Site Characterization, Remediation and Health and Safety Plan

For

Former
CLEVITE CORPORATION SITE
East 105 Street, Cleveland, Ohio

Submitted To:

GOULD INC.
Eastlake, Ohio

Submitted By:

SEVENSON ENVIRONMENTAL SERVICES, INC.
2749 Lockport Road
Niagara Falls, NY 14302

Revised March 3, 1994

Former CLEVITE CORPORATION Site

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1.0. INTRODUCTION

The intent of this plan is to present the methods and general sequencing of the activities Sevenson Environmental Services, Inc. proposes to employ in order to remediate the former Clevite Corporation Facility at East 105th Street.

The primary objective of this plan is to provide a site characterization plan and remediation plan for NRC approval. Once the characterization plan is approved by the NRC, the sequencing of subsequent operations is as follows:

a. Performance of the site characterization survey;

b. Submittal of the site characterization survey report for NRC approval;

c. Submittal of a revised remedial plan for NRC approval, if amendment of this Plan is required;

d. Site remediation;

e. Submittal of a final survey report;

f. Performance of a confirmatory survey by the NRC; and

g. Release of the site when confirmatory survey verifies that release requirements have been satisfied.

The remedial action will be performed in a safe, efficient, and economical manner in accordance with NUREG/CR-5849 requirements to minimize the potential of human contact with potentially contaminated material by removing this material and transporting it to a Low Level Radioactive Disposal Facility. Upon completion of this remediation, the affected areas will be restored to their original, or better, condition.

Approval of the characterization and remediation plan by the NRC will operate in lieu of obtaining NRC permits for the remedial work.

2.0. SITE DESCRIPTION/BACKGROUND

The former Clevite Corporation Facility is located at 540 East 105th Street, Cleveland, Ohio. This site is presently owned by Neighborhood Progress, Inc.

Clevite Corporation was a manufacturer of nuclear fuel under an Atomic Energy Commission license, including high-enriched uranium fuel for the U.S. Navy and AEC research reactors. The company ceased fuel manufacturing in the 1960's. A closeout radiation survey by the licensee was accepted by the AEC, and the license was terminated. The 160,000 square

foot building was sold in 1991 to Neighborhood Progress, Inc., and has been divided into smaller sections for lease.

On May 27, 1993, a Region III (Chicago) radiation specialist performed a radiation survey at the site which had been identified as a potentially contaminated site in an Oak Ridge National Laboratory review of former AEC and NRC licenses.

The survey identified low-level radioactive contamination in some cracks and crevices in the concrete floor of one portion of the building now occupied by a machine shop.

The machine shop area was surveyed because blueprints in the AEC license file identified it as a fuel manufacturing area. Other areas of the building were surveyed on a sampling basis, and no contamination was identified. Selected areas outside the building were also surveyed, and no contamination was identified.

Based upon its May 27, 1993 survey, the NRC concluded that the first floor machine shop and a few assembly areas were not decontaminated to a residual radiation level consistent with NRC Guidelines. However, the NRC also concluded these radiation levels do not constitute an immediate health and safety problem. Although the NRC believes there is no immediate danger, the NRC believes its measurements exceed NRC limits for unrestricted use.

3.0. CHARACTERIZATION AND REMEDIATION PLAN

3.1. Premobilization

Prior to mobilization, the characterization and remediation plans presented herein will require approval by the NRC. Once approval is granted, Sevenson will commence mobilization activities.

3.2. Mobilization

Upon receipt of the Notice to Proceed, Sevenson will mobilize to the site. Site mobilization includes moving men and equipment to the site in preparation of performing the characterization surveys. All workmen who will perform remedial activities will have undergone baseline physicals and OSHA and site-specific training.

3.3. Training Requirements

The primary purpose of maintaining training requirements is to ensure that all personnel know and understand radiological controls and that all personnel working on the site are aware of their responsibilities in the area of radiation protection to ensure the safe operation of the site and general safety of the public. The best protective measure available to the site is a highly trained and capable work force that

employs proper radiological controls in their work environment. Training will meet or exceed all requirements of 10 CFR 19. Specific details of the training requirements are presented in Section 10 of the Health and Safety Plan.

3.4. Radiological Surveys for Site Characterization

Once mobilized on-site, Sevenson will perform radiological surveys. The areas to be surveyed include those areas identified by the NRC as being contaminated in their December 30, 1993 report. The NRC areas include the first floor machine shop which exhibited five 1-meter grids of contamination and the hallway outside the first floor machine shop and fuel assembly area. One 1-meter grid of contamination was noted in the hallway area. Unaffected areas to be surveyed are those areas in the machine shop and hallway which are greater than 6 feet in height as well as the remaining first floor, second floor, roof and basement areas. This survey will consist of direct measurements and loose surface measurements for Beta (β), Gamma (γ), and Alpha (α).

Surveys will be performed to meet the criteria as described in NUREG /CR-5849 as described below.

Affected Areas

A grid will be established for the affected area in 1 meter squares. The grid will be limited to the floor and the lower 2 meters of the wall. One hundred percent of the exposed lower wall and floor areas will be surveyed. The survey measurements will consist of surface scans, direct measurements, and smears for removable activity. These surveys will be for both alpha and beta/gamma radiation. In addition, gamma surveys will be performed at a 1 meter distance from the floor and lower wall surfaces at a frequency of at least one measurement per every 4 square meters. Once all identified elevated areas are evaluated and remediated, systematic measurements of surface activity will be performed at 1 meter intervals.

The upper walls and ceilings of the affected areas will be surveyed at a minimum of 30 locations each on vertical and horizontal surfaces where radioactive material would likely accumulate. A scan, a direct measurement, and a smear will be performed at each of the 30 locations. The 30 locations will be determined in the field and will be in the vicinity of the remedial work.

Unaffected Areas

Scans of unaffected areas will cover at least 10% of the floor and lower wall surface area. At least 30 randomly selected measurement locations will be performed for each

survey unit. In addition, an exposure rate measurement at 1 meter from the floor will be performed at each location of surface activity measurement. Each location will be upgraded (to affected) if levels in excess of 25% of the guideline values exist. The area will then be reclassified as an affected area.

The instruments to be utilized for the radiological surveys are as follows:

Beta-Gamma Radiation, Direct and Smearable

- ***Ludlum Model 3 or 4 Scaler with a 44-9 Pancake Geiger Miller "GM" Probe***

Alpha Radiation, Direct and Smearable

- ***Ludlum Model 3 or 4 Scaler with a 43-6[illegible] Probe***

Contact and General Area Gamma

- ***Ludlum Model 3-97***

3.5. Instrument Calibration

Instruments will be sent to Applied Health Physics for recalibration. The procedure from Applied Health Physics is included as *Appendix D*. Initial calibration is performed by the instrument supplier; in this case, Ludlum. The instruments will be calibrated with Th-230 and Cs-137.

A. The 44-9 pancake probe was initially calibrated to the following parameters:

1. Efficiency for Th-230 is approx./equal to 31.9% using Th-230 s/n 1619 - 3442 cpm.

2. Efficiency for Cs-137 is approx./equal to 1.9% for gamma only, using beta shield using Cs-137 sn/ 158-112 - 0.00439 μCi.

3. Efficiency for Cs-137 is approx./equal to 47.8% for beta-gamma without beta shield using Cs-137 s/n 158-112 - 0.00439 μCi.

- Statistical Data

  Survey data and sampling calculations will be performed at a 95% confidence level. Statistical data for instrument calibration will be provided once recalibration of the equipment is performed.

- Contaminated Limits - Uranium and Thorium

  Limits above natural background at 1.0 cm from surface.

  a. *Direct Radiation*

     1. 5,000 dpm ($\beta\gamma$)/100 cm^2 averaged over one meter squared
     2. 15,000 dpm/100 cm^2

b. *Smearable*

1. 1,000 dpm (α)/100 cm^2
2. 1,000 dpm ($\beta\gamma$)/100 cm^2

c. *Dose Rates*

1. Direct radiation measurements not to exceed 200 μR/hr (average)
2. 1,000 μR/hr (maximum)

3.6. Characterization Report

Upon completion of the site characterization surveys, a formal characterization report will be compiled and submitted to the NRC for formal approval.

3.7. Site Remediation

Work zones will be established prior to the commencement of any remedial activities. The remedial work zones are discussed in detail in the Health and Safety Plan.

Work will consist of "hand" excavation/chipping methods. Identified areas will be chipped using hammers, chisels or small electrically operated chipping guns. During all chipping operations, HEPA vacuums will be utilized to collect all dust and particles. The Health Physicist Technician will be present during all remedial activities to insure dust mitigation does not occur as well as determining remedial limits by radiological survey. Contaminated materials collected in the HEPA vacuum will be placed in DOT-approved 55-gallon drums in preparation for transport to a licensed disposal facility. Remediation will occur after normal working hours (e.g. second shift) so that normal plant operation will not be affected. Remediated areas will be cleaned, then restored to their original condition. Restoration will primarily consist of applying "flash patch" concrete to disturbed floor areas and paint "touch-up". Equipment and materials that can be decontaminated will be. Decontamination

water will be placed in properly labeled 55-gallon drums for proper filtering or disposal. Personnel and equipment decontamination procedures are discussed in the *Health and Safety Plan.*

3.8. Final Survey Report

Final verification surveys of the remediated areas will be performed to the guidelines noted in Item 3.4., above. The report will be prepared by Sevenson and submitted to the NRC.

3.9. Transportation and Disposal

Sevenson anticipates approximately two (2) 55-gallon drums of material may be collected (15 Cubic Feet ±) from the remedial activities dependent upon results of the site characterization surveys. The controlled material will be placed in DOT-approved containers (drums) in preparation of transportation and disposal. A licensed hauler will be utilized to transport this material to a facility permitted to accept this material.

The waste will be properly manifested, then shipped to the disposal facility. The selected disposal facility will be submitted to Gould Inc. prior to disposal.

3.10. Demobilization

Once all remedial activities are complete, Sevenson will demobilize. All men and equipment will be removed from the site. The site will be left in its original, or better, condition.

APPENDIX A
HEALTH AND SAFETY PLAN

CLEVITE CORPORATION SITE REMEDIATION
Cleveland, Ohio

HEALTH and SAFETY

PLAN

Submitted to:

GOULD INC.
Eastlake, Ohio

Submitted by:

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February 24, 1993

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HEALTH AND SAFETY PLAN

1.0 GENERAL

The Health and Safety Plan will provide for a safe and minimal risk working environment for on-site personnel. It also provides for emergency response procedures to minimize the potential adverse impact of construction activities on the general public. The controls described in this Plan are designed to maintain exposures as low as can be reasonably achievable (ALARA).

2.0 BASIS

The Occupational Safety and Health Administration (OSHA) Standards and Regulations, Parts 1910 and 1926. Standards for Radiation protection and training (10 CFR 20 and 19) of the Nuclear Regulatory Commission, 40 CFR 61 (parts A&M) of the Environmental Protection Agency, provide the basis for the safety and health program. Additional specifications within this section are in addition to the regulatory requirements and reflect the positions of the National Institute for Occupational Safety and Health and American Conference of Governmental Industrial Hygienists.

3.0 PERSONNEL RESPONSIBLE FOR SAFETY and HEALTH

The following personnel as illustrated in Figure 1 are responsible for the safety and health program to be implemented at this Site:

1. Paul Hitcho - Health and Safety Officer (Certified Industrial Hygienist (Certificate #2771)

His duties are:

a) Develop, implement, update as appropriate, and enforce the site specific safety, health and emergency response plan.

b) Provide continuing health and safety support, as needed.

c) Review results of air monitoring and accident reports.

d) Weekly oversight in conjunction with Health Physicist.

2. Anthony Certo - Superintendent

His duties are:

a) Overall responsibility for work operations.

b) Assist the Health Physics Technician in the identification of existing and predictable hazards and to take prompt corrective measures to eliminate these hazards.

3. Rory Grube - Radiological Safety Officer/Health Physicist

His duties are:

a) Supervise and perform radiological monitoring and analysis.

b) Review and evaluate radiological surveys.

c) Prepare reports.

