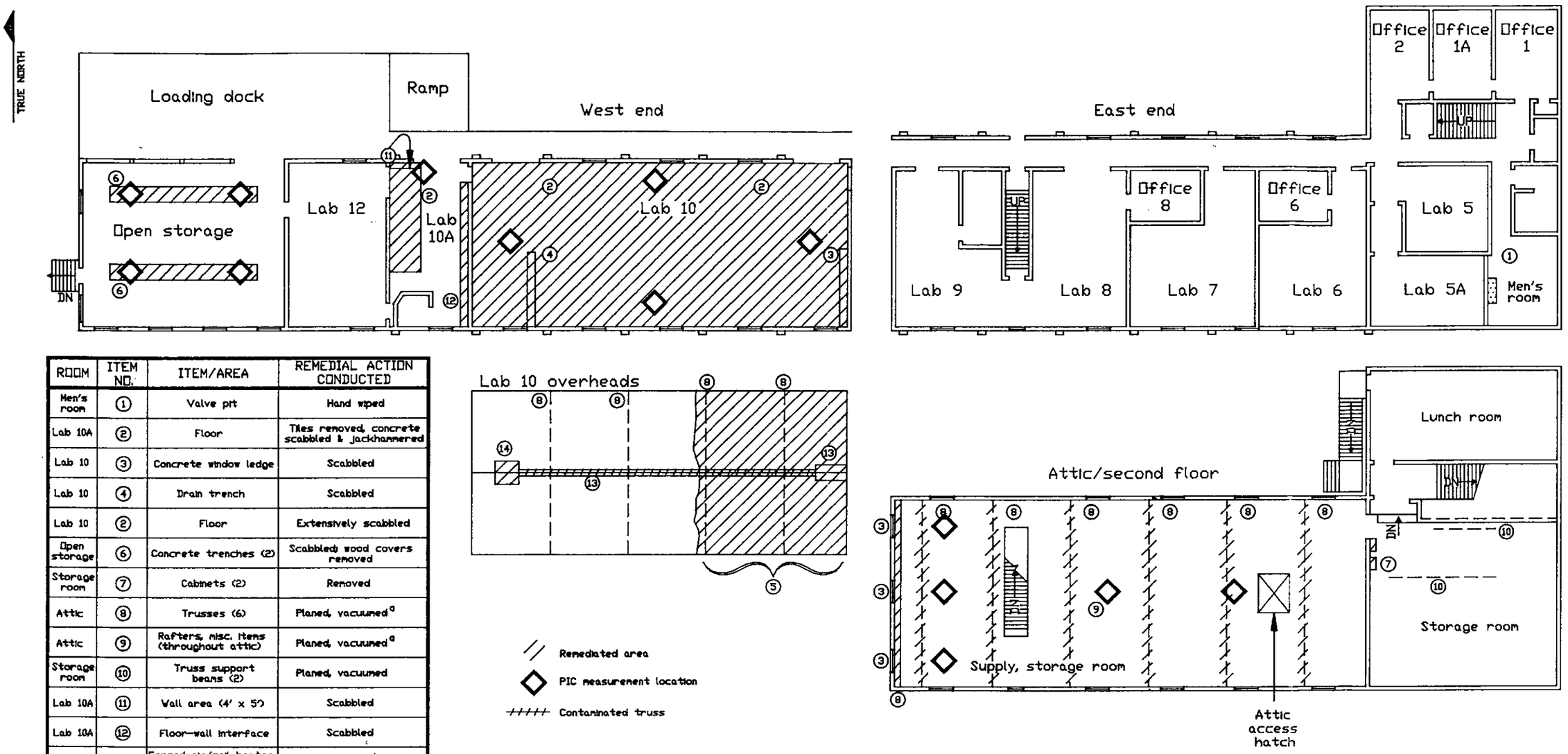
TRUE NORTH

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Metal storage room	①	Floor	Scabbled
Machine shop	②	Electrical conduit	Removed
Machine shop	③	Cast iron pipes (2)	Removed
Plumbing/ metal storage	④	Monorail	Vacuumed
Machine shop	⑤	Sump cover and support ledge	Scabbled
Machine shop	⑥	Floor cracks	Scabbled
Plumbing shop	①	Floor	Scabbled

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Metal storage room	⑦	Blower & surrounding roof	Blower and tar paper removed
Plumbing shop	⑧	Seam, upper roof to wall	Gasket removed
Plumbing shop	⑨	Roof surface	Tar paper removed
Metal storage room	⑩	Ceiling support and ceiling	Vacuumed and planed
Machine shop	⑪	Ceiling tiles and underside of roof	Removed
Machine shop upper south wall	⑫	Windows	Removed

B44PLAN12AV1

FIGURE III-23 REMEDIATED AREAS IN BUILDING 5



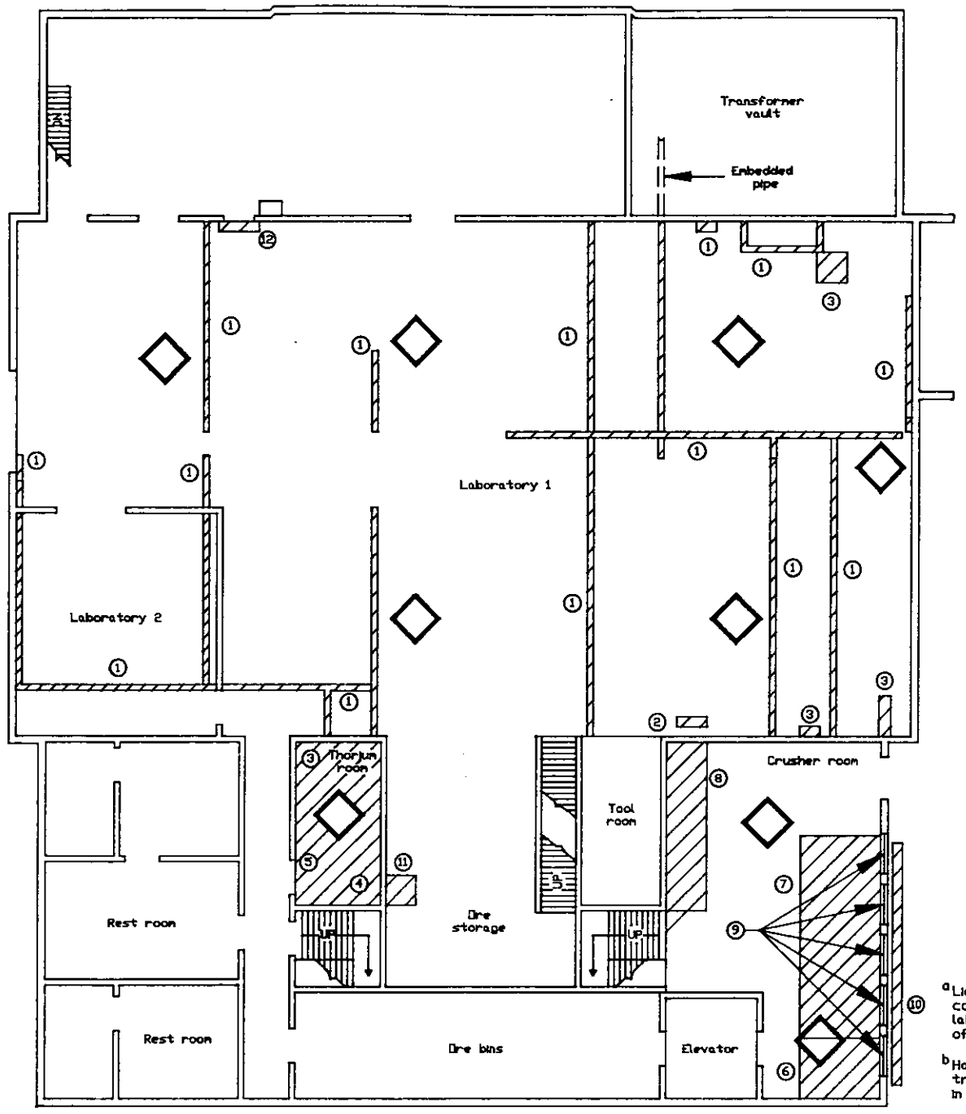
ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Men's room	①	Valve prt	Hand wiped
Lab 10A	②	Floor	Tiles removed, concrete scabbled & jackhammered
Lab 10	③	Concrete window ledge	Scabbled
Lab 10	④	Drain trench	Scabbled
Lab 10	②	Floor	Extensively scabbled
Open storage	⑥	Concrete trenches (2)	Scabbled; wood covers removed
Storage room	⑦	Cabinets (2)	Removed
Attic	⑧	Trusses (6)	Planed, vacuumed[a]
Attic	⑨	Rafters, misc. items (throughout attic)	Planed, vacuumed[a]
Storage room	⑩	Truss support beams (2)	Planed, vacuumed
Lab 10A	⑪	Wall area (4' x 5')	Scabbled
Lab 10A	⑫	Floor-wall interface	Scabbled
Lab 10	⑬	Forced air/coil heater, duct work	Removed[b]
Lab 10	⑭	Exhaust blower, duct work	Removed[b]
Lab 10	⑧	Trusses (4)	Planed, vacuumed
Lab 10	⑤	Ceiling panels; insulation, rafters	Removed. Rafters planed/vacuumed
Lab/ attic	⑧	Truss	Planed, vacuumed; one truss replaced

[a] In several areas, small sections of wood were cut out and disposed of.

