



April 21, 1994

Westinghouse Electric Company
11 Stanwix Street
Gateway 1539
Pittsburgh, PA 15222

Attention: Mr. Wayne Bickerstaff

Subject: REVISED COPIES OF NRC COMMENT RESPONSES, PROCEDURE REDS-
RAM-103 AND THE BLOOMFIELD FINAL SURVEY PLAN

Dear Mr. Bickerstaff:

The purpose of this letter is to provide you with the revised copies of the NRC comment responses, REDS-RAM-103, *Unconditional Release of Tools, Equipment and Waste Materials* and the Bloomfield Final Survey Plan. Other than incorporation of the NRC comments in the procedure and the plan, no technical or scope changes were made. Grammatical and editorial changes were made based on an internal review.

Comments 7 and 9 have been slightly revised due to comments and the determination of the identity of uranium. If you do not have any changes to the rest of the responses, then they are ready for submittal to the NRC.

Sincerely,

A handwritten signature in black ink, appearing to read 'David M. Hall', with a stylized flourish at the end.

David M. Hall
Manager, Decommissioning Contract Services
Radiological Engineering and
Decommissioning Services

cc: D. Neely
A. Johnson
B. Rogers

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ATTACHMENT 1
RESPONSES TO NRC COMMENTS

ATTACHMENT 1

RESPONSE TO NRC COMMENTS

1. The NRC commented that SEG would need to give written permission to disclose information in their procedures or submit an application and affidavit to withhold disclosure in accordance with 10 CFR 2.790 (b). SEG confirms that the information can be made publicly available.
2. The NRC commented that at least one copy of each procedure must be available at the facility for reference. SEG confirms that at least one controlled copy of each procedure used for the characterization, remediation and final surveys is kept on site for the duration of the project.
3. The NRC commented that SEG should describe the scope of biased surveys discussed in the January 26, 1994 letter. Biased surveys were to be performed prior to demolition, assuming conditions permitted the safe performance of the surveys. The open penetrations in the roof where the ventilation louvers were located were surveyed to the extent possible. For this the scope of the biased survey was all areas which were safely reachable with survey instrumentation.

The interior walls of Buildings 9 and 10A did not have a pre-demolition biased survey performed. It was determined that they could not be safely accessed. As the buildings (9 and 10A) are demolished, the debris is receiving a 100% direct survey.

4. The NRC commented that there was an editing mistake in step 4.2.3 of procedure REDS-RAM-103, Unconditional Release of Tools, Equipment and Waste Materials. The procedure has since been revised, and the definition of Radioactive Material has been deleted.
5. The NRC commented that step 5.1.6 of procedure REDS-RAM-103 is too limiting and does not allow for the presence of naturally occurring radioactive materials nor licensed material less than decommissioning guidelines. Step 5.1.6 has been revised to state that waste "... contain no licensed material with activity greater decommissioning guidelines."
6. The NRC commented that steps 5.2 and 5.3 of procedure REDS-RAM-103 does not provide sufficient guidance for selecting instrumentation or applying the appropriate release limit for thorium contamination. The procedure is meant to provide general guidance for monitoring and release of material from areas with any type of contaminant. The Final Survey Plan provides the specific guidance for selecting instrumentation and applying the appropriate release limits for the contaminants on the Bloomfield site.

7. The NRC commented that surveying a 10-meter radius around each of the locations identified by ORISE as "potentially contaminated" is not sufficient for Buildings 9 and 10A and the basement of Building 7. Section 2.2 of the Final Survey Plan was revised to state that Buildings 9 and 10A and the basement of Building 7 will be surveyed in accordance with the requirements for affected areas in NUREG/CR-5849.
8. The NRC commented that Section 3.1 of the Final Survey Plan should include that licensed radioactive materials must be removed from the contaminated areas outside the buildings as well as inside the buildings. Section 3.1 was revised to include the removal of license materials from contaminated areas outside the buildings to below NRC guidelines for release for unrestricted use.
9. The NRC commented that SEG must confirm the identity of uranium contamination (natural or processed) on site and apply the appropriate concentration guideline. The NRC *Safety Evaluation Report Release for Unrestricted Use Bloomfield Lamp Plan Buildings 1 - 6 and the Garage, Westinghouse Electric Company, Bloomfield, New Jersey* dated May 24, 1993 states the residual radioactive material present at the Bloomfield facility is "processed uranium, i.e., uranium neither enriched or depleted in the U-235 isotope, but which does not include the radioactive daughter products of U-234". The Final Survey Plan has been revised to state that the contamination present is processed uranium and 35 pCi/g is the appropriate limit.
10. The NRC commented that the appropriate NRC guidelines must be applied to soil samples from indoor areas as well as outdoor areas. Section 5.5 of the Final Survey Plan has been revised to state that appropriate NRC guidelines will be applied for soil samples from indoor areas.
11. The NRC commented that Section 5.0 of the Final Survey Plan does not explain how contamination in soil will be investigated to ensure that NRC guidelines will be met. Section 5.5.5, Soil Surveys, has been added to the Final Survey Plan which discusses the preliminary survey, remediation, and final survey activities that will be conducted for areas where contaminated soil exists.
12. The NRC commented that if SEG intends to use respiratory protection equipment during remediation, applicable regulations in 10 CFR 20.1703 must be met. To date no daily air samples taken on site have required posting of an Airborne Radioactivity Area. SEG is using engineering controls as opposed to respiratory protection to control the possible spread of contamination. It is not anticipated, however, SEG is evaluating whether respiratory protection will be needed for future work. If it is determined to be needed, SEG will meet all requirements of 10 CFR 20.1703 and submit the required policy statement and written notification prior to implementing the respiratory protection program on site.

13. The NRC commented that specific contaminated areas such as manholes and the contaminated area on the south end of Building 9 should be surveyed as discrete locations. Section 5.5.6, Other Surveys, has been added to the Final Survey Plan which discusses specific evaluation of discrete locations.
14. The NRC commented that SEG should provide a tentative schedule of operations. The tentative schedule is as follows:

Building 7/8/10A Remediation	12/27 - 1/20
Building 9 Demolition/Remediation	3/14 - 5/27
Building 7 Basement Remediation	6/01 - 7/15
Soil Remediation	7/15 - 8/30
Final Survey Area Preparation	5/23 - 6/03
Building 7/8 Survey	6/06 - 6/17
Building 7 Basement Survey	7/15 - 8/01
Building 9/10A Survey	6/27 - 7/15
Grounds Survey	9/01 - 9/15

ATTACHMENT 2

REVISED PROCEDURE

REDS-RAM-103



**RADIOLOGICAL ENGINEERING AND
DECOMMISSIONING SERVICES**

REDS-RAM-103

REVISION 2

**UNCONDITIONAL RELEASE OF TOOLS,
EQUIPMENT AND WASTE MATERIALS**

PREPARED BY:

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3/29/94
Date

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4/11/94
Date

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PROPRIETARY INFORMATION: This document is the property of the Scientific Ecology Group, Inc., P.O. Box 2530, 1560 Bear Creek Road, Oak Ridge, TN 37831-2530, and furnished with the understanding that the information herein will be held in confidence and will not be duplicated, used, or disclosed either in whole or part without the written permission of the Scientific Ecology Group, Inc.

1.0 PURPOSE

This procedure provides guidelines and criteria for the performance of release surveys that are required prior to the unconditional release of tools, equipment and waste materials from Radiologically Controlled Areas (RCAs).

2.0 APPLICABILITY

This procedure applies to all project personnel who perform unconditional release surveys.

3.0 REFERENCES & COMMITMENTS

3.1 References

3.1.1 NRC, *Guidelines for Decontamination Facilities and Equipment prior to Release for Unrestricted use or Termination of Licenses for Byproduct, Source or Special Nuclear Material*. May 1987.

3.1.2 10 CFR 20. *Standards for Protection Against Radiation*.

3.1.3 REDS-DEC-301. *Tool, Area and Equipment Decontamination*.

3.1.4 REDS-INST-100. *Radiation Protection Instrumentation Program*.

3.2 Commitments

None

4.0 GENERAL

4.1 Discussion

None

4.2 Definitions

4.2.1 Aggregate Material

Items or material which by their physical nature do not lend themselves to being effectively surveyed using portable instrumentation and require bulk or composite survey techniques or representative sampling and analysis.

4.2.2 Minimum Detectable Activity (MDA)

The smallest amount or concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal. MDA depends upon the type of instrument, the counting geometry, and the radionuclide to be detected. MDA has the same meaning as Lower Limit of Detection (LLD) for radiation survey instruments. (ANSI N13.3-1989)

4.2.3 Unconditional Release

The removal of materials from a Radiologically Controlled area (RCA) to areas which do not require radiological control of the material by the licensee.

4.3 Responsibilities

- 4.3.1 The Project Manager is responsible for administering and implementing this procedure.
- 4.3.2 Health Physics technicians are responsible for the performance of unconditional surveys and completing the required documentation.

4.4 Prerequisites

- 4.4.1 Instruments shall be used in accordance with REDS-INST-100, *Radiation Protection Instrumentation Program*.

4.5 Precautions & Limitations

- 4.5.1 DO NOT remove material from potentially contaminated areas without having the material surveyed and released in accordance with this procedure.
- 4.5.2 The following exclusions are NOT addressed by this procedure:
 - 1. The monitoring of personnel or personal articles prior to egress from an RCA in accordance with posted frisking procedures.
 - 2. Samples for off-site analysis released in accordance with radioactive waste procedures.
 - 3. Effluents released or discharged to the environment.
- 4.5.3 Oils or solvents shall NOT be introduced into floor drains.

- 4.5.4 Due to interference and sensitivity difficulties in performing direct frisk for alpha, a technical basis may be developed to demonstrate compliance with alpha criteria using measured correlations with associated beta-gamma emitting radioisotopes.
- 4.5.5 **DO NOT** open electrical equipment containing power supplies or transformers (e.g., welders) to avoid the risk of electrical shock. contact personnel knowledgeable of such hazards (i.e., electricians) for specific guidance.
- 4.5.6 **DO NOT** cover over contamination by painting, plating, taping, etc. to reduce contamination to releasable limits.

4.6 Apparatus

- 4.6.1 Typical instrumentation necessary for unconditional release of items may include but is not limited to:
 - 1. SAC-4 or equivalent
 - 2. BC-4 or equivalent
 - 3. TCM-2 or equivalent
 - 4. CM7A with DP5A gas flow probe or equivalent
 - 5. Model 177 with 44-9 probe or equivalent
 - 6. Model 19 micro-R meter or equivalent
- 4.6.2 Gamma spectroscopy equipment as required for isotopic identification
- 4.6.3 Disc smears
- 4.6.4 Sample containers

4.7 Records

- 4.7.1 Release Log

5.0 PROCEDURE

NOTE

When using a pancake GM detector (HP-210 or equivalent equipment) held at 1/2 inch from the item being surveyed, 100 cpm above background approximates 5000 dpm/100 cm² for most fission and activation products. Specific values per direction of the Project Manager may be used if a source term and detector efficiency correlation has been made.

5.1 General

- 5.1.1 Health Physics technicians shall be notified of items or materials to be removed from potentially contaminated areas prior to their removal.
- 5.1.2 Document all release surveys in accordance with Section 5.6.
- 5.1.3 Direct the transfer of contaminated tools and equipment and waste materials to processing areas.

CAUTION

Extreme care should be taken when handling sensitive maintenance and test equipment (e.g., micrometers, voltmeters, oscilloscopes, etc.).

- 5.1.4 Surfaces of tools and equipment which are likely to be contaminated, but are of such size, construction, or location as to make the surfaces inaccessible for measurement, shall be presumed to be contaminated in excess of the limits specified in Step 5.3.1.
- 5.1.5 Decontaminate reusable items used within Contamination Areas in accordance with REDS-DEC-301, *Tool, Area and Equipment Decontamination*, prior to survey for release.
- 5.1.6 Control all wastes as radioactive material until release surveys indicate that the wastes contain no licensed material with activities greater than decommissioning guidelines, given in Reference 3.1.1.
- 5.1.7 Resurvey aggregate waste packages found to be free from radioactive contamination with a gamma sensitive instrument, in accordance with Step 5.2.3 of this procedure prior to release from the potentially contaminated areas.

- 5.1.8 All HVAC ducts and equipment and all piping that is potentially contaminated shall be physically surveyed internally and externally, as appropriate, to ensure that the wastes contain no detectable quantities of radioactivity.

5.2 Instrumentation Criteria

- 5.2.1 Instruments selected for survey shall be calibrated and set up for monitoring radioactivity considered representative of that present at the site employed.
- 5.2.2 Portable counting instruments employed to evaluate gross beta-gamma or alpha contamination shall be capable of detecting less than the following (Table 1) levels of activity using direct survey methods, as applicable to the project site.

Table 1
(Taken from Reference 3.1.1)

NUCLIDES	AVERAGE ^{a,c}	MAXIMUM ^{a,d}	REMOVABLE ^{b,e,f}
U-nat, U-235, and associated decay products	5,000 dpm/100cm ² α	15,000 dpm/100 cm ² α	1,000 dpm/100 cm ² α
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm ²	300 dpm/100 cm ²	20 dpm/100 cm ²
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000 dpm/100 cm ²	3,000 dpm/100 cm ²	200 dpm/100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000 dpm/100 cm ² $\beta\text{-}\gamma$	15,000 dpm/100 cm ² $\beta\text{-}\gamma$	1,000 dpm/100 cm ² $\beta\text{-}\gamma$

- a Where surface contamination by both alpha and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma emitting nuclides should apply independently.
- b 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 observed by an appropriated detector for background, efficiency, and geometric factors associated with the instrumentation.
- c Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.
- d The maximum contamination level applies to an area of not more than 100 cm².
- e The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.
- f The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

- 5.2.3 Portable instruments used to perform final measurements shall be capable of detecting low levels (e.g., $\mu\text{rem/hr}$) of gamma radiation in low level background areas.

NOTE

For purposes of waste material release criteria, background is equivalent to the minimum level of activity that can be detected (MDA) considering the instrumentation utilized. Background may also include measurable activity resulting from naturally occurring radioisotopes contained in construction materials (e.g., concrete).

5.3 Release Criteria

- 5.3.1 To unconditionally release an item from potentially contaminated areas, ensure the item or material does not contain detectable amounts of radioactive material in accordance with the criteria listed in Table I.
- 5.3.2 For those materials which were subjected to a reactor neutron flux or were in contact with reactor coolant, volume analysis shall be performed to meet standard NRC Radiological Effluent Technical Specification lower limits of detection in accordance with 10 CFR 20.

5.4 Vehicle Surveys

- 5.4.1 Survey all vehicles exiting an RCA according to the following:
1. Vehicles under constant control not entering a contaminated area:
 - a. Survey for loose surface contamination.
 - b. Survey all tires, as a minimum.
 2. Vehicles not under constant control and entering a contaminated area:
 - a. Survey for loose surface and fixed beta-gamma contamination.
 - b. Survey tires, steps and driver's compartment area.
 - c. Survey surfaces that may have come in contact with radioactive materials.

5.4.2 Allow emergency vehicles (ambulances, fire/rescue vehicles, etc.) to immediately exit an RCA without an Unconditional Release Survey.

1. Perform the following:

- a. Contamination surveys along the travel route within an RCA AND in the immediate area(s) outside the RCA from which the vehicle exited.
- b. Notify the Project Manager after emergency vehicles have exited an RCA without an Unconditional Release Survey.

2. Survey the emergency vehicle as soon as possible following use (i.e., after transport of a contaminated injured person) in accordance with Step 5.4.1.2 of this procedure.

5.5 Contaminated Items

5.5.1 **DO NOT** unconditionally release any items found to be contaminated in excess of the limits given in Step 5.3.1 of this procedure.

5.5.2 Handle all items being released from contaminated areas as radioactive material.

5.5.3 Attempt to decontaminate an item by wiping with disposable wipes or similar technique.

5.5.4 **IF** contamination levels still exceed the limits given in Step 5.3.1 of this procedure, **THEN** send item for decontamination **OR** dispose as radioactive waste.

5.6 Survey Documentation and Review

5.6.1 Document items unconditionally released on Attachment 6.1, *Release Log*, or equivalent. Attachment 6.1 shall provide the following information:

1. Date and time of survey.
2. Organization responsible for the item or material.
3. Item description and origin, if known. Include container contents where applicable, and provide sufficient detail to maintain historical information regarding material disposition.
4. Instruments used to perform the survey, including the serial number, calibration due date and background count rate, if applicable.

5. The results of the release survey.
 - a. IF direct frisk is performed using a Model 177 with 44-9 probe or equivalent, THEN record the cpm observed in the space provided.
 - b. IF direct frisk is performed using a TCM-1, CM7A with DPSA probe or equivalent, THEN record as less than or greater than MDA, as observed in the space provided.
 6. The ~~initials~~ of the Health Physics technician performing the survey.
 7. Complete all information for the entry. "N/A" is acceptable, where appropriate.
 8. Review by the project ~~engineer~~.
- 5.6.2 Completed Attachment 6.1, along with other survey documentation associated with Unconditional Release Surveys shall be reviewed, documented, and filed.

6.0 ATTACHMENTS

6.1 *Release Log*

ATTACHMENT 6.1
RELEASE LOG

Control Point:		No.	Instrument Type	Serial No.	Cal. due Date	MDA	Remarks			
		1								
		2								
		3								
Project Engineer		4								
		5								
Date:		6								
		7								

Date/Time of Survey		Organization Resp. for item/material		Description of Item	Inst Used (No.)	Survey Results					HP Tech Initials
						Background (cpm)	Direct Frisk (cpm)	Direct Frisk* (MDA)	Smear (dpm/100 cm ²)	Smear (dpm/100 cm ²)	

*TCM-2 and CMTA only

ATTACHMENT 3
REVISED SURVEY PLAN

**BLOOMFIELD LAMP PLANT
SITE FINAL SURVEY PLAN
BUILDINGS 7, 8, 9 AND 10A**

**WESTINGHOUSE ELECTRIC CORPORATION
BLOOMFIELD, NEW JERSEY**

Prepared By: Michelle A. Con 4.19.94
Date

Reviewed By: Gerard V. Policastro 4/20/94
Gerard V. Policastro, Manager
Support Services Date

Al Johnson 4/21/94
Al Johnson, Manager
Oak Ridge Operations Date

Approved By: Donald R. Neely 4/21/94
Donald R. Neely, Vice President
Radiological Engineering and
Decommissioning Services Date

PREFACE

This document describes the methods used by the Westinghouse Electric Corporation to demonstrate that radioactive contamination levels within the documented survey areas of Buildings 7, 8, 9 and 10A at the Bloomfield Lamp Plant in Bloomfield, New Jersey have been reduced to levels below criteria established for release for unrestricted use. This plan has been developed in accordance with the Draft NUREG/CR-5849, *Manual for Conducting Radiological Surveys in Support of License Termination*; the NRC 1987 *Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct Source or Special Nuclear Material*; and the NRC 1981 Branch Technical Position *Disposal or On-site Storage of Thorium or Uranium from Past Operations*. This document supplements and updates the Westinghouse Electric Corporation, August 1992, *Radiological Decontamination Confirmatory Survey, Westinghouse Bloomfield Lamp Plant, Buildings 7, 8 and 9*.