4. James Davis - Health Physics Technician

His duties are:

a) Conduct radiological monitoring and analysis.

b) Assist in report preparation.

c) Enforce site specific safety and health plan.

The Health Physicist has authority from to halt or interrupt any operation involving radiation or radioactive materials that is deemed to present an imminent danger of exposure to unacceptable levels of radioactivity by workers or the public. The Radiation Safety Organization has authority to carry out all duties needed to operate the Radiation Safety Program as it is described herein.

4.0 ACCIDENT PREVENTION PLAN

General

During all active site work, Sevenson will implement and maintain an Accident Prevention Plan to ensure safe, accident free completion of the site work. As a minimum, Sevenson will implement the safety standards presented in 29 CFR 1926.

Sevenson's designated Superintendent/Competent Person (Anthony Certo) will be directly responsible for enforcing the Safety Plan for Contractor and Subcontractor personnel and

will report directly to the Health Physics Technician (HPT) any unsafe site activities as they occur.

This project may involve contact with Uranium-235 (U-235) and Thorium-230 (Th-230) contaminated material. Whenever radioactive contamination is a component in the workplace, the inherent hazard must be considered and steps must be taken to reduce the risk of harm to workers and the public to a reasonably low and acceptable level.

Exposure from radioactive contamination that may enter the body through inhalation, ingestion or a break in the skin and expose the cells through intimate contact presents the chief concern.

Radiation is know to produce cellular damage and subsequently a wide range of adverse bodily responses. These include tumors, cataracts, leukemia, damage to blood forming organs, the lowering of resistance to bacterial and viral infection, and the possibility of cellular mutations that may show up with the incidence of abnormalities in subsequent progeny. Levels of radioactivity associated with this project are extremely low and near normal background, therefore, the above mentioned bodily responses are highly unlikely.

Some risk to workers and the public is inherent in any project where radioactive materials are involved. However, risk can be minimized and kept within acceptable

limits if adequate radiation safety monitoring is carried out to assess daily exposures and effective radiation exposure controls are made an essential part of the operational plan.

Sevenson has developed a comprehensive accident prevention program which follows the requirements listed in 29 CFR 1926.

Some of the more important features of the program are:

1) Statement of company policy.
2) Delegation of responsibility.
3) A self inspection guide.
4) Safety meetings.
5) Outline of topics suitable for safety meetings.
6) Fire prevention program.
7) Posting requirements.
8) Assured equipment grounding conductor program.
9) Policy for violation of safety rules.
10) Accident investigation.
11) General safety rules for employees.

The hazards that are expected to be encountered by personnel with the exception of possible employee exposure to the radiation are common to any work site. Some of these hazards and their applicable OSHA regulations would include:

1) Electrical - (1926.400)

2) Fire protection and prevention - (1926.150-152)

3) Housekeeping - (1926.25)

The other problems expected to be encountered i.e., personal protection, first aid, and emergency procedures are discussed more fully in other sections of this plan.

The Certified Industrial Hygienist will be responsible for the implementation and overview of the program while the HPT will manage the program on a daily basis. The HPT will determine whether any of the safety rules are -being violated, advise the employee on the proper procedure(s), initiate any disciplinary action which may be required, conduct the daily safety inspections, investigate all accidents, and make recommendations that will correct all unsafe conditions.

It is anticipated that all phases of the project will have essentially the same types of hazards present, and there will be no change in the emphasis of our accident prevention program.

There will be weekly safety meetings conducted by the HPT. The topics will be developed in conjunction with the Certified Industrial Hygienist and Health Physicist. All on-site personnel will be required to attend the safety meetings. A log will be kept of the attendees and subjects covered.

Basic fire prevention measures will be followed. A Fire Alarm Plan is included as a section of this Plan.

The site will be kept in a neat and orderly fashion. Non-contaminated refuse will be disposed of on a regular basis. The disposal of contaminated material is discussed in the section on decontamination.

Electrical equipment will be checked to determine whether it is properly grounded and there are no frayed cords or other obvious defects.

There will be one person on site at all times trained and certified in first aid and cardiopulmonary resuscitation. There will also be an industrial first aid kit located in the site office. All injuries and/or illnesses will be reported to the HPT who will then decide on the proper course of treatment i.e., routine first aid or emergency medical treatment. The emergency medical treatment facility and the route to be followed to get there is discussed in another section of this plan.

All accidents and property damage will be reported to the HPT who will then investigate the accident and make recommendations to prevent its reoccurrence.

The HPT will make a daily safety inspection of the site. All safety hazards will be immediately corrected.

5.0 FIRE ALARM PLAN

The basic outline of the fire alarm program is as follows:

1) The alarm system will be activated when any on-site personnel notices the presence of a fire. Initial warnings will be sent out to all personnel carrying a radio, who will then be responsible for notifying their respective crews.
2) As soon as the initial alarm to on-site personnel is completed and evacuation is under way, outside assistance will be immediately requested if deemed necessary by the HPT.
3) Personnel not intrinsically involved in on-site emergency response procedures will evacuate to an area upwind of the fire. If the fire can be treated with a fire extinguisher, personnel closest to the fire will obtain a fire extinguisher and attempt to extinguish the fire. This will be attempted only if there is minimum risk to the personnel involved. Sevenson personnel have received training in the

use of fire extinguishers, but they have not received fire brigade training as outlined by OSHA.

6.0 WORK ZONES

Sevenson will clearly layout and identify work areas in the field and will limit equipment, operations, and personnel in the area as defined below:

a. **Exclusion Zone** (Hazardous or Contaminated Zone) -This will include all areas in which significantly contaminated material are to be removed or handled and contaminated surface areas adjacent to these areas. This zone would include all areas:

   1) In which removal takes place.

   2) Where surface contamination has been found to exceed the specified limits.

The Exclusion Zone will be clearly delineated in the work area prior to commencing site work by warning take spaced around the perimeter of the Zone warning of a hazardous work area.

Access to the Exclusion Zone will be restricted to personnel who are wearing the proper personal protective equipment and proper dosimetry, have received the

required medical examination, and have undergone the safety and health training. Eating, drinking, or smoking is prohibited in this area. All personnel will be scanned for radiological contamination prior to exiting the CRZ.

b. Contamination Reduction Zone - This zone will occur at the interface of the Exclusion Zone and the Support Zone and will provide for the transfer of construction materials and equipment, and the decontamination of equipment and personnel prior to entering the Support Zone, and for the physical segregation of the Support Zone from the Exclusion Zone. All materials, equipment, tools, and vehicles removed form this zone for uncontrolled release must be certified as uncontaminated by the HPT.

Access to the Contamination Reduction Zone will be restricted to personnel who wear the proper personal protective equipment, have undergone the medical examination, and have participated in the training program. Eating, drinking, or smoking is prohibited in this area.

c. Support Zone - This area is the remainder of site and is defined as being an area outside the zone of significant air and surface contamination. The Support Zone will be clearly delineated and procedures will be implemented to prevent active or passive contamination from the work site. The functions of the Support Zone include:

1) An entry area for personnel, material, and equipment to the Exclusion Zone;

2) An exit area for decontaminated personnel, materials, and equipment from the Contamination Reduction Zone;

3) A storage area for clean, safety and work equipment.

The Support Zone will be clearly delineated in the field.

7.0 EQUIPMENT and PERSONNEL DECONTAMINATION

Sevenson will provide and require the use of:

a) Contained storage and disposal for used disposable outerwear; and

b) Hand/face washing facilities.

c) Portable shower.

All personnel who have worked in the Exclusion Zone will be considered to be contaminated, and they will be scanned for radioactivity before they leave the area. An action level of 1000 dpm (β, γ)/100 cm^2 has been established, and if a person's hands, shoes, clothing or body, exhibit a level of radioactivity greater than the action level, they then must be decontaminated. Water from the decontamination process will go to a retention tank so the water can be filtered or disposed of as radioactive waste if analysis

confirms that this water is contaminated. If the water is not contaminated, it will be discharged to the sewer system. Items with activities lower than the action level will be considered clean.

8.0 MEDICAL SURVEILLANCE

Sevenson will utilize the services of physicians who are board certified in occupational medicine to supervise the medical surveillance program. Sevenson's medical consultants are affiliated with the Thomas Jefferson Medical College, Philadelphia, Pennsylvania.

The medical examination will consist of:

- Medical History
- General Physical, including evaluation of all major organ systems
- Pulmonary Function Examination (at least FVC and FEV 1.0)
- Electrocardiogram
- Stress Test (optional)
- Chest X-Ray (optional)
- Otoscopic Examination
- Audiometric Examination
- Visual Acuity Examination
- Blood Tests, Blood Count, Blood Profile - (SMAC 25)

- Radiation Bioassay (Uranium-235 and Thorium-230)

Medical examination will be given in the following conditions.

1) More than a year has passed since the employee's last examination.
2) The employee experiences an acute exposure that results in demonstrable symptoms to a toxic or hazardous material, or an injury.
3) The Examining Physician, the Health Physicist, the CIH, the CHP, or HPT recommends one.
4) Initial and exit examinations will be given to all affected employees. (Radiation Bioassay)

Sevenson will obtain a certification from the occupational physician that the employee is medically fit to wear respiratory protection and has no medical condition that would place him at an increased risk. No employee will be permitted to work in the Exclusion Zone until his certificate has been submitted to the Gould Representative.

All medical records will be kept for at least 30 years and will be made available, as required.

9.0 LEVELS OF PROTECTION/PERSONNEL PROTECTIVE EQUIPMENT

Sevenson will provide for on site personnel and visitors all necessary protective clothing and equipment and maintain it in accordance with the manufacturer's specifications. All equipment will be NIOSH approved.

All of Sevenson's personnel who are required to wear a respirator will have to pass a fit test given in accordance with 1910.134. Respirators will not be interchanged between workers without cleaning and sanitizing. Cartridges will be changed daily or upon increased resistance.

Prescription glasses worn on site will be safety glasses. Prescription lens inserts will be provided for all employees who wear a full face air purifying respirator.

All personal protective equipment worn on-site will be decontaminated or properly disposed of at the end of the work day.

The following are the various levels of protection that may be in effect for this project:

A. Partial - gloves or gloves and boots.

   1. Only when contamination levels are greater than the limits and less than 10 times the limits for loose surface contamination.

   2. No airborne generating evolutions.

3. With permission of HP technician.

B. Full - one set of: cotton gloves, rubber gloves, coveralls, rubber boots etc.

1. When loose surface contamination levels exceed the release limits and are less than 10 times the limits.

2. With unknown levels of contamination.

3. When directed by an HP technician.

C. Double - double: coveralls and rubber gloves.

1. When loose surface contamination levels exceed the release limits by 10 times the limits.

2. When directed by an HP technician.

D. Respiratory protection.

1. Respiratory protection, unless otherwise indicated by Health and Safety, is required if airborne activity is greater than 10% DAC or

2. When dry, loose contamination greater than 10,000 dpm/100 cm^2 alpha or 10,000 dpm/100 cm^2 beta is present on the work surfaces or in the immediate work area and has area. Contaminants that are wet, oily or otherwise not readily mobilized may not require the use of respiratory protection if the potential for becoming airborne is low. The respiratory requirements should be based primarily on air samples in these instances.

Personal protective downgrade will only occur when:

1) The HPT makes the change based on site activity, air monitoring of contaminant levels, and work place practices as specified in this plan.

2) The Certified Industrial Hygienist approves the change.

The following provisions apply to respiratory protection:

a) Employees who are required to wear respirators must pass a pulmonary function test.

b) Each time a respirator is donned the employee must perform a positive pressure/negative pressure fit test.

c) No facial hair which interferes with a satisfactory fit is permitted. A "two-day" growth of beard is considered to interfere with the fit.

d) Cartridges and filters shall be changed daily or more frequently if increased resistance occurs.

10.0 SAFETY TRAINING

Sevenson will provide and require that all personnel assigned to or entering the site complete training or refresher sessions.

Training and refresher sessions will ensure that all personnel are capable of and familiar with the use of safety, health, respiratory, and protective equipment and with the safety and security procedures required for this site. The training session will include the OSHA mandated 40 hour training course for new Sevenson personnel, as well as, refresher courses for those persons who have had this training.