[b] Replaced with ceiling-mounted heaters.

B4PLANN2\V1

FIGURE III-24 REMEDIATED AREAS IN BUILDING 17



First floor

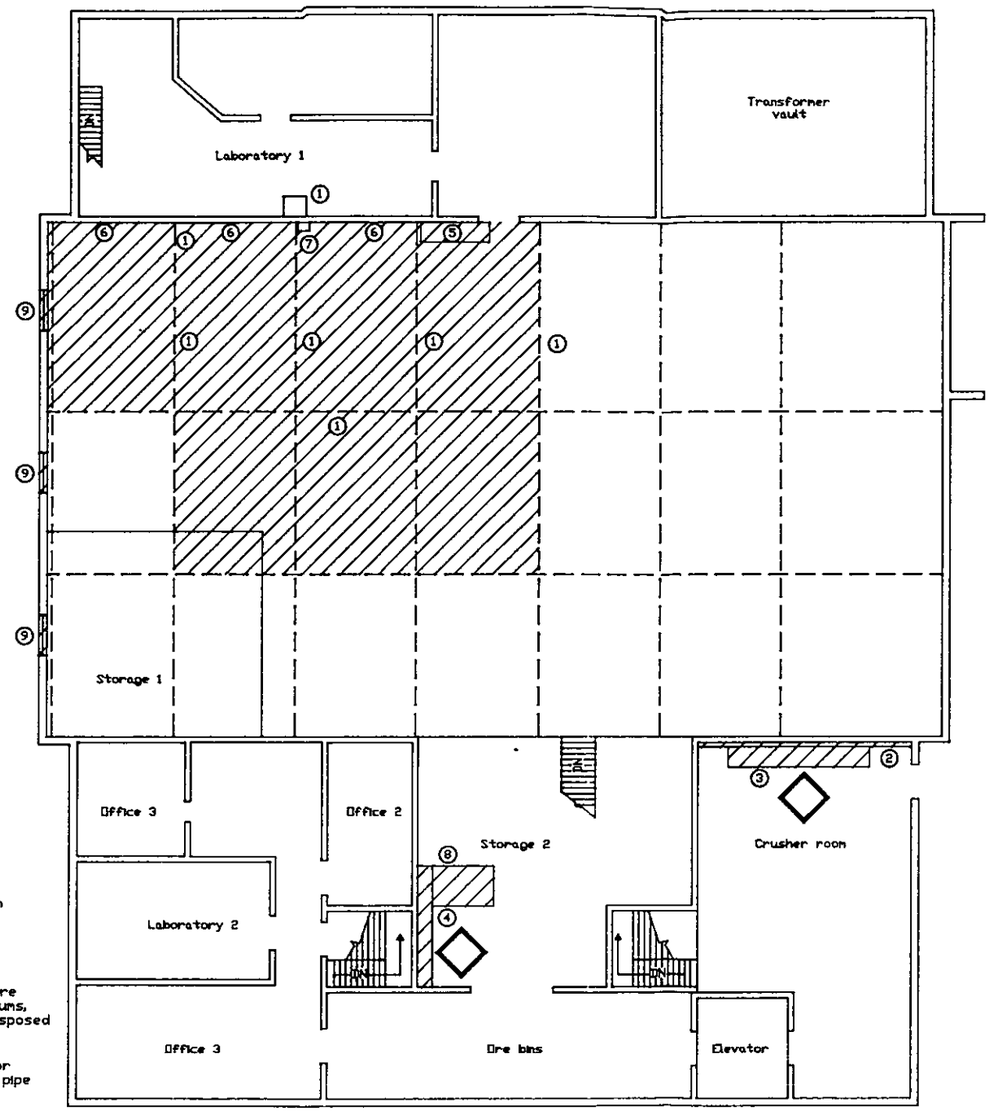
TRUE NORTH

Remediated area

PIC measurement location

[a] Liquids found in the trenches were collected, stored in 55-gallon drums, labeled as aqueous liquids and disposed of by the Bureau of Mines.

[b] Hazard assessment performed for trenches in Lab 2 and embedded pipe in the Transformer room.



Second floor

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Lab 1, 2	①	Trenches, conduit [a,b]	Removed some pipes; scabbled floor and wall
Lab 1	②	Sump	Scabbled
Thorium	③	Floor, walls, duct	Walls & duct removed; floor tile replaced
Thorium	④	Furring strips, lamps	Removed
Thorium	⑤	Trenches w/pipes hood	Pipes removed; trench scabbled
Crusher	⑥	Floor surfaces and equipment	Scabbled floor; scrubbed equipment with wire brush

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Crusher	⑦	Crusher & platform	Used wire brush, needle gun
Crusher	⑧	Crusher, platform, & floor	Used wire brush, needle gun scabbled floor
Crusher	⑨	Windows & frames (5)	Removed
Exterior	⑩	Duct	Removed
Ore storage	⑪	Blower	Removed
Lab 1	⑫	Floor-wall interface area excluding door	Scabbled

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Lab 1	①	Conduit/support trusses	Removed conduit; vacuumed trusses
Crusher	②	Floor-wall interface	Scabbled
Crusher	③	Drying oven	Removed asbestos lining, used wire brush & needle gun
Storage 2	④	Wall	Scabbled
Lab 1	⑤	Balcony	Scrubbed with wire brush & sand paper
Lab 1	⑥	Wall ledge	Removed brick, lightly scabbled

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Lab 1	⑦	Chimney blower, platform	Removed blower; scrubbed platform with wire brush
Storage 2	⑧	Steel floor	Removed
Lab 1	⑨	Windows frames & ledges (3)	Used needle gun and vacuum

