# Northeast Ohio Regional Sewer District

3826 Euclid Avenue • Cleveland, Ohio 44115-2504 216 • 881 • 6600 FAX: 216 • 881 • 9709


November 1, 1995

Mr. John Madera
U. S. Nuclear Regulatory Commission
Region III
901 Warrenville Road
Lisle, Illinois 60532-4351
VIA OVERNIGHT DELIVERY

Re: London Road Interceptor Remediation

Dear Mr. Madera:

Thank you for your telephone call. As we had discussed, the Northeast Ohio Regional Sewer District ("District") has discussed our general requirements for confined space entry with Advanced Medical Systems, Inc. ("AMS"). As you had requested, enclosed you will find correspondence with AMS reflecting those requirements and discussions. As you can see, AMS has been apprised of our requirements for entry into our systems since December of last year. AMS has yet to comply, or to communicate that they will comply, with those requirements. If AMS has represented to you that the District has been dilatory, unresponsive, or uncooperative in this regard, you have been misinformed.

Further, as we had discussed briefly, the requirements we have discussed with AMS are for their evaluation of the extent to which they have contaminated the area around their connection to the London Road interceptor. As to the remediation itself, there is a strong feeling that neither AMS nor its contractors can be trusted sufficiently to carry out actual remediation activities. You are well aware that AMS has not demonstrated appropriate control of radioactive materials. You may also be aware that they are quite uncooperative with District employees, and can therefore not be relied upon to follow instructions therefrom. Because of the extensive contamination already caused by this licensee, we will not be put in the position of having to trust AMS to be careful in regard to District property. Accordingly, much more detailed plans would be required of AMS prior to the actual remediation of the London Road interceptor.

I hope this has answered your questions. Please call me at (216) 881-6600 if you have any further questions or comments.

Very truly yours,

Lawrence K. English
Assistant General Counsel

EXHIBIT "D"

# Northeast Ohio Regional Sewer District

3826 Euclid Avenue • Cleveland, Ohio 44115-2504 216 • 881 • 6600 FAX: 216 • 881 • 9709


December 22, 1994

Henry E. Billingsley, II, Esq.
Arter & Hadden
1100 Huntington Building
925 Euclid Avenue
Cleveland, Ohio 44115-1475

Re: Northeast Ohio Regional Sewer District v. Advanced Medical Systems, Inc., et al.
Case No. 1:94 CV 2555

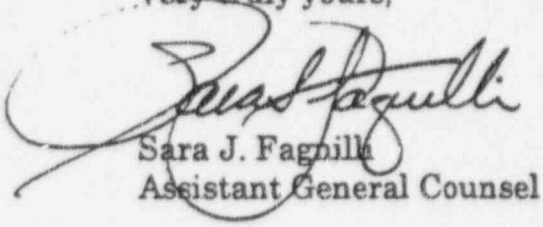
Dear Henry:

Pursuant to your request, enclosed please find a copy of the District's Confined Space Entry Program. Please let me know when you have secured someone to take the samples you requested. The District needs at least 72 hours notice for any sampling. You should also be prepared to examine the individuals for any contamination upon exiting the manhole. Given the position of the manhole you will also need to arrange for traffic control that is acceptable to the District to ensure the safety of those working in the street.

The District will have its RSO on site as well and will accompany your person into the manhole. District personnel on site will retain control of the entry, and any instructions given by them must be strictly adhered to. Air monitoring equipment must be used prior to entering the manhole to assure proper atmospheric conditions for entry. Also remember that there must be a rescue team available with individuals that have appropriate CPR/First Aid training which can be documented. Your comment to me that you and/or your client have not seen District personnel utilize air monitoring equipment must be an error in observation. District personnel do not enter manholes without first checking the atmospheric conditions.

Please contact me if you need further information. As I told you, the District would be available to obtain samples for you. The District hereby requests splits of any samples you obtain, and of course, a copy of the data generated from the sampling.

Very truly yours,



Sara J. Fagnilli
Assistant General Counsel

cc: Frank A. DiPiero, Esq.
Lawrence K. English, Esq.
Richard Cannily, WQIS
Dwight A. Miller, Esq.

# Northeast Ohio Regional Sewer District
INTERNAL CORRESPONDENCE

TO Distribution

DATE July 9, 1993

FROM Erwin J. Odeal, Executive Director

SUBJECT Permit Required Confined Space Entry Program

As you may be already aware, on January 14, 1993 OSHA published the Permit Required Confined Spaces for General Industry, Final Rule (29 CFR 1910.146). This OSHA regulation is to be effective on April 15, 1993. The District is currently not subject to OSHA regulations, although we do strive to set standards in line with them. Recently, the Ohio Legislature passed HB308, which established the Public Employment Risk Reduction Program. It is anticipated that the program will adopt in its entirety all OSHA regulations, causing them to be applicable to the District.

Attached you will find the District's Permit Required Confined Space Entry Program. Please review the program and insure that compliance with the standards is effected by all personnel working under your authority, whom it will impact.

If you have any questions on this matter, please contact Richard Connelly of WWIS at 641-6000.

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$\$228\text{f}218/5$

Distribution:

Ken Pew
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# PERMIT REQUIRED CONFINED SPACE PROGRAM

## INTRODUCTION

This Document (Program) contains requirements of the Northeast Ohio Regional Sewer District (NEORSD) for practices and procedures to be used to protect District employees from hazards associated with confined space entry and work. The procedures set forth are minimum procedures and are to be followed by persons entering and working in confined spaces.

The site supervisor will ensure that all provisions of the confined space entry procedure are followed with respect to District employees, and will also sign the permit signifying all conditions for entry have been met.