Documentation will be available to the Gould Representative that each employee has satisfied the requirements of the OSHA training regulation 1910.120(e).

Severson will provide and conduct a training program on site for all site personnel prior to commencing work within the EZ. This training program will address as a minimum the following topics:

a) Potential hazards;

b) Biology, chemistry and physics of hazardous materials;

c) Rights and responsibilities of workers under OSHA;

d) Standard safety operating procedures;

e) Types of monitoring equipment to be used;

f) Site Safety Plan;

g) Internal and external communications;

h) Medical surveillance program;

i) Personal protective clothing and equipment;

j) Respiratory equipment including training and qualitative fit-testing for full facepiece respirators;

k) Air monitoring program;

l) Decontamination procedures;

m) Evacuation, first aid and emergency procedures dealing with fire and medical situations;

n) Work zones established at the site;

o) Safe work practices associated with employee's work assignment, including dust control measures, hazardous materials recognition, and use of the buddy system;

p) Basic operational safety, emphasizing hazards expected on site, and

q) Prohibitions (inside EZ and CRZ), including:

1) Glasses or facial hair, such as beards or long sideburns, which interfere with respirator fit;

2) Contact lenses;

3) Eating, drinking, smoking, chewing in the EZ or CRZ;

4) Wearing of personal articles, e.g., watches, rings, etc.; and

5) Working when ill.

r) Discussion of radioactivity, the types of radiation, how radiation interacts with matter, the relationship of radiation and radioactive materials, and the nature of radioactive contamination.

s) Discussion of the biological effects of radiation, the difference between acute and chronic effects, the difference between somatic and genetic effects, and a comparison of the risks of working with radiation and other potential hazards.

t) Discussion of the measures that are taken and are required of workers to reduce risk of exposure to radiation at the project site to an acceptable level. This includes instruction in the site radiation safety procedures.

All personnel assigned to the site will receive this training. Upon completion of this training, a training acknowledgement log will be completed and submitted to the Construction Officer. The training acknowledgement logs will include provisions for the following information:

a) Employee or visitor's name

b) Verification of topics covered, including:

1) Materials used;

2) Equipment demonstrated;

3) Hands-on equipment practice for each employee;

4) Prohibitions covered;

5) Buddy-System explanation; and

6) Standard operating procedures.

c) Date and signature.

In addition to the safety and health training, site personnel will receive Radiation Worker Training (RWT) in accordance with 10 CFR 19. The training will conform to the following criteria and training topics:

A. Radiation protection training is required for all occupational workers.

1. Radiation protection training is required before unescorted access is allowed within the controlled areas.

a. Satisfactory training is documented by successful completion of a written examination.

b. Passing for a written examination is 75 percent.

2. All occupational workers are to receive documented requalification training.

a. Qualification will expire 24 months after the successful completion of the training cycle.

b. Requalification can be documented by completion of the training course or through completion of an authorized bypass examination process as incorporated by the training department and Health Physics department.

3. Training will be commensurate with and based o the individuals job assignment.

4. The minimum required information to be presented include:

a. Responsibilities, accountabilities, and authorities for their position.

b. Radiation protection administration and line organization.

c. Documentation of safety awareness regarding radiation protection.

5. Retraining shall be provided when there are significant changes to Health Physics policies and procedures which affect occupational workers.

B. Occupational Worker Training

Note: Training is to be commensurate with the job functions and work scope of the individuals.

1. Required for all occupational workers.

2. Knowledge level is based on the occupational worker whose normal duties are performed in non-radiological areas (i.e., clerical and administrative workers who have limited access to the radiological areas).

3. The minimum training requirements include, but are not limited to:

a. Radiation and contamination control.

b. Somatic and genetic health effects from exposure to ionizing radiation.

c. Allowable exposures to the unborn child.

d. Requirement for the individual to inform her supervisor of her pregnancy.

e. The risk of low-level radiation exposure; including cancer and genetic effects.

f. The risk of prenatal radiation exposure.

g. Basic radiation protection concepts.

h. Company radiation protection policies and procedures.

i. Employee and management responsibilities for radiation safety.

j. Emergency procedures.

C. Radiation Worker Training

1. This training is mandatory for any individual who performs work in a designated radiological area and/or whose designated work area is in a radiological area.

2. Requirements include:

a. Successful completion of Occupational worker training.

b. Training should include classroom training and applied training as necessary.

(1) Training under assignment is acceptable if the training is done under qualified supervision.
(2) Completion of training is required prior to assignment as a Radiation worker.

c. Successful completion of training that includes as a minimum, but is not limited to the following, commensurate with the worker assignment:

(1) Radioactivity and radioactive decay.
(2) Characteristics of ionizing radiation.
(3) Man-made radiation sources.
(4) Acute effects of exposure to radiation.

(5) Risks associated with exposure to radiation.
(6) Special considerations in the exposure of women of reproductive age.
(7) Dose-equivalent limits.
(8) Mode of exposure - internal and external.
(9) Dose-equivalent determinations.
(10) Basic protective measures - time, distance, and shielding.
(11) Specific site procedures for maintaining exposures ALARA.
(12) Radiation survey instrumentation - calibration and limitations.
(13) Radiation monitoring programs and procedures.
(14) Contamination control, including protective clothing and equipment and workplace design.
(15) Personnel decontamination.
(16) Emergency procedures.
(17) Warning signs and alarms.
(18) Responsibilities of employees and management.
(19) Interaction with Health Physics staff.
(20) Operational procedures associated with specific job assignments.

d. Successful completion of training will include the satisfactory completion of the following practical factors.

(1) Donning and removal of anti-contamination clothing and devices.
(2) Whole body frisking techniques.
(3) Hand and foot frisking techniques.
(4) Vehicle monitoring.

D. Health Physics Technician Training

1. Successful completion of Radiation Worker training is required.

2. Successful completion of a written examination with a passing score of 80 percent is required.

3. Formal training in all operational aspects of the site radiological protection program. This will include lessons learned and changes to operational procedures that affect radiological practices.

4. Topics should familiarize the worker with.

a. Fundamentals of radiation protection.

b. Procedures and methodology for maintaining radiation exposure ALARA.

Personal dosimeters (TLD badges) will only be issued to individuals who have successfully completed this training.

All on-site personnel will participate in daily safety tailgate meetings that address the health and safety concerns presented by the day's tasks. Training attendance and participation shall be documented in a meeting log. The CIH will delegate the day-to-day implementation of this follow-up training to the HPT.

All visitors will be required to undergo a training program conducted by the HPT providing the training does not prevent the HPT from performing his designated duties consequently causing a delay in site work. The training will consist of:

1) Hazards present at the site.

2) Effects of these hazards.

3) Progress of work and the relationship of the present work in regard to the type of hazards that may be encountered.

4) Emergency signals and procedures.

5) Type and limitations of personal protective equipment in use.

6) Proper use of protective equipment.

7) General safety rules and policies in effect at the site.

8) Completion of a training acknowledgement log.

If a visitor does not, for any reason, obtain the required training nor have the required OSHA training and medical examination, they will not be permitted in the Exclusion or Contaminant reduction zones.

11.0 STANDARD SAFETY OPERATING PROCEDURES

The following general safety rules will be in effect for all site personnel:

1) Eating, drinking, smoking, chewing gum or tobacco, and other practices that increase the probability of hand-to-mouth transfer and ingestion of material is prohibited in any area designated contaminated.

2) Hands and face shall be thoroughly washed upon leaving the work area and before eating, drinking, urinating, or other activities.

3) Medicine and alcohol can increase the effects of exposure to toxic chemicals. Therefore:

   a) Personnel using prescription drugs shall inform the doctor who prescribed them of their potential contact with toxic materials.

b) Personnel who take over-the-counter drugs within a day before work on the site must inform the HPT of the warnings listed on the drug's container (the part of the label that says, for example, "Do not take this medication if you are operating a motor vehicle").

c) Alcoholic beverage intake shall be prohibited during project operations. Personnel under the influence of alcohol or recreational or illegal drugs will not be allowed on site.

12.0 EMERGENCY EQUIPMENT and FIRST AID REQUIREMENTS

Sevenson will provide the following emergency and first aid equipment within the on-site storage trailer:

1) Industrial type first aid kits;

2) 2A:10B:C fire extinguishers;

3) Emergency eye wash units; and

4) Spill kit consisting of shovels, drums, and absorbent material.

13.0 RECORD KEEPING

Sevenson will maintain all records documenting the implementation of this plan. The records will include:

1) Training Logs

2) Daily Logs

3) Real Time Air Monitoring for Particulate

4) Documentation of Safety Meetings

5) Decontamination Logs

6) Monitoring Equipment Calibration Sheets

7) Radiological Monitoring

8) Accident Report

9) Employee/Visitor Register

10) Medical Certifications

If an accident or a release of radioactive materials occurs during the course of the project, the Gould Representative will be notified immediately and receive a written report within 24 hours. Accidents or releases will also be reported to NRC Region III and other cognizant agencies such as state and city as soon as Gould is notified.

The report will include the following items:

- Name, organization, telephone number, and location of the Contractor.
- Name and title of the person(s) reporting.
- Date and time of the accident/incident.
- Location of the accident/incident, i.e., site location, facility name.

- Brief summary of the accident/incident giving pertinent details including type of operation ongoing at the time of the accident/incident.
- Cause of the accident/incident, if known.
- Casualties (fatalities, disabling injuries).
- Details of any existing chemical hazard or contamination.
- Estimated property damage, if applicable.
- Nature of damage, effect on contract schedule.
- Action taken by the Contractor to ensure safety and security.
- Other damage or injuries sustained, public or private.

Daily safety inspection logs will be submitted to the Gould Representative for review and include the following items:

- Date
- Employees in the particular areas
- Equipment being utilized by the employees named
- Protective clothing and equipment being worn by the employees
- Respirator daily fit-testing documentation, when worn
- Air monitoring results
- Signature of HPT

A daily radiation safety report will be submitted to the Gould Representative for review and include the following items:

- Date
- Summary of surveys and samples completed
- Results of air sample analysis
- Summary of soil samples performed
- Unusual occurrences or problems
- Corrective actions taken
- Summary of soil excavation, if performed
- Status of site conditions
- Signature of HPT

Employee's and Visitor's Logs shall include:

- Date
- Name
- Address
- Representing Agency or Company
- Time entering site
- Time exiting site

14.0 EXPOSURE MONITORING and SAMPLING

Radiation monitoring will consist of area, personal, site waste, occupational and environmental air samples.

A. Area Monitoring

1. Gamma - Once a shift HPT or his designee will monitor the gamma radiation exposure adjacent and inside the Exclusion Zone and record his findings on radiological survey forms.
2. Real Time Particulate - A real time particulate monitoring program supplements the airborne radioactivity monitoring program. The HPT or his designee makes real-time measurements using a MDA-PCD1 or P5-H2 at least once each hour during active work in Radiation Control Areas near suspected sources of dust emission. The results of this monitoring are recorded in the Daily Safety Log.

B. Personnel Monitoring

1. External Exposure
   a) Site personnel will be assigned a Landauer^{R} K-1 Thermoluminescent Dosimeter (TLD) which is evaluated once for this project to accurately determine their external radiation exposure. TLD's are worn by those to whom they have been issued whenever they enter an Exclusion Zone. TLD's will not be issued unless the individual has completed the required

40 hour OSHA Safety and Health training, a satisfactory medical surveillance examination, site specific training, and radiation worker training.

2. Particle - Throughout the period of excavation, the HPT or his designee collects low volume air samples at each work location where the highest concentration of radionuclides is expected. RAS-1 air sampling pumps will be calibrated to collect a minimum of 10,000 liters of air for an individual or group of individuals. The samples will be analyzed for activity using a counter.

3. Bioassay - Urine samples are collected from each contractor employee prior to his initial entry into the Exclusion Zone. These samples are analyzed for U-235 concentrations. Subsequent samples are collected and analyzed at the end of the project.

4. Scan - A Beta Geiger-Muller Detector will be used to scan personnel and equipment (especially feet, hands, tires, and equipment shovels) for surface radioactive material contamination.