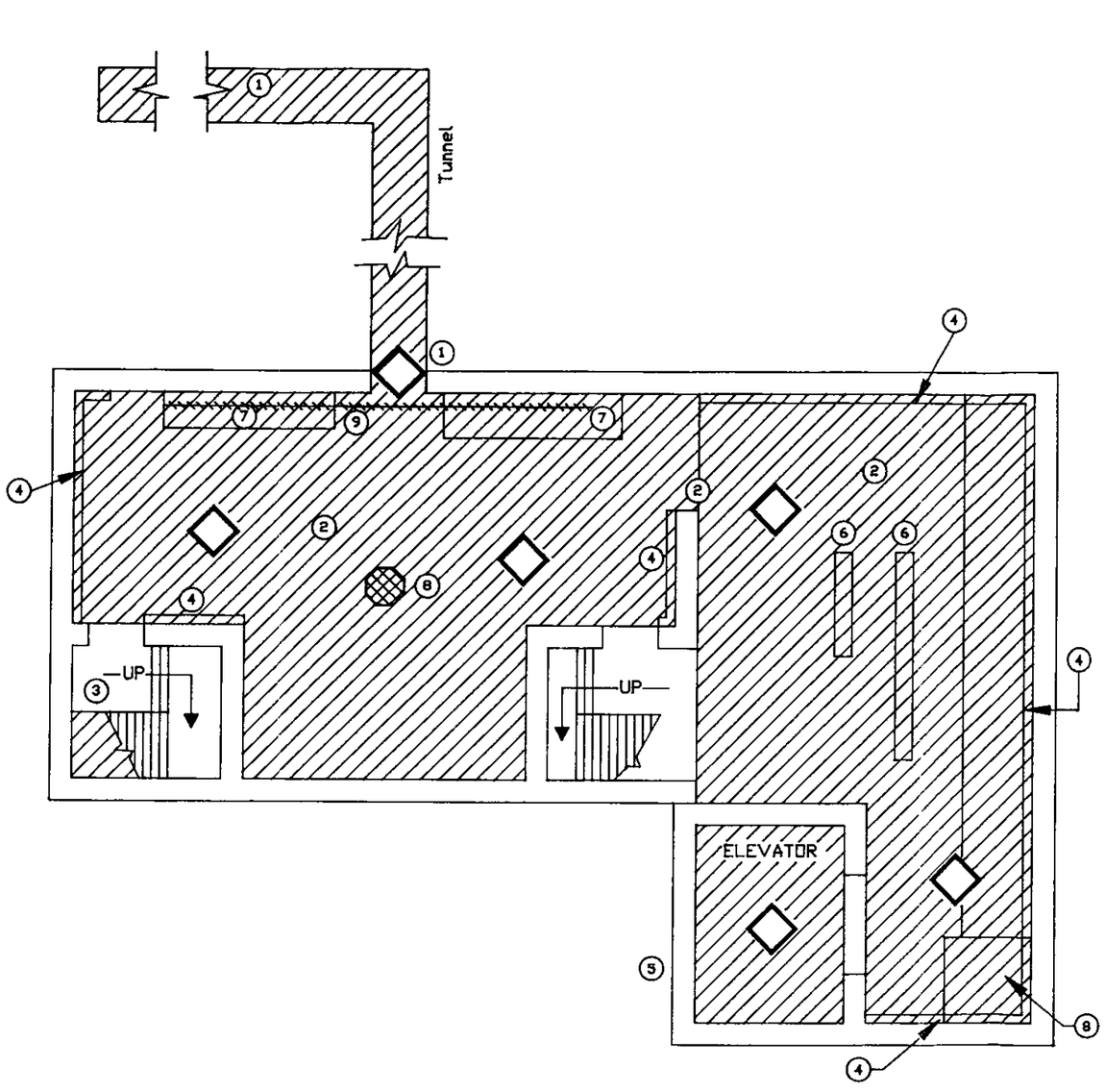
0 10 20
Scale in feet

B4PLANN14V1

FIGURE III-25 REMEDIATED AREAS IN BUILDING 23

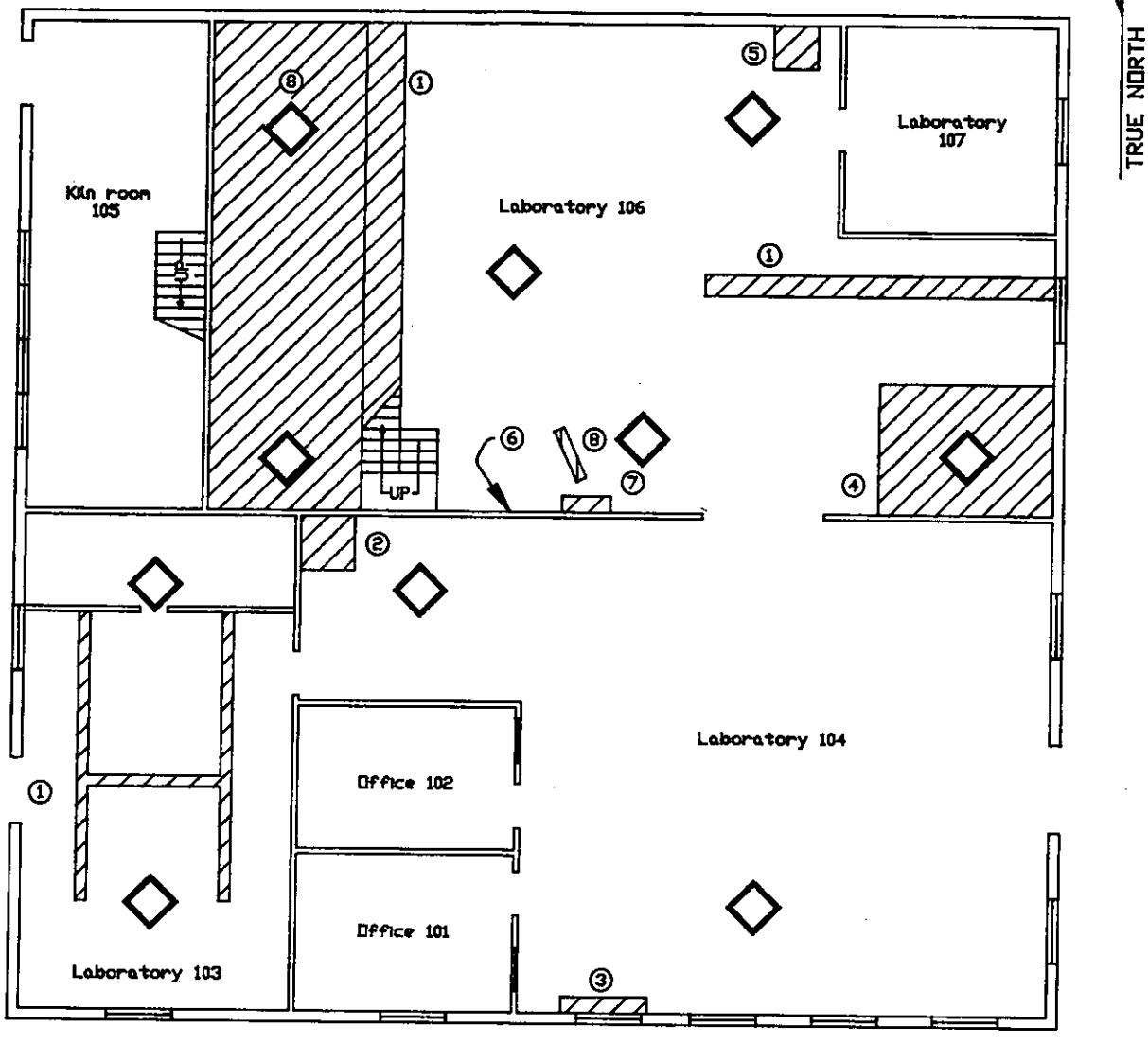
ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Tunnel	(1)	Floor, walls, and piping	Scabbled concrete; removed piping
Basement	(2)	Floor	Scabbled
Southwest stairwell	(3)	Piping, floor, sump, and walls	Scabbled floors and walls[a]
Basement	(4)	Wall	Scabbled
Basement	(5)	Elevator pit	Scabbled walls; scrubbed some steel sections with wire brush
Basement	(6)	Shelves	Removed; not replaced
Basement	(7)	Compressor and pedestal	Scrubbed compressor with wire brush; scabbled pedestal
Basement	(8)	Sump, sump pumps, and drain pipe	Removed pump; scabbled floor and walls[a]
Basement	(9)	Overhead piping	Vacuumed

[a] The sumps and associated piping were left in place because they could not be remediated; a hazard assessment was conducted for these items (BNI 1991).



B4PLAN15.V1

FIGURE III-26 REMEDIATED AREAS IN BUILDING 23 BASEMENT



ROOM	ITEM NO.	ITEM/ AREA	REMEDIAL ACTION CONDUCTED
103	①	Trench	Scabbled
104	②	Floor	Scabbled
104	③	Air line valves	Wiped with a dry cloth
106	④	Transite ceiling tiles	Removed (contained asbestos and radioactive mat.)
106	①	Concrete trench	Scabbled

ROOM	ITEM NO.	ITEM/ AREA	REMEDIAL ACTION CONDUCTED
106	⑤	Sink	Removed
106	⑥	Wall ledge	Vacuumed
106	⑦	Floor crack	Scabbled
106	⑧	Floor	Extensively scabbled & used needle gun