# CONFINED SPACE

## ENTRY/EXIT/RESCUE

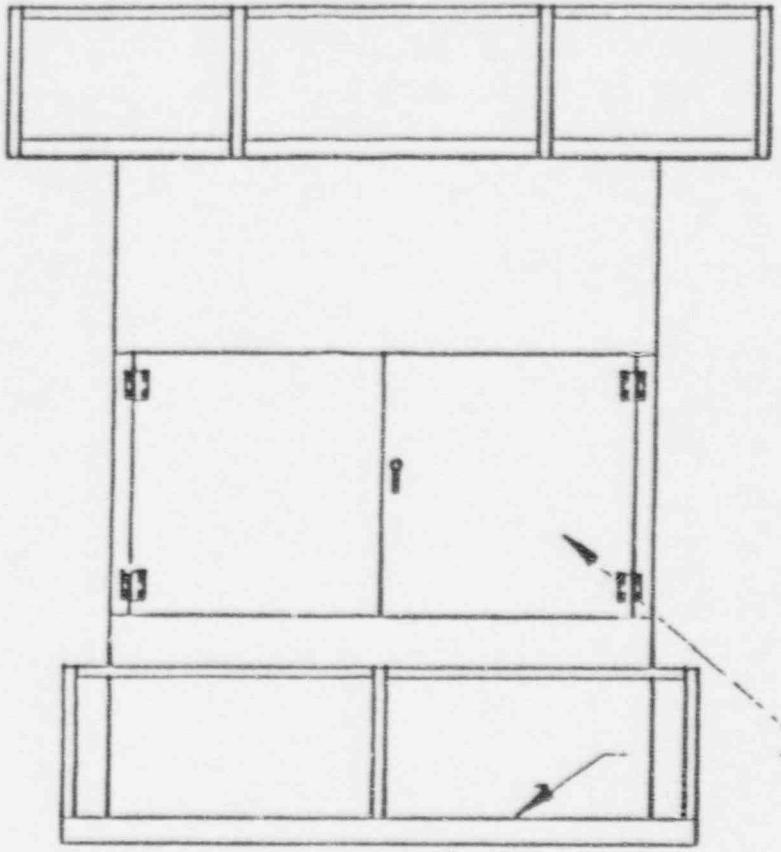
## 29CFR Pt 1910

I. What is Confined Space?

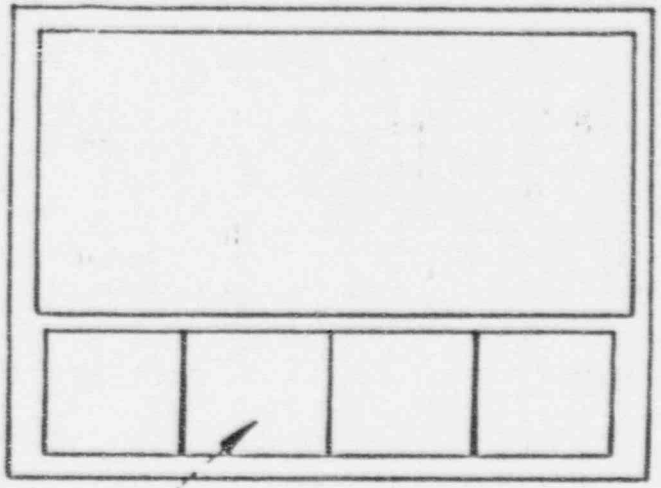
A. Permit Required Confined Space means an enclosed space which:

1. Is large enough and so configured that an employee can bodily enter and perform assigned work.
2. Has limited or restricted means for entry or exit. (Some examples are aeration tanks, vessels, manholes, storage bins, hoppers, vaults, pits, and diked areas. Specific plant examples would include Zimpro reactors, boilers, incinerators.)
3. Is not designed for continuous employee occupancy.
4. Has one or more of the following characteristics:
   a. Contains or has a known potential to contain a hazardous atmosphere.
   b. Contains a material with the potential for engulfment of an entrant.
   c. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or a floor sloping downward and tapering to a smaller cross section.
   d. Contains any other recognized serious safety or health hazards.