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1.0 HISTORICAL BACKGROUND

The Bloomfield Lamp Plant is located approximately 7.5 miles north of the Newark International Airport in Bloomfield, New Jersey. The plant consists of 11 buildings on Macarthur and Arlington Avenues. The primary purpose of the facility was the manufacturing and development of electric lamps. Studies involving various types of materials, including radioactive materials, were also performed at the facility throughout its history.

Several of the processes utilized at the plant involved the use and study of radioactive material specifically uranium and thorium. Thorium was used in the production of thoriated tungsten wire and in the study of emission mixtures. In the 1940s and early 1950s, uranium was used in various metallurgical studies related to the Manhattan Engineering District.

In 1986, decontamination and decommissioning activities were initiated to remediate the residual radioactivity remaining in the facility resulting from past operations. Decontamination and survey activities were completed in April 1991 for Buildings 1 through 6 located west of Arlington Avenue. The unrestricted release of these buildings was authorized by the NRC in 1993. Decontamination activities continued in Buildings 7, 8, 9 and 10A, (east of Arlington Avenue) into early 1992. The unrestricted release of these facilities was requested in an application to the NRC dated August 24, 1992. At the request of the NRC Region I office, the Oak Ridge Institute of Science and Education (ORISE) performed confirmatory surveys of Buildings 7, 8, 9 and 10A in May 1993. The results of the confirmatory surveys identified several locations throughout these buildings where residual radioactivity above the unrestricted release limits was still present.

SEG was contracted in November 1993 to characterize, remediate and perform the final release surveys for all areas identified as contaminated in the ORISE confirmatory survey. At this time, the characterization surveys and remediation work is in progress for Buildings 7, 8 and 10A. Due to safety concerns, Building 9 must be partially demolished before the characterization and remediation can continue. This issue is addressed in a separate letter to the NRC. Upon completion of the remediation work in each building, a final release survey will be performed in accordance with this Final Survey Plan.

2.0 SITE INFORMATION

2.1 Site Description

Building 7 is a five-story building containing office and laboratory space. The building is constructed of steel and concrete. The concrete floors are covered with 3 to 4 inches of asbestos nail-crete and further covered with wood and floor tile. Some of the offices have carpet flooring.

Building 8 is a five-story building constructed of steel and concrete. The building floors are also covered with 3 to 4 inches of asbestos nail-crete, wood and floor tile. The building consists of large open areas that housed manufacturing equipment.

Building 9 and 10A is a single story manufacturing facility constructed of steel and concrete. This building housed furnaces, plating equipment and presses used in the manufacture of thoriated lamp filaments.

2.2 Site Conditions for Final Survey

In preparation for the final survey, areas identified as potentially contaminated in the ORISE confirmatory survey of Buildings 7, 8, 9 and 10A are being characterized and remediated. The characterization surveys are being performed at each location identified as potentially contaminated by ORISE and in the general area around each location. For Buildings 7 (except the basement) and 8, the size of the survey areas is based on an objective to survey within a 10 meter radius surrounding each location identified by ORISE. If the physical dimensions of the area or room are less than the 10 meters, the survey is only performed up to the walls of the area. In most cases, this criteria results in the performance of a full survey for each room where ORISE identified potential contamination. Because of the extent of contamination, Buildings 9 and 10A and the basement of 7, will be surveyed in accordance with the requirements for affected areas in Draft NUREG/CR-5849. The characterization surveys are being performed following the guidance contained in Draft NUREG/CR-5849, *Manuals for Conducting Radiological Surveys in Support of License Termination*, for the type of survey being performed. Using this guidance, the final survey can be limited to only those grids where contamination was found during the characterization survey.

Samples were taken in each survey area to determine if the radioactive contaminant was natural thorium, natural uranium or both and to determine the appropriate survey guidelines. Samples were analyzed using gamma spectroscopy by Scientific Ecology Group, Inc., in Oak Ridge, Tennessee.

2.3 Site Areas Covered - Scope of Survey

Characterization surveys are being performed in the following areas to determine the quantity and extent of radioactive contamination. Highlighted maps illustrating the locations being surveyed are included in Appendix C. All areas identified as containing residual radioactivity above the limits specified in Table 3-1 will be remediated and final surveys performed in accordance with this plan. Final release surveys will only be performed in areas where remediation was performed. This data will then be combined with the characterization data obtained in accordance with NUREG-5849, *Manuals for Conducting Radiological Surveys in Support of License Termination*, for all other areas where contamination was not identified.

Building 7

First Floor	Room 128 Room 129 South Hall and Stairwell
Second Floor	Elevator Shaft and Carriage SE Pipe Chase South Hall and Stairwell North Hall and Stairwell
Third Floor	Room 310 Hallway (outside 310) SE Pipe Chase Central Pipe Chase Room 314 Room 316/317
Fourth Floor	Room 424 Central Stairwell
Fifth Floor	Central Stairwell

Building 8

Basement	East Half of Basement
First Floor	Center of Floor (approx. 500 m ²)
Third Floor	West Wing (approx. 600 m ²) Room in West Wing
Fourth Floor	South Wing (approx. 250 m ²)

Building 9

First Floor	All areas
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Building 10A

First Floor	All areas
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Outside of Buildings

Facility grounds outside Building 7, Freight elevator
Soil and concrete pad, South side Building 9/10A, Manholes

A remediation work plan is being developed and implemented for each survey area based upon the results of the characterization surveys and sample analyses. All areas within the scope of the characterization survey will be remediated to levels below the NRC acceptance criteria.

The final survey of the areas will be performed in accordance with this plan and supporting procedures to verify that each survey area meets the NRCs acceptance criteria for unrestricted use and license termination.

3.0 FINAL SURVEY OVERVIEW

3.1 Survey Objective

The Final Survey is designed to demonstrate that licensed radioactive materials have been removed from the Bloomfield Lamp Plant in the documented survey areas inside and outside of Buildings of 7, 8, 9 and 10A to levels below NRC guidelines for release for unrestricted use (Table 3-1) and that Westinghouse has met all necessary requirements for termination of the current license.

Table 3-1
Acceptable Surface and Soil Contamination Levels^{1, 2}

Thorium	1,000 dpm/100 cm ² , total, averaged over a 1 m ² area 3,000 dpm/100 cm ² , total, maximum in a 100 cm ² area 200 dpm/100 cm ² , removable activity 10 pCi/g in soil
Uranium	5,000 α dpm/100 cm ² , total, averaged over a 1 m ² area 15,000 α dpm/100 cm ² , total, maximum in a 100 cm ² area 1,000 α dpm/100 cm ² , removable activity 35 pCi/g in soil

¹*Guidelines for Decontamination of Facilities and Equipment Prior to the Release for Unrestricted Use or Termination of Licenses for Byproduct Source or Special Nuclear Material (NRC August 1987).*

²*Disposal or On-site Storage of Thorium or Uranium Wastes from Past Operations (NRC 1981).*

3.2 Identity of Contaminants

The radioactive contaminants present in each survey area were identified through sampling and gamma spectroscopy analysis. The results of these analyses identified processed uranium and natural thorium to be present in the following areas.

Building 7

First Floor	Room 128	uranium/thorium
	Room 129	uranium
	South Hall and Stairwell	uranium
Second Floor	All	uranium
Third Floor	Room 310	uranium/thorium
	Room 314	thorium
	Room 316/317	uranium
	Hallway	uranium
Fourth Floor	Room 424	thorium
	Center Stairwell	uranium
Fifth Floor	Stairwell	uranium

Building 8

Basement	East End	uranium/thorium
First Floor	West and South Wings	uranium/thorium
Third Floor	West Wing	uranium
Fourth Floor	South Wing	uranium/thorium

Building 9

thorium

Building 10A

thorium

Facility Grounds

Buildings 9/10A	South Side	thorium
Building 7	Outside Freight elevator	uranium
Building 7	North Wing, East Side	thorium

Additional sampling and analysis will be conducted throughout the characterization and remediation process to verify the above findings.

3.3 Determination of Site-Specific Guidelines**3.3.1 Gamma Exposure Rate Guidelines (External Effective Dose)**

The gamma exposure rate for all radionuclides was evaluated by ORISE during the confirmatory survey and found to be acceptable. Verification surveys will be performed in the areas where remediation activities were performed; however, additional gamma measurements are not planned for the Final Survey.

3.3.2 Alpha and Beta-Gamma Removable Surface Contamination Guidelines

The levels of removable alpha and beta-gamma surface contamination will be limited to the values provided in Table 3-1. Samples will be counted such that the MDA will be no higher than 75% of these guidelines.

3.3.3 Alpha and Beta-Gamma Total Surface Contamination Guidelines

The levels of alpha and beta-gamma total (fixed) surface contamination will be limited to the values provided in Table 3-1. Count times for direct activity measurement will be established such that the MDA will be no higher than 75% of these guidelines.

3.3.4 Soil Contamination Guidelines

The levels of total uranium and total thorium soil contamination will be limited to the values provided in Table 3-1. Samples will be

analyzed by gamma spectroscopy analysis such that the MDA will be approximately 10% of these guidelines.

3.4 Organization and Responsibilities

Development and implementation of the Final Survey Program will be performed by qualified members of the Westinghouse/SEG Project Team. An organization chart is included in Figure 3-1.

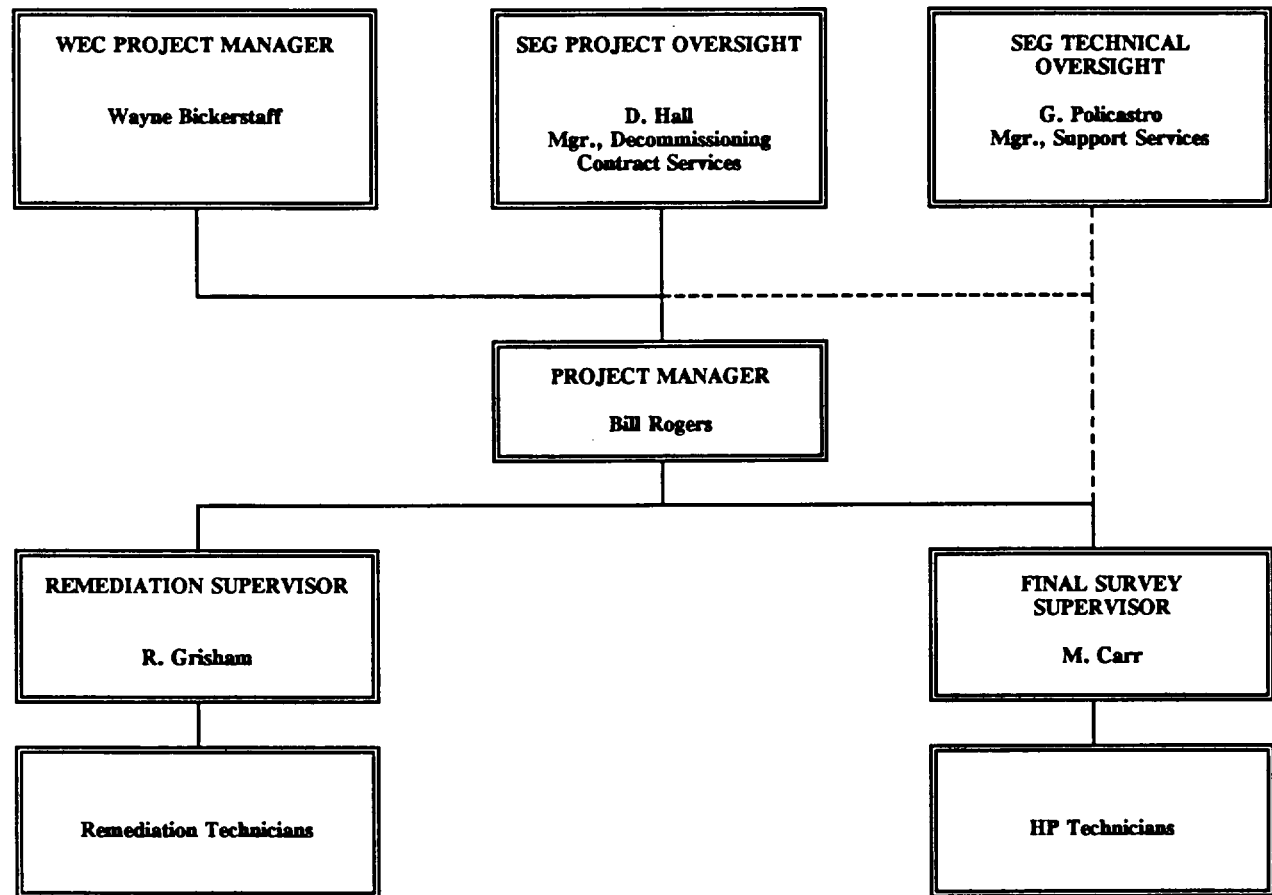


Figure 3-1
Final Survey Organization Chart

4.0 FINAL SURVEY INSTRUMENTATION

Radiation detection and measurement instrumentation for final surveys has been selected to provide reliable operation and adequate sensitivity to demonstrate that the measurements taken are sufficient to conclusively demonstrate that the release criteria have been met. An evaluation has been conducted of commercially available portable and laboratory instruments and detectors produced by several manufacturers. Instrumentation has been selected based upon detection sensitivity, operating characteristics and expected performance in the field. The detectors selected and their detection characteristics are summarized in Table 4-1.

4.1 Instrument Detector Description

The principal detector selected for final survey measurements are illustrated in Table 4-1, *Final Survey Instrumentation*. The detectors used for total surface contamination monitoring will, for the most part, be operated with data logging survey meters.

**Table 4-1
Final Survey Instrumentation**

Instrument	Detector	Radiation Detected	Calibration Source	Use
Ludlum Model 2350/43-68	126 cm ² gas proportional	alpha	Th-230	Surface contamination and scanning
Ludlum Model 2350/43-68		beta	Tc-99	
Ludlum Model 2350/44-2	1" x 1" NaI(Tl) scintillator	gamma	Cs-137	Exposure rate
Ludlum Model 2350/44-40	15.5 cm ² GM	beta-gamma	Tc-99	Surface contamination (restricted access)
Gamma Spectrometer	HPGe	gamma	Mixed Gamma, Am-241	Concrete and soil gamma spectra
Tennelec LB-5100/W or BC-4 or Ludlum Model 2350	gas proportional or scintillator or GM	alpha	Po-210	Removable surface contamination
Tennelec LB-5100/W or SAC-4 or Ludlum Model 2350		beta	Tc-99	

4.2 Detection Sensitivity

The detection sensitivity of the detectors selected for field surface contamination measurements have been evaluated and determined to satisfy the detection requirements outlined in Table 3-1. The minimum detectable activities for field equipment have been calculated by using the SEG proprietary spreadsheet program, CNTTIME[®], and MDA and limit value software. These values are shown in Table 4-2.

Table 4-2
Typical Counting Times and MDA

Nuclide	dpm/100cm ²		Instrument	Bkg(cpm)	Contingencies	MDA	% of Limit	EFF
Th-nat	1000	α	2350/43-68	4	12	160	16	.15
Th-nat	200	α	2350/43-68	4	60	72	36	.15
Uranium	5000	α	2350/43-68	4	3	440	9	.15
Uranium	1000	α	2350/43-68	4	12	190	19	.15
Th-nat	1000	β	2350/43-68	200	18	510	15	.15
Th-nat	200	β	2350/43-68	200	NA	---	---	.15
Uranium	5000	β	2350/43-68	200	3	1400	28	.15
Uranium	1000	β	2350/43-68	200	15	710	71	.15
Th-nat	1000	β	2350/43-40 15.5 cm ² GM	40	NA	---	---	.10
Th-nat	200	β	2350/43-40 15.5 cm ² GM	40	NA	---	---	.10
Uranium	5000	β	2350/43-40 15.5 cm ² GM	40	15	3400	68	.10
Uranium	1000	β	2350/43-40 15.5 cm ² GM	40	15	530	53	.10
Th-nat	200	α	Tennelec	.1	60	44	22	.15
Uranium	1000	α	Tennelec	.1	12	190	19	.15
Th-nat	200	β	Tennelec	1	60	44	22	.15
Uranium	1000	β	Tennelec	1	12	240	24	.15

Laboratory fixed based equipment minimum detectable activities are calculated using the equation from section 4.3. The minimum detectable activity, (MDA), is dependent upon several factors: Sample count time, background count time, background count rate and detector efficiency. Smear counters for measurement of removable surface contamination are of current design (anti-coincidence low-background) and will be used to determine the activities to meet the guideline value MDA for both alpha and beta radiation.

4.3 Minimum Detectable Activity Calculation

The MDA value for the Tennelec LB-5100 for counting smears is calculated as:

$$MDA = \frac{\frac{2.71}{t_s} + 3.29 \sqrt{\frac{R_b}{t_s} + \frac{R_b}{t_b}}}{E}$$

where: MDA = the minimum amount of activity that can be statistically detected above background with a 95% probability and with a maximum of 5% probability of falsely interpreting background activity as activity due to contamination (dpm/100 cm²),

t_s = Sample counting time (minutes)

R_b = The background count rate in counts per minute (cpm)

t_b = Background counting time (minutes) and

E = The counting efficiency (cpm/dpm).