C. Site Wastes

1. Personal Protective Clothing and Equipment - Disposable personnel protective clothing and equipment that is contaminated above 20 dpm/100 cm^2 removable or 100 dpm/100 cm^2 fixed alpha that cannot be economically decontaminated is disposed of with the material as waste.

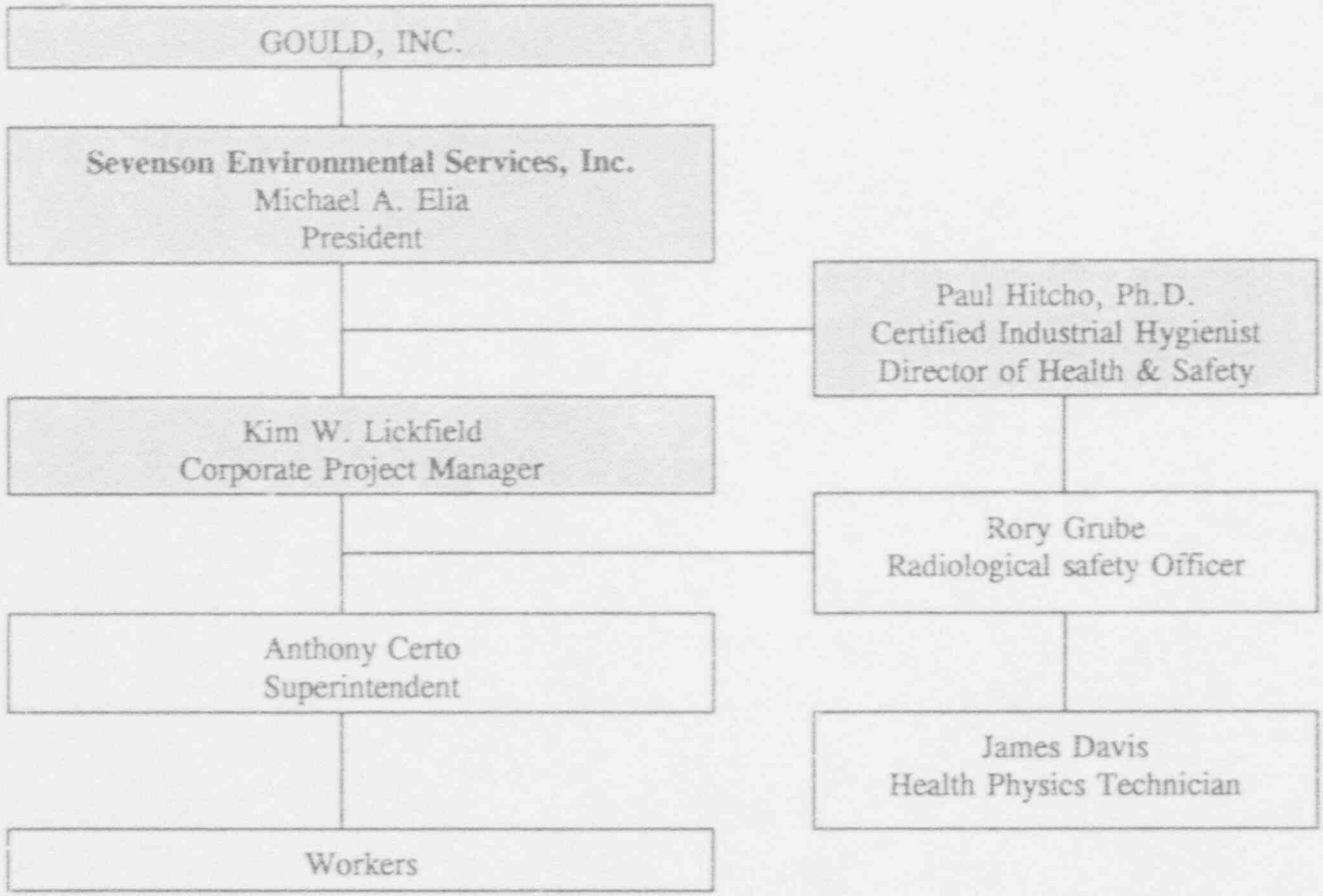
2. Records

a) Consolidated Sample Record - This log will be used to record all air and soil samples taken during the project. Samples will be numbered consecutively and chronologically regardless of type. This log will contain: (a) the sample number; (b) the date taken; (c) the name of the sample taker; (d) the name of the assayer; (e) the date the sample was assayed; and the assay results.

b) Counting Log - This log will contain data generated when samples are assayed. For each sample assayed the following information will be entered: (a) sample number; (b) type of sample; (c) date assayed; (d) name of assayer; and (e) assay results. In addition, the counting log will contain daily background and efficiency data together with the name of the individual that tested the equipment.

c) Daily Events Log - This log is generated by the HPT at the end of each working day. it contains the significant happenings of the day. Items that are included are: (a) any personnel contamination events; (b) any airborne radioactivity at or above Maximum Permissible Concentrations observed; (c) any fire or medical emergency; (d) a daily characterization of project progress and (e) any other unusual occurrence that could effect exposure of individuals to radiation, project liability, or project progress. This log is signed and dated by the HPT each day.

PROJECT ORGANIZATIONAL CHART
for
CLEVITE CORPORATION SITE
Cleveland, Ohio



OFFICE PERSONNEL FIELD PERSONNEL

Name:	**RORY M. GRUBE**
Certifications:	National Registry of Radiation Protection Technologists Instructor, Radiological and Water Quality Control Technician Training Program
Project Assignment:	**Radiological Safety Officer**

PROFESSIONAL EXPERIENCE

Mr. Grube has 8 years experience in the nuclear industry serving in a variety of capacities. Using his U.S. Navy training as an engineering and laboratory technician, he served as a radiological laboratory assistant performing sampling and analysis of waste materials for a U.S. Department of Energy contractor after leaving military service. Mr. Grube progressed to the position of radiological engineer where he was responsible to conduct radiological surveys, schedule routine maintenance and repair shutdowns, and develop procedures for administrative and support functions. Mr. Grube became a health and safety trainer where he developed courses outlines to cover radiological worker protection. He advanced to the position of health physicist technician and radiological safety officer. In his capacity at Sevenson, Mr. Grube is responsible for radiological monitoring required in the site specific health and safety plan as well as assisting in the training of project employees to meet the requirements of OSHA 10 CFR 20.

- **Montclair/Glen Ridge/West Orange Radium Sites, New Jersey:** Health Physicist/Radiological Officer for the excavation, transport, and disposal of low-level radium-contaminated soils and debris from a residential area.

- **Bartlett Nuclear, Paducak Gaseous Diffusion Plant, Paducak, Kentucky:** Development and implementation of radiological health and safety procedures.

- **Enercon Services, Sequoia Fuels Corporation, Gore, Oklahoma:** Developed and conducted radiological health and safety training.

APPENDIX B
NRC May 27, 1993 Report

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 99990003/9311(DRSS)

License No. SNM-183 (terminated)
Docket No. 070-00133 (terminated)
Associated Licenses: 34-00653-01
34-00653-02
C-3790
C-3692

Facility: Clevite Research Center
Division of Clevite Corporation
540 East 105th Street
Cleveland, Ohio

Inspection At: Neighborhood Progress, Inc.
(a former Clevite Corp. facility)
540 East 105th Street
Cleveland, Ohio 44108

Inspection Conducted: May 27, 1993

Inspector: D. G. Wiedeman
Senior Health Physicist

7-11-93
Date

Approved: John A. Grobe
Fuel Cycle and Decommissioning

7-13-93
Date

Inspection Summary

Inspection on May 27, 1993 (Report No.99990003/9311(DRSS))
Areas Inspected: This was a special inspection which included a review of the former licensee's activities associated with the decontamination and remediation of their formerly used manufacturing and processing areas. This inspection was in response to an NRC project in which an evaluation of approximately 17,000 retired licenses was conducted by an NRC contractor, Oak Ridge National Laboratories (ORNL), which on the basis of the information in the retired license file, may have a potential for significant residual contamination in their former facilities. Due to the lack of documentation in the Clevite Corporation retired license files, the NRC contractor concluded that the former facilities used by Clevite Corporation could have significant amounts of residual contamination.
Results: The NRC inspector identified low levels of fixed uranium contamination on the floor of the former licensee's manufacturing building. The inspector did not identify any radiation levels above natural background outside the facility. Based upon the inspection findings, it was concluded that the facility was not successfully decontaminated to levels below the NRC release criteria.

DETAILS

1. Persons Contacted

*# Raymond J. Pierce, Facilities Manager, Neighborhood Progress, Inc. (NPI)
* Daryl Rush, Vice President, NPI
@ Craig Bowman, Esq., General Counsel, The Pullman Company
Robert Owen, Radiation Health Programs Administrator, Ohio Department of Health
Todd T. Brady, R.T., Cuyahoga County Board of Health
@ Thomas Coyne, Esq., legal counsel for NPI

* Attended the exit meeting conducted on May 27, 1993.
# Telephone conversation conducted on June 15, 1993 regarding the results of the smear tests taken on the day of the inspection.
@ Telephone conversation conducted on June 1, 1993 to discuss the findings of the inspection.

2. Background

License No. SNM-183 was issued to Clevite Research Center, Division of Clevite Corporation on March 10, 1958 for use and possession of enriched uranium-235 at their facility located at 540 East 105th Street, Cleveland, Ohio. The authorized activities included melting, alloying, forging, rolling, welding, pickling, chemical and metallographic analyses, machining, stamping and the sintering of enriched uranium powder and ceramic materials for the production and fabrication of fuel elements for nuclear reactors. Initially the license authorized 9,010 grams (9.01 kg) of 90% enriched uranium-235. Subsequent amendments to the license authorized 55,800 grams (55.8 kg) of enriched uranium-235 (see Attachment A). According to documents found in the license files, a special area located on the 1st floor of the building (near the rear of the building) was reserved for fabrication of fuel elements. Drawings found in the docket files show that this area had approximately 20 operational criticality areas. In 1962 Clevite Corporation elected to not renew their license and prepare for the decontamination and decommissioning of their facility. In a letter dated August 14, 1962 Clevite Corporation submitted their final radiation survey results. A review of this radiation survey indicates that the maximum radiation level over the surface of the working area was 140 microroentgen/hour (μR/hr) measured at 1.0 cm from the surface and the average radiation level was 30 μR/hr measured at that same distance. The Atomic Energy Commission (AEC) conducted an inspection on August 30, 1962 to confirm the licensee's survey results. Apparently, the AEC inspector took nine smear tests in certain areas of the facility to compare with the licensee's results; however, it appears that direct radiation measurements by the AEC inspector were not conducted during that inspection.

Other licensed activities at this facility were conducted under license No. 34-00653-01 and 34-00653-02. The 01 license authorized millicurie amounts of phosphorus-32, sodium-24, potassium-42 and chlorine-36 for

use in irradiation and research on crystalline compounds. The 02 license authorized sealed sources of cobalt-60 for use in irradiation and radiography. Source Material Licenses No. C-3790 and C-3692 authorized 200 pounds of natural uranium and 5 grams of thorium sulfide, respectively, for research. It appears that work under the 01 and 02 licenses were being conducted on the second floor of the building. The files did not indicate where work (research) with the source materials was conducted. The docket files did not contain a close-out survey by the licensee and a confirmatory survey by the AEC for the above referenced licenses.

During the license file review by ORNL, references were made in the terminated license file that disposal of contaminated waste materials were made in an onsite incinerator. The NRC contractor also concluded that due to the way that the radioactive material was used, there was a potential for an off-site release and the on-site buildings could have been left with contamination.