# HEADWORKS (Bar Screen)

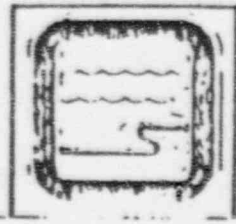


FRONT



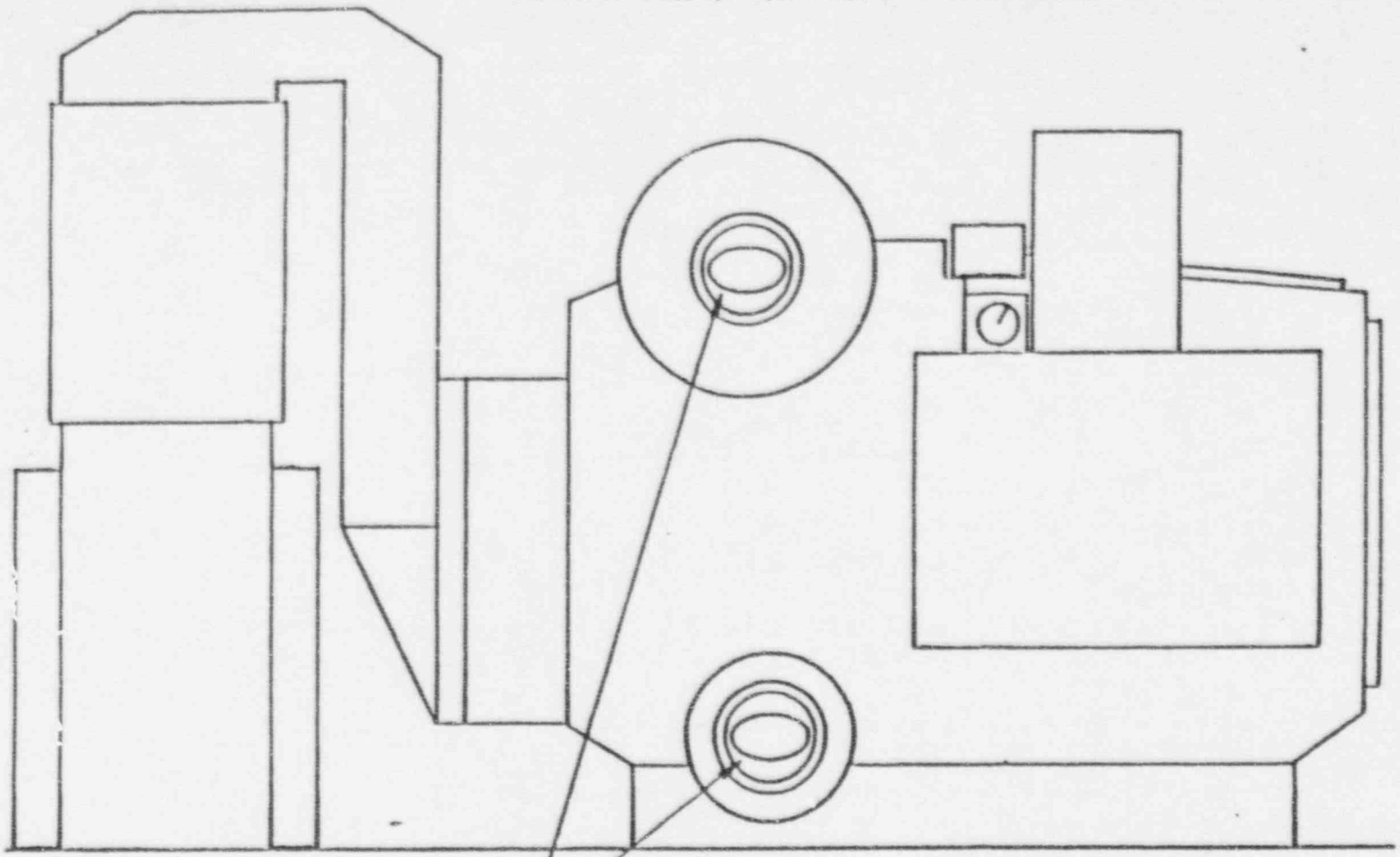
TOP

## CONFINED SPACE

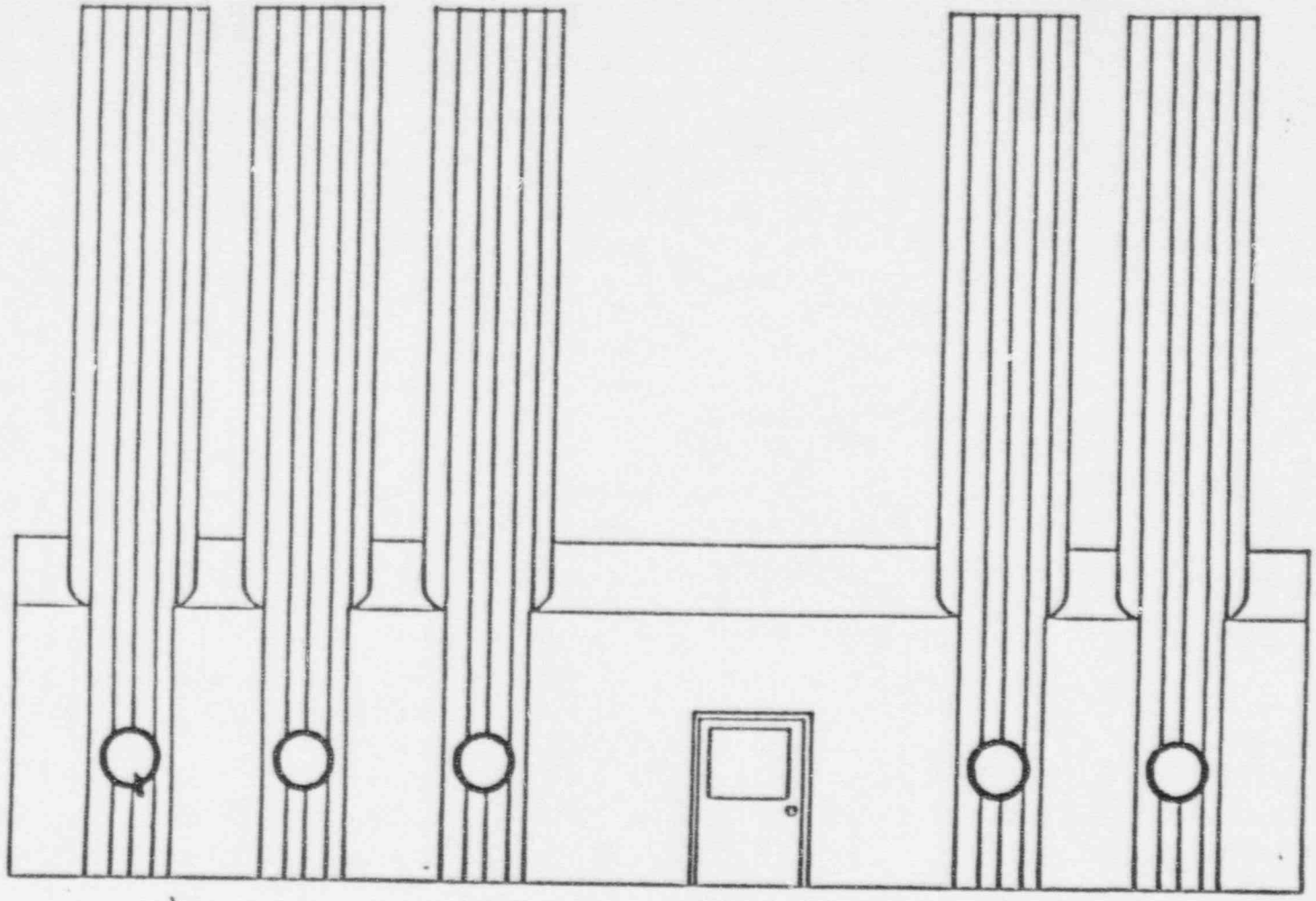


| | |
|---|---|
| NORTHEAST OHIO REGIONAL SEWER DISTRICT | DATE: 7-7-93 |
| TITLE: Bar Screen Confined Space | SCALE: N/A |
| DRNTBY: Clayton Thomas Cox | REV. 001 |