Other counting systems without internal MDA calculation functions will have routine counting times established using CNTTIME[®] which uses this same equation in a parametric form that permits choosing a lower probability of false positive and which provides alarm and action flag values.

4.4 Calibration and Maintenance

Instruments and detectors used to conduct final surveys will be calibrated and maintained in accordance with instrumentation procedures. Radioactive sources used for the purpose of calibration will be traceable to the National Institute of Standards and Technology (NIST).

5.0 FINAL SURVEY PROCESS

The final survey of the Bloomfield site will be planned, performed and controlled in accordance with the final survey procedures listed below and related project procedures listed in Appendix A.

REDS-FSP-101, *Final Survey of Structures*
REDS-FSP-103, *Final Survey of Environs*
REDS-FSP-104, *Final Survey Data Handling and Analysis*

The final survey procedures are included as Appendix B to this document.

The final survey process consists of six general tasks for each survey area:

- Area Classification
- Area Walkdown and Survey Design
- Survey Package Preparation
- Survey Area Preparation
- Area Surveys
- Data Processing and Analysis

Each of these tasks are discussed briefly in the following sections. Applicable SEG procedures are also referenced which provide guidance for each survey task.

5.1 Area Classification

Each survey area and unit are classified into "affected" and "unaffected" areas based upon the historical use of radioactive materials and processes in the areas, past surveys and other area records. Affected and unaffected areas are defined as follows:

- Affected Areas

Areas that have potential radioactive contamination (based on plant operating history) or known radioactive contamination (based on past or preliminary radiological surveys). Affected areas are further subdivided, according to survey effort, into suspect and non-suspect areas.

- Unaffected Area

All areas not classified as affected. These areas are not expected to contain residual radioactivity, based on a knowledge of site history and previous survey information.

This classification provides a basis for the final survey design and methodology. All of the areas covered by the final survey at the Bloomfield Lamp Plant are designated as "affected" areas. Affected areas may not be reclassified from "affected" to "unaffected."

5.2 Area Walkdown and Survey Design

Each survey area is inspected prior to performing final release surveys. This inspection, or "walkdown," is intended to identify all survey and safety concerns that would impact the final release survey and to identify any additional suspect areas that would require survey. Typical items identified in the walkdown include area housekeeping, power supplies, confined spaces, surface penetrations, drains, materials of construction, painted surfaces, needs for special equipment, and the overall condition of the facility and survey area.

Upon completion of the walkdown, the methods of survey are determined and a survey package is prepared to track the completion status of the final release survey. All systems and areas requiring survey are identified and grid sizes are established.

5.3 Survey Package Preparation

A portfolio, referred to as a final survey package, will be prepared for each survey area. Within this package will be a Final Survey Package Worksheet identifying grid size, types of measurements required, description of the area, any special sample requirements, historical information (if available), survey data location code(s), and other information pertinent to the survey area. Also provided in the package will be survey drawings that will include the survey grids. As each package is prepared, it will be reviewed by supervisory personnel for both completeness and suitability to achieve the acceptance criteria. Survey packages will be referenced during the performance of final surveys. Reports of survey data, smear data and the results of required sample analyses will be placed into the packages.

5.4 Survey Area Preparation

Preparation of the survey area generally consists of laying out the grid markings in accordance with the survey package specifications. All survey surfaces will be cleaned and need to be dry to ensure accurate detection of residual radioactivity. In some instances, additional preparation such as scaffolding may be required to permit access to survey areas.

Area floors, walls and overhead will be gridded and surveyed in accordance with the scope of the final survey plan. Interior floors and the lower (<2 meters high) walls will be gridded into one meter grids with no single grid smaller than one square meter. If there is the potential for upper walls and ceiling contamination, then these surfaces will also be gridded. Otherwise, the overhead surveys will be referenced to the floor or lower wall grids. Interior or exterior discrete locations (e.g. drains, manholes and other penetrations) that are contaminated or potentially contaminated will be surveyed regardless of grid location. These locations will be surveyed as applicable before the existing contamination, if any, is distributed by decontamination efforts. Both physical controls and administrative controls will be used as necessary.

5.5 Area Surveys

Area surveys will be performed using instrumentation capable of detecting radioactive contaminants to the limits specified in Table 3-1 in accordance with the survey package for the area. The final surveys for Bloomfield will consist of surface scans and direct measurements for contamination and smear surveys for removable contamination for surfaces inside of the buildings. Soil samples from both inside and outside the buildings will be analyzed to verify that contamination is below NRC guidelines. The process for performing surface surveys is described below.

5.5.1 Building Surface Scanning

The first step in conducting the final survey measurements within a grid will consist of scanning the entire grid with a large area detector (typically 100 cm²). The purpose of scanning is to identify the presence of elevated alpha or beta-gamma readings. The detector used to perform the scanning will be the same type of detector used to make the direct surface measurements. The detector will be maintained as close as possible to the surface (approximately 1/2 inch) and moved across the surface at a speed sufficiently slow to permit detection of increased activity by listening to the audible count rate. Audible output will be monitored using the instruments speaker or earphones. As a precaution, headphones or amplified speakers will be available for use in higher noise areas. If elevated readings are found, the suspect area will be investigated to determine if further decontamination is needed. Surface scanning done as part of the decontamination program to release a remediated area for final survey, if done with the proper instrument, will meet the scan requirement and will not be repeated.

5.5.2 Building Surface Measurements - Direct

The mean activity for each square meter grid will be estimated based on five measurements taken over the grid. Beta surface activity will be measured at five locations within the grid including any location of elevated activity detected by scanning. The detector used will be the large area gas-flow proportional detector, typically 100 cm² calibrated to a Tc-99 standard source. The datalogger will be used in the scaler mode with a count time as determined for the detector parameters by CNTTIME[®], typically 3 seconds or greater. The beta counts will be corrected for the local background.

The mean alpha activity for each square meter grid will be estimated based on one measurement taken within the grid near the center. Alpha surface activity will be measured at one location near the center of each grid and at any location of elevated activity detected by scanning. The detector used will be the large area gas-flow proportional detector, typically 100 cm² calibrated to a Th-230 standard source. The datalogger will be used in the scaler mode with a count time as determined for the detector parameters by CNTTIME[®], typically 12 seconds or greater. The beta counts will be corrected for the mean alpha background for the detector.

A few survey areas and penetrations on the walls and floors may be difficult to measure because of the size of the gas-flow proportional detector. In such situations, smaller detectors such as a 15.5 cm² thin-window pancake GM detector will be used. Count times will be adjusted to provide alarm set points capable of responding to the guideline value at a high confidence level.

In all cases, for all detectors, the counting times will be determined before doing the survey using the CNTTIME[®] program and the detector parameters (size, background, efficiency) and measurement parameters (limits, background counting time, administrative rules). CNTTIME[®] is normally used with the false detection probability set to 0.001 (0.1%) and alarm decisions based on observing 20 or more events. Using CNTTIME[®] the detection decision is based on Normal statistics.

5.5.3 Building Surface Measurements - Removable

Removable activity on building surfaces will be measured by collecting smears at random or systematic locations, not at biased locations. A smear will be taken at the center of each grid that is measured directly by wiping a 100 cm² area of the surface with a dry cloth smear. Smears may be counted for both alpha and beta activity on a SAC-4 and BC-4 calibrated with Th-230 and Tc-99 sources, respectively. Smears may also be counted using the Model 2350 using gas-flow, alpha scintillation, or pancake GM detectors such as those used in the SAC-4 and BC-4 or they may be counted in the Tennelec LB-5100 automatic low background counting system.

The counting time for smears will be selected using CNTTIME[®] to be appropriate for the limiting nuclide in the area.

5.5.4 Background Measurements

Before a beta survey of each survey unit is performed, the background count rate will be measured for the survey unit. The same instrument will be used for both the survey and the background measurements. Three or more background measurements will be made with the detector near the surface to be measured (but not against it) and with the face shielded to determine the gamma component of the local area background. Three additional background measurements will be made at the end of the survey of each survey unit. The average of all six measurements will be used as the background count rate in the data conversion calculation. The duration of the background count is determined based on the counting time for each measurement and will total more than ten times the duration of any single measurement.

Alpha background values will be determined similar to the beta background measurements. A scaler count will be used for these alpha background measurements. The duration of alpha background measurements will be set so that they are more than 10 times the duration for any single measurement and such that the total duration of background counting is approximately equal to the total duration of the survey measurements. These values will be used for alpha background in the data conversion calculation. Generally alpha background is unaffected by the local gamma radiation, but it may be affected by radon and radon daughters in the area being measured.

These alpha background measurements will be performed before and after each alpha survey period, not necessarily by individual survey units. Averaging may be used to smooth the alpha background expected value.

5.5.5 Soil Surveys

The surface area of indoor and outdoor soil areas were scanned to identify locations of elevated activity. Surface soils samples were taken in these locations as well as additional locations totalling thirty for each area. The additional locations were chosen randomly by the technician in approximately equally spaced locations. This preliminary survey determined which areas were affected and unaffected.

The affected areas will be gridded into 1 meter grids to determine areas which require remediation. Each grid will be scanned and a composite surface sample from several points within the grid will be taken. Subsurface samples will be taken wherever surface samples are determined to be above guideline values. Those grids which were determined to have licensed material greater than guideline values will be excavated deeper than the determined depth of contamination.

Once excavation is complete, the areas will be sampled to verify that no licensed material exists above guideline values. Excavated trenches will be scan surveyed to identify the presence of any elevated readings which remain after remediation for biased sampling. Samples will also be collected from all other remediated grids. If elevated results are found, the area will be investigated to determine if further remediation is needed.

5.5.6 Other Surveys

Locations in survey areas such as drains, man holes, specific contaminated areas, inaccessible areas, etc. will be treated separately from the survey areas they are located in. These locations will be specifically evaluated as discrete locations. Each of these locations will be surveyed by direct measurements, smear samples and sludge or debris samples as much as practicable, and the survey results will be analyzed to determine if these locations meet acceptance criteria.

5.6 Data Processing and Analysis

5.6.1 Data Processing

Records of final surveys will be maintained in the separate survey package for each area in accordance with project procedures. The specific records that will be compiled in a survey package are:

- Final Survey Package Worksheet giving the package identification, survey location information, historical information of area surveyed, general survey instructions and any specific survey instructions.
- Final Survey Comment Addendum is provided for comments from the survey technician regarding any unusual situation that may encounter while surveying.
- The Survey Unit Diagram provides a drawing of the area to be surveyed. Survey grids are represented on the drawing.

- Photographs of the survey area will be provided, as necessary, to show special or unique conditions.
- Logs or Printout of smear survey analyses.
- Printout of gamma spectroscopy results (if performed).
- Ludlum Model 2350 survey reports for all direct alpha, direct beta, and exposure rate measurements.

Direct survey measurements are taken using the Ludlum Model 2350 Datalogger system. Upon completion of the survey, the contents of the datalogger's memory will be downloaded to a database. The download process utilizes a proprietary program, developed by Ludlum Measurements, Inc., and revised by SEG to fit specific needs of a final survey.

During each datalogger download, two raw data files are automatically generated. These files are sequentially assigned an identical index (file) number by the software. These files are automatically combined and translated into Paradox® database relational tables. In conjunction with the download process, additional Paradox® tables are updated. The survey file contains information about the survey, the (assigned) file number, the survey description, data logger and detector serial numbers, detector efficiency in cpm/dpm and the local background level in cpm.

A printed report, referred to as Survey Report, is generated for review. All raw measurement data, calculated values and information for each survey location code is shown in the report. This report is reviewed by the survey technician and supervisor for completeness, accuracy and any suspect entries that had been noted. Flags are attached to values that exceed the report alarm settings.

Any changes to the database tables such as detector efficiency, background, etc., that could affect survey results require supervisor approval. In addition, changes to data in the primary table requires a written explanation on a hardcopy printout of the Survey Report. The marked-up hardcopy will be maintained as a permanent record. Changes are not made to the raw files.

Data and document control includes maintaining raw data files, translated data files (Paradox® data files) and corrected data files showing documentation of all corrections. Paradox® program scripts and related data and information, including modifications, used for the development of the report will be identified and controlled to ensure

accurate identification. The databases will be backed-up daily and archived on a weekly basis.

5.6.2 Data Analysis

All measurements will be converted to the appropriate units for comparison with release criteria limit values. Surface activity measurements and removable contamination will be converted to units of dpm per 100 cm².

The upper bound of the mean at the 95% confidence level for each survey unit and/or subunit will be compared with the release criteria values.

a. Direct Measurements - Total Surface Activity

Measurements of total surface activity will be converted from observed gross counts per minute to net dpm/100cm². By subtracting the background counting rate for the instrument and correcting the net count rate for geometry and efficiency, the results in dpm/100 cm² units are obtained.

The statistical evaluation of the resulting set of measurements is examined. When the results statistically exceed the administrative action levels, the findings will be investigated. The SEG spreadsheet program, CNTTIME[®] is used to establish the statistical limits based on instrument type, detector efficiency, background and counting duration. The program provides counting time, scaler alarm settings, and MDA settings in dpm and dpm/100 cm². The confidence level for false positive values may be varied to reflect confidence intervals from the 95 to the 99.9 percentile. CNTTIME[®] provides the values and flag conditions for critical and action levels.

b. Removable Contamination Measurements

Measurements of removable surface activity will be converted from gross count rate to units of net dpm/100 cm² by subtracting the background count rate of the smear counting detector and correcting the net count rate for detector geometry and efficiency. CNTTIME[®] can also be used as described above to provide counting times and flag values for smear counting.

5.6.3 Attainment of Release Criteria for Surface Contamination

The methods outlined below will be used to demonstrate attainment of the release criteria limits.

a. Total Surface Activity (fixed plus removable contamination):

Individual measurements: < 15,000 dpm/100 cm² for uranium or 3000 dpm/100 cm² for thorium. In most cases samples indicating more than the mean limit will be remediated and only in exceptional cases will the limit be approached. Weighing by area will be used, if required, to show that the area mean meets the mean limit.

Area Mean: Upper limit of confidence interval for the mean value is below 5000 dpm/100 cm² for uranium and 1000 dpm/100 cm² for thorium.

b. Removable Surface Contamination:

Individual measurements: < 1000 dpm/100 cm² for uranium and < 200 dpm/100 cm² for thorium.

c. Calculation of Upper Limit of Confidence Interval of the mean:

$$U_{\alpha} = \bar{x} + t_{1-\alpha, df} \frac{s_x}{\sqrt{n}}$$

where: U_{α} = upper confidence limit of population mean, and

\bar{x} = sample mean value

$t_{1-\alpha, df}$ = Student T statistic for the degree of confidence and degrees of freedom; df (degrees of freedom) is equal to $n - 1$ and " α " is 0.05 for this test.

s_x = sample standard deviation

n = number of measurements in the population

5.6.4 Evaluation of Soil Sample Results

Soil samples will be evaluated for uranium and thorium activity by gamma spectroscopy analysis at Scientific Ecology Group, Inc., in Oak Ridge, Tennessee, or by another approved licensed laboratory facility. The samples will be analyzed such that the MDA value for total thorium and uranium is 10% of the guideline values of 10 pCi/g and total thorium and 35 pCi/g total uranium activity. All samples will be collected according to SEG procedure, packaged and shipped for analysis. Duplicate samples will also be submitted for Quality Assurance and Quality Control according to procedure. Sample custody will be controlled.

5.7 Documentation

All original survey documents and calculations will be kept as evidence of the surveys performed. These documents will not be altered or changed except as authorized under controlled conditions covered by procedures. All changes to the records will be documented and the traceability of the recorded data will be maintained.

Final survey records are original records and will be maintained in survey packages prepared for each survey area. Survey records will be kept in fireproof secure storage.

Raw data files and database files of final survey data and of sample analytical processes and the scripts and programs used to process the data are original records and will be terminated. Archive files of magnetic media will be maintained at a second site for the duration of the project and until the license is terminated.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL

The Quality Assurance program is constructed to ensure that all quality and regulatory requirements are satisfied. All activities affecting quality are suitably controlled by SEG procedures. A list of the applicable procedures to be implemented and used during the final release survey are presented in Appendix A. These procedures ensure that the appropriate equipment, environmental conditions, quality controls and prerequisites for any given activity are met. These procedures include the following Quality Control measures as an integral part of the final release survey process.

6.1 General Provisions

6.1.1 Selection of Personnel

The selection of supervisory personnel directing the final survey is based upon their experience and familiarity with Final Survey procedures and processes. Health Physics technicians performing the surveys are selected based upon their experience and ability to meet ANSI-3.1 qualifications. All of the personnel have previously performed final surveys on other projects. Training and qualification records will be maintained for all personnel selected to perform the final survey.

6.1.2 Written Procedures

All final survey tasks which are essential to survey data quality will be controlled by procedures. Appendix A is a list of SEG procedures utilized for the Bloomfield project. Appendix B contains procedures which control the Final Survey process.

6.1.3 Instrumentation Selection, Calibration and Operation

Instrumentation has been selected which has been proven to reliably detect the contaminants present at the Bloomfield site. Instrumentation will be operated and counting times established such that the minimum MDA values for the various measurements will be at least 75 % of the specified values provided in Table 3-1. Table 4-1 lists the instruments to be used.

Instrumentation calibrations are performed either under approved procedures using calibration sources traceable to the National Institute of Standards and Technology (NIST) or by qualified vendors with the results traceable to NIST. Measurements are performed using approved written procedures for each instrument. Issue, control and accountability of all survey instrumentation has been established by an instrumentation control procedure. Procedures for calibration, maintenance, accountability, operation and quality control of radiation detection instruments are written to implement the guidelines established in American National Standard Institute (ANSI) standard ANSI N323-1978 and ANSI N42.17A-1989. All detectors used during surveys for direct measurement are subject to the following quality control checks:

- All large area gas-flow detectors will be subjected to a linearity check. This involves counting a NIST traceable source of known activity at each end and at the center of the detector and ensuring that both counts fall within $\pm 20\%$ of the mean of the counts. If an acceptable linearity check is obtained, the efficiency is calculated and is used for that day.
- An efficiency in cpm/dpm is determined for each detector to be used for direct beta-gamma and alpha measurements. The efficiency is determined daily before and after use. The pre-use efficiency will be used to determine surface activity for all surveys done that day in dpm/100 cm².
- The post-use efficiency is used to check detector operability at the end of the day. An acceptability range of $\pm 20\%$ will be used to determine detector operability. If the post-use efficiency was not within the data quality objective of $\pm 20\%$ of the pre-use efficiency, the lower efficiency of the two will be used.
- The above checks will also be carried out following any repairs or modifications to the Ludlum Model 2350/detector set-up (e.g., mylar window change, change in high voltage, etc.)