3. Facility Status

Neighborhood Progress, Inc., a non-profit corporation which rehabilitates, refurbishes and manages industrial buildings, moved into the building on December 6, 1991. The building was purchased from The Pullman Company who procured the assets of Clevite Corporation/Gould, Inc. It was the inspectors understanding that prior to 1969 the original building owners were known as Cleveland Graphite Bronze/ Clevite. Clevite became a sole subsidiary and in 1969 Clevite merged with Gould, Inc. In September 1981, the building was purchased by a newly formed corporation, Imperial Clevite, Inc.. A "buy-out" occurred in 1986 and the building reverted back to Clevite, Inc. In 1987, the Pullman Company purchased certain assets which included this building from Clevite, Inc. and Neighborhood Progress, Inc. purchased the building in December 1991 from The Pullman Co. The approximate size of the entire site is 180,000ft^2 and the building is approximately 160,000ft^2, the former fabrication and manufacturing area where contamination was found is approximately 7,000ft^2. Currently this area is occupied by a tenant known as Grid Seal Corporation. The surrounding neighborhood is a mixture of commercial buildings and single family residences. Prior to the purchase of the building, Neighborhood Progress, Inc. hired a private consulting firm (EDP Consultants) to conduct an independent environmental assessment of the property which included a radiation survey of the building. This assessment was performed on August 6, 1991, and the consultant concluded that no radiation levels above natural background were found, (See Attachment B).

4. Independent Measurements

The inspector conducted radiologic surveys in and around the former manufacturing areas on the first floor. The areas surveyed included first floor locker rooms, rest rooms, hallways, offices, former manufacturing areas, basement areas, incinerator, parking lot and

building down spouts and loading dock. The inspector noted that some remodeling of the facility has occurred during the past 30 years. The current property owner did not have any records of the disposition of the building rubble and equipment that was removed during the remodeling. The NRC inspectors radiologic surveys of the parking lot and adjacent property did not identify any radiation levels above natural background.

Independent radiation surveys were performed with a Victoreen, Model 190 portable survey instrument with a Model RP-1 pancake probe, NRC Tag No. 042444 which was calibrated on January 22, 1993. An instrument response check with a .006 μCi thorium-230 check source showed 2,900 counts per minute (cpm) which equates to 600-700 microroentgens/hour (μR/hr) and a 1 μCi cesium-137 check source showed 19,000 cpm which equates to 2.8 milliroentgens/hour (mR/hour). Attachment C of this report shows direct radiation measurement locations and locations where smear tests were taken. Attachment D shows the results of the smear tests for removable contamination.

Background measurements taken in the parking lot with the Victoreen, Model 190 showed 40-50 CPM which equals to 10-20 μR/hr. Random measurements on contact with the floor of the 1" floor manufacturing area now occupied by Grid Seal, Corp. showed low level contamination in an area that was approximately 9 ft X 15 ft that ranged from 400 to 2,800 CPM (beta + gamma) and one isolated area under a cabinet measured 120,000 CPM (beta + gamma). The inspector placed a piece of sheet metal over this area to reduce the radiation level to near background. Smear tests were taken on various areas that showed elevated radiation levels. These smears were analyzed in the Region III laboratory and indicate that the contamination is predominantly a beta emitter and the contaminant is not removable. The results from the smear tests were consistent with the findings of the AEC inspection conducted on August 30, 1962. In conclusion, the inspectors direct radiation measurements indicate that the low level contamination that remains on the floor in the former manufacturing area exceeds the NRC release criteria for release of facilities for unrestricted use. The NRC limit for release of a licensed facility for unrestricted use is 1,000 dpm/100 cm^2 (removable), 5,000 dpm/100 cm^2 (average over 1 m^2) and 15,000 dpm/100 cm^2 (maximum) and direct radiation measurements not to exceed 200 μR/hr (average) and 1,000 μR/hr (maximum) above natural background when measured at 1.0 cm from the surface. This criteria is described in "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licensees for Byproduct, Source, or Special Nuclear Material" dated August 1987.

5. Exit Meeting

The NRC inspector met with the individuals identified in Section 1 of this report and summarized the findings of the inspection. The inspector informed the current property owner representatives that the independent radiologic survey indicated that the former Clevite Corporation facility did not meet current NRC criteria for release of

facility for unrestricted use as described in the NRC document "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material" dated August 1987. The NRC inspector also emphasized the point that this survey was not complete and all encompassing and consideration should be given to have the entire building characterized for residual contamination.

Attachments:
A. AEC license
B. Consultants report (excerpt)
C. Survey results and wipe locations
D. Smear test results

Form AEC-401
(1-56)

UNITED STATES
ATOMIC ENERGY COMMISSION

SPECIAL NUCLEAR MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 70, "Special Nuclear Material Regulations," a license is hereby issued authorizing the licensee to receive and possess the special nuclear material designated below; to use such special nuclear material for the purpose(s) and at the place(s) designated below; and to transfer such material to persons authorized to receive it in accordance with the regulations in said Part. This license shall be deemed to contain the conditions specified in Section 70.32(a) of said regulations, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee

1. Name: Clevite Research Center
Division of Clevite Corporation

2. Address: 540 East 105th Street
Cleveland 8, Ohio

3. License No.
SNM-183, as amended

4. Expiration Date
March 31, 1960

5. Docket No.
70-133

6. Special Nuclear Material

Uranium enriched to 90%
in the U-235 isotope.

7. Maximum quantity of special nuclear material which licensee may possess at any one time under this license
55.8 kilograms U-235 contained in uranium enriched to 90% in the U-235 isotope.

8. Authorized use For use in the processing of enriched uranium and attendant activities using the procedures described in the licensee's application of July 22, 1957, as amended Jan. 24, Feb. 10 & 21, March 14 & Dec. 19, 1958 and Feb. 2, 16 & 27, March 17, April 13, 17 & 28, May 8 (2), June 8 & 26 and (*con'd)

9. Quantity of special nuclear material allocated to licensee pursuant to Section 70.31(b) of said part

None

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

8. (*con'd) September 5, 1959, but the manufacturing processes thereof are limited to those procedures described in S. P. Mfg. CR-17-A and CR-17-D.

For the U. S. ATOMIC ENERGY COMMISSION

U. S. Atomic Energy Commission
Division of Licensing and Regulation

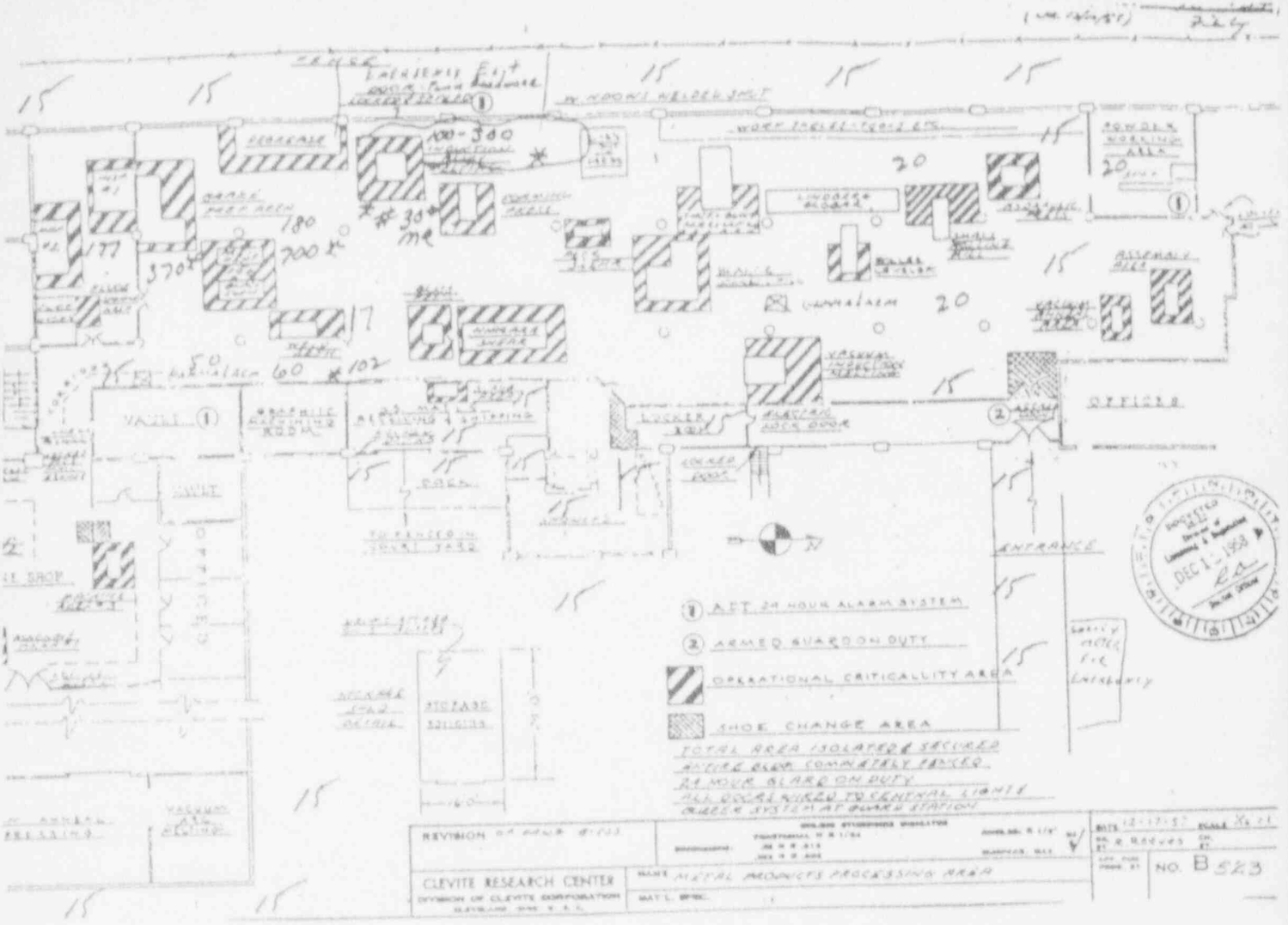
10/1/59

ATTACHMENT A
PAGE 1 of 1 PAGES

GEIGER COUNTER SURVEY

On August 6, 1991, an environmental geologist from our office met Mr. Gale Davies of Grid Seal Corporation. Mr. Davies escorted us through the portion of the building which he is currently leasing. From conversation with Mr. Davies, a longtime Clevite employee, we learned that uranium fuel pellets were processed in the western one-half of the first floor of the main building. Mr. Davies was in charge of a number of sections in the former uranium fuel processing area during the operations of Clevite-Gould. We asked Mr. Davies if there were any other areas where uranium was handled. The only other area of possible concern, according to Mr. Davies, would be the former ceramics lab on the second floor, where thorium oxide was handled. Mr. Davies indicated that the former operations of Clevite-Gould were regulated by the Atomic Energy Commission (AEC), and that when the uranium fuel pellet processing area ceased production, the AEC conducted an audit of the decontamination of the entire area.

During our walkover with Mr. Davies, our environmental geologist was equipped with an Anton Electronics Geiger counter which is accurate to within one-hundredth of a millirem. During our walkover of the former uranium fuel processing area, we did not encounter any radiation levels above normal background, which was measured outside of the building. Our radiation survey of the second floor ceramics lab showed no indication of radioactivity. In addition to the areas indicated by Mr. Davies we also surveyed the remainder of the building, including the roof for indications of abnormal radiation levels. We did not encounter any anomalous radiation levels in the remainder of the building.



NOTE: All direct readings are in units of microrads/hour (gamma + beta) except one area which is in millirads (area to the left of the forming press area

- 540 E 105th St
- Neighborhood Progress Inc.

ATTACHMENT C
PAGE 1 of 1 PAGES

Clevite Corporation
540 East 105th Street
Cleveland, Ohio

SUMMARY of SURVEY RESULTS

Number	Location	Direct measurement CPM beta+gamma	Removable Activity dpm/100cm²	
			alpha (α)	beta (β)
1	South entrance- floor/wall joint	408	3.39±2.90	10.0±4.0
2	Entrance to new room	720	1.39±1.75	0.79±0.62
3	Left side to entrance to new room	1,480	1.56±1.87	4.17±2.25
4	Concrete seam in machine shop warehouse	2,800	2.06±2.18	4.04±2.26
5	Under cabinet (floor) machine shop	120,000	2.39±2.39	30.0±7.2

Instrument - Victoreen 190

Probe - Model RP-1

Background = 40-50 counts per minute

Note: All direct measurement readings include background

Date of survey 5-27-93

Survey by: D. G. Wiedeman

ATTACHMENT D
PAGE 1 of 1 PAGES

Date: May 27, 1993

PRELIMINARY NOTIFICATION OF EVENT OR UNUSUAL OCCURRENCE PN39331

This preliminary notification constitutes EARLY notice of events of POSSIBLE safety or public interest significance. The information is as initially received without verification or evaluation, and is basically all that is known by the Region III staff on this date.