Remediated area

PIC measurement location

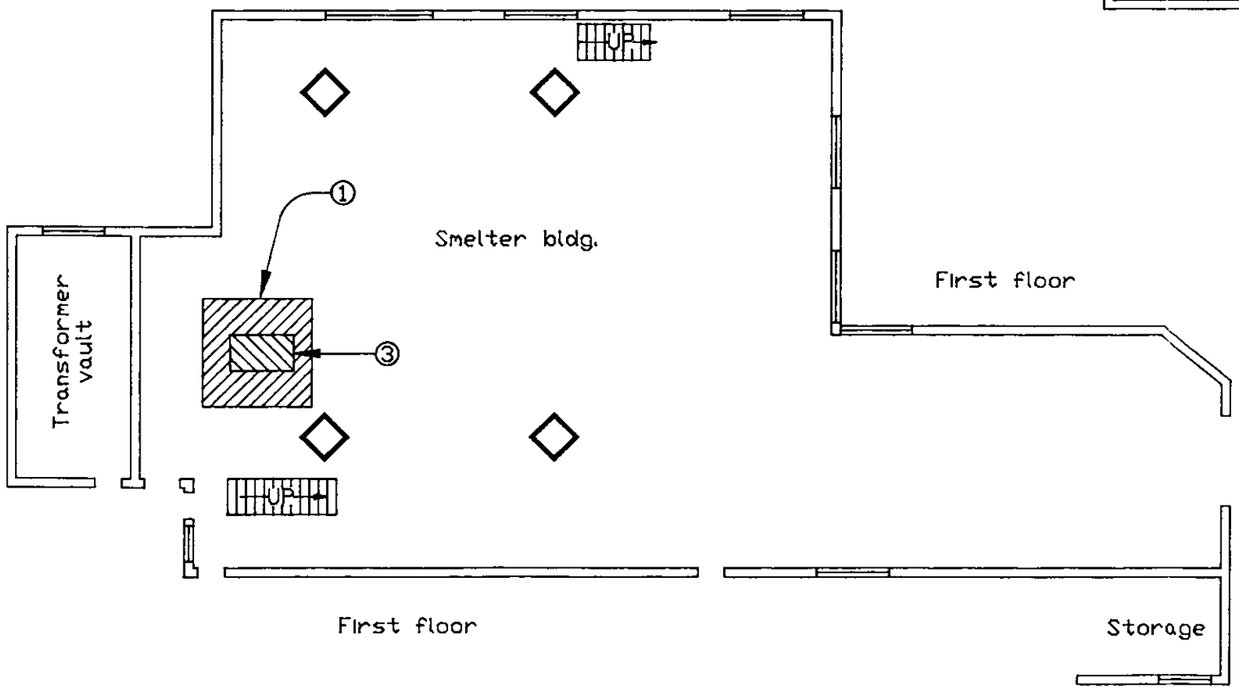
0 9 18
Scale in feet

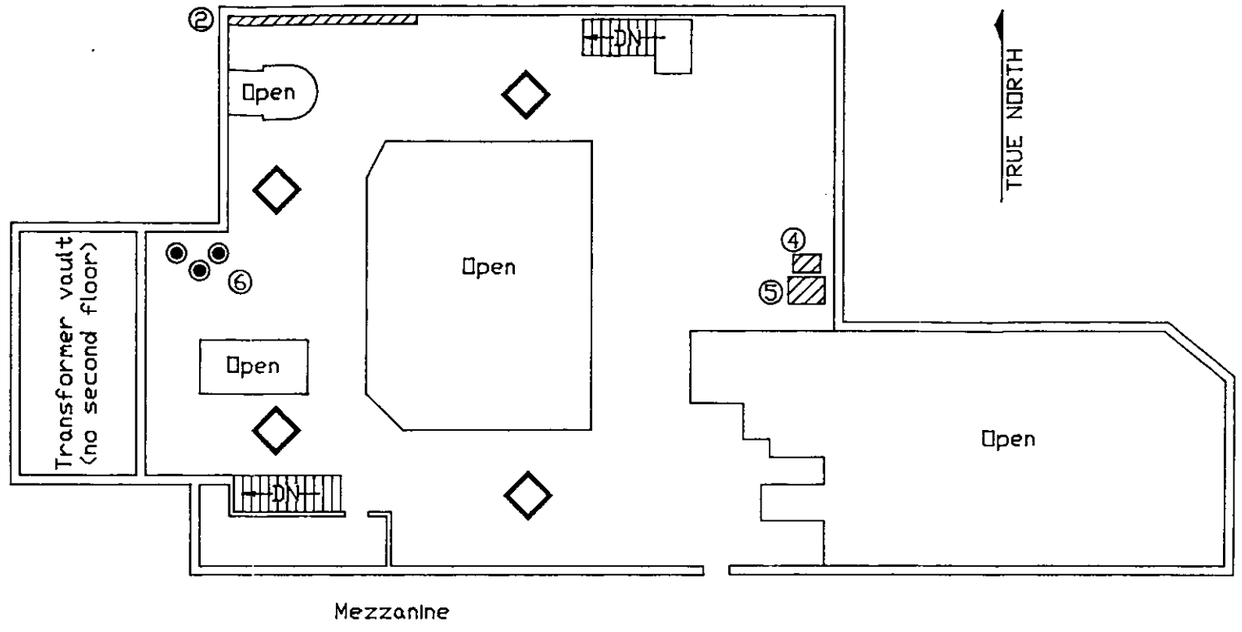
B4PLANN13V1

FIGURE III-27 REMEDIATED AREAS IN BUILDING 24

.80 5894.5

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
First floor	①	Raised floor	Scabbled
Mezz.	②	Wall, catwalk	Scabbled
First floor	③	Pit	Scabbled
Mezz.	④	Scale	Scrubbed with wire brush, used needle gun
Mezz.	⑤	Crusher	Removed and not replaced
Mezz.	⑥	Furnace lids	Used needle gun