6.1.4 Survey Documentation

The survey packages will be the primary method of controlling and tracking the hardcopy records of final survey results. Records of final surveys will be documented and maintained in the survey package for each area according to SEG procedures. Each Final Survey measurement will be identified by the date, technician, instrument type and serial number, detector type and serial number, location code, type of measurement, mode of instrument operation, sample number, and file number.

6.1.5 Quality Control - Verification

Replicate field and laboratory measurements will be performed independently on a selected sample of survey measurements. Instruction regarding the type and number of Quality Control measurements are contained within the applicable procedures.

6.1.6 Chain of Custody

Procedures establish responsibility for custody of samples and survey data from the time of measurement or collection until final results are obtained. All samples shipped off-site for analysis will be accompanied by a chain-of-custody record to track each sample.

6.1.7 Records Management

Generation, handling and storage of final survey design and data packages is controlled by an approved procedure.

6.1.8 Independent Review of Survey Results

The survey package from each survey unit will be given independent review to verify all documentation is complete and accurate and that release criteria have been met prior to input into the Final Survey Database.

6.2 Training

Prior to implementation of the Final Survey Plan, all project personnel will receive additional training, including an overview of the Final Survey Plan, the objectives of the final survey and on procedures governing the final survey.

6.3 Laboratory Services

Gamma spectrometry analyses are provided by the Scientific Ecology Group, Inc., at their laboratory in Oak Ridge, Tennessee. The analyses are performed in accordance with SEG procedures and subject to the SEG Quality Assurance Program. During the final survey, quality control duplicate samples will be analyzed in accordance with project procedures.

7.0 FINAL REPORT

Upon completion of the final survey, a final report will be prepared for submission to the Nuclear Regulatory Commission. The report will follow the guidance of Draft NUREG-CR/5849 regarding content.

7.1 Topical Outline

The Final Report will address the following topics. The report will provide adequate data and discussion of each topic to meet the intent of Draft NUREG/CR-5849. The following describes the format for the Final Report with regards to document volumes, topical outline and content:

List of Figures

List of Tables

- 1.0 Introduction and Scope
 - 1.1 Introduction
 - 1.2 Project Scope
- 2.0 Background Information
 - 2.1 Facility Description
 - 2.2 Operating History
 - 2.3 Decommissioning Purpose and Objectives
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 - 2.5 Radiological Characterization
- 3.0 Decommissioning Activities
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 - 4.7 Final Survey Implementation
 - 4.7.1 Surface Scans
 - 4.7.2 Activity Measurements
 - 4.7.3 Exposure Rate Measurements
 - 4.7.4 Soil and Sediment Sampling
 - 4.7.5 Sample Analysis
 - 4.7.6 Special Measurements
 - 4.7.7 Sample Disposal
 - 4.7.8 Data Collection

	4.7.9	Field Data Results
	4.7.10	Laboratory Data Results
	4.7.11	Records Management System
	4.8	Data Reduction and Evaluation
	4.8.1	Surface Surveys
	4.8.2	Removable Activity Surveys
	4.8.3	Gamma Exposure Rate Surveys
	4.8.4	Nuclide Analysis
	4.9	Statistical Evaluation
5.0		Final Survey Findings
	5.1	Final Survey Results
	5.2	Background Results
	5.2.1	On-Site Buildings
	5.2.2	Soil Nuclides
	5.3	Comparison of Final Survey Results to Guideline Values
6.0		References
Appendix A		Background Determination Data
Appendix B		Summary of Equations

8.0 REFERENCES

- 8.1 USNRC NUREG/CR-5849, *Manuals for Conducting Radiological Surveys in Support of License Termination*, Draft, June, 1992
- 8.2 USNRC *Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of License Byproduct, Source or Special Nuclear Materials*, May, 1987.
- 8.3 ORISE, *Radiological Decontamination Confirmatory Survey, Westinghouse Bloomfield Lamp Plant, Buildings 7, 8, and 9*, August, 1992.
- 8.4 SEG, *Bloomfield Lamp Plant, Site Characterization Survey Plan, Building 7, 8, 9, and 10A*, Westinghouse Electric Corporation, Bloomfield, New Jersey, December, 1993.
- 8.5 USNRC, *Letter to Westinghouse Electric Corporation. Additional Information Regarding Building 7, 8, 9 and 10A, Bloomfield, New Jersey Facility*, March 25, 1994.

APPENDIX A
List of Procedures

List of Procedures

REDS-CHM-101	Sample Identification and Chain-Of-Custody
REDS-CHR-100	Site Characterization Plan
REDS-CHR-101	Characterization of Structures
REDS-CHR-102	Characterization of Systems
REDS-CHR-106	Surface Soil Sampling
REDS-CHR-107	Subsurface Soil Sampling
REDS-DEC-201	Operation of Wall and Floor Scabblers
REDS-DEC-203	HEPA Vacuum Operation
REDS-DEC-204	Operation and Maintenance of the PENTEK CORNER CUTTER
REDS-DEC-205	Operation and Maintenance of the PENTEK SQUIRREL-III Scabbler
REDS-DEC-206	Operation and Maintenance of the PENTEK VAC-PAC Models 6A and 9A
REDS-DEC-301	Decontamination of Tools, Equipment and Area
REDS-DEC-302	Control and Use of Radiological Containments
REDS-DEC-303	Decontamination Techniques - Selection and Precautions
REDS-FSP-100	Preparation of a Final Survey Plan
REDS-FSP-101	Final Surveys of Structures
REDS-FSP-103	Final Surveys of Environs
REDS-FSP-104	Final Survey Data Handling and Analysis
REDS-HS-101	Confined Space Entry
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REDS-INST-101	Issue, Control and Accountability of Radiation Protection Instrumentation
REDS-INST-102	Quality Control of Counting Systems and Portable Counters
REDS-INST-201	Operation of the Ludlum Model 2350 Data Logger
REDS-INST-203	Operation of NE Technology CM7A Contamination Monitor
REDS-INST-205	Operation of Ludlum Model 3 Survey Meter with Model 44-9 Beta Gamma Probe or Model 43-5 Alpha Scintillation Probe

List of Procedures
(continued)

REDS-INST-206	Operation of the Ludlum Model 19 Micro-R Meter
REDS-INST-207	Operation of Eberline Ion Chamber Model RO-2/RO-2A
REDS-INST-209	Operation of Ludlum Model 177 Portable Frisker
REDS-INST-211	Operation of Eberline BC-4 Portable Beta Counter
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REDS-OPS-303	Posting of Radiologically Controlled Areas
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REDS-RAM-103	Unconditional Release of Tools, Equipment and Waste Materials

APPENDIX B

Final Survey Procedures

Package #: F0000	Total Sheets: 2	Building #: 0000	Area: Facility Grounds
Historical Information:			Rooms: South side Bldg 9/10a, Trench outside Bldg 7 freight elevator, east side Bldg 7 north wing, and outside Bldg 8 loading dock
			Floor/Elevation: Ground level
General Instructions: Grid the identified soil areas into 1 meter grids. Obtain one surface soil sample per grid following the SEG soil sampling procedure. Collect subsurface soil samples pending upon surface soil sample results. Seal all samples collected and ship to SEG Oak Ridge for isotopic analysis. Analyze all samples for total uranium and total thorium activity. Direct the SEG lab to dry and sift all samples prior to counting (i.e. send memorandum with shipment). Ship all samples using sample chain of custody forms and following the SEG chain of custody procedure.			
Package prepared by: Michael A. Carr 2-16-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
Area 1	Excavated trench behind Buildings 9 and 10a	Collect one surface soil sample per grid location (1 liter marinelli filled 1 inch above the well).					
		Collect subsurface soil samples pending sample results and direction of the project engineer.					
Area 2	Excavated trench outside Building 7 freight elevator	Collect one surface soil sample per grid location (1 liter marinelli filled 1 inch above the well).					
		Collect one subsurface soil sample at 4 feet from initial soil sample location 11. Collect additional subsurface soil samples pending sample results and direction of the project engineer.					
Area 3	Exposed soil east of the Building 7 north wing	Collect one surface soil sample per grid location (1 liter marinelli filled 1 inch above the well).					
		Collect subsurface soil samples pending sample results and direction of the project engineer.					

Area 4	Exposed soil area outside Building 8 loading dock, south side	Investigate and search for the ORISE sample location near the loading dock. Collect one surface soil sample (1 liter marinelli filled 1 inch above the well).			
		Collect one subsurface soil sample at 2 feet at the same sample location.			

Package #: F07S1	Total Sheets: 2	Building #: 07	Area: South Wing
Historical Information: Building 7 was primarily an office and laboratory building. The south wing consists of small laboratories and offices which contained fume hoods, lab benches and sinks. Many of the rooms have had extensive remediation including the removal of the flooring to the nail-crete, wood or concrete subflooring. The survey areas in the south wing consist of room 128, and the SE stairwell, pipe chase and hallway. Both uranium and natural thorium were identified in laboratory 128 while uranium was only identified in the hallway, pipe chase and stairwell.			Rooms: 128, SE stairwell, SE hallway, and SE pipe chase
			Floor/Elevation: First Floor
General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections. Take one smear from the center of each decontaminated grid. Obtain one alpha reading near the center of each decontaminated grid in all areas where natural thorium was identified. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07S1128F01	Room 128 floor	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.					
		Obtain one alpha readings at the center of each decontaminated grid.					
		Obtain one smear from the center of each decontaminated grid.					

Package #: F07C1	Total Sheets: 1	Building #: 07	Area: Center Wing
<p>Historical Information: Building 7 was primarily an office and laboratory building. The center wing houses several laboratories, offices and storage rooms. A pipe trench runs along the outside walls of the laboratories to the north side of the center stairwell. Many of the rooms in the area have had extensive remediation in the past including the removal of the area floors to the nail-crete or wood subflooring and in some cases excavation of the building foundation and underlying soil to remove floor drains and piping. The isotope of concern identified in the survey areas was uranium.</p>			Rooms: 129
			Floor/Elevation: First floor
<p>General Instructions: No surveys are to be performed in this wing. Room 129 was surveyed during characterization and no levels were found to exceed the uranium free release guidelines. No additional surveys are required.</p>			
<p>Package prepared by: Michael A. Carr 2-15-94</p>			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07C1129F01	Room 129 floor	No additional surveys in the area are to be performed. The isotope of concern was identified to be uranium. No remediation was required for the area.					

Package #: F07N1	Total Sheets: 1	Building #: 07	Area: North Wing
Historical Information: Building 7 was primarily an office and laboratory building. The north wing consists primarily of small laboratories which used to contain fume hoods, lab benches and sinks. A pipe trench is located along the outside perimeter of the north wing along the outside walls in the laboratories and continues on to the center wing. Many of the laboratories in the area have had extensive remediation in the past including the removal of the laboratory floors to the nail-crete subfloor and in some cases excavation of the building foundation and underlying soil to remove floor drains and piping.			Rooms: None
			Floor/Elevation: First floor
General Instructions: No surveys are to be performed in this wing. There were no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07N1	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the north wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F07S2	Total Sheets: 2	Building #: 07	Area: South Wing
<p>Historical Information: Building 7 was primarily an office and laboratory building. The south wing consists of small laboratories and offices which contained fume hoods, lab benches and sinks. Some of the rooms have had extensive remediation including the removal of the flooring to the nail-crete, wood or concrete subflooring. The survey areas in the south wing consist of the SE end of the hallway, the SE stairwell and pipe chase and the center pipe chase. The isotope of concern identified in the survey areas was uranium.</p>			<p>Rooms: SE hallway, SE stairwell, SE pipe chase and center pipe chase (Freight elevator to be addressed in separate package)</p>
			Floor/Elevation: Second floor
<p>General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections and one per stair. Take one smear from the center of each decontaminated grid and stair. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations and stairs on a comment sheet prior to area final release surveys.</p>			
<p>Package prepared by: Michael A. Carr 2-15-94</p>			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07S2000SW1	Southeast stairwell	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid and one for each stair.					
		Obtain one smear from the center of each decontaminated grid and stair.					
07S2000PC1	Southeast pipe chase	Perform a 100% beta-scan survey of the pipe chase surfaces and walls. Obtain ten beta readings from the pipe chase surfaces and walls.					

Package #: F07C2	Total Sheets: 1	Building #: 07	Area: Center Wing
Historical Information: Building 7 was primarily an office and laboratory building. The center wing consists primarily of small laboratories and offices. Some of the laboratories have had remediation in the past including the removal of the room flooring to the nail-crete, wood or concrete subflooring.			Rooms: None
			Floor/Elevation: Second floor
General Instructions: No surveys are to be performed in this wing. There were no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07S2	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the center wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F07N2	Total Sheets: 1	Building #: 07	Area: North Wing
Historical Information: Building 7 was primarily an office and laboratory building. The north wing consists of small laboratories and offices which contained fume hoods, lab benches and sinks. Many of the rooms have had extensive remediation including the removal of the flooring to the nail-crete, wood or concrete subflooring. The survey area consists of the east end of the hallway and the NE stairwell. The isotope of concern identified in the survey areas was uranium.			Rooms: Hallway and stairwell
			Floor/Elevation: Second floor
General Instructions: Grid the floors into 1 meter grids using reference lactations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections. Take one smear from the center of each decontaminated grid. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07N2000SW1	Northeast stairwell	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid and the decontaminated crack at the top of the stairs.					
		Obtain one smear from the center of each decontaminated smear.					

Package #: F07S3	Total Sheets: 2	Building #: 07	Area: South Wing
<p>Historical Information: Building 7 was primarily an office and laboratory building. The south wing consists primarily of small laboratories which used to contain fume hoods, lab benches and sinks. Many of the laboratories in the area have had remediation in the past including the partial removal of the laboratory flooring. The survey areas consist of laboratories 310, 316/317 and 314 and the hallway and the pipe chase in room 312. Both uranium and natural thorium were identified in rooms 310 and 314 while uranium was only identified in the hallway, room 316/317 and the two pipe chases.</p>			Rooms: 310, 312 pipe chase, 314, 316/317, hallway west end and the center pipe chase
			Floor/Elevation: Third floor
<p>General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections. Take one smear from the center of each decontaminated grid. Obtain one alpha reading near the center of each decontaminated grid in all areas where natural thorium was identified. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.</p>			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07S3310F01	Room 310 floor	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.					
		Obtain one alpha reading at the center of each decontaminated grid.					
		Obtain one smear from the center of each decontaminated grid.					

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Package #: F07C3	Total Sheets: 1	Building #: 07	Area: Center Wing
Historical Information: Building 7 was primarily an office and laboratory building. The center wing consists primarily of office and laboratory space. Some remediation has been performed in several of the rooms in the past including the removal of the flooring to the nail-crete, wood or concrete subfloor.			Rooms: NONE
			Floor/Elevation: Third floor
General Instructions: No surveys are to be performed in this wing. There were no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 11-29-93			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07C3	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the center wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F07N3	Total Sheets: 1	Building #: 07	Area: North Wing
Historical Information: Building 7 was primarily an office and laboratory building. The north wing consists primarily of office space and some laboratories. Some remediation has been performed in several of the rooms in the past including the removal of the flooring to the nail-crete, wood or concrete subfloor.			Rooms: NONE
			Floor/Elevation: Third floor
General Instructions: No surveys are to be performed in this wing. There were no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07N3	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the north wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F07S4	Total Sheets: 1	Building #: 07	Area: South Wing
Historical Information: Building 7 was primarily an office and laboratory building. The south wing consists of office and laboratory space. Some remediation has been performed in the past in these areas including the removal of some of the flooring to the nail-crete subfloor. The survey area included room 424. The isotope of concern identified in the survey area was natural thorium.			Rooms: 424
			Floor/Elevation: fourth floor
General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations area dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grid locations needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections and on alpha reading near the center of the grids. Take one smear from the center of each decontaminated grid. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.			
Package prepared by: Michael A. Carr 2-16-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07S4424F01	Room 424 floor.	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.					
		Obtain one alpha reading at the center of each decontaminated grid.					
		Obtain one smear from the center of each decontaminated grid.					

Package #: F07C4	Total Sheets: 1	Building #: 07	Area: Center Wing
Historical Information: Building 7 was primarily an office and laboratory building. The center wing consists of office and laboratory space. Some remediation has been performed in these areas in the past such as the removal of the flooring to the nail-crete subfloor. The survey area includes the center stairwell including the mid-floor landing. The isotope of concern identified in the survey area was uranium which was suspected to be tracked from the building roof.			Rooms: Center stairwell
			Floor/Elevation: fourth floor
General Instructions: No surveys are to be performed in this wing. The stairwell was surveyed during characterization and no levels were found to exceed the uranium free release guidelines. No remediation was performed in the area. No additional surveys are required.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07C4000SW1	Center stairwell	No additional surveys in the area are to be performed. The isotope of concern was identified to be uranium. No remediation was required for the area.					

Package #: F07N4	Total Sheets: 1	Building #: 07	Area: North Wing
Historical Information: Building 7 was primarily an office and laboratory building. The north wing consists of office space.			Rooms: None
			Floor/Elevation: fourth floor
General Instructions: No surveys are to be performed in this wing. There were no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-16-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07N4	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the north wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F07S5	Total Sheets: 1	Building #: 07	Area: South Wing
Historical Information: Building 7 was primarily an office and laboratory building. The south wing consists of office and laboratory space. Many of the areas in the wing have had remediation in the past including the removal of the some of the walls and the flooring to the nail-crete and concrete subfloor.			Rooms: None
			Floor/Elevation: fifth floor
General Instructions: No surveys are to be performed in this wing. There were no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-16-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07S5	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the south wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F07C5	Total Sheets: 1	Building #: 07	Area: Center Wing
<p>Historical Information: Building 7 was primarily an office and laboratory building. The center wing consists of office and laboratory space. Some remediation has been performed in these areas in the past such as the removal of the flooring to the nail-crete subfloor. The survey area includes the center stairwell including the mid-floor landing. The isotope of concern identified in the survey area was uranium which was suspected to be tracked from the building roof.</p>			Rooms: Center stairwell
			Floor/Elevation: fifth floor
<p>General Instructions: No surveys are to be performed in this wing. The stairwell was surveyed during characterization and no levels were found to exceed the natural uranium free release guidelines. No remediation was performed in the area. No additional surveys are required.</p>			
<p>Package prepared by: Michael A. Carr 2-15-94</p>			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07C5000SW1	Center stairwell	No additional surveys in the area are to be performed. The isotope of concern was identified to be uranium. No remediation was required for the area.					