Facility:
Clevite Corporation
540 E. 105th Street
Cleveland OH

Former AEC Licensee

Licensee Emergency Classification
____General Emergency
____Site Area Emergency
____Alert
____Unusual Event
__X__N/A

Subject: CONTAMINATION FOUND AT FACILITY OF FORMER AEC LICENSEE

Clevite Corporation was a manufacturer of nuclear fuel under an Atomic Energy Commission license, including high-enriched uranium fuel for the U. S. Navy and AEC research reactors. The company ceased fuel manufacturing in the 1960s. A closeout radiation survey by the licensee was accepted by the AEC and the license was terminated. The 160,000 square foot building was sold in 1991 to Neighborhood Progress, Inc., and has been divided into smaller sections for lease.

On May 27, 1993, a Region III (Chicago) radiation specialist performed a radiation survey at the site which had been identified as a potentially contaminated site in an Oak Ridge Associated Universities review of former AEC and NRC licenses.

The survey identified low-level radioactive contamination in some cracks and crevices in the concrete floor of one portion of the building now occupied by a machine shop. The radiation levels were measured at 100 to 700 microrad per hour at the floor surface [10 to 20 microrad per hour is the background radiation measurement]. Measurements at a distance of one meter were at background levels. The NRC specialist found one small spot on the floor which measured 30 millirad per hour at the surface, primarily beta radiation.

The machine shop area was surveyed because blueprints in the AEC license file identified it as a fuel manufacturing area. Other areas of the building were surveyed on a sampling basis and no contamination was identified. Selected areas outside the building were also surveyed and no contamination was identified.

The small spot of contamination was restricted and posted. The remaining radiation measurements are such that they do not represent a immediate health and safety problem to workers in the building. However, the measurements exceed NRC release limits for unrestricted use.

Region III will be reviewing the survey results and, after consulting with MNSS, will be discussing possible remedial actions with the current building owner.

IE 34

The State of Ohio will be informed.

Region III was notified of the survey results by the NRC radiation specialist at 2:30 p.m. (CDT) on May 27, 1993. This information is current as of that time.

CONTACT:

B.E. Norelius	B.E. Norelius
Jack Grobe	Charles Norelius
708/790-5721	708/790-5410

DISTRIBUTION:

STANDARD E-MAIL DISTRIBUTION

FAX TO:				MAIL TO:
INPO		NSAC		DCS (Orig)
LIC		NRC OPS CTR	11:47	DOT
PDR (8/634-3343)	11:45	OIG	12:03	(Trans)
A. Byrdsong, NRR				
State: (OH)	12:28			

APPENDIX C
NRC Correspondence Of:
December 30, 1993
January 13, 1994

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
801 WARRENVILLE ROAD
LISLE, ILLINOIS 60532-4351

Neighborhood Progress, Inc.
ATTN: Mr. Daryl Rush
Vice President
504 East 105th Street
Cleveland, OH 44108

License No. SNM-183(terminated)
Docket No. 070-00133(terminated)
License No. 34-000653-01(terminated)
License No. 34-000653-02(terminated)
License No. C-3790(terminated)
License No. C-3692(terminated)

Dear Mr. Rush:

This refers to the special inspection conducted by Messrs. R. L. Glinski and D. G. Wiedeman on December 6 and 8, 1993, of the former facilities occupied by Clevite Corporation located at 504 East 105th Street, Cleveland, Ohio. Licensed activities were previously authorized by Atomic Energy Commission (AEC) Special Nuclear Material License No. SNM-183, Byproduct Material Licenses No. 34-000653-01 and 34-000653-02 and Source Material Licenses No. C-3790 and C-3692. This also refers to the telephone conversation between Mr. D. G. Wiedeman and you on December 21, 1993, regarding the progress of our laboratory analyses of the concrete sample and smear tests for removable contamination collected during the inspection. The results of our preliminary survey findings were discussed with Mr. Pierce at the conclusion of the inspection on December 8, 1993. A supplement to this report will be issued when our laboratory results become available.

The enclosed copy of our inspection report identifies areas examined during the inspection. The inspection consisted of a selective examination of representative records from the former license file, observations, independent measurements, and interviews with representatives of the current building owner.

Based upon this inspection, we have concluded that five 1-meter grids in the first floor machine shop and one 1-meter grid in the hallway outside the first floor machine shop and fuel assembly areas were not decontaminated to a residual radiation level consistent with current NRC guidelines. The radiation levels found in these areas do not constitute an immediate health and safety problem for your tenants and visitors of the building; however, we do expect remediation of the contaminated areas. It is our understanding that Gould, Inc. (representing the former licensee) has agreed to characterize and remediate the contamination. We also are aware that our headquarter's Program Office is reviewing the survey plan for your facility. Should you have any questions regarding the inspection report, please contact Mr. George McCann at (708) 829-9856. Questions regarding the survey should be directed to Mr. Tim Johnson (301) 504-3603.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC Public Document Room.

We will gladly discuss any questions you have concerning the inspection.

Sincerely,

George M. McCorker

Gary L. Shear, Chief,
Fuel Cycle and Decommissioning Branch

Enclosure: Inspection Report
No. 999-90003/93041(DRSS)

cc w/enclosure:
R. Owen, Ohio
Department of Health
L. Weinstein, Esq.,
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M. White, Mayor, City of
Cleveland
L. Mehringer, City of
Cleveland Law Department

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 999-90003/93041(DRSS)

License No. SNM-183 (terminated)
Docket No. 070-00133 (terminated)
License No. 34-00653-01(terminated)
License No. 34-00653-02(terminated)
License No. C-3790 (terminated)
License No. C-3692 (terminated)

Licensee: Clevite Research Center
Division of Clevite Corporation
540 East 105th Street
Cleveland, Ohio

Inspection At: Neighborhood Progress, Inc.
(a former Clevite Corp. facility)
540 East 105th Street
Cleveland, Ohio 44108

Inspection Conducted: December 6 and 8, 1993

Inspectors: D. G. Wiedeman
Senior Health Physicist
12/22/93
Date

R. L. Glinski
Radiation Specialist
12-22-93
Date

Approved by: G. M. McCann, Chief
Fuel Facilities and Decommissioning Section
12/22/93
Date

Inspection Summary

Inspection on December 6 & 8, 1993 (Report No. 999-90003/93041(DRSS))
Areas Inspected: This was a special followup inspection which included a review of the former licensee's activities associated with the decontamination and remediation of their manufacturing, processing and research areas. This inspection was a followup to the previous NRC inspection conducted on May 27, 1993.
Results: The NRC inspectors identified six areas that exceeded the NRC release limit of 5,000 dpm ($\beta\gamma$)/100 cm^2, averaged over one meter squared and four individual areas that exceed the NRC release criteria of 15,000 dpm/100 cm^2 on the floor of the former licensee's hallway and manufacturing areas of the building. The inspectors did not identify any significant radiation levels above natural background in the basement or former research areas on the second floor. Based upon the inspection findings, it was concluded that the facility was not successfully decontaminated to levels below the NRC release criteria.

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DETAILS

1. Persons Contacted

*Raymond J. Pierce, Facilities Manager, Neighborhood Progress, Inc. (NPI)
#Daryl Rush, Vice President, NPI
Todd T. Brady, R.T., Cuyahoga County Board of Health

*Attended the exit meeting conducted on December 8, 1993.
#Telephone conversation conducted on December 21, 1993 regarding progress of the laboratory sample analyses.

2. Background

License No. SNM-183 was issued to Clevite Research Center, Division of Clevite Corporation on March 10, 1958, for use and possession of enriched uranium at their facility located at 540 East 105th Street, Cleveland, Ohio. The authorized activities included melting, alloying, forging, rolling, welding, pickling, chemical and metallographic analyses, machining, stamping, and the sintering of enriched uranium powder and ceramic materials for the production and fabrication of fuel elements for nuclear reactors. Initially the license authorized 2,010 grams of 90% enriched uranium-235. Subsequent amendments to the license authorized 55,800 grams of enriched uranium-235. A special area located on the 1st floor of the building (near the rear of the building) was reserved for fabrication of fuel elements.

Other licensed activities at this facility were conducted under license No. 34-00653-01 and 34-00653-02. The 01 license authorized millicurie amounts of phosphorus-32, sodium-24, potassium-42 and chlorine-36 for use in irradiation and research on crystalline compounds. License No. 34-00653-02 authorized sealed sources of cobalt-60 for use in irradiation and radiography. Source Material Licenses No. C-3790 and C-3692 authorized 200 pounds of natural uranium and 5 grams of thorium sulfide, respectively, for research.

3. Facility Status

Since the last NRC inspection conducted on May 27, 1993, (see NRC Report No. 999-90003/93011(DRSS), status of the facility had not changed. During a November 16, 1993 meeting between Neighborhood Progress, Inc., legal counsel for Gould Inc., and the NRC staff, it was agreed that the NRC would conduct another inspection to further characterize the level of contamination in the facility.

4. Independent Measurements

The NRC inspectors conducted radiologic surveys in and around the former manufacturing areas on the first floor, basement and second floor research areas of the building. The areas surveyed included the first

floor locker rooms, rest rooms, hallways, offices, former manufacturing areas, ventilation ducts and loading docks. The NRC inspectors' radiologic surveys of the basement and second floor research areas did not identify any significant radiation levels above natural background.

Independent radiation surveys were performed with a Victoreen, Model 190 portable survey instrument with a Model RP-1 pancake probe, Serial No. 000549, calibrated on October 12, 1993, and Ludlum Model 12, Serial No. 105690 with a Model 43-5 pancake probe, calibrated on October 6, 1993. Prior to the surveys both instruments were checked for accuracy and constancy with dedicated and traceable check sources. Both instruments responded as expected. During the instrument response checks, both instruments were corrected for background, probe size, geometry and counting efficiency with an NIST traceable standard. This correction showed that 2,250 counts/minute (cpm) equates to ≈15,000 disintegrations per minute/100 cm^2 and 750 cpm (average) equates to 5,000 dpm/m^2 beta/gamma radiation. Direct radiation measurement results and locations where smear tests were taken are indicated in Attachment A. Attachment B shows the results of the average contaminate level in 1-meter grids and the locations where smear tests were taken.

Background measurements taken in the parking lot with the Victoreen and Ludlum survey instruments showed 45-55 counts per minute (cpm). Measurements on contact with the floor were made in five areas of a one meter grid of the 1st floor manufacturing area which showed the highest radiation level. Each area was surveyed for alpha, beta and gamma radiation and smear tests were taken to determine if the contaminate was removable. A sample of chipped concrete was taken to determine the specific nuclide.

Five one meter grid areas in the manufacturing/machine shop area and one 1-meter grid in the hallway exceeded the NRC release criteria of 5,000 dpm/100 cm^2 (averaged over 1 square meter) and four specific areas in the machine shop exceeded the NRC release criteria of 15,000 dpm/100 cm^2. Smear tests were taken on various areas that showed elevated radiation levels. These smear tests are currently being analyzed in the Region III laboratory; however, previous smear tests indicate that the contamination was predominantly a beta emitter and the contaminant was not removable. The results from the smear tests and concrete sample taken during this inspection were not available. A supplemental report will be issued when the results become available.