Remediated area

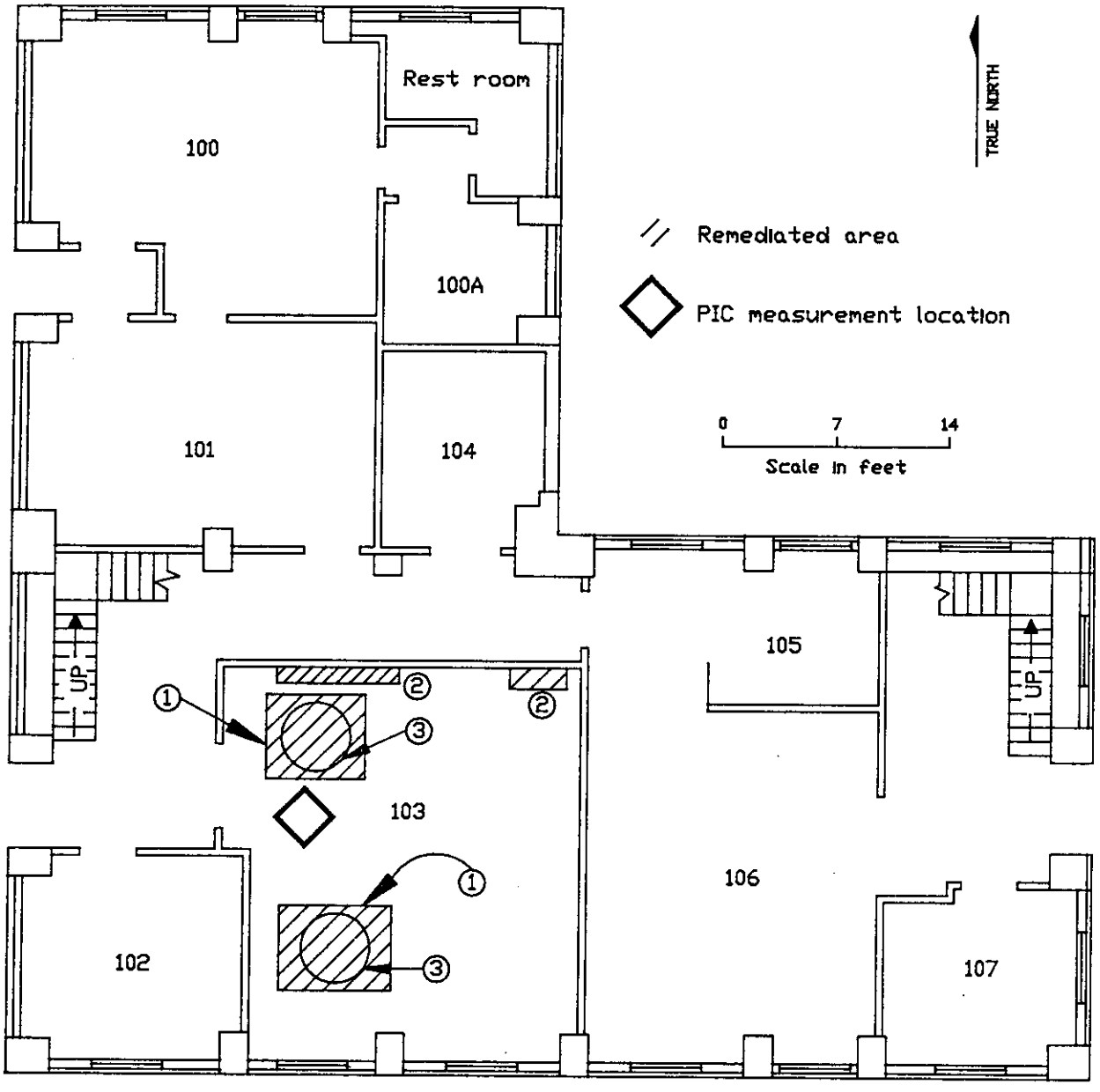
PIC measurement location

0 20 40

Scale in feet

B4PLANN1bV1

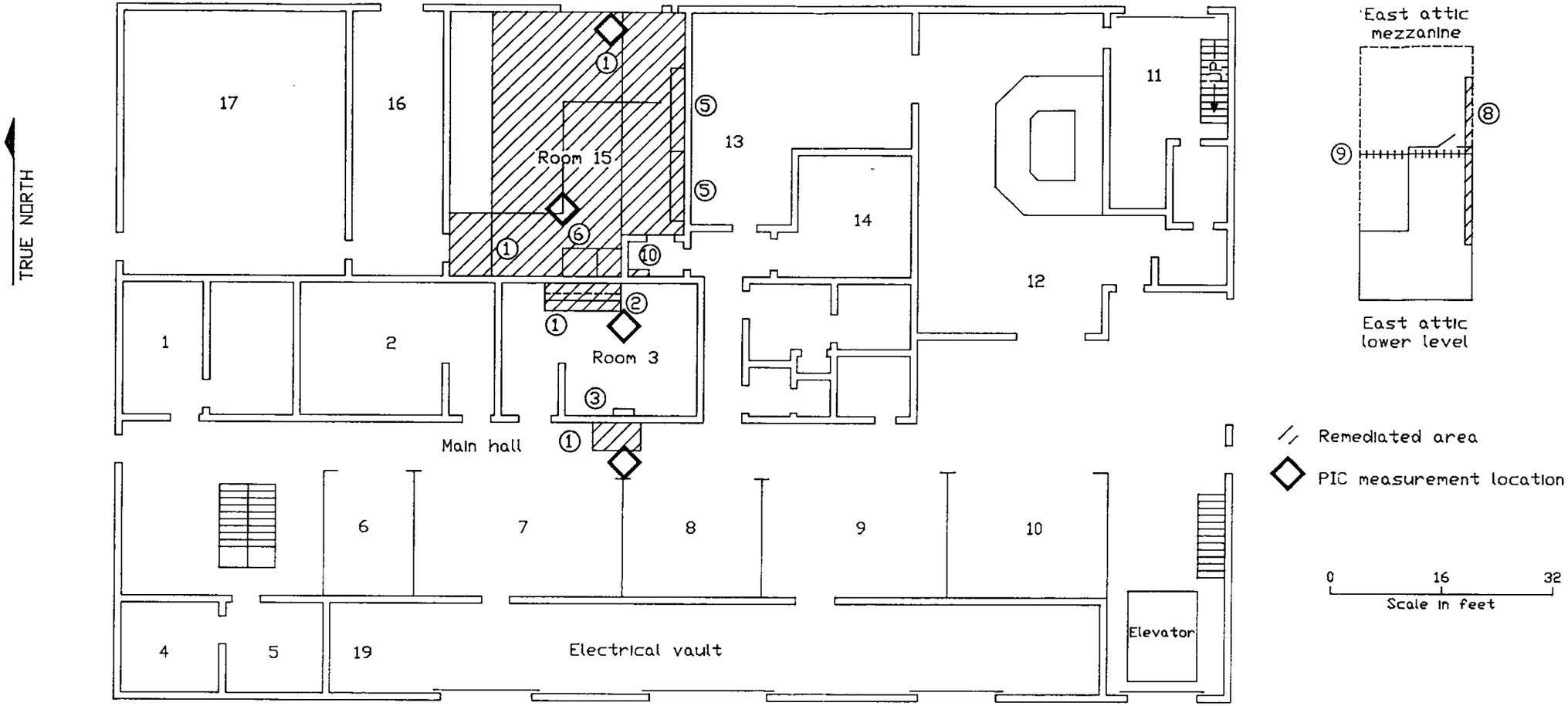
FIGURE III-28 REMEDIATED AREAS IN BUILDING 25



ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
103	①	Floor (concrete & linoleum, 2 areas)	Removed linoleum, scabbled concrete
103	②	Cabinet, sink	Removed
103	③	Abandoned furnace pits (2)	Scabbled and jackhammered

B4PLANN10V1

FIGURE III-29 REMEDIATED AREAS IN BUILDING 26



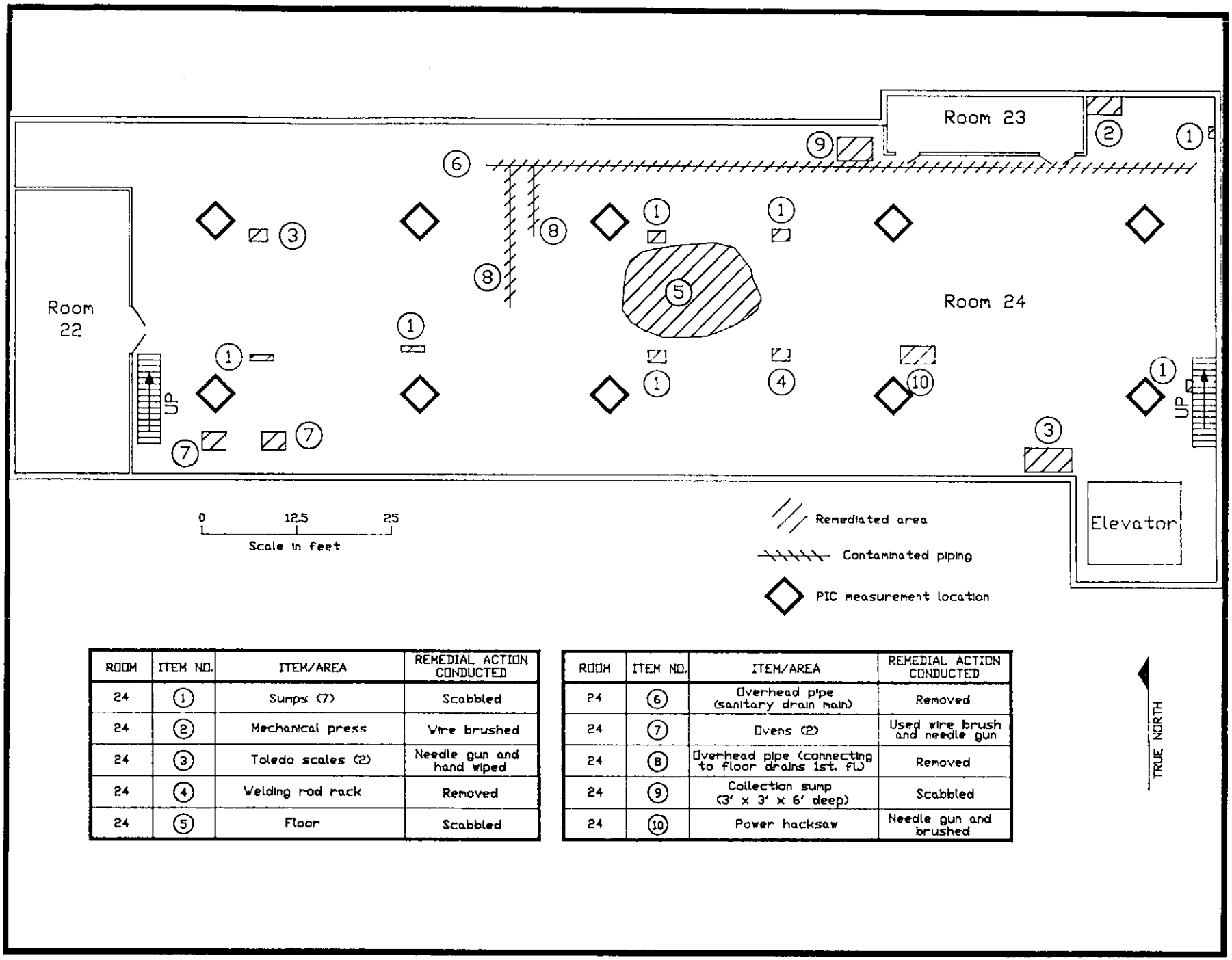
ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
3	①	Floor, walls	Scabbled
3	②	Cabinet, sink, pipe drain	Removed
3	③	Floor beneath cabinet	Scabbled