Package #: F07N5	Total Sheets: 1	Building #: 07	Area: North Wing
Historical Information: Building 7 was primarily an office and laboratory building. The north wing consists of office space.			Rooms: None
			Floor/Elevation: fifth floor
General Instructions: No surveys are to be performed in this wing. There were no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-16-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
07N5	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the north wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F070R	Total Sheets: 1	Building #: 07	Area: Roof
Historical Information: The roof area housed historical operations associated with the Manhattan Project. The roof has been remediated in the past including the removal of the roof stone and materials and new stone replaced.			Rooms: None
			Floor/Elevation: Roof
General Instructions: No surveys are to be performed on the roof. There were no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-16-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
070R000F01	Building 7 Roof	No surveys to be performed on the roof. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F0800	Total Sheets: 2	Building #: 08	Area: Basement
Historical Information: The Building 8 basement survey area includes only the large room where the pump pedestals are located and the back room near the freight elevator. All other room and areas were not surveyed. See the grid map for the survey area. The primary isotope identified in the basement was natural thorium			Rooms: Center area near the freight elevator
			Floor/Elevation: Basement
General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey the decontaminated grids only. Refer to the grid map to identify all grids needing final survey. Start the survey at the southwest most grid and survey west to east taking four beta readings near the grid intersections and one alpha reading at the center of each grid. Perform a 100% beta survey of the decontaminated grids extending out one grid width in all directions. Obtain one smear from the center of each decontaminated grid. Obtain beta and alpha measurements on each decontaminated structure. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.			
Package prepared by: Michael A. Carr 2-14-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
0800001F01	Building 8, basement, Area 1, floor 1 (basement east side)	Perform a 100% beta scan of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.					
		Obtain one alpha reading at the center of each decontaminated grid.					
		Obtain one smear from the center of each decontaminated grid.					
0800001D04	Building 8, basement, Area 1, floor drain 4	Obtain one beta reading on each remediated floor drain.					

		Obtain one alpha reading on each remediated floor drain.							
		Obtain one smear from each remediated floor drain.							
0800001S07, 0800001S10	Building 8, basement, Area 1 structures 7 and 10.	Obtain five beta measurements on each remediated structure.							
		Obtain five alpha measurements on each remediated structure.							
		Obtain one smear from each remediated structure (decontaminated area).							

Package #: F08W1	Total Sheets: 1	Building #: 08	Area: West wing
<p>Historical Information: Building 8 is a manufacturing and office building. The west wing survey area on the first floor is a large open manufacturing area empty of any equipment. The survey area consists of a 10 meter buffer zone around the identified ORISE survey location. The survey area was expanded to the west side where contamination above the release limit guidelines of 1000 dpm average/100 cm² was identified up to the survey area boundary. Both natural uranium and natural thorium were identified in the survey area.</p>			Rooms: Area between pillar aisle 7 and 10.
			Floor/Elevation: First floor
<p>General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections and one alpha reading at the center of each grid. Perform a 100% beta survey of the decontaminated grids extending out one grid width in all directions. Obtain one smear from the center of each decontaminated grid. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.</p>			
Package prepared by: Michael A. Carr 2-14-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	Nal Scans	Lab Samples
08W1001F01	Building 8, first floor, Area 1, floor (Area bounded by pillar aisles 7 and 10)	Perform a 100% beta-scan of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid .					
		Obtain one alpha reading at the center of each decontaminated grid.					
		Obtain one smear from the center of each decontaminated grid.					

Package #: F08S1	Total Sheets: 2	Building #: 08	Area: South wing
Historical Information: Building 8 is a manufacturing and office building. The south wing survey area on the first floor is a large open manufacturing area empty of any equipment. The survey area consists of a 10 meter buffer zone around the identified ORISE survey location in the west wing. Both natural uranium and natural thorium were identified in the survey area.			Rooms: Area between pillar aisles 12 and the pipe trench. Floor/Elevation: First floor
General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections and one alpha reading at the center of each grid. Perform a 100% beta survey of the decontaminated grids extending out one grid width in all directions. Obtain one smear from the center of each decontaminated grid. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.			
Package prepared by: Michael A. Carr 2-14-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08S1001F01	Building 8, first floor, Area 1, floor (Area bounded by pillar aisle 12 and the pipe trench)	Perform a 100% beta-scan of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.					
		Obtain one alpha reading at the center of each decontaminated grid.					
		Obtain one smear from the center of each decontaminated grid.					

08S1001TCH	Building 8, first floor, Area 1, pipe trench	Perform a 100% beta-scan of all decontaminated grids extending up the trench walls. Obtain four beta readings near the corners of each decontaminated grid.							
		Obtain one alpha reading at the center of each decontaminated grid.							
		Obtain one smear from the center of each decontaminated grid.							

Package #: F08S2	Total Sheets: 1	Building #: 08	Area: South wing
Historical Information: Building 8 is a manufacturing and office building. The south wing consists of several smaller rooms and laboratories. Some of the area equipment and structures remains such as concrete platforms and pedestals, experimental cage areas, some lab benches and a partial glovebox.			Rooms: None
			Floor/Elevation: Second floor
General Instructions: No surveys are to be performed in this wing. There are no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08S2	Room floors and area systems, structures and drains (entire wing)	No surveys are to be performed in the south wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F08W2	Total Sheets: 1	Building #: 08	Area: West wing
Historical Information: Building 8 is a manufacturing and office building. The west wing in general is a wide open area with a few offices and laboratories toward the far west end of the wing. A majority of the floor in the west wing has been remediated in the past and the flooring has been removed to the nail-crete subflooring.			Rooms: None
			Floor/Elevation: Second floor
General Instructions: No surveys are to be performed in this wing. There are no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08W2	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the west wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F08S3	Total Sheets: 1	Building #: 08	Area: South wing
Historical Information: Building 8 is a manufacturing and office building. The south wing consists of a large open area with a couple small rooms or storage areas.			Rooms: None
			Floor/Elevation: Third floor
General Instructions: No surveys are to be performed in this wing. There are no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08S3	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the south wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F08W3	Total Sheets: 2	Building #: 08	Area: West wing
<p>Historical Information: Building 8 is a manufacturing and office building. The west wing survey areas on the third floor consist of the southwest laboratory with the tile floor and walls and the large open area located at the center of the wing between the freight elevator and the south stairwell. The large survey area in the open part of the wing includes a ten meter buffer zone around two contaminated survey points identified by ORISE during the confirmatory survey. The isotope of concern identified on the third floor was processed uranium. The survey area was expanded to the east and west where contamination above the release guidelines was identified at the boundary of the survey area. Two drain basins were exposed from under the wood flooring and concrete during initial decontamination efforts.</p>			<p>Rooms: Southwest laboratory and large area located at the center of the wing between the freight elevator and the south stairwell</p> <p>Floor/Elevation: Third floor</p>
<p>General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections and one alpha reading at the center of each grid. Perform a 100% beta survey of the decontaminated grids extending out one grid width in all directions. Obtain one smear from the center of each decontaminated grid. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.</p>			
<p>Package prepared by: Michael A. Carr 2-15-94</p>			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08W3001F01	Area 1 floor, decontaminated grids. (Large open area)	Perform a 100% beta-scan of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.					
		Obtain one alpha reading at the center of each decontaminated grid.					
		Obtain one smear from the center of each decontaminated grid.					

08W3001B01	Area 1, drain basin 1. East basin.	Perform a 100% beta-scan of the drain basin. Obtain one beta reading on the basin drain.							
		Obtain one alpha reading on the basin drain.							
08W3001B02	Area 1, drain basin 2. West basin.	Perform a 100% beta-scan of the drain basin. Obtain one beta reading on the basin drain.							
		Obtain one alpha reading on the basin drain.							
08W3002F01	Southwest laboratory floor	Perform a 100% beta-scan of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.							
		Obtain one alpha reading at the center of each decontaminated grid.							
		Obtain one smear from the center of each decontaminated grid.							

Package #: F08S4	Total Sheets: 2	Building #: 08	Area: South wing
Historical Information: Building 8 is a manufacturing and office building. The south wing survey area on the fourth floor is a large open area consisting of a ten meter buffer zone around the two contaminated survey locations identified by ORISE. The survey area includes the floor area at the far south end of the wing between the last two pillar aisles. Both natural uranium and natural thorium were identified in the survey area on the fourth floor.			Rooms: Last two pillar aisles toward the south end of the wing.
			Floor/Elevation: Fourth floor
General Instructions: Grid the floors into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Survey decontaminated grids only. Refer to the survey grid map to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections and one alpha reading at the center of each grid. Perform a 100% beta survey of the decontaminated grids extending out one grid width in all directions. Obtain one smear from the center of each decontaminated grid. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid locations on a comment sheet prior to area final release surveys.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08S4001F01	Area 1 floor, decontaminated grids.	Perform a 100% beta-scan of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.					
		Obtain one alpha reading at the center of each decontaminated grid.					
		Obtain one smear from the center of each decontaminated grid.					
08S4001D01	Building 8, floor drain 1	Perform a 100% beta-scan of the drain in the decontaminated area. Obtain one beta reading on the floor drain.					

		Obtain one alpha reading on the floor drain in the decontaminated area.						
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Package #: F08W4	Total Sheets: 1	Building #: 08	Area: West wing
Historical Information: Building 8 is a manufacturing and office building. The west wing consists of several offices, and storage locations. All of the equipment has been removed from the area except for a HVAC unit located in the north west corner of the wing. Much of the floor has been remediated in the past and has been removed to the nail-concrete subflooring.			Rooms: None
			Floor/Elevation: Fourth floor
General Instructions: No surveys are to be performed in this wing. There are no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08W4	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the west wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F08S5	Total Sheets: 1	Building #: 08	Area: South wing
Historical Information: Building 8 is a manufacturing and office building. The south wing consists of a large open area with no equipment or structures.			Rooms: NONE
			Floor/Elevation: Fifth floor
General Instructions: No surveys are to be performed in this wing. There are no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08S5	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the south wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F08W5	Total Sheets: 1	Building #: 08	Area: West wing
Historical Information: Building 8 is a manufacturing and office building. The west wing consists of a large open area with a couple of small rooms.			Rooms: NONE
			Floor/Elevation: Fifth floor
General Instructions: No surveys are to be performed in this wing. There are no potentially contaminated survey points identified by ORISE located in this area.			
Package prepared by: Michael A. Carr 2-15-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
08W5	Area floors and systems, structures and drains. (Entire wing)	No surveys are to be performed in the west wing. No potentially contaminated survey locations were identified by ORISE during the confirmatory survey.					

Package #: F0901	Total Sheets: 16	Building #: 09	Area: Building 9
Historical Information: Building 9 was used as a manufacturing facility which was used for drawing thoriated tungsten wire lightbulb filaments. The area housed manufacturing equipment including furnaces. Natural thorium has been tracked throughout the building into the adjacent rooms (west side) and the tunnel.			Rooms: All areas; Main manufacturing room, restroom, west side rooms, tunnel, elevator and loading dock
			Floor/Elevation: First floor, tunnel and pit
General Instructions: Grid the floors and lower walls (bottom 2 meters) into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Ensure that the freight elevator pit has been pumped and dried. Ensure that the NW room with the wood bridge has been pumped and dried. Ensure that all trenches and pits have been pumped and dried. Ensure that the trenches have been shored prior to collecting soil samples if entering the trenches. Survey all decontaminated grids. Refer to the survey grid maps to identify all grids needing final survey. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections and one per each stair. Take one alpha readings and one smear near the center of each grid. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grid location and stairs on a comment sheet prior to area final release surveys.			
Package prepared by: Michael A. Carr 4-12-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
0901001TCH	Excavated trenches	As access allows, beta scan the excavated trenches and identify any elevated readings and identify for biased sampling. Obtain one 500 ml surface soil sample from each elevated reading location.					
		Obtain one 500 ml surface soil sample from the bottom of the trench every ten feet. Ensure each sample is a composite sample of the ten foot length.					

0901001F01	Area 1 floor (High bay)	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
		Acquire soil samples per attached soil sampling package.					
0901001W01	Area 1 Wall 1, (North wall)	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901001W02	Area 1 Wall 2, (East wall)	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					

0901001W03	Area 1 Wall 3, (South wall)	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901001W04	Area 1 Wall 4, (West wall)	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901001D01, 0901001D02...	Area 1, Drains 1 thru X	Obtain one beta reading at the entrance to each floor drain.					
		Obtain one alpha reading at the entrance to each floor drain.					
		Obtain a smear or swab from the drain internals if not excavated. Obtain one thin window NaI(Tl) detector reading from each floor drain internals.					
0901001SMP	Area 1 Sump	Perform a 100% beta-scan survey of the sump. Obtain 10 beta readings from inside the sump.					
		Obtain 3 alpha readings from inside the sump					

0900ELEF01	Elevator Pit floor	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0900ELEW01	Elevator Shaft Wall 1, north wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0900ELEW02	Elevator Shaft Wall 2, east wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0900ELEW03	Elevator Shaft Wall 3, south wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.					

		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0900ELEW04	Elevator Shaft Wall 4, west wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corner of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901001S01	Area 1 Structure 1 (pedestal)	Perform a 100% beta-scan survey of the pedestal. Obtain 10 beta readings on the pedestal.						
		Obtain 3 alpha readings on the pedestal.						
0901001S02	Area 1 Structure 2 (pedestal)	Perform a 100% beta-scan survey of the pedestal. Obtain 10 beta readings on the pedestal.						
		Obtain 3 alpha readings on the pedestal.						
0901001S03	Area 1 Structure 3, Metal press	Perform a 100% beta-scan survey of the structure. Obtain 20 beta readings on the structure.						
		Obtain 5 alpha readings on the structure.						
0901001P01	Area 1 Pit 1, under structure 3	Perform a 100% beta-scan survey of the pit. Obtain 10 beta readings in the pit.						
		Obtain 3 alpha readings in the pit.						
0901001P02	Area 1 Pit 2 pipe chase	Perform a 100% beta-scan survey of the pit. Obtain 25 beta readings in the pit (5 each wall and 5 on the bottom).						

		Obtain 5 alpha readings in the pit (1 each wall and 1 on the bottom).						
0901001C1A	Area 1, general area ceiling and west side rooms	Obtain one beta reading for approximately each 20 square meters of the ceiling. Obtain a minimum of 30 readings. Beta-scan survey localized areas around each reading location. Record the survey locations on a survey map.						
		Obtain one alpha reading for approximately each 20 square meters of the ceiling. Obtain a minimum of 30 readings.						
0901001C1B	Area 1, general area and west side rooms upper walls and vertical surfaces	Obtain one beta reading for approximately each 20 square meters of vertical surface. Obtain a minimum of 30 readings. Beta-scan survey localized areas around each reading location. Record the survey locations on a survey map.						
		Obtain one alpha reading for approximately each 20 square meters of vertical surface. Obtain a minimum of 30 readings.						
0901001C1C	Area 1, general area and west side rooms overhead horizontal surfaces (tops of I-beams, concrete ledges and lips, tops of systems)	Perform a 100% beta-scan survey of the overhead horizontal surfaces. Obtain one beta reading for approximately each 20 square meters of vertical surface. Obtain a minimum of 30 readings.						
		Obtain one alpha reading for approximately each 20 square meters of overhead horizontal surface. Obtain a minimum of 30 readings.						
0901004F01	Area 4 floor	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						

		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901004W01	Area 4 wall 1, east wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901004W02	Area 4 wall 2, south wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901004W03	Area 4 wall 3 west wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						

0901004D01, 0901004D02...	Area 4 floor drains 1 thru X	Obtain on beta reading on top of each floor drain at the entrance.					
		Obtain one alpha reading on top of each floor drain at the entrance.					
		Obtain a smear or a swab from the drain internals if not excavated. Obtain one thin window NaI(Tl) detector reading from the internals of each floor drain.					
0901005F01	Area 5 floor	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901005W01	Area 5 wall 1, east wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901005W02	Area 5 wall 2, south wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					

		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901005W03	Area 5 wall 3, west wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901005D01, 0901005D02...	Area 5 floor drains 1 thru X	Obtain one beta reading at the top of each floor drain at the entrance.						
		Obtain one alpha reading at the top of each floor drain at the entrance.						
		Obtain a smear of swab from the drain if not excavated. Obtain one thin window NaI(Tl) detector reading from the internals of each floor drain.						
0901006F01	Area 6 floor, SW room (transformer area)	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						

0901006W01	Area 6 wall 1, north wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901006W02	Area 6 wall 2, east wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901006W04	Area 6 wall 4, west wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901006S09	Area 6 structure 9	Perform a 100% beta-scan survey of the structure. Obtain 20 beta readings on each structure.					

		Obtain 5 alpha readings on each structure.						
0901007F01	Area 7 floor	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901007W02	Area 7 wall 2, east wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901007W03	Area 7 wall 3, south wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						

0901007W04	Area 7 wall 4, west wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901008F01	Area 8 floor	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901008W02	Area 8 wall 2, east wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					

0901009F01	Area 9 floor	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901009SFT	Area 9 shaft	Obtain 25 beta readings from the shaft surfaces. (5 on each wall and 5 on the bottom)					
		Obtain 5 alpha readings from the shaft surfaces. (1 on each wall and 1 on the bottom)					
0901009W01	Area 9 wall 1, north wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901009W02	Area 9 wall 2, east wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					

		Obtain one smear near the center of each decontaminated grid.						
0901009W03	Area 9 wall 3, south wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901009W04	Area 9 wall 4, west wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901009S01	Area 9 structure 1, wooden walkway	Perform a 100% beta-scan of the wooden walk way. Obtain 30 beta reading on the structure.						
		Obtain 10 alpha readings on the structure.						
0901010F01	Area 10, tunnel floor	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						

		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901010SW1	Area 10 stairwell	Perform a 100% beta-scan of the stairwell. Obtain one beta reading on each stair.						
		Obtain one alpha reading on each stair.						
		Obtain one smear from each stair.						
0901010W05	Area 10 wall 5, stairwell north wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						
0901010W06	Area 10 wall 6, stairwell south wall	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.						
		Obtain one alpha reading near the center of each decontaminated grid.						
		Obtain one smear near the center of each decontaminated grid.						