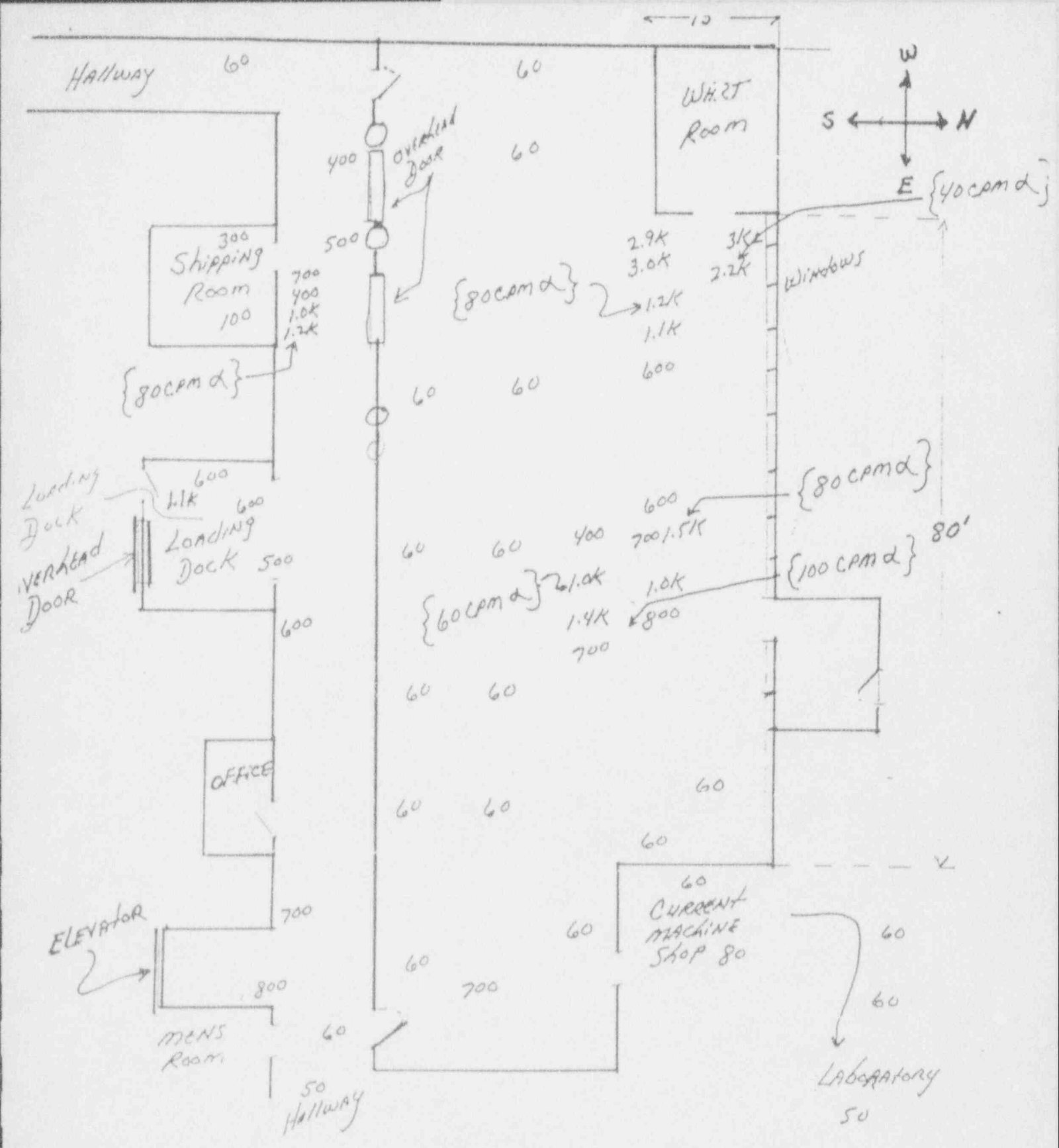
In conclusion, the inspectors independent radiation measurements indicate that the low level contamination that remains in the floor in the former manufacturing area exceeds the NRC release criteria for release of facilities for unrestricted use.

5. Exit Meeting

The NRC inspectors met with the individuals identified in Section 1 of this report and summarized the findings of the inspection. The inspectors informed the current property owner representatives that the

independent radiologic survey confirmed the previous NRC findings and indicated that certain areas did not meet the current NRC release criteria. These areas were identified for further evaluation during remediation. During the course of the inspection and during the exit meetings with the current property owner and their legal counsel, they did not identify any documents or inspection findings and/or statements as proprietary in nature.

Attachments:
A. Survey results and smear test locations
B. Survey results (Grids 1-6)

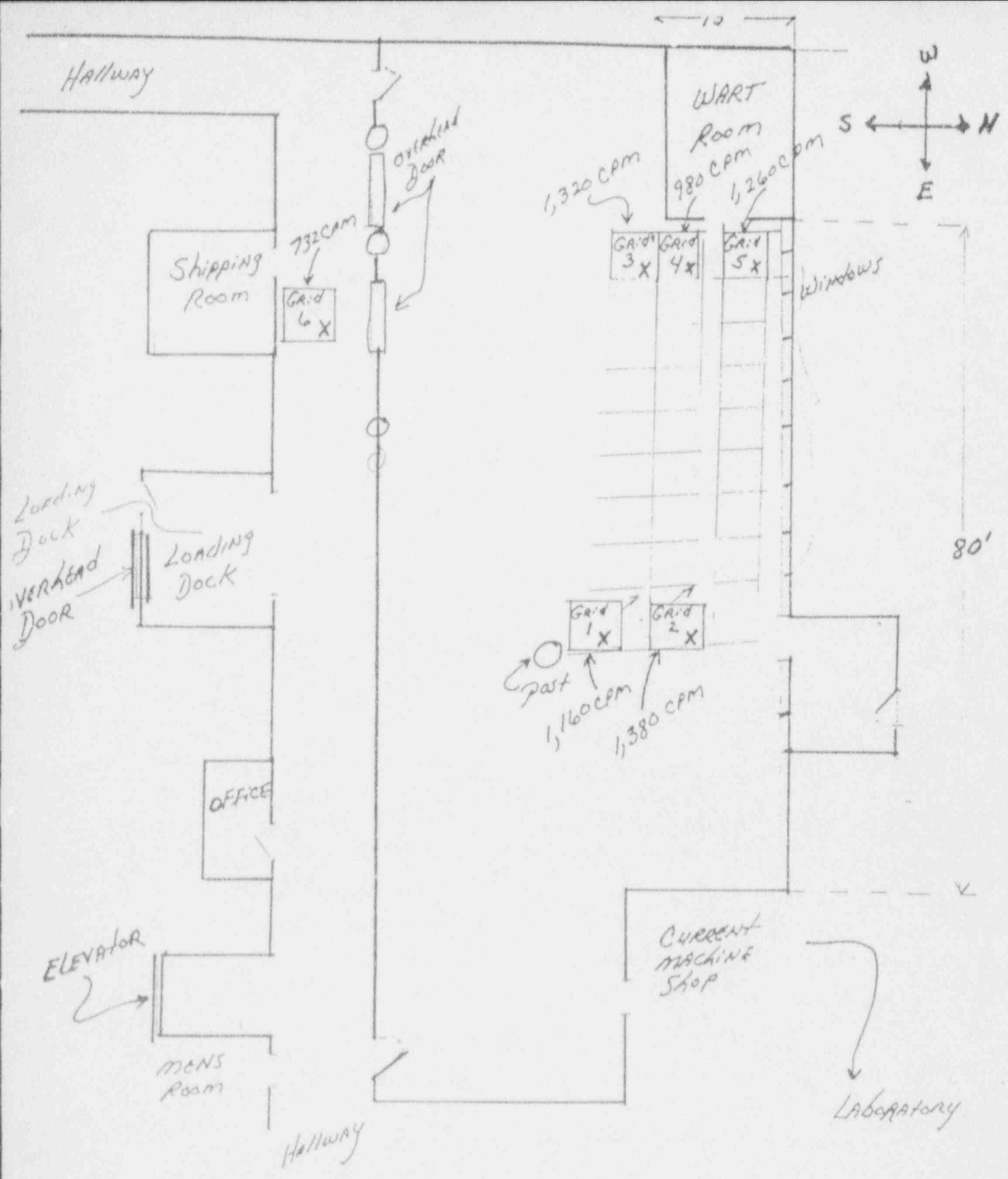


Clevite (Neighborhood Progress, Inc.)
1st Floor and adjacent rooms to former machine shop
Survey Date- December 6, 1993, by. R. Glinski & D. Wiedeman
Survey instrument- Ludlum Model 12, Probe 4345 pancake, and alpha probe
background= 45-~~55~~ counts/minute (cpm) beta/gamma
.5-2.0 cpm alpha

Xxxxxxxx
X= smear test locations

ATTACHMENT A
PAGE 1 of 3 PAGES

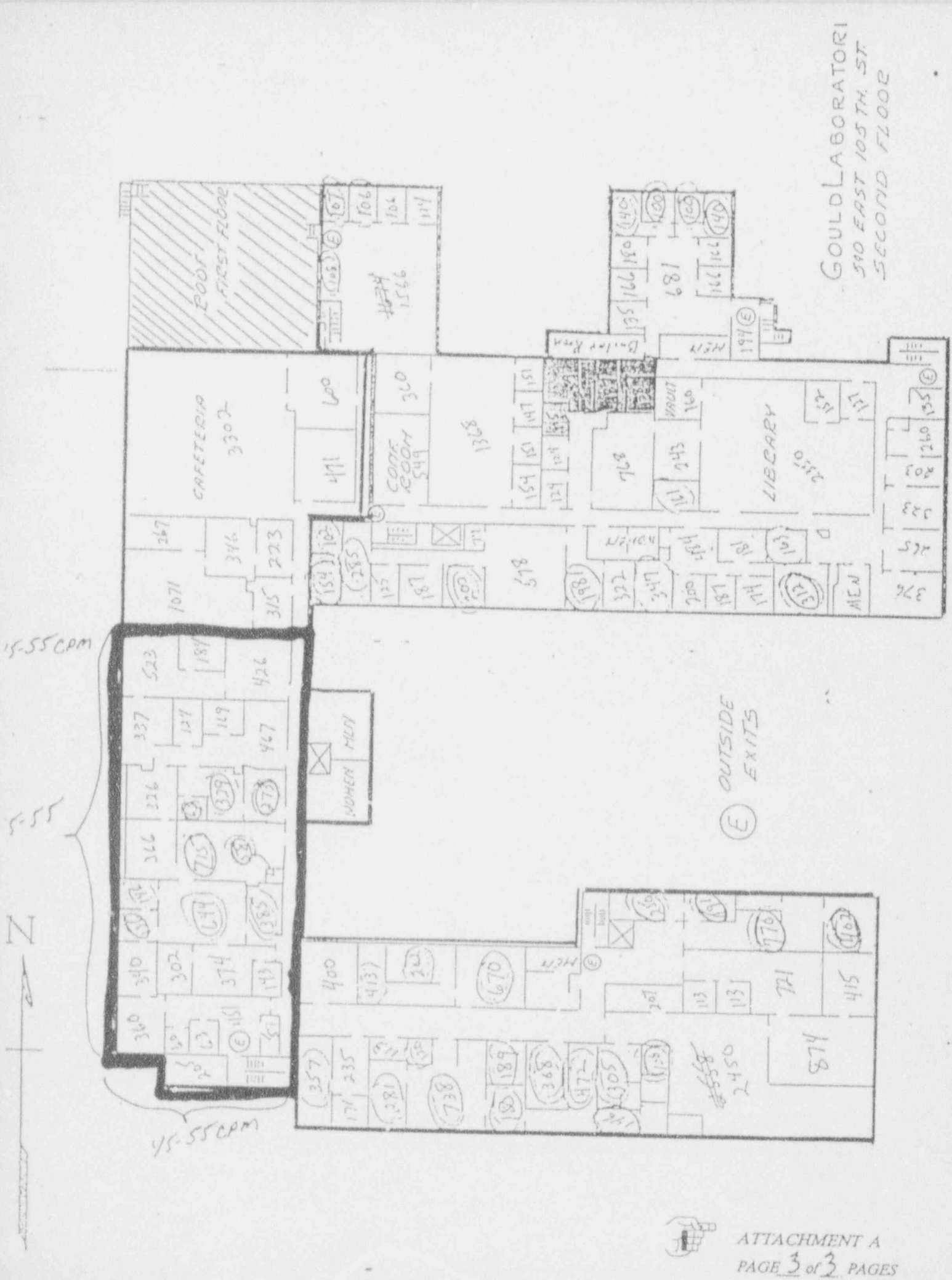
NOTE- All units are counts/minute (cpm) 750 cpm= 5,000 dpm/1 meter squared 2,250 cpm= 15,000 dpm/100 cm²