# CONFINED SPACE LOCATIONS



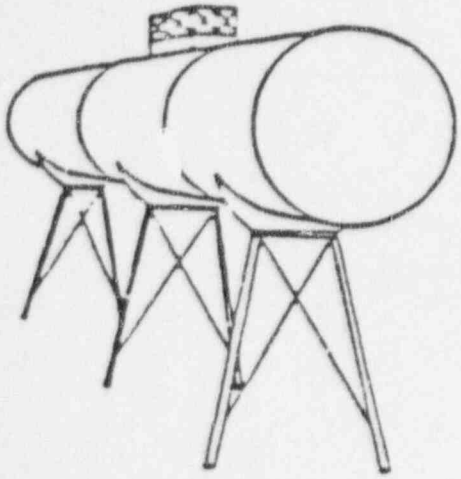

| | | |
|---|---|---|
| | NORTHEAST OHIO REGIONAL SEWER DISTRICT | DATE: 7-8-93 |
| | TITLE: Roller Confined Space | SCALE: N/A |
| | DRN BY: Clayton Thomas Cox | REV. 001 |



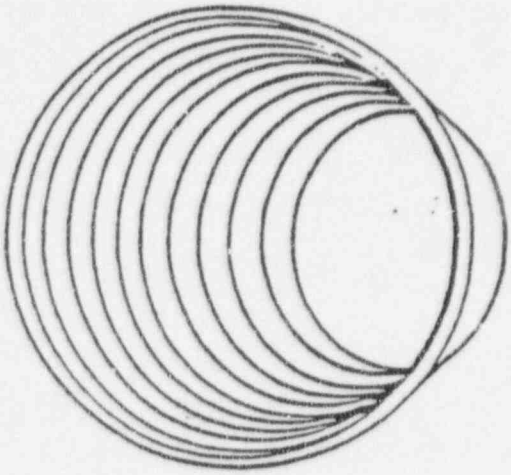
CONFINED SPACE
5 36" Hinged manhole covers

| | | |
|---|---|---|
| | NORTHEAST OHIO REGIONAL SEWER DISTRICT | DATE: 7-8-93 |
| | UNIT: Reactor Confined Space | SCALE: N/A |
| | DRWTY: Clayton Thomas Cox | REV. 001 |

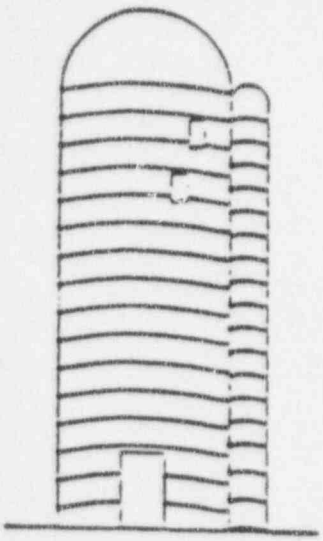
B. Examples of Confined Spaces.



Storage Tank

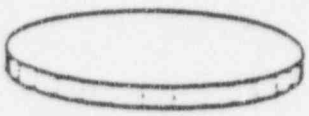


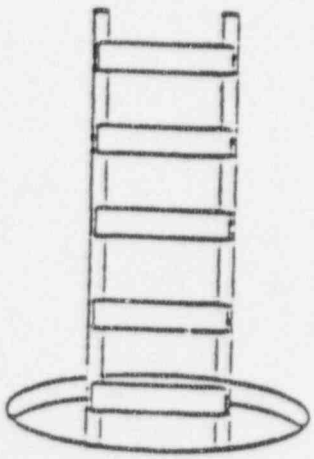
Pipeline



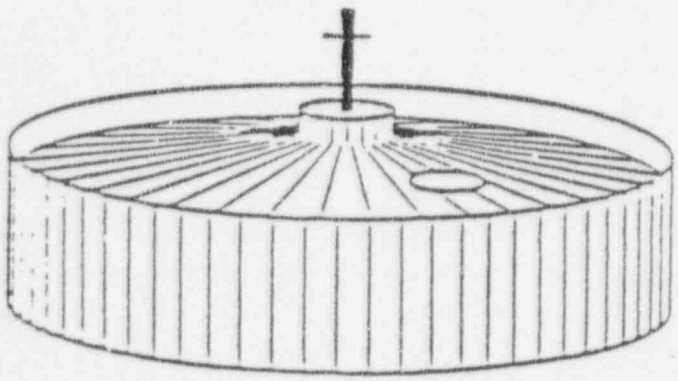
Silo

Examples of Confined Spaces





Manhole



Digester

C. Definitions

1. Acceptable entry conditions

The conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit required confined space entry can safely enter into and work within the space.

2. Attendant (i.e. Confined Space Entry Attendant)

An individual stationed outside the permit required confined space who is trained as required by this standard.

3. Authorized entrant

An employee who is authorized by the supervisor to enter a permit required confined space.

4. Entry supervisor

The person (such as the manager, supervisor, or crew leader) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

5. Entry

The action by which a person passes through an opening into a permit required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

6. Entry Permit

Means the written document established by the District. The entry permit defines the conditions under which the permit space may be entered. (Refer to District Confined Space Permit under Section III. Permit Program)

7. Entry Permit System

The District's written procedures for preparing and issuing permits for entry into permit required confined spaces.