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
15	①	Floor, walls	Removed linoleum, scabbled concrete
15	⑤	Cabinets (2)	Removed
15	⑥	Sink, drain shelf, cabinet and fume hood	Removed
15	⑩	Floor-wall interface	Scabbled

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Main hall	①	Floor	Removed linoleum, scabbled concrete
East attic	⑧	Header plate	Used needle gun
East attic	⑨	Trusses and braces	Vacuumed, planed

B4PLAN3:V1

FIGURE III-30 REMEDIATED AREAS IN BUILDING 28



ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
24	1	Sumps (7)	Scabbled
24	2	Mechanical press	Wire brushed
24	3	Toledo scales (2)	Needle gun and hand wiped
24	4	Welding rod rack	Removed
24	5	Floor	Scabbled

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
24	6	Overhead pipe (sanitary drain main)	Removed
24	7	Ovens (2)	Used wire brush and needle gun
24	8	Overhead pipe (connecting to floor drains 1st. fl.)	Removed
24	9	Collection sump (3' x 3' x 6' deep)	Scabbled
24	10	Power hacksaw	Needle gun and brushed

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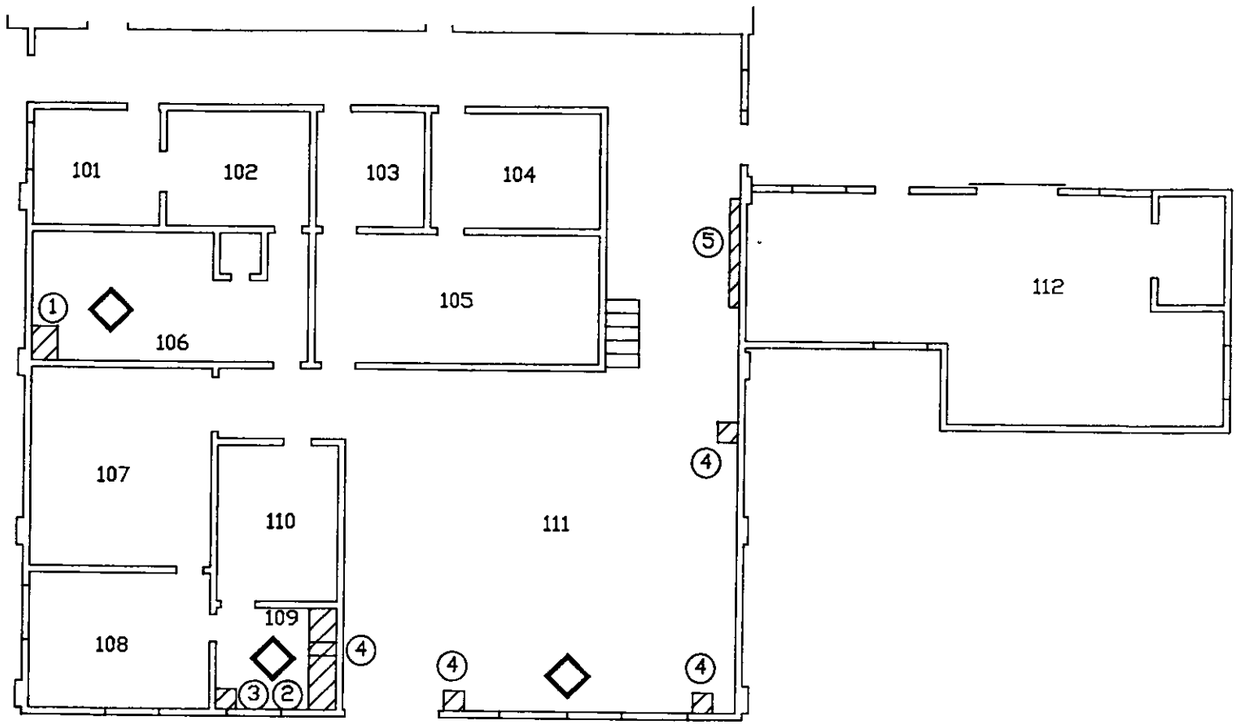
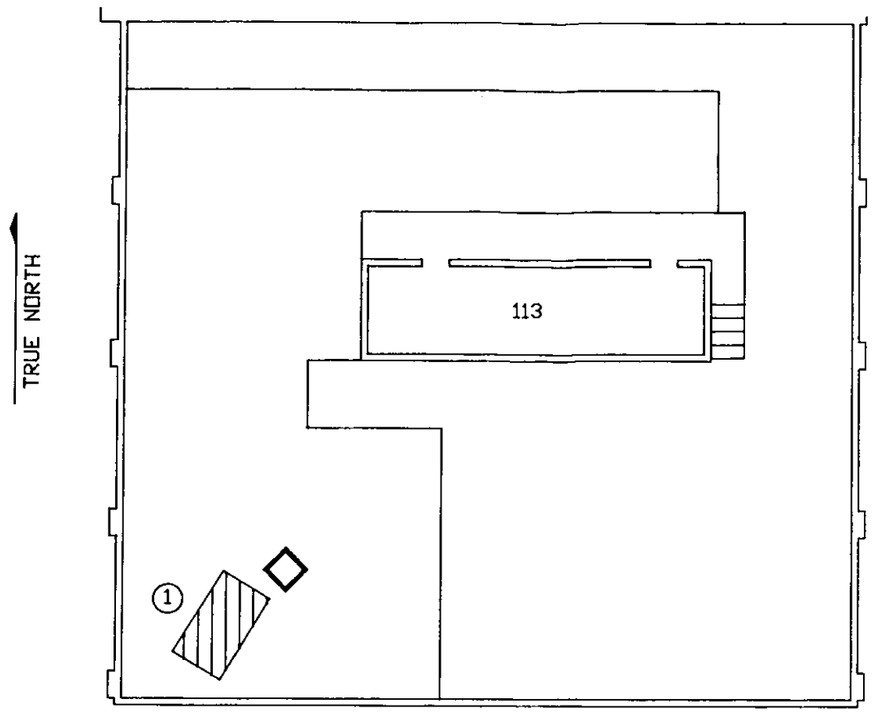
FIGURE III-31 REMEDIATED AREAS IN BUILDING 28 BASEMENT



First floor



Second floor

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
106	①	Floor drain	Scabbled drain area
109	②	Cabinet	Removed some wood
109	③	Floor adjacent to drain	Scabbled
109	④	Drain	Used needle gun
111	④	Drains (3)	Used needle gun
111	⑤	Floor-wall interface	Scabbled

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
113	①	High efficiency particulate Air (HEPA) unit	Removed filters and hand wiped plenum