Clevite (Neighborhood Progress, Inc.)
1st Floor and adjacent rooms to former machine shop
Survey Date- December 6, 1993, by. R. Glinski & D. Wiedeman
Survey instrument- Ludlum Model 12. Probe 4345 pancake, and alpha probe
background= 45-~~65~~ counts/minute (cpm) beta/gamma
.5-2.0 cpm alpha

Xxxxxxx
X= smear test locations

NOTE- All units are counts/minute 750 cpm=5,000 dpm/1 meter squared



ATTACHMENT A
PAGE 3 of 3 PAGES

DATE December 6, 1993 LOCATION Neighborhood Progress

INSTRUMENT Ludlum Model 12 S/N 105690 PROBE Model 43-5 pancake

Grid Number 1	Grid Number 2	Grid Number 3
1. 900	1. 1000	1. 2100
2. 900	2. 1300	2. 1600
3. 1700	3. 1900	3. 1300#
4. 500	4. 1800#	4. 600
5. 1800#	5. 900	5. 1000
Average 1160	Average 1380	Average 1320

Grid Number 4	Grid Number 5	Grid Number 6
1. 1400	1. 700	1. 600
2. 1?00#	2. 700	2. 1300
3. 800	3. 1200	3. 1200
4. 800	4. 1500	4. 200
5. 700	5. 2200#	5. 350
Average 980	Average 1260	Average 732

NOTE- All units are in counts/minute (cpm)

2,250 cpm= 15,000 dpm/100 cm^2

750 cpm(avg)= 5,000 dpm/1 $meter^2$

#=area smear tested for removable contamination

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
801 WARRENVILLE ROAD
LISLE, ILLINOIS 60532-4351

JAN 13 1994

Neighborhood Progress, Inc.
ATTN: Mr. Daryl Rush
Vice President
504 East 105[th] Street
Cleveland, OH 44108

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Dear Mr. Rush:

This refers to our December 6 and 8, 1993 special inspection. This also refers to the January 7, 1994 telephone conversation between Mr. D. G. Wiedeman and Mr. Ray Pierce, regarding the results of our laboratory analyses.

The enclosed copy is a supplement to our previous inspection report (Report No. 999-90003/93041(DRSS) transmitted by mail on December 30, 1993. It provides results of our laboratory analyses of the contaminated concrete sample and smear tests for removable contamination which were collected at the time of our inspection.

Based upon our laboratory findings, we have concluded that the contaminant is predominantly a fixed beta emitter and the radioactive material is uranium. Any questions regarding this supplement should be directed to Mr. George McCann at (708) 829-9856.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report supplement will be placed in the NRC Public Document Room.

We will gladly discuss any questions you have concerning the inspection.

Sincerely,

Gary L. Shear

Gary L. Shear, Chief,
Fuel Cycle and Decommissioning Branch

Enclosure: Inspection Report
No. 999-90003/93041(DRSS)-Supplement

See Attached Distribution

JAN 13 1994

Distribution

cc w/enclosure:
R. Owen, Ohio
Department of Health
L. Weinstein, Esq.,
Squire, Sanders & Dempsey
M. White, Mayor, City of
Cleveland
L. Mehringer, City of Cleveland
Law Department

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Inspectors: _____ 1/12/94
O. G. Wiedeman Date
Senior Health Physicist

_____ 1/12/94
R. L. Glipski Date
Radiation Specialist

Approved by: _____ 1/12/94
for G. M. McCann, Chief Date
Fuel Facilities and Decommissioning
Section

Inspection Summary

Inspection on December 6 and 8, 1993 (Report No. 999-90003/93041(DRSS)-Supplement)
Areas Inspected: This report is a supplement to Report No. 999-90003/93041(DRSS) issued December 30, 1993. A sample of contaminated concrete taken from the floor of the former manufacturing area and smear tests from six 1-meter grids were collected December 6 & 8, 1993.
Results: The NRC Region III laboratory analyses confirmed that the radioactive material is predominately a fixed beta emitter and uranium. After review of this data, it was confirmed that the level of fixed contamination within five of the six 1-meter grids exceed the NRC release criteria and the remaining grid approaches the NRC limit.

DETAILS

1. Persons Contacted

#*Raymond J. Pierce, Facilities Manager, Neighborhood Progress, Inc. (NPI)

*Attended the exit meeting conducted on December 8, 1993.
#Telephone conversation conducted on January 7, 1994 regarding the results of the laboratory sample analyses.

2. Laboratory Results

Smear Number	Location	Direct Radiation Measurements: disintegrations per minute * dpm/100 cm^2 averaged over 1-$meter^2$	Smear Test Results: @ Removable Activity dpm/100cm^2	
			alpha	beta
Grid 1	Floor machine shop	7,733	1.0 ± 0.5	5.3 ± 1.1
Grid 2	Floor machine shop	9,200	4.5 ± 1.2	37.3 ± 3.4
Grid 3	Floor machine shop	8,800	0.9 ± 0.5	4.7 ± 1.0
Grid 4	Floor machine shop	6,533	1.1 ± 0.5	4.7 ± 1.0
Grid 5	Floor machine shop	8,400	1.4 ± 0.6	7.8 ± 1.4
Grid 6	Floor hallway	4,880	0.1 ± 0.1	3.2 ± 0.8

* NRC limit is 5,000 dpm\100 cm^2 averaged over 1 square meter. Readings were converted from counts/minute (cpm) to disintegrations/minute (dpm) using a conversion factor of 750 cpm ≈ ≈5,000 dpm/100 cm^2 averaged over 1 square meter.
@ NRC limit is 1,000 dpm (alpha)/100 cm^2 and 1,000 dpm (beta)/100 cm^2

Laboratory analysis of ≈5 grams of chipped concrete taken from Grid 3 indicated uranium.

3. Conclusion

All smear tests for removable contamination were below the NRC release criteria. Five of the six 1-meter grid areas of fixed contamination found on the floor exceed the NRC release limit of 5,000 dpm/100 cm^2 (averaged over 1-meter) and four individual areas exceeded the NRC maximum limit of 15,000 dpm/100 cm^2. These areas are described in Report No. 999-90003/93041(DRSS).

APPENDIX D
Applied Health Equipment Calibration Criteria

APPLIED HEALTH
CALIBRATION

A. GAMMA PROCEDURE CRITERIA

1. The source will be approximatley a point source.
2. Either the apparent source activity or the exposure rate at a given distance will be traceable by documented measurements to a standard certified within 5 percent accuracy traceable to the National Bureau of Standards.
3. Only Cs-137 and Ra-226 and their associated photon energies will be employed.
4. The sources will be sufficient to give exposure rates between .1 mR/hr and 1 R/hr.
5. The inverse square law backed up by certified measurements will be used to correct for change in exposure rates due to changes in the distance or source decay.
6. A calibration/service record will be made of each survey meter calibration.
7. A single point on a survey meter scale will be considered satisfactorily calibrated if the indicated exposure rate differs from the actual exposure rate by less than 10 percent. This procedure will only be used in extreme exceptions.
8. Meters on which the user selects a linear scale will be calibrated at no less than two points on each scale. The points will be at approximately 1/3 and 2/3 of the full scale deflection.
8. Meters that have a multidecade logarithmic scale will be calibrated at no less than one point on each decade and no less than two points for the entire range. These points will be at approximately 1/3 and 2/3 of the full scale deflection.
10. Meters that have an automatically ranging digital display device for indicating rates will be calibrated at no less than one point on each decade and no less than two points for the entire range. These points will be at approximately 1/3 and 2/3 of the full scale deflection.
11. Readings above 1000 mR/hr will not be calibrated. These scales will be checked for operation and approximate correct response.
12. The calibration service/record will indicate the procedure used, the data obtained and indentification of the equipment.

B. CALIBRATION/SERVICE RECORD CRITERIA

1. The owner of the instrument.
2. A description of the instrument that includes manufacturer, model number and serial number of the base meter and model number and serial number of the probe/detector/ion chamber.
3. A description of the calibration source and position or relationship between the probe/detector/ion chamber and the gamma ray field.
4. The calibration points on each scale or range and the indicated responses on each scale or range. With these

readings correction factors will be used for excessive inaccuracies.

5. The battery check reading statis if available.

8. Shielded detectors are to be calibrated in the shielded position unless otherwise stated.

7. The check source reading and description of how it was taken, if available.

8. The name of the person who performed the calibration and the date on which the calibration was performed.

C. CALIBRATION/SERVICE STICKER CRITERIA

1. The source that was used to calibrate the instrument.

2. The battery check reading.

3. Excessive correction factors.

4. Angle of detection for probe/detector/ion chamber.

5. The check source reading

8. The name of the person calibrating.

7. The date of the calibration and the date due for recalibration.

D. SPECIFIC GAMMA CALIBRATION PROCEDURES

1. Receipt-Instruments are received and surveyed for contamination using a pancake window GM survey meter, and upon release the are cleaned with detergent for calibration preparation.

2. Preparation-The instruments are visually inspected for abuse if so it is duly noted. Receiving condition and mode of calibration desired is also recorded. All batteries, lamps and other general maintenance parts are replace where necessary. The high voltage, line voltage, line current, etc. are inspected where necessary. Any detection windows are inspected and the unit is give a vibration interference test . The instrument is now exposed to a small check source of CO-80 insure response. All relavant data is recorded to account for preparational check.

3. Write Up-The instrument's calibration/service record is completed with the exception of the response data.

4. Calibration-All instruments are exposed to gamma radiation levels on each range within the scope of our source strength. Each range is adjusted to within plus or minus 10 percent accuracy where possible. Any range or ranges out of accuracy by a deviation of greater than 10 percent will be noted and correction factors supplied. Each range where possible will be exposed to at least 2-points per range at approximately 1/3 and 2/3 of full scale deflection. The minumal exposure will be 1-point at 1/2 full scale deflection. Any instrument that has an integration mode will also be checked for adequate operation by timing exposures of gamma radiation levels. All the relavant data is then recorded.

5. Post Preparation-The instrument is again exposed to

the check source of CO-60 and final inspection is done. All power switches are fastened down in the off position for transit. The unit is now released for with the completed calibration/service record completed for pick up or shipping by way of the requested carrier. United Parcel Service is used when no other carrier is suggested.

E. SPECIFIC ALPHA/BETA CALIBRATION PROCEDURES

1. Receipt-Instruments received and surveyed for contamination with a pancake GM survey meter, and upon release cleaned with detergent for calibration preparation.
2. Preparation-The instruments received are visually inspected for abuse and if so it is duly noted. Receiving condition and mode of calibration desired recorded. All batteries, lamps and other general maintenance parts are replaced where necessary. High voltage, line voltage, line current, etc. are inspected and adjusted where necessary. Any windows are examined for tears, light leaks or vibation problems. The instrument is now exposed to a check source of U-238 to assure operation. The relavant data is recorded to account for preparation check.
3. Write Up-The instrument's calibration/service record is completed with the exception of the response data.
4. Calibration-All instruments are electronically calibrated for the detection of pulse rates on every range. Each range where possible will be exposed to 2-points per range at approximately 1/3 and 2/3 of full scale deflection. The minumal range exposure will be 1-point at 1/2 full scale deflection. All relavant data is then recorded for calibration/service record. The instrument is then exposed to ALPHA/BETA radiation levels/ranges within the scope of our source strengths and elements available. Which are (PU-239, alpha / C-14, SRY-90, beta). Calculations of ALPHA/BETA efficiencies on contact to a 2-pi geometry will be recorded for each meter probe/detector/ion chamber combination.
5. Post Preparation-The instrument is then exposed to the U-238 check source and the final inspection is done. All power switches are fastened down in the off position for transit and the unit is released with the appropriate data on the calibration/service record for pick up or shipping by the requested carrier. United Parcel Service is used when there is no requested carrier.

F. SPECIFIC MULTIPLE SOURCE CALIBRATION PROCEDURE

1. Scope- The above calibration procedures will be used to accomodate any versitile detection equipment at the clients request. These procedures can be combined to accomodate equipment with multiple probes or probes with multiple detection capabilities to achieve a more versitile calibration.