8. Hazardous Atmosphere

An atmosphere which exposes employees to a risk of death, incapacitation, injury, or acute illness such as:

a. A flammable gas, vapor, or mist in excess of 10% of its L.E.L. (Lower Explosive Level).

b. An airborne combustible dust at a concentration that meets or exceeds its LEL. NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of five (5) feet (1.52 M) or less.

c. An atmospheric oxygen concentration in the confined space below 19.5 percent or above 23.5 percent.

d. An atmospheric concentration of any substance for which a permissible exposure limit is published in Subpart 2 of 29 CFR Pt 1910 and could result in employee being exposed above the P.E.L.

e. Any atmospheric condition recognized as immediately dangerous to life or health.

9. Immediately Dangerous to Life or Health (IDLH)

a. Any condition which poses an immediate threat of loss of life, may cause irreversible severe health effects or could impair escape from the permit space.

10. Immediately Severe Health Effects

a. Any acute clinical sign(s) of a serious exposure related reaction manifested within 72 hours after exposure.

11. Non-Permit Confined Space

a. A confined space that does not contain, or with respect to atmospheric hazards have the potential to contain, any hazard capable of causing death or serious physical harm.

12. Oxygen Deficient Atmosphere

a. An atmosphere containing less than 19.5 percent oxygen.

13. Oxygen Enriched Atmosphere

a. An atmosphere containing more than 23.5 percent oxygen.

14. Retrieval Line

a. A line or rope secured at one end to the worker by a full body harness and with its other end secured to either a lifting device or to an anchor point located outside the entry portal.

II. Reason for Entering Permit Required Confined Space

A. Maintenance and Repair

B. Inspection

C. Sampling

D. Investigation

E. Other projects related to proper operation of treatment plants and/or collection system

F. Emergency Rescue

III. Permit Required Confined Space Program

A. Where required under Subpart 2 of 29 CFR 1910.146, the NEORSD shall prepare a permit(s) in a standardized format (or preprinted), through which the NEORSD identifies all parameters which must be evaluated and all conditions that must be met to ensure safe entry.

B. Persons who intend to authorize entry into a permit space shall include the following information in the checklist portion of a permit:

1. The hazards of the permit space including;

a. Chemical Hazards (hazardous atmosphere)

1) Flammable liquid - flash point below 100 degrees F. (Example gasoline)

2) Combustible liquid - flash point at or above 100 degrees F. (Example kerosene)

3) Oxygen enriched over 23.5%

4) Oxygen deficient, oxygen 19.5 or less percent. Always test for oxygen first in a hazardous atmosphere.

5) Toxic Substance - any substance that can cause acute or chronic injury to the human body, (i.e. hydrogen sulfide toxic alarm - 10 ppm).

b. Mechanical Hazards

1) Electrical shock

2) Falling objects

3) Machinery within the work place having moving parts

c. Biological

1) Bacteria/viruses

2. The measures for isolation of the permit space;

3. The measures used to remove or control potential hazards such as lockout/tagout, purging, inerting, ventilating and flushing;

4. Acceptable entry conditions, quantified with regard to the hazards identified in the permit space, which must be maintained during entry;

5. Testing and monitoring equipment and procedures by which the NEORSD will verify that acceptable environmental conditions are being met before entry and are being maintained during entry;

6. The rescue and other services which would be summoned in case of emergency and the means of communication with those services;

7. Rescue equipment to be provided on-site, if necessary.

8. The communication procedures and equipment used by authorized entrants and attendants to maintain contact;

9. The personal protective equipment, such as respirators, clothing and retrieval lines, provided in order to ensure employee safety.

10. The individual authorizing the entry shall sign or initial the permit before the entry begins, but not

until all actions and conditions necessary for safe entry into the permit space have been performed.

11. Upon completion of the entry covered by the permit, and after all entrants have exited the permit space, the individual authorizing the entry shall cancel the permit.

12. Review entry operations when the District has reason to believe that the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized.

13. Any other appropriate information, given the circumstances of the particular permit space.

C. Hazard Control

1. The District shall establish and implement the means, procedures, and practices by which the permit space can be entered safety. The entry supervisor will be responsible for ensuring that the following are implemented.

   a. Proper use of gas monitoring detectors.
   b. Implement lock out/tag out when necessary.
   c. Purge and ventilate when necessary.
   d. Remove of potential hazards.
   e. Ensure the proper safety equipment is worn.
   f. Explain entry/exit procedures.

D. Personnel Information

1. Signs shall be posted near permit spaces to notify all personnel that only authorized entrants may enter the permit space (i.e., "Danger - permit required confined space, do not enter).

2. By such signs and training, unauthorized personnel will be prevented from entering permitted confined space area.

E. Personnel Training

1. Personnel shall be trained so that attendants, authorized entrants, and personnel authorizing or in

charge of entry can work safely in and around the permit space (Refer to Section VI Training).

F. Equipment

1. Appropriate equipment shall be provided and maintained.
2. Proper use of equipment should be ensured.
3. Equipment generally required for permitted confined space entry may include but not be limited to the following:
   a. Monitors & Test equipment such as MSA 361 to test for LEL, oxygen, Toxics)
   b. Communication equipment when necessary
   c. Personal protective equipment
   d. Ventilating equipment needed to obtain acceptable entry conditions.
   e. Lighting equipment needed to enable employees to see well enough to work safety and to exit the space quickly in an emergency.
   f. Equipment, such as tripods/winches,mechanical advantage systems and/or ladders, needed for safe entrance and exit by authorized entrants.

G. Rescue

1. The entry supervisor will ensure that procedures and equipment necessary to rescue entrants from permit spaces are implemented and provided.
   a. It is the policy of the District to have in-plant rescue teams. [For contractor personnel see (III) (I) (5)].
   b. The rescue team shall have the necessary equipment for rescue.
   c. The rescue team shall be properly trained and training shall be ongoing. Annual training will be conducted in confined spaces to practice rescue.

H. Protection from External Hazards

1. Insure that barriers necessary to protect entrants from external hazards are provided. No unauthorized

personnel/pedestrians/vehicles may be in the permit space.