0901011F01	Area 11 floor (loading dock)	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901011W01	Area 11 wall 1, loading dock wall and door exterior of Building 9	Perform a 100% beta-scan survey of all decontaminated grids and stairs extending out one grid width in all directions. Obtain four beta readings near the corners of each decontaminated grid.					
		Obtain one alpha reading near the center of each decontaminated grid.					
		Obtain one smear near the center of each decontaminated grid.					
0901011M01, 0901011M02..	Area 11 manhole 1 through X (loading dock)	Obtain 5 beta reading on the walls of the manhole and sewer extending down as far as can be reached.					
		Scan the sewer surfaces using a NaI(Tl) detector (preferably a thin window detector) and record 5 readings.					
		Obtain a sludge sample from the bottom of the sewer.					

Package #: 1001	Total Sheets: 9	Building #: 10A	Area: Building 10A
Historical Information: Building 10A was used for the storage of radioactive materials utilized by the manufacturing processes that were located in building 9. The survey area consists of the entire building. The isotope of concern in building 10 has been identified as natural thorium.			Rooms: All areas
			Floor/Elevation: First
General Instructions: Grid the floors and lower 2 meters of the walls into 1 meter grids using reference locations and paint. Ensure that the floor has been cleaned of all debris and vacuumed for survey. Ensure that all floors and floor penetrations are dry. Start the survey in the southwest most grid and survey west to east taking four beta readings near the grid intersections. Take one alpha reading near the center of each grid. Obtain a smear from the center of each decontaminated grid. Survey decontaminated grids only unless otherwise specified. Refer to the survey grid map to identify all grids needing final survey. Perform beta-scan surveys prior to obtaining direct radioactivity measurements. Record a list of all decontaminated grids on a comment sheet prior to performing final release surveys.			
Package prepared by: Michael A. Carr 2-22-94			

Task Completed and Data reviewed
(Technicians Initials and date)

Location Code	Area Description	Special Instructions and Comments	2350 Data	Smears	β/γ Scans	NaI Scans	Lab Samples
1001001F01	Area 1 floor, north end	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid. (All grids decontaminated)					
		Obtain one alpha reading at the center of each decontaminated grid. (All grids decontaminated)					
		Obtain on smear near the center of each decontaminated grid. (All grids decontaminated)					

Page 3

		Obtain one alpha reading at the center of each decontaminated grid.							
		Obtain on smear near the center of each decontaminated grid.							
1001002W01	Area 2 wall 1, north wall (If wall removed, N/A)	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.							
		Obtain one alpha reading at the center of each decontaminated grid.							
		Obtain on smear near the center of each decontaminated grid.							
1001002W02	Area 2 wall 2, east wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.							
		Obtain one alpha reading at the center of each decontaminated grid.							
		Obtain on smear near the center of each decontaminated grid.							
1001002W04	Area 2 wall 4, west wall	Perform a 100% beta-scan survey of all decontaminated grids extending out one grid width in all directions. Obtain four beta readings near the grid intersections of each decontaminated grid.							
		Obtain one alpha reading at the center of each decontaminated grid.							
		Obtain on smear near the center of each decontaminated grid.							

1001002M01	Area 2 manhole 1, south manhole	Obtain 20 beta readings from the manhole extending from the top of the access to the bottom.					
		Obtain 5 alpha readings from the manhole extending from the top of the access to the bottom.					
		Obtain 5 smears from the manhole access.					
1001002M02	Area 2 manhole 2, middle manhole	Obtain 20 beta readings from the manhole extending from the top of the access to the bottom.					
		Obtain 5 alpha readings from the manhole extending from the top of the access to the bottom.					
		Obtain 5 smears from the manhole access.					
1001002M03	Area 2 manhole 3, north manhole, Area 1 entrance	Obtain 20 beta readings from the manhole extending from the top of the access to the bottom.					
		Obtain 5 alpha readings from the manhole extending from the top of the access to the bottom.					
		Obtain 5 smears from the manhole access.					
1001002D01	Area 2 drain 1, south drain	Obtain one beta reading at the entrance to the floor drain.					
		Obtain one alpha reading at the entrance to the floor drain.					
		Obtain on beta thin window NaI(Tl) detector reading from the drain internals.					

		Obtain 30 random alpha readings on the overhead vertical surfaces. Record on a map the locations of readings including descriptions.							
1001000C1C	General area, Overhead horizontal surfaces (tops of I-beams, concrete ledges and lips, tops of systems)	Perform a 100% beta-gamma scan of all overhead horizontal surfaces prior to obtaining a direct measurement at the location. Obtain a minimum of 30 random beta readings on overhead horizontal surfaces. Record on a map the locations of readings including descriptions.							
		Obtain 30 random alpha readings on the overhead horizontal surfaces. Record on a map the locations of readings including descriptions.							

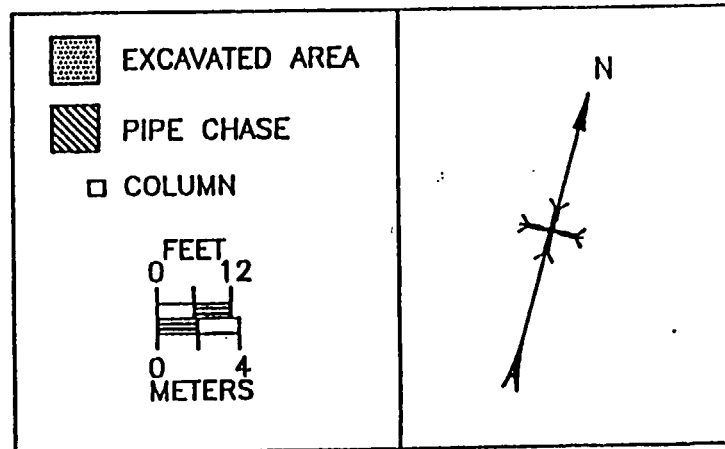
APPENDIX C
Final Survey Area Maps

APPENDIX C (continued)

**Facility Grounds
(Soil)**



SOUTH WING CENTER WING NORTH WING



REV STATUS OF SHEETS	REV	0
	SHEET	1

REVISIONS	ZONE DESCRIPTION


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APPRVD		DATE	



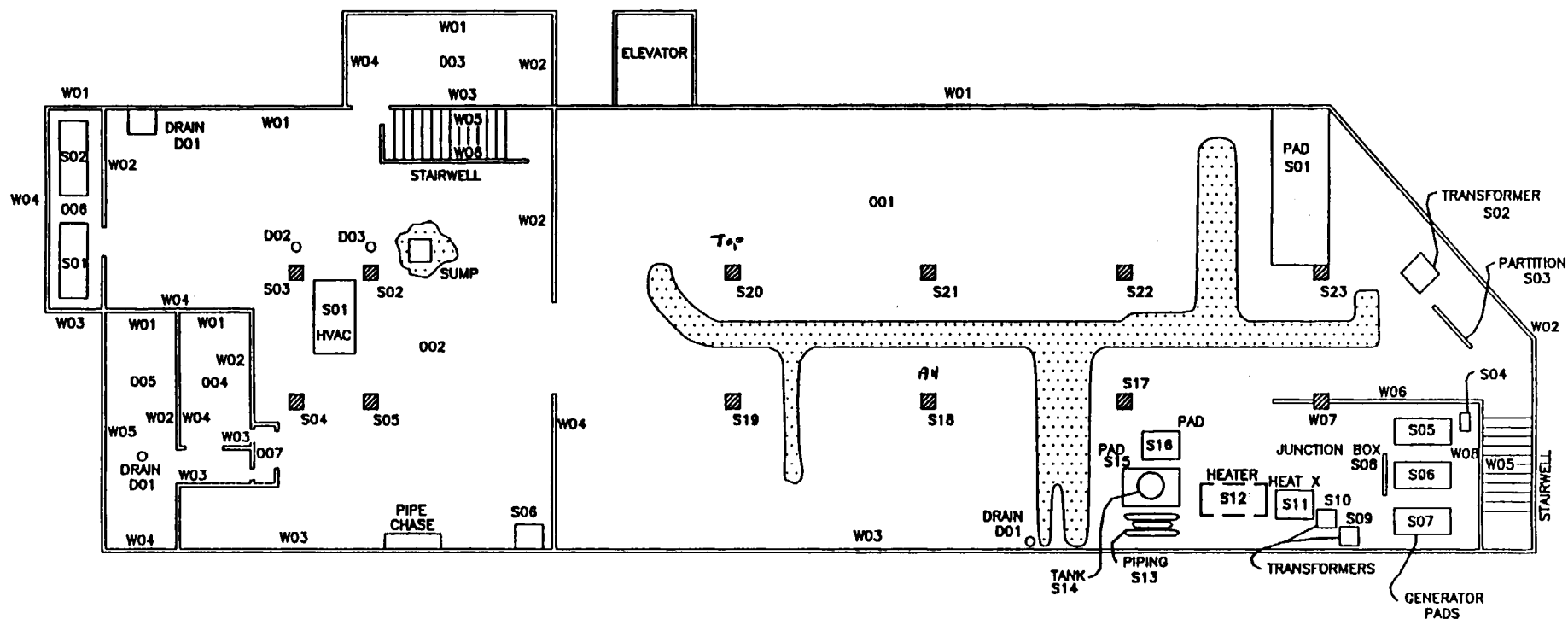
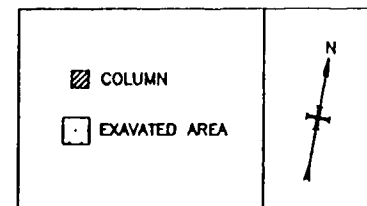
Oak Ridge Engineering
Oak Ridge, Tennessee

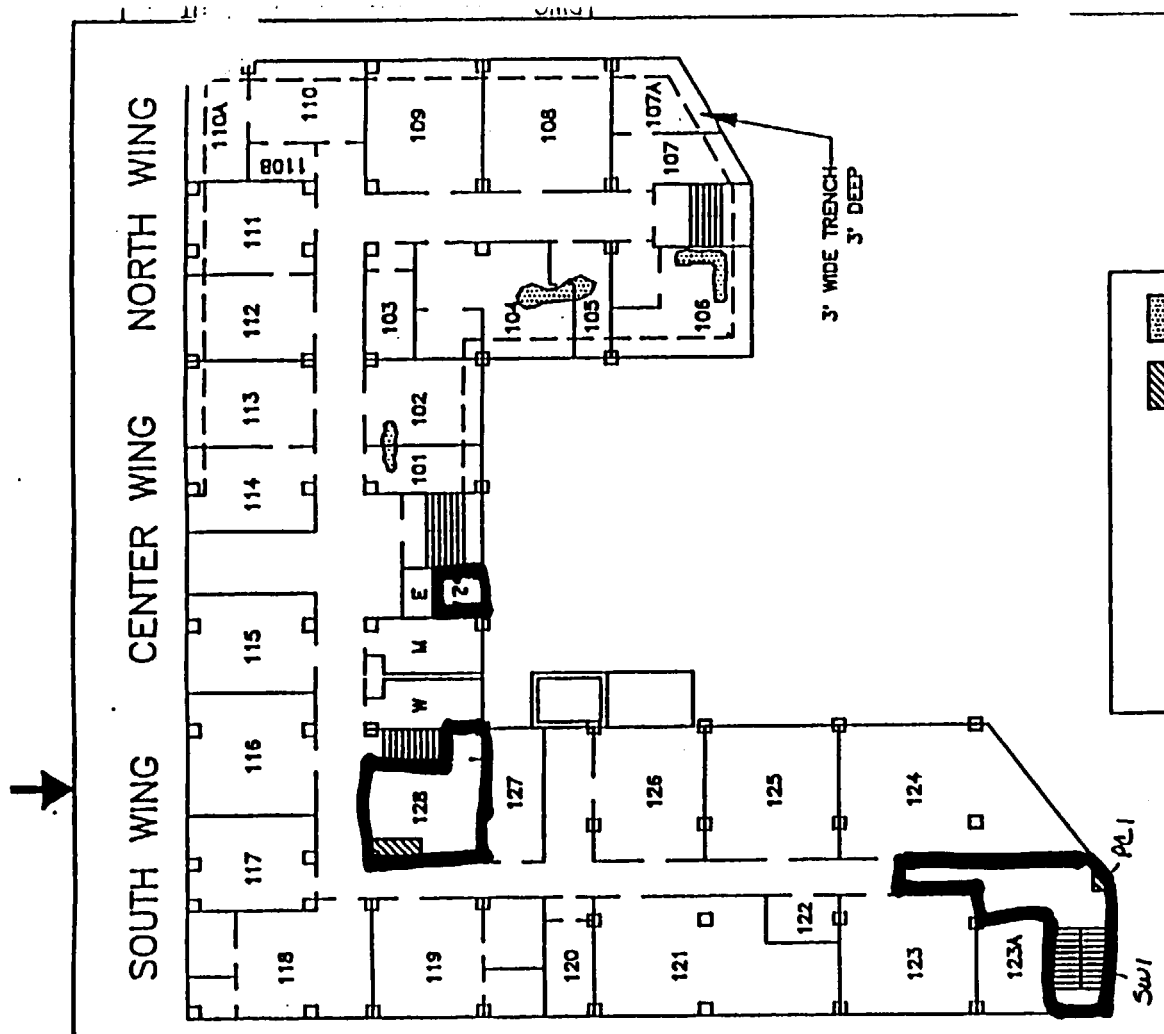
BUILDING 7 FIRST FLOOR			
SIZE A	DWG NO	SEG-93-244	REV 0
SCALE NONE		SHEET 1 OF 1	

		Oak Ridge Engineering Oak Ridge, Tennessee	
BUILDINGS 9 AND 10A			
SIZE A	DWG NO SEG-93-256	REV 0	
SCALE NONE		SHEET 1 OF 1	

APPENDIX C (continued)

Building 7





EXCAVATED AREA

PIPE CHASE

COLUMN

FEET
0 12
0 4
METERS

N

REV STATUS OF SHEETS	REV	0
	SHEET	1

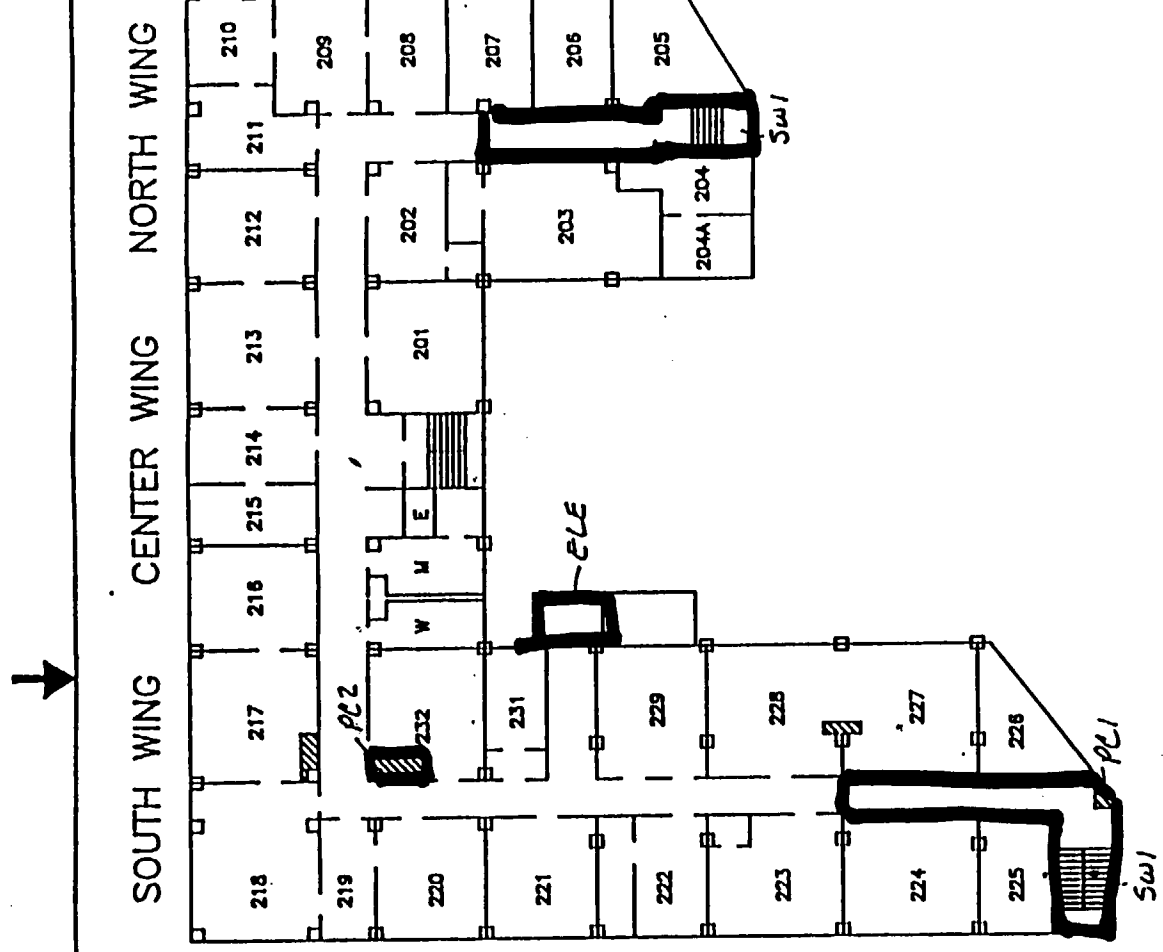
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			DSGN MGR	DATE
			MFO	DATE
			QA	DATE
			APPRVD	DATE


SCIENTIFIC ECOLOGY GROUP, INC.