Remediated area

PIC measurement location

0 10 20

Scale in feet

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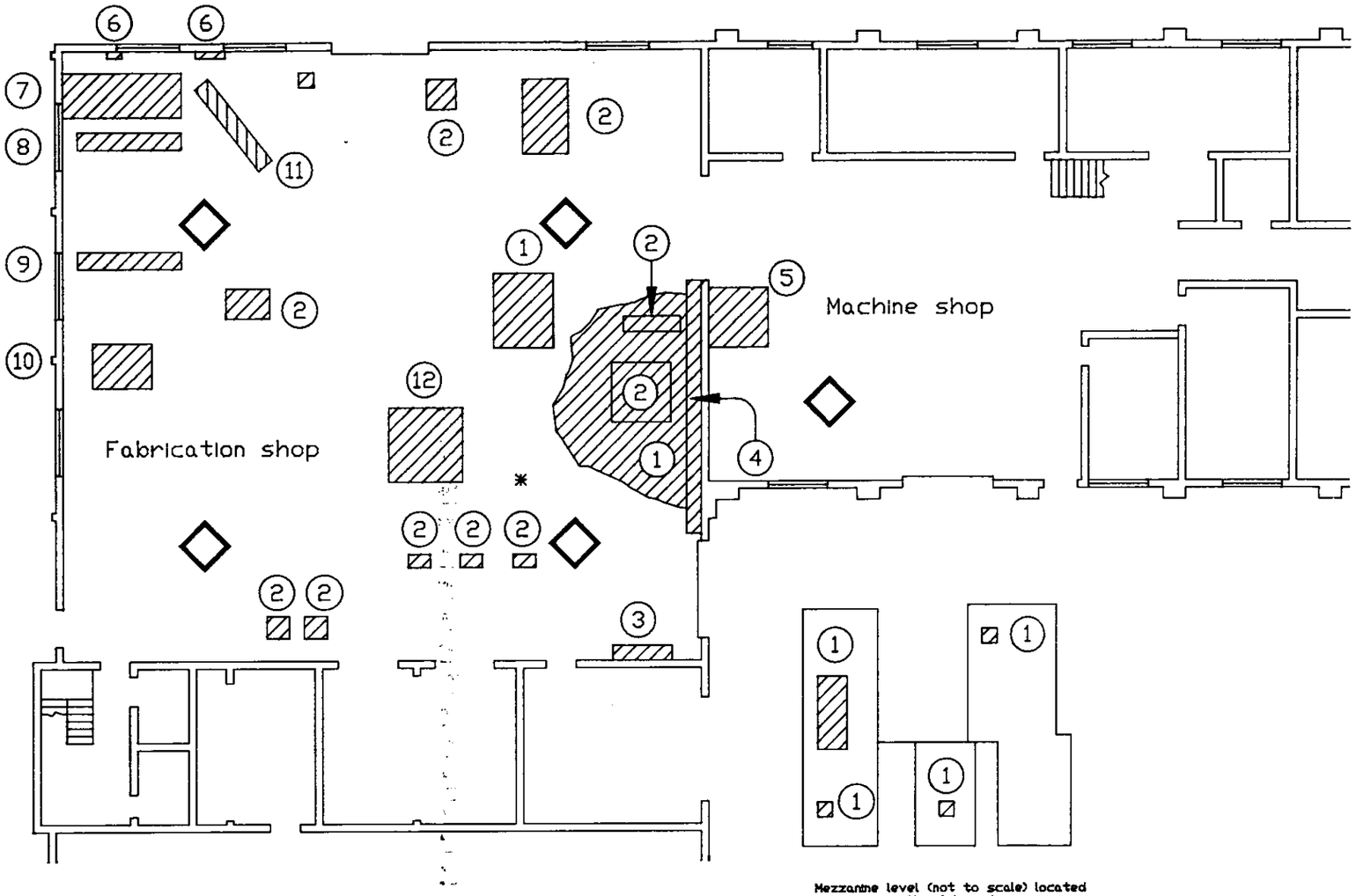
FIGURE III-32 REMEDIATED AREAS IN BUILDING 29



Mezzanine level (not to scale) located over the fabrication room.

ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Fab.	①	Linoleum floor	Removed
Fab.	②	Equipment	Scrubbed with wire brush (some small parts removed)
Mezz.	①	Wood floor	Vacuumed and planed
Fab.	③	Metal shear	Removed paint, used needle gun for removable contamination[a]
Fab.	④	Floor-wall interface	Scabbled
Mach. shop	⑤	Baldwin press	Used wire brush and needle gun[a]
Fab.	⑥	Floor drain bowls	Needle gun and vacuum
Fab.	⑦	Lindberg furnace	Interior: asbestos removed[a] Exterior: needle gun, grinder
Fab.	⑧	Clark roller/mobile puller	Used wire brush and needle gun
Fab.	⑨	Loma roller	Disassembled; removed some parts and cleaned others with wire brush and needle gun
Fab.	⑩	Vacuum furnace	Scrubbed with wire brush
Fab.	⑪	Transfer cart (12'x18'x12') and 12 furnace tongs	Used wire brush and grinder
Fab.	⑫	Hydraulic press	Disassembled; removed some parts and cleaned others with wire brush and needle gun[a]
Fab.	✳	Overhead roof trusses	Planed and vacuumed

[a]A hazard assessment was conducted to determine the radiological condition of this item (BNI 1991).

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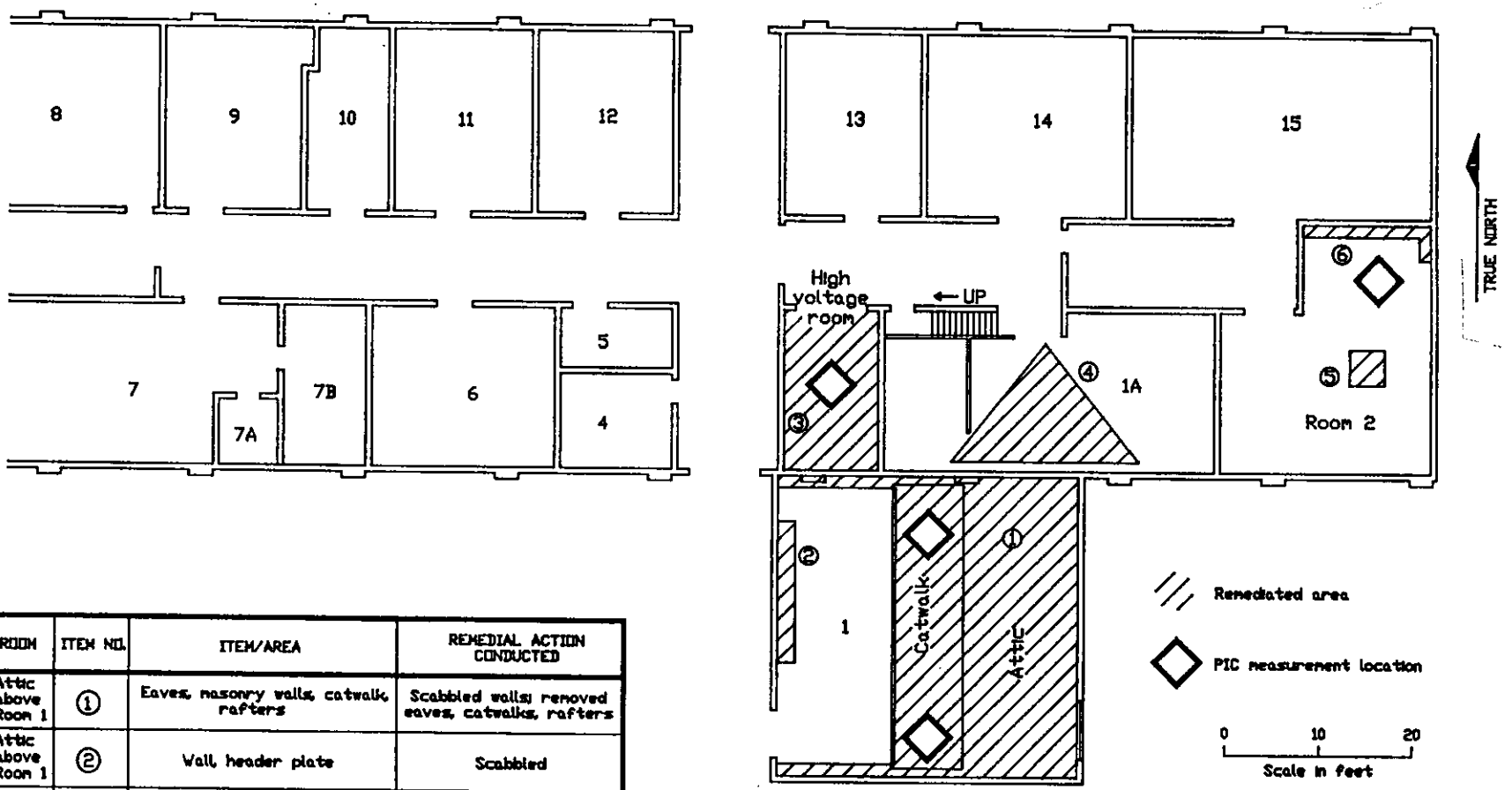
FIGURE III-33 REMEDIATED AREAS IN BUILDING 30



ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
Attic above Room 1	①	Eaves, masonry walls, catwalk, rafters	Scabbled walls; removed eaves, catwalks, rafters
Attic above Room 1	②	Wall, header plate	Scabbled
High voltage room	③	Floor, floor-wall interface	Scabbled
Roof	④	Tar paper	Removed
2	⑤	Fume hood	Used wire brush and hand wiped
2	⑥	Wall	Scabbled