I. Duty to Other Employers

1. The District will provide contractors with all the available information on permit space hazards which the contractor needs to be aware of in order to comply with this standard.
2. Coordinate entry operations with the contractor, when both District personnel and contractor personnel will be working in or near permit spaces.
3. Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.
4. Responsibility for the health and safety of contractor personnel remains that of the contractor.
5. Although the District will assist during any emergency involving contractor personnel, the responsibility for the health and safety of such personnel remains that of the contractor.

IV. Permit System

A. Before entry is authorized, the entry supervisor will document the completion of measures required by Section III - Permit Required Confined Space Program

B. Before entry begins, the entry supervisor identified on the permit will sign the entry permit to authorize entry.

C. The completed permit will be made available at the time of entry to all authorized entrants, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-entry preparations have been completed.

D. The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit.

E. The entry supervisor will terminate entry and cancel the entry permit when:

1. The entry operations covered by the entry permit have been completed; or
2. A condition that is not allowed under the entry permit arises in or near the permit space.

F. The Superintendent or his/her designee at each facility will retain each cancelled entry permit for at least one (1) year to facilitate the review of the permit. The review will be done annually. Any problems encountered during an entry operations shall be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

V. Entry Permit

A. The individual who authorizes an entry assumes direct charge of the entry for its duration. An individual who intends to authorize entry in a permit space shall, in addition to the checklist items required in Section III, include in the permit, at a minimum the following information:

1. The identity of the permit space;
2. The purpose of the entry;
3. The date of the entry and the authorized duration;
4. A list of the authorized entrants entering confined space;
5. A list of attendants currently serving on this entry;
6. The individuals, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;
7. The hazards of the permit space to be entered;
8. The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;
9. The acceptable entry conditions;
10. The results of initial and periodic tests performed, accompanied by the names or initials of the testers and by an indication of when the test was performed;
11. The rescue and emergency services that can be summoned and the means for summoning those services;

12. The communication procedures used by attendants and authorized entrants to maintain contact during the entry;

13. The equipment to be provided and used during confined space entry and exit; and

14. Any other information to insure employee safety.

VI. Training

A. It is the policy of the District that training will be provided so that all employees whose work is regulated by this section, acquire the understanding, knowledge and skills necessary for the safe performance while working in confined spaces.

B. Training will be provided to each affected employee:

1. Before the employee is first assigned duties to enter confined spaces;

2. Before there is a change in assigned duties in regards to confine space operations;

3. Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

4. Whenever the District has reason to believe that there are deviations from the permit space entry operations required under the Permit Required Space Program - III, or that there are inadequacies in the employee's knowledge of equipment or procedure.

C. The training will establish employee proficiency in the duties required for confined space operations.

D. It is the policy of the District that each respective department certify that training required for confined space procedures has been accomplished. The certification will contain each employee's name, the signature or initials of the trainers, and the dates of training. The certification will be available for inspection by the employee and the authorized representative.

E. Any non-employee shall receive training equivalent to that described in this Section VI prior to entry.

VII. Training and Duties of Authorized Entrants

A. Hazard Recognition: It is the policy of the District that authorized entrants:

1. Know the hazards which may be faced during entry (Refer to III Permit Program).
2. Recognize the signs and symptoms of exposure to a hazard. Example - chemical exposure - burning of eyes or skin, physical exposure - oxygen deficiency, impaired judgment, rapid fatigue.
3. Understand the consequences of exposure to a hazard. Example - shortage of oxygen can cause brain damage or even death.

B. Communication: It is the policy of the District that the authorized entrants:

1. Maintain contact with attendant and alert the attendant whenever;
   a. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation; or
   b. The entrant detects a prohibited condition.
2. Notify the attendant when the entrants self initiate evacuation of a permit space.

C. Protective Equipment: It is the policy of the District that authorized entrants:

1. Are aware of the personal protective equipment needed for safe entry and exit:
   - entry/exit system
   - respirators/SCBA's
   - protective clothing
2. Are provided with and use the personal protective equipment properly.
3. Are aware of external barriers needed to protect entrants from external hazards and the proper use of those barriers. Example - barricades to protect entrants from unauthorized personnel entering the permit space.

D. Self-Rescue: It is the policy of the District that the authorized entrant exit the permit space, unless it is physically impossible to do so, when:

1. The attendant or entrance supervisor orders evacuation.
2. An automatic alarm is activated.
3. The authorized entrants perceive they are in danger and/or detect a prohibited condition.

VIII. Training and Duties of Attendant

A. It is the policy of the District that an attendant is stationed and remains outside the permit space(s) at all times during entry operation.

B. Individuals who work as attendants shall receive the appropriate training. (Refer to III Permit Program.)

C. Individuals who work as attendants shall perform their duties under the entry permit system.

1. Number of entrants. The entry supervisor shall ensure that attendants continuously maintain an accurate count of all persons in the space.

2. Hazard Recognition. The entry supervisor shall ensure the attendants know of and can recognize potential permit space hazards, monitor activities inside and outside the permit space to determine if it is safe for entrants to remain in the space.

3. Communication. The entry supervisor shall ensure that attendants:

a. Maintain effective and continuous contact with authorized entrants during entry.

b. Order authorized entrants to evacuate the permit space immediately, when:

1) The attendant observes a condition which is not allowed in entry permit.

2) The attendant detects behavioral effects of hazard exposure.

3) The attendant detects a situation outside the space which could endanger the entrants.

4) The attendant detects an uncontrolled hazard within the permit space.

5) The attendant must leave the work station or perform duties that might interfere with the attendants primary duty to monitor and protect entrant.

6) The attendant observes any other situation that in the attendant's judgment warrants evacuation.

c) Attendant must summon rescue and other emergency services as soon as the attendant determines that the authorized entrants need to escape from permit space hazards.

d) Attendant must take the following actions as necessary, when unauthorized persons approach or enter a permit space while entry is underway.

1) Warn the unauthorized persons away from the space.