Oak Ridge Engineering
Oak Ridge, Tennessee

BUILDING 7
FIRST FLOOR

SIZE A	DWG NO SEG-93-244	REV 0
SCALE NONE		SHEET 1 OF 1



 PIPE CHASE


 COLUMN

0 12

0 4

FEET

METERS




N

REV STATUS OF SHEETS	REV	0
	SHEET	1

REVISIONS	ZONE DESCRIPTION

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CHKR		DATE
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DSCN MGR		DATE
MFO		DATE
QA		DATE
APPRVD		DATE



Oak Ridge Engineering
Oak Ridge, Tennessee

BUILDING 7
SECOND FLOOR

SIZE A

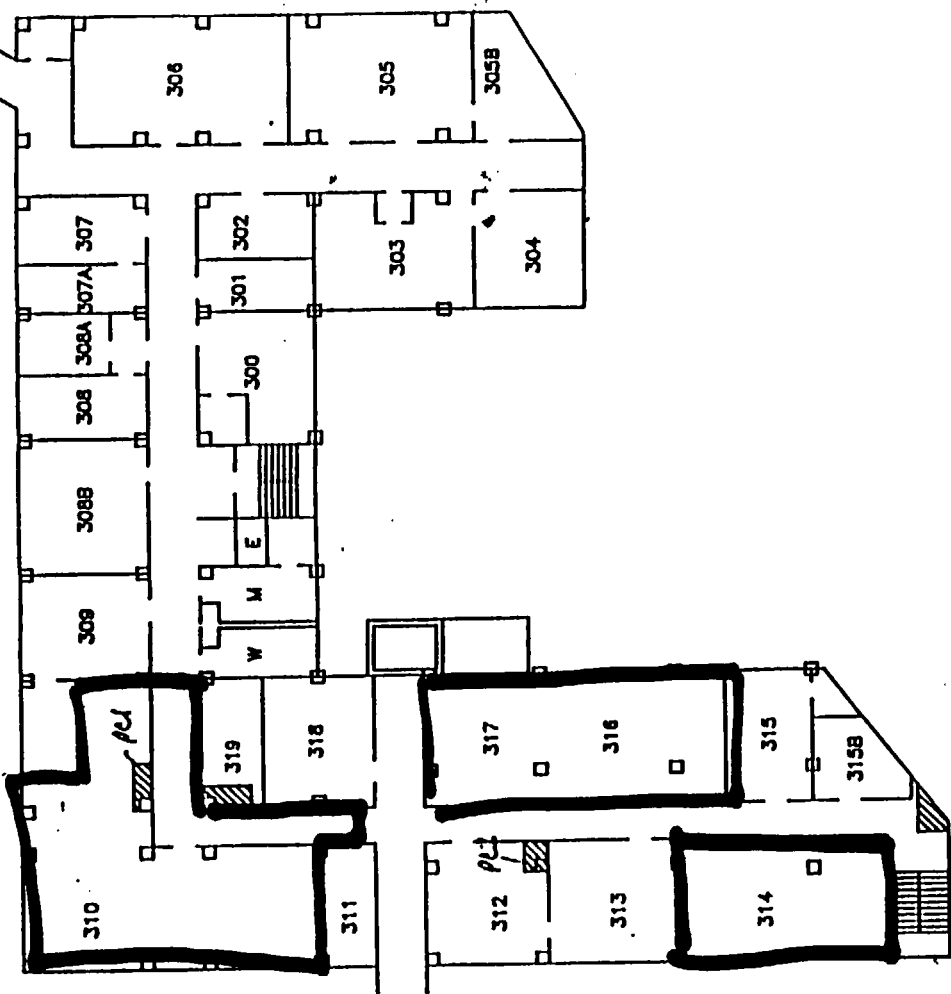
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REV 0

SCALE NONE

SHEET 1 OF 1

SOUTH WING CENTER WING NORTH WING BRIDGE



PIPE CHASE

COLUMN

FEET

0 4 8 12

METERS

N

REV	STATUS OF SHEETS	REV	0
	SHEET	1	

REVISIONS	ZONE DESCRIPTION

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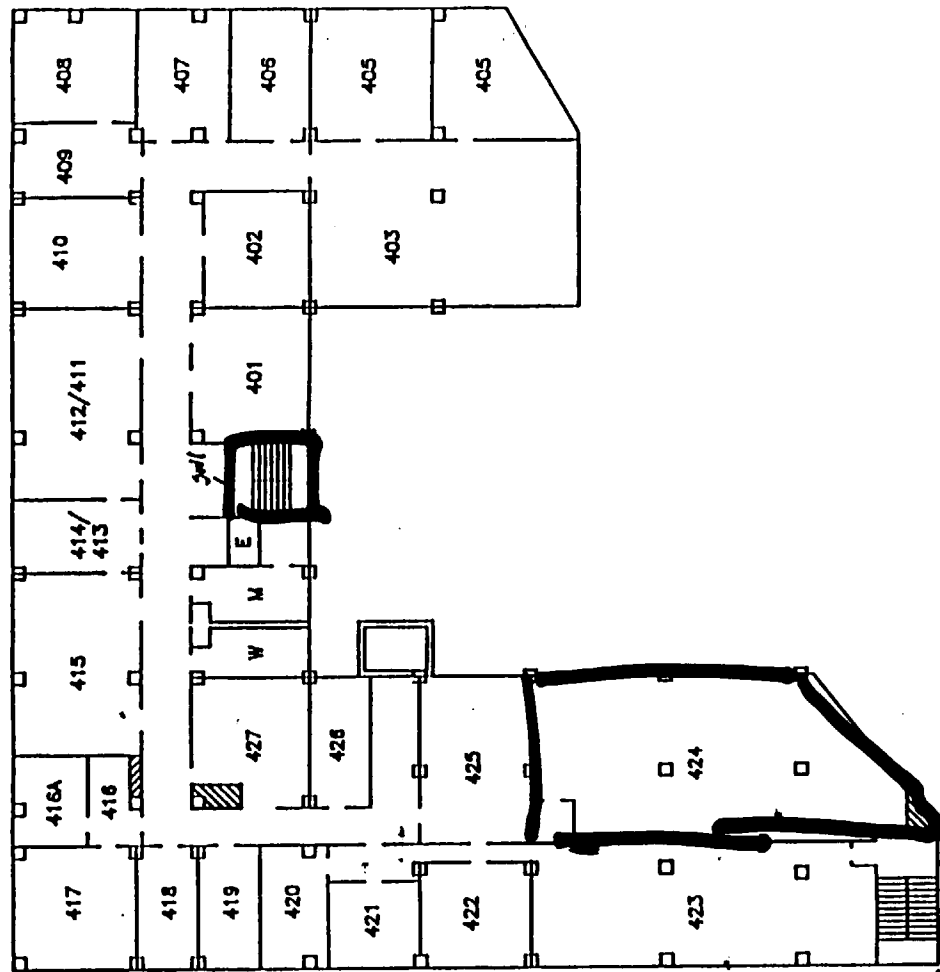
SEG
SCIENTIFIC ECOLOGY GROUP, INC.

Oak Ridge Engineering
Oak Ridge, Tennessee

BUILDING 7
THIRD FLOOR

SIZE A	DWG NO SEG-93-246	REV 0
SCALE NONE		SHEET 1 OF 1

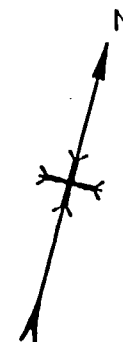
SOUTH WING CENTER WING NORTH WING




PIPE CHASE

COLUMN

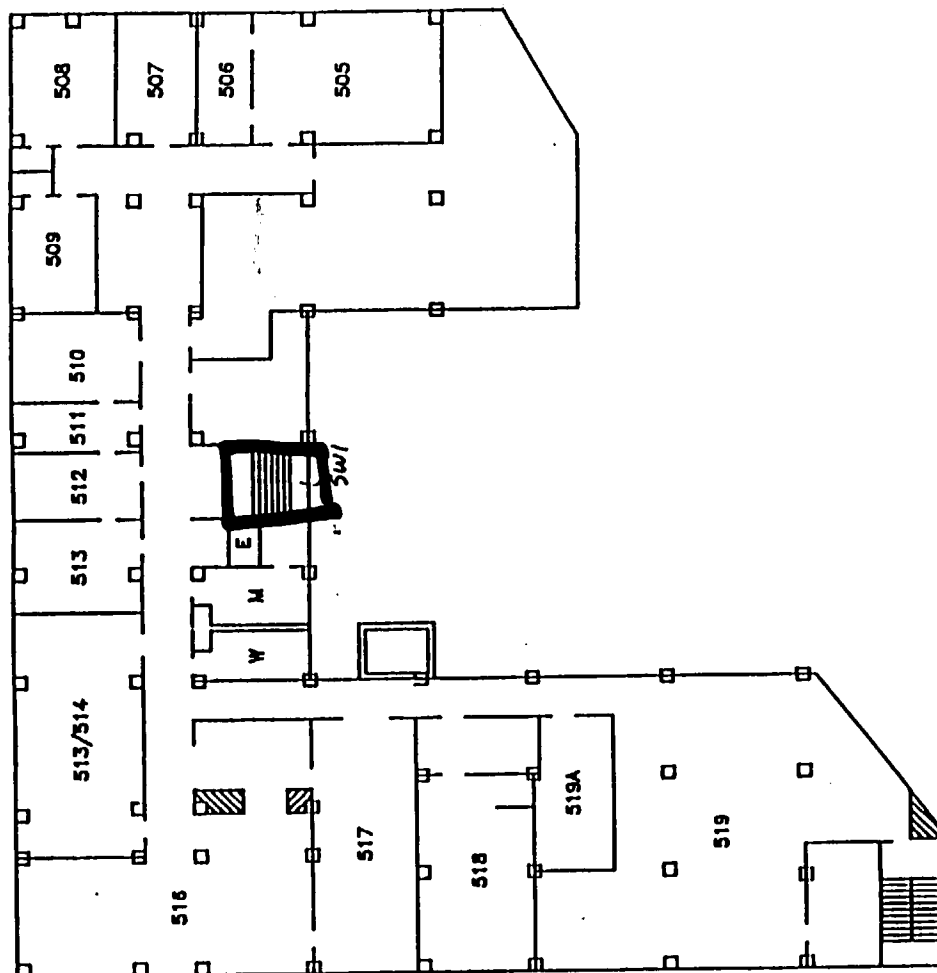
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METERS



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			DSGN MGR		DATE	
			MFG		DATE	SIZE A DWG NO SEG-93-247 REV 0
			QA		DATE	
			APPRVD		DATE	SCALE NONE SHEET 1 OF 1

SOUTH WING CENTER WING NORTH WING



PIPE CHASE

COLUMN

FEET
0 12
0 4
METERS



REV STATUS
OF SHEETS

REV 0
SHEET 1

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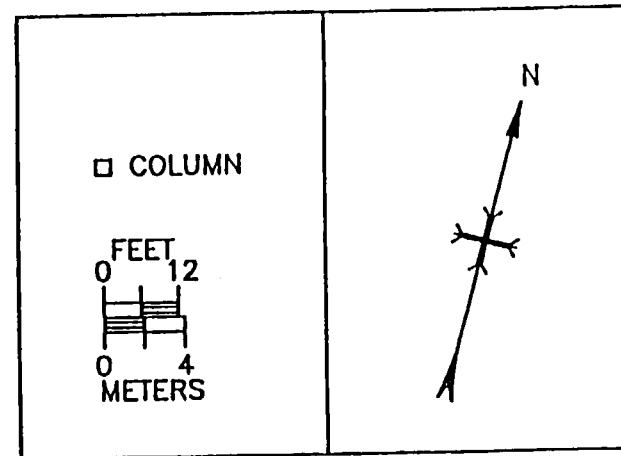
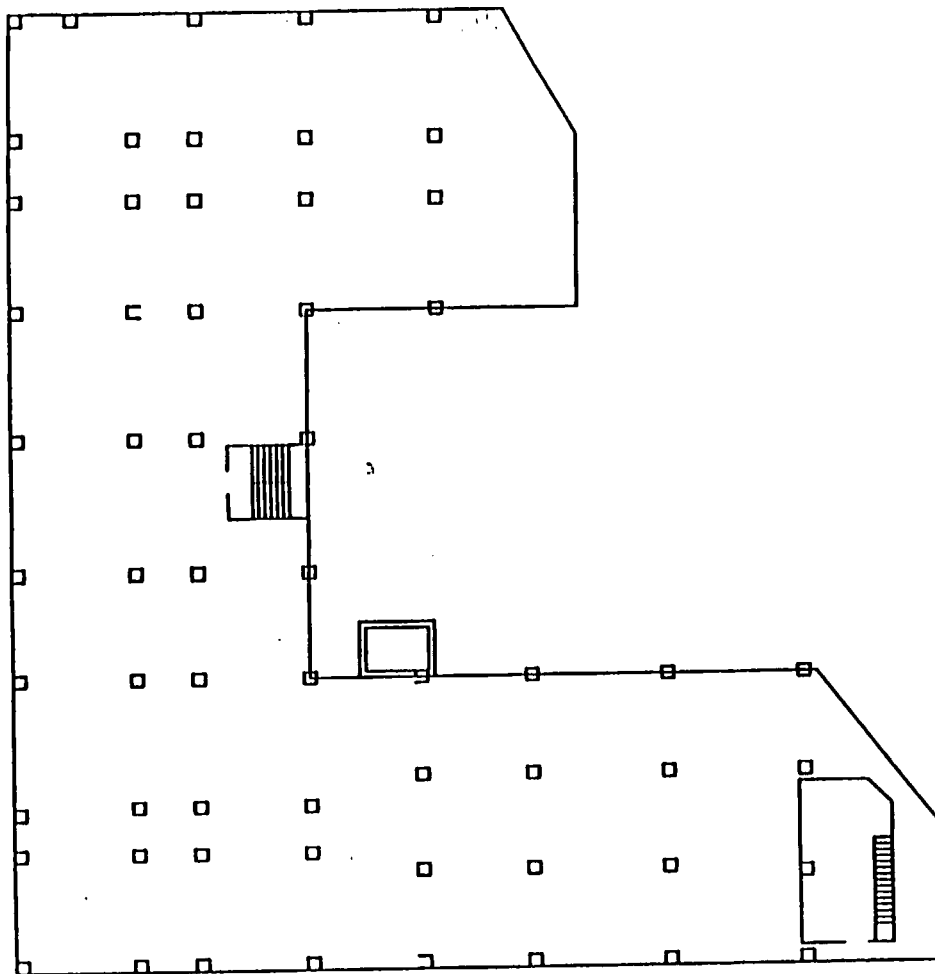