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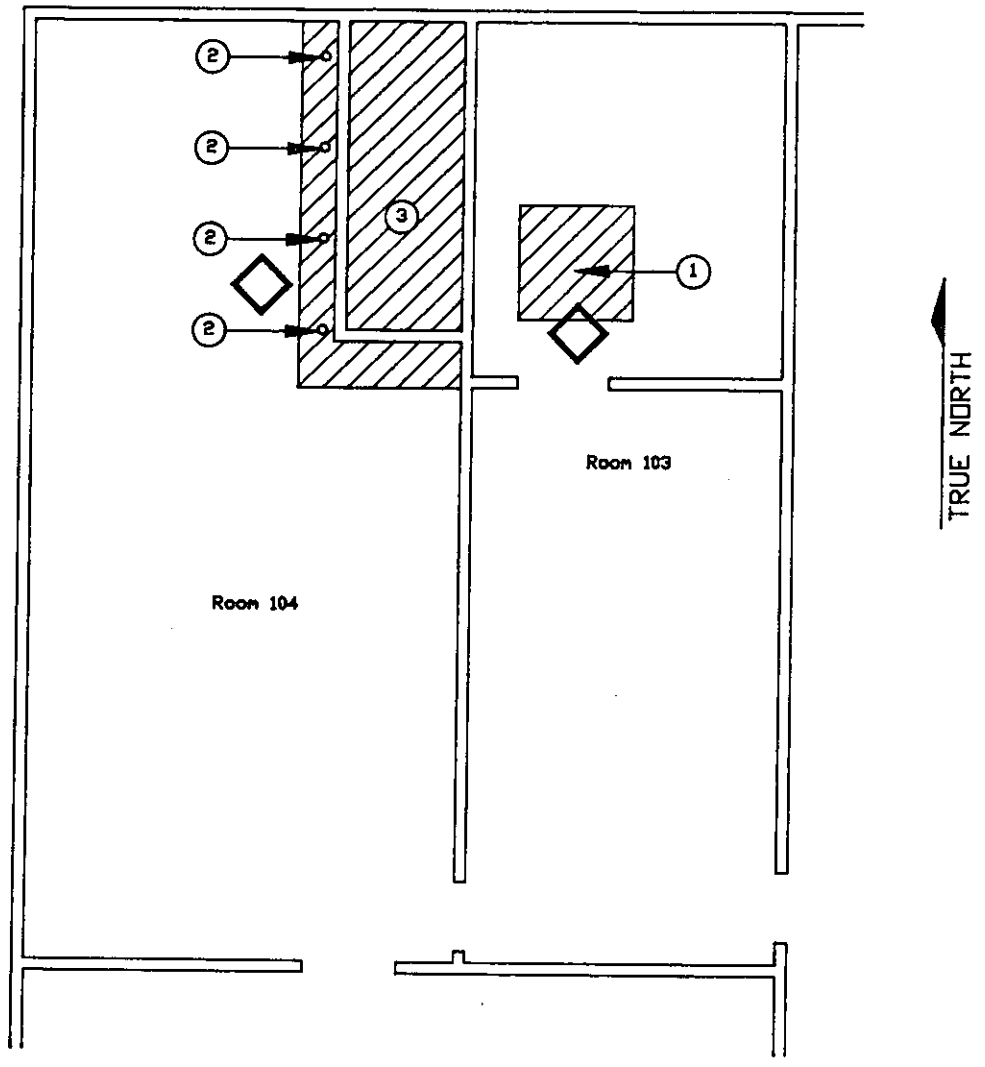
FIGURE III-34 REMEDIATED AREAS IN BUILDING 31



ROOM	ITEM NO.	ITEM/AREA	REMEDIAL ACTION CONDUCTED
103	(1)	Floor	Removed tiles, scabbled concrete
104	(2)	Anchor bolts (4)	Removed; scabbled surrounding concrete
104	(3)	Floor, floor-wall interface	Removed tiles, scabbled concrete

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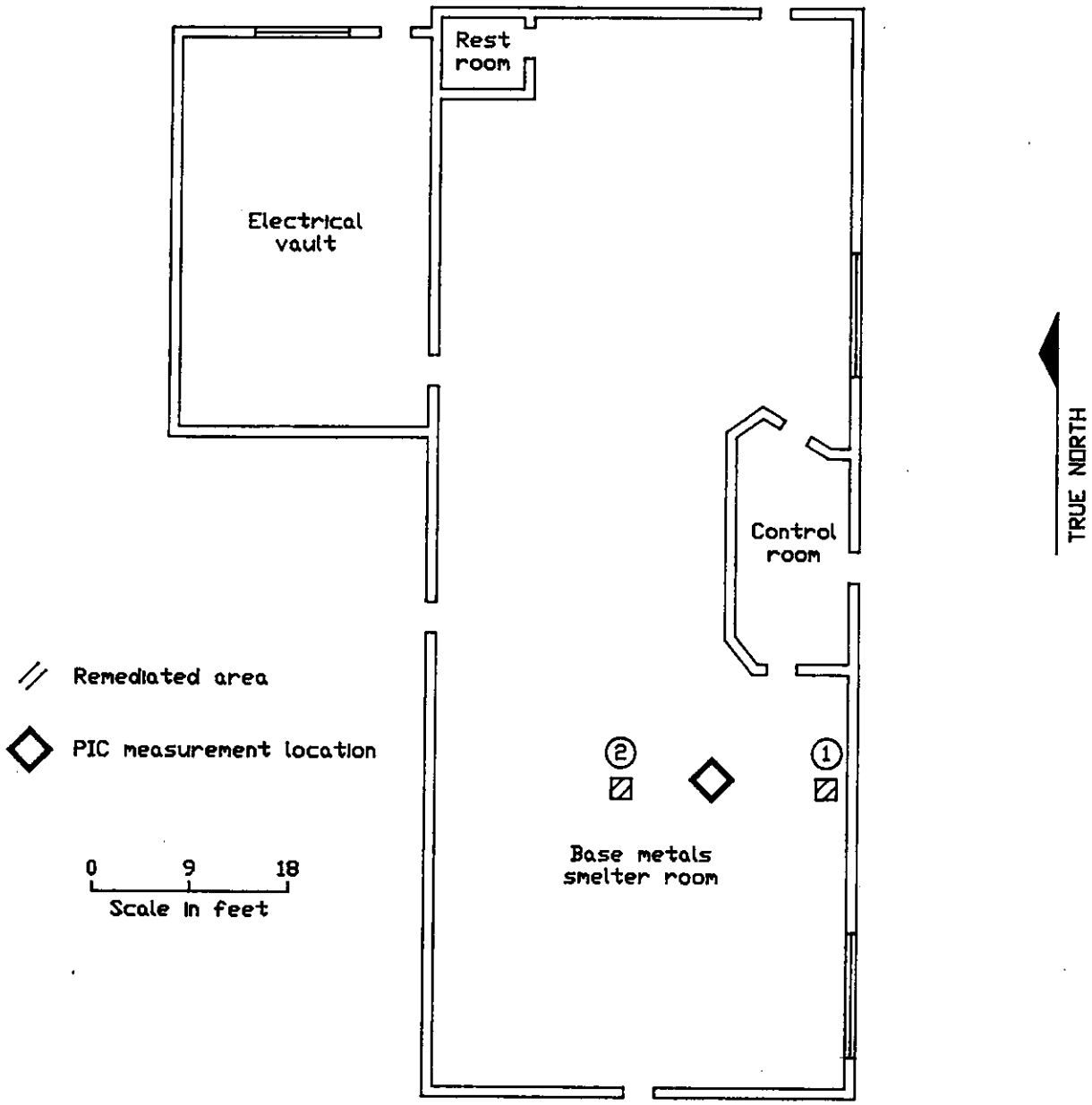
FIGURE III-35 REMEDIATED AREAS IN BUILDING 33



ROOM	ITEM NO.	ITEM	REMEDIAL ACTION CONDUCTED
Base metals smelter	①	Handlift	Scrubbed with wire brush & sand paper
Base metals smelter	②	Pedestal tube	Scabbled

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FIGURE III-36 REMEDIATED AREAS IN BUILDING 34