2) Request the unauthorized persons to exit immediately if they have entered the permit space.

3) Inform the authorized entrants and any other designated persons if unauthorized persons have entered the permit space.

4. Rescue - The entry supervisor shall ensure that attendants:

a) Do not enter the permit space to attempt rescue of entrants.

b) Properly use any rescue equipment provided for their use and perform any other assigned rescue and emergency duties, without entering permit space.

c) Enter confined space only if he/she has been trained in confined space rescue and if another attendant is present for back up.

IX. Training and Duties of the Individual Authorizing or in Charge of Entry

A. It is the policy of the District to ensure that individuals authorizing or in charge of entry shall receive the appropriate training. (Refer to III Permit Program.)

B. Entry authorization and supervision. Individuals authorizing or in charge of entry shall:

1. Determine that the entry permit contains the required information before or authorizing or allowing entry.
2. Determine that the necessary procedures, practices and equipment are in effect before allowing entry.
3. Determine at appropriate intervals, that entry operations remain consistent with the terms of the entry permit, and that the acceptable entry conditions are present.
4. Take the necessary steps for concluding an entry operation, such as closing off a permit space and cancelling the permit once the work authorized by the permit has been completed.
5. Also serve as authorized entrants or attendants for an entry if they have the proper training.
6. Verify that rescue services are available and the means for summoning them are operable, prior to entry.
7. Shall take the appropriate measures to remove unauthorized personnel who are in or near permit spaces.
8. Determine whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

## CONFINED SPACE

## ENTRY PROCEDURES

I. Training Requirements

A. Personnel Training (Entrants/Support Personnel)

1. Entry/Exit Procedures (Annual Review)
2. Use of Applicable Respirator, SCBA and Exit Capsule (Annual)
3. Lockout/Tagout Procedures (With Annual Review)
4. Use of Safety Equipment (Ongoing)

B. Personnel Training (Rescue Team)

1. Use of SCBA (Twice per year)
2. Rescue Training (Once per year)
3. CPR/First Aid (Annual/Every Three Years)
4. Use of Safety Equipment (Ongoing)

II. Wastewater Treatment Facilities

A. Preliminary Planning Session (Supervisor, Entry Team and Rescue Team)

1. Review nature of entry location
2. Review work to be completed
3. Review personnel requirements
4. Preliminary Hazard Assessment
   a) Review list of chemicals vented to, stored, or to be used in confined workspace during operation (Utilize MSDS for respective hazard review for each, if any)
   b) Review equipment needs based on hazard potential
5. Review entry methodology
6. Review entry permit requirements

B. Entry Permit Application/Worksheet

1. Hazard Evaluation

   a) Atmospheric testing. Continuous monitoring for oxygen concentration, L.E.L. conditions and toxic gas concentrations.

   b) Mechanical hazards

   c) Electrical hazards

   d) Miscellaneous conditions

2. Hazard Remediation

   a) Ventilation

   b) Respirator/SCBA usage

   c) Lockout/Tagout

3. Equipment Requirements

   a) Safety and personnel protection equipment

   b) Operational equipment

4. Personnel Requirements

   a) Designate entry personnel

   b) Designate support personnel (topside or outside attendant(s))

   c) Designate rescue team

   d) Communication System/Method

C. Permit Application Review by Authorizing Supervisor

1. Review of Hazard Evaluation

2. Review of Hazard Remediation

3. Review of Equipment Requirements

4. Review of Personnel Requirements

   a) Verification of Entry Training for entry and support personnel

   b) Verification of Rescue Training for designated rescue team

   c) Verification of appropriate communication system/method

5. Permit Authorization Granted or Denied

D. Lockout/Tagout (When Applicable)

1. Lockout of electrical sources/devices

2. Lockout of mechanical devices

3. Blind flanging of pipes

E. Secure the Work Site (Exclusion Zone)

1. Only those personnel involved in confined space entry to be in exclusion zone
2. Barricade as necessary to insure safety of all concerned (but maintain appropriate fire exits)
3. No smoking in exclusion zone

F. Continuous Atmospheric Monitoring

1. Outside/topside monitoring with appropriate metering device, when applicable
2. Self monitoring by entrant(s) with a meter which at a minimum measures for oxygen content, L.E.L. conditions, and hydrogen sulfide.
3. Use of additional monitoring devices if called for (i.e. draeger tubes).

G. Entry Into Confined Space

1. Utilize Predetermined Entry Method (see Appendix A for specific use requirements for vertical entry)
   a) Tripod/Mechanical with harness and lifeline. (Vertical entry only)
   b) CSEEM (Vertical entry only)
   c) Multiple Attendant Assisted with harness and lifeline
2. Perform Tasks as Authorized by Permit
3. Continuous communication capability with entrant(s) established.
4. Continuous communication capability with Rescue Team established (when different from topside attendants).

H. Exit From Confined Space

1. Utilize Planned Exit Method
   a) Self Exit
   b) Tripod/Mechanical (Vertical Exit only)
   c) CSEEM (Vertical Exit only)
   d) Multiple Attendant
2. Close Entry Portal
3. Clear Equipment From Work Site

I. Emergency Exit

1. Rescue Team Contacted. No Entry For Rescue Except by Properly Trained and Equipped Rescue Team.
2. Exit Methodology
   a) Self Rescue
   b) Tripod/Mechanical (Vertical Only)
   c) CSEEM (Vertical Only)
   d) Multiple Attendant Retrieval
   e) Rescue Team Enters to Retrieve. (Only when rescue from outside space cannot be accomplished)
      1) Equipment utilized appropriate to hazard condition (protective clothing, SCBA, etc)
      2) Appropriate Entry/Exit Methodology
3. Care for Evacuated Entrant
   a) First Aid/CPR (if required)
   b) EMS (if required)
4. Document Emergency Exit Condition
   a) Authorizing Supervisor to Investigate
   b) Appropriate Accident/Incident Report completed by Supervisor