Oak Ridge Engineering
Oak Ridge, Tennessee

BUILDING 7
FIFTH FLOOR

SIZE A	DWG NO SEG-93-248	REV 0
SCALE NONE		SHEET 1 OF 1

SOUTH WING CENTER WING NORTH WING



REV STATUS OF SHEETS	REV	0
	SHEET	1

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APPRVD	





Oak Ridge Engineering
Oak Ridge, Tennessee

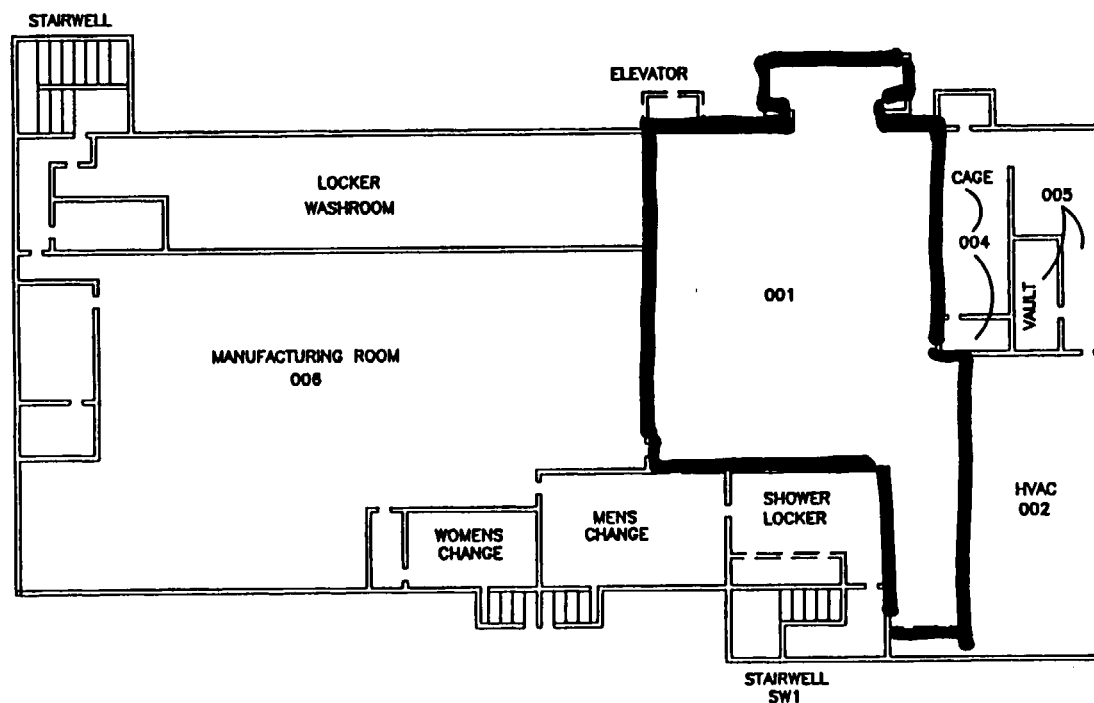
BUILDING 7
ROOF

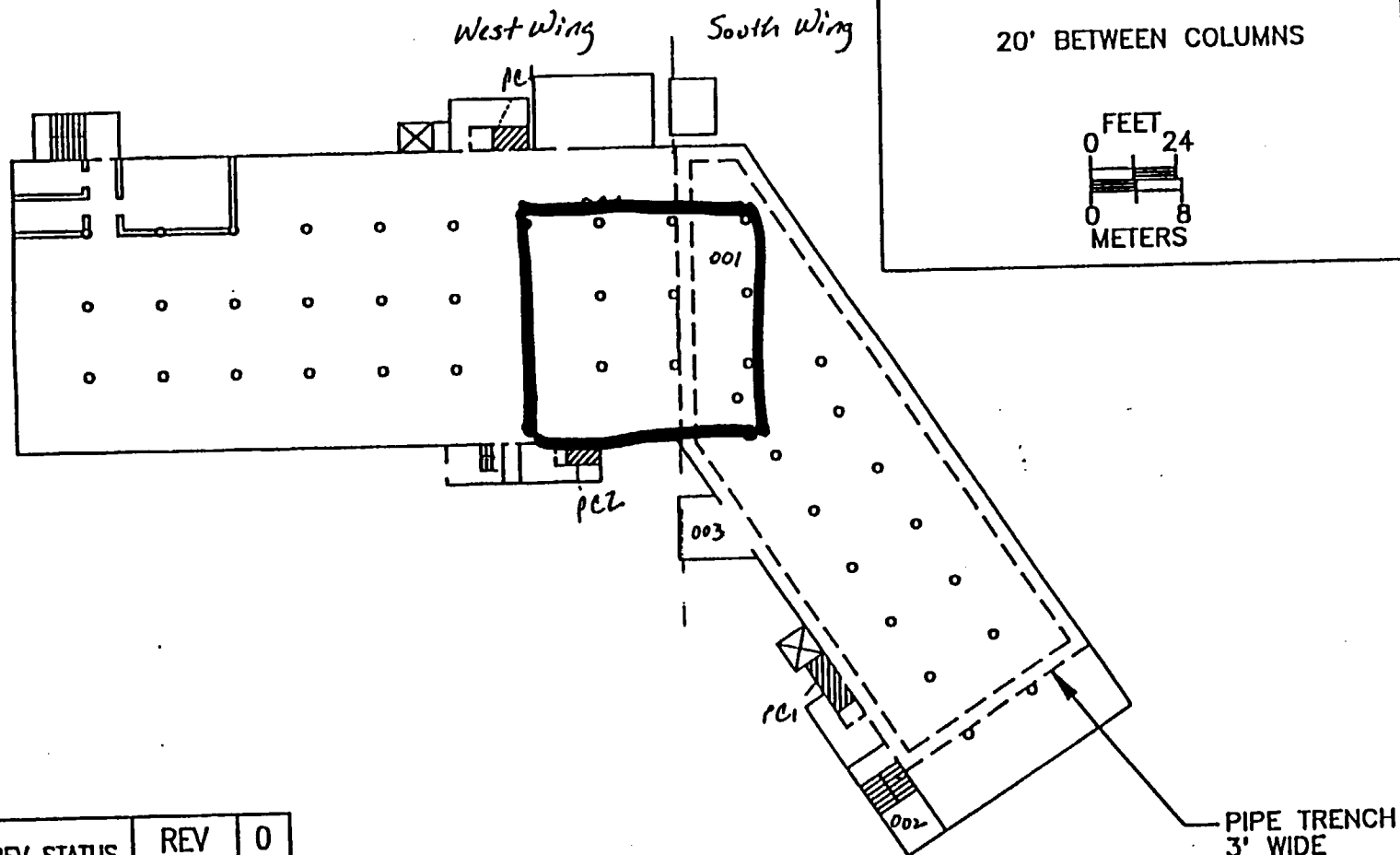
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SCALE			NONE	SHEET 1 OF 1	

APPENDIX C (continued)

Building 8

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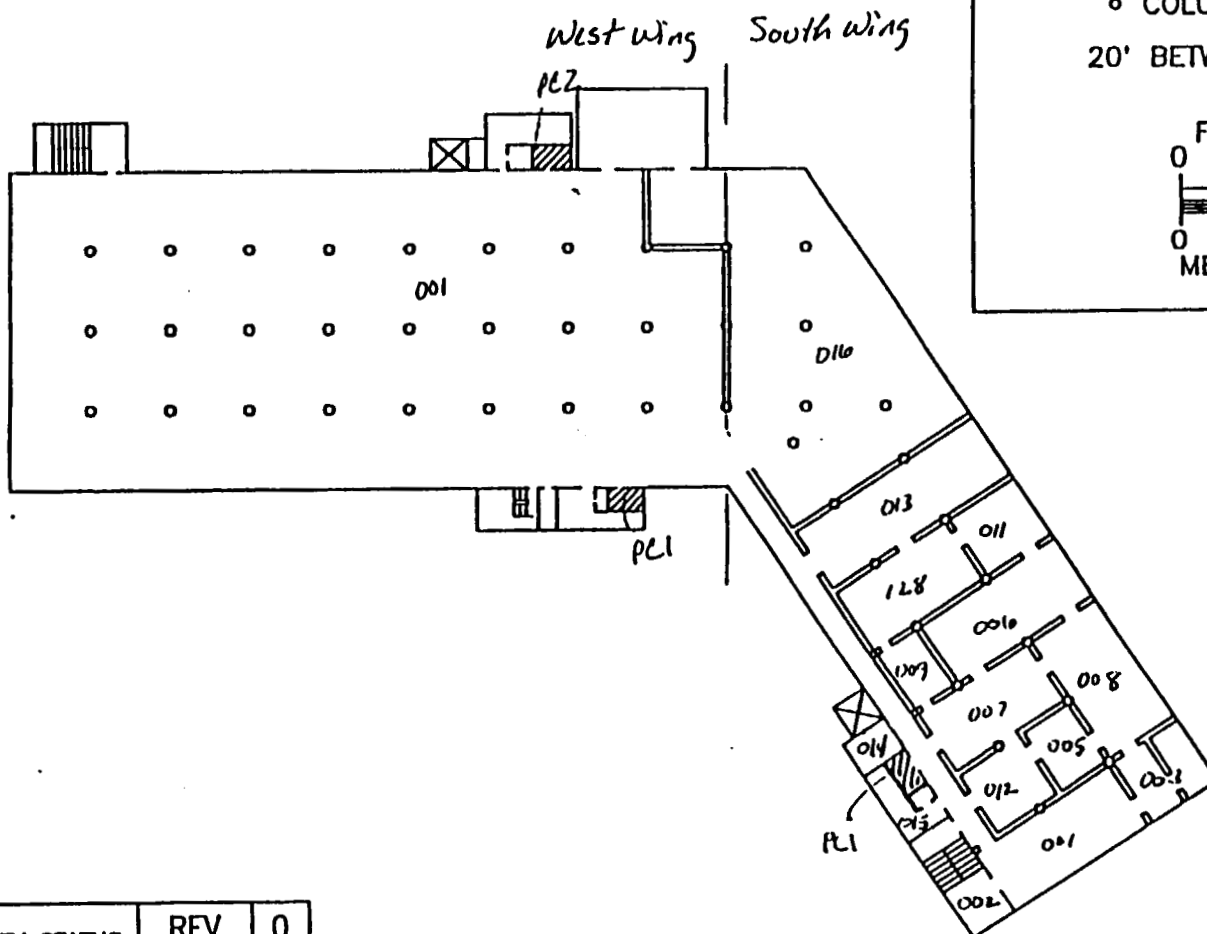
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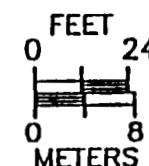
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		Oak Ridge Engineering Oak Ridge, Tennessee	
BUILDING 8 FIRST FLOOR			
SIZE A	DWG NO	SEG-93-250	REV 0
		SCALE NONE	SHEET 1 OF 1



PIPE CHASE
COLUMN
20' BETWEEN COLUMNS



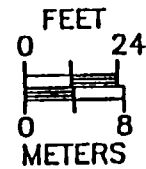
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	SHEET	1

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			MES	11-19-93		Oak Ridge, Tennessee	
			CHKR	DATE			
			DSGN ENGR	DATE	BUILDING 8		
			DSGN MGR	DATE	SECOND FLOOR		
			MFG	DATE	SIZE	DWG NO	REV
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			APPRVD	DATE	SCALE NONE		SHEET 1 OF 1

PIPE CHASE

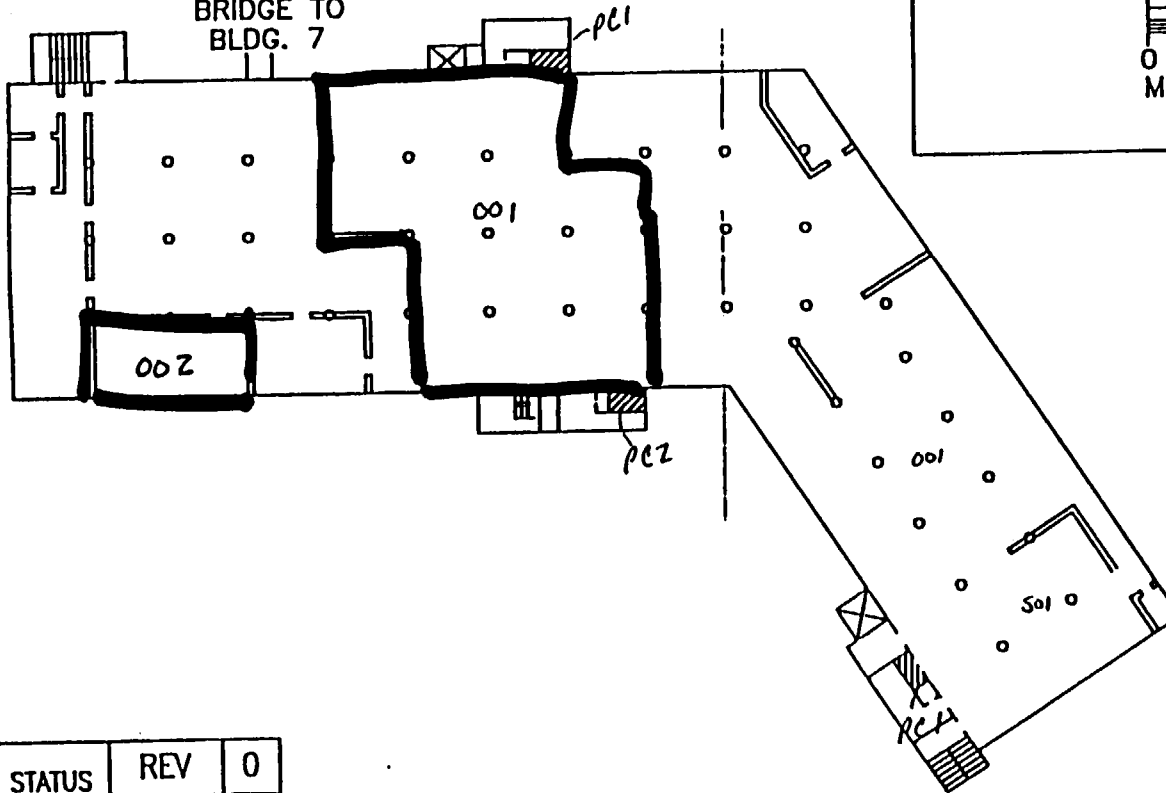
COLUMN

20' BETWEEN COLUMNS



West Wing | South Wing

BRIDGE TO
BLDG. 7



REV STATUS OF SHEETS	REV	0
	SHEET	1

REVISIONS	ZONE DESCRIPTION

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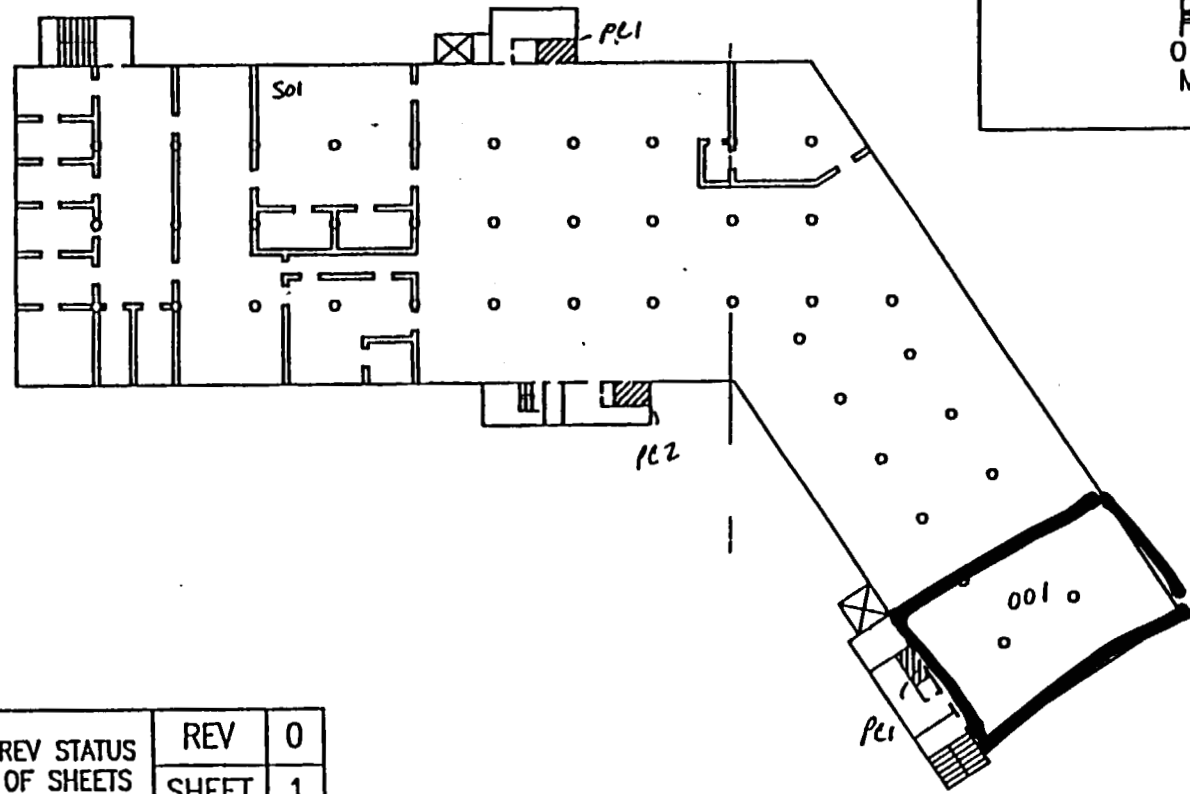


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Oak Ridge, Tennessee

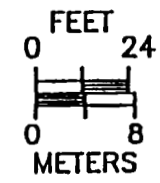
BUILDING 8
THIRD FLOOR

SIZE A	DWG NO	SEG-93-252	REV 0
SCALE NONE		SHEET 1 OF 1	

West Wing | South Wing



PIPE CHASE
COLUMN
20' BETWEEN COLUMNS



REV STATUS OF SHEETS	REV	0
	SHEET	1

REVISIONS	ZONE DESCRIPTION

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Oak Ridge Engineering
Oak Ridge, Tennessee

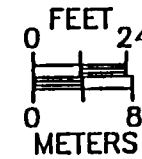
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FOURTH FLOOR

SIZE A	DWG NO	SEG-93-253	REV 0
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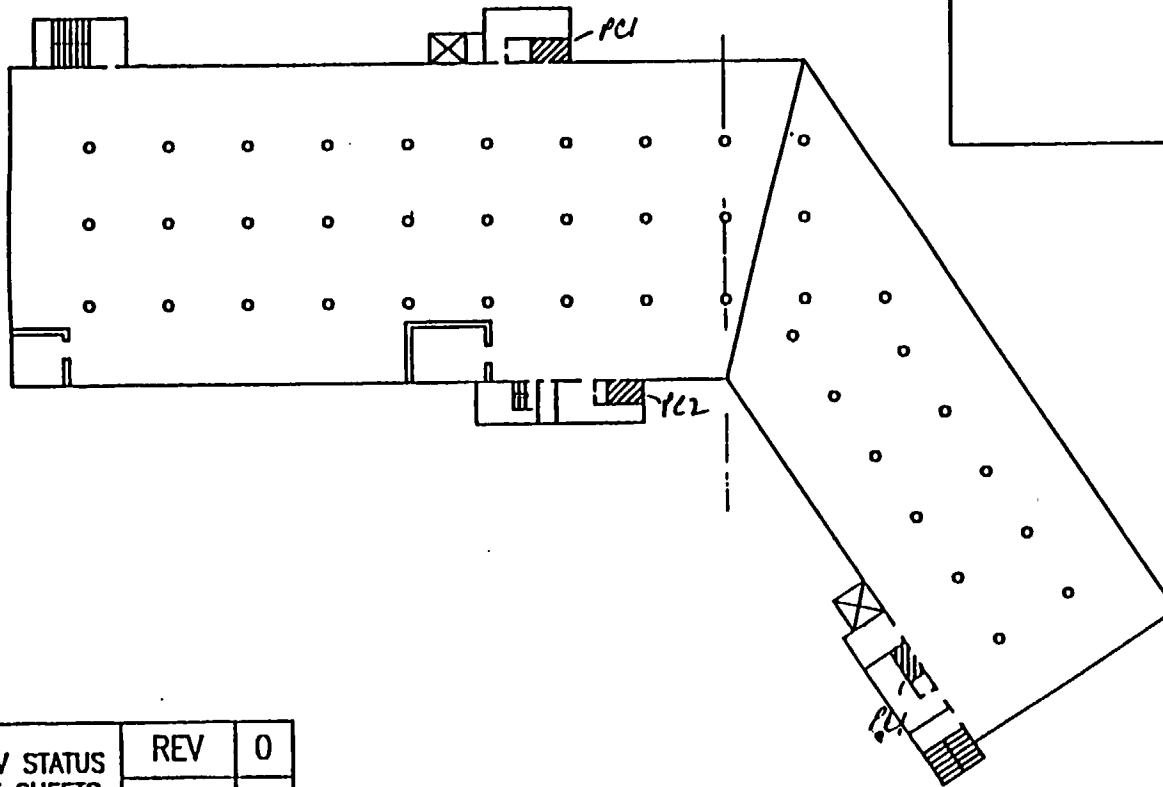
PIPE CHASE

COLUMN


20' BETWEEN COLUMNS



West Wing South Wing



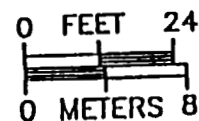
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			DSGN ENGR	DATE							
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			APPRVD	DATE							

APPENDIX C (continued)

Buildings 9 & 10A

Loading Dock



		Oak Ridge Engineering Oak Ridge, Tennessee	
BUILDINGS 9 AND 10A			
IZE A	DWG NO	SEG-93-256	REV 0
SCALE NONE		SHEET 1 OF 1	