III. Collection Systems Facilities/Pre-Permitted Locations (WQIS, SMC, Pump Stations)

A. Secure the Work Site
   1. Traffic control set up
   2. Exclusion zone determined
   3. No smoking in exclusion zone

B. Prepare Confined Space Entry Log (All manholes entered by District personnel are permit required confined spaces.)

C. Lockout/Tagout (When applicable)
   1. Lockout of electrical sources
   2. Lockout of mechanical devices
   3. Blind flanging of pipes

D. Atmospheric Monitoring
   1. Monitor atmosphere before opening manhole whenever possible

2. Monitor top, middle, and bottom of space prior to entry
   a) Monitor for L.E.L., oxygen concentration, $H_2S$/CO/toxics
   b) Record readings on entry log form
3. Continuous monitoring during entry
   a) Topside monitoring with appropriate device
   b) Self monitoring (tritector)
   c) Additional monitoring with draeger tubes etc. when needed

E. Miscellaneous Hazard Review
1. Inspect entry location for other hazards
   a) Slippery conditions (snow, ice, rain etc.)
   b) Bad rungs/no rungs etc.
   c) High flow/high velocities
   d) Other
   e) Document hazards on confined space entry log form

F. Hazard Remediation
1. Corrective action for hazards (i.e., ventilation etc.)
2. Document corrective action on confined space entry log form

G. All Required Equipment on Hand and Secured

H. Entry Into Confined Space
1. Utilize entry method appropriate to site (See Appendix A for specific use requirements for vertical entry)
   a) Tripod/mechanical
   b) CSEEM
   c) Attendant assisted with harness and lifeline
2. Perform assigned task(s)
3. Continuous communication with entrant established

I. Exit From Confined Space
1. Utilize planned Exit method
   a) Self-Exit
   b) Tripod/mechanical
   c) CSEEM
   d) Attendant assisted
2. Close manhole/entry portal
3. Clear work site

J. Emergency Exit

1. Declare emergency to clear radio communication.
2. Notify Base of emergency exit status (contact WQIS if applicable)
3. Exit Methodology
   a) Self-Rescue
   b) Tripod/Mechanical
   c) CSEEM
   d) Attendant assisted retrieval
   e) Rescue Team enters to retrieve
      1) equipment utilized appropriate to hazard condition
      2) appropriate entry/exit methodology
4. Care for Evacuated Entrant
   a) First Aid/CPR
   b) EMS (Notification via Base)
   c) Transport to care
5. Document Emergency Exit Condition
   a) Supervisor to investigate immediately
   b) Appropriate accident/incident report completed by supervisor

## APPENDIX A

## CONFINED SPACE ENTRY PERMIT PROGRAM

Manhole/Vertical Entry Requirements for Fall Arrest/Retrieval Devices

Note: Fall Arrest/Retrieval Devices Include:

...DBI/SALA System (Winch & Tripod)

...CSEEM (Mechanical Advantage)

...Rollgliss (Mechanical Advantage & Tripod)

| Condition | Requirement |
|---|---|
| Bad rungs or no rungs, under all topside conditions | Fall arrest/retrieval system required |
| Good rungs, one person topside, 5' or less depth | Manual assist. Fall arrest/ retrieval system optional |
| Good rungs, one person topside, greater than 5' depth required | Fall arrest/retrieval system |
| Good rungs, two or more persons topside, 15-20'* or less depth | Manual assist. Fall arrest/ retrieval system optional |
| Good rungs, two or more persons topside, greater than 15-20'* depth | Fall arrest/retrieval system required |
| High flow conditions, all depths, under all topside conditions | Fall arrest/retrieval system required |
| Rescue situation, all depths | Fall arrest/retrieval system required |

*All manual assist entries assume the optimum use of personnel available at the scene. Less than optimum conditions or use of personnel would call for the use of fall arrest/retrieval system option.

PART 3

## PERSONNEL PROTECTION GEAR AND EQUIPMENT TO BE UTILIZED

| | Yes/No | Type/Comment | Reviewed with Entry Team |
|---|---|---|---|
| Respirators | | | |
| Self Contained Breathing Apparatus | | | |
| Protective Clothing/Gloves | | | |
| Protective Helmets | | | |
| Eye Protection | | | |
| Foot Protection | | | |
| Life Lines and Harness | | | |
| Mechanically Assisted Entry Equip. | | | |
| Lighting | | | |
| Communication Equipment | | | |
| Ventilation Equipment | | | |
| Fire Equipment | | | |
| Warning Signs Posted | | | |
| Monitoring Equipment | | | |

Remarks: _____

_____

_____

_____

_____

_____

_____

_____

PART 4

| Authorized Entrant | Department | Trained |
|---|---|---|
| Name _____ | _____ | Y N |
| Name _____ | _____ | Y N |

| Attendant | Department | Trained |
|---|---|---|
| Name _____ | _____ | Y N |
| Name _____ | _____ | Y N |

| Rescue Team _____ | Dept. | CPR/ Trained | First Aid |
|---|---|---|---|
| Name _____ | _____ | Y N | Y N |
| Name _____ | _____ | Y N | Y N |
| Name _____ | _____ | Y N | Y N |
| Name _____ | _____ | Y N | Y N |

| Crew Leader _____ | Dept. | CPR/ Trained | First Aid |
|---|---|---|---|
| Name _____ | _____ | Y N | Y N |
| Name _____ | _____ | Y N | Y N |

Special entry and/or work procedures _____

_____

I certify that all requirements of this Confined Space Entry Permit have been met.

## CONFINED SPACE ENTRY PERMIT APPLICATION

### PART 1

Location of confined space _____

Purpose for entering space _____

Chemicals to be used (described fully) _____

_____

MSDS available and reviewed?: Yes N/A No _____

Previous contents of space: _____

Expected entry date _____ Expected entry time _____

Outside contractors (name) _____ Training given Y __ N __

By District

### PART 2

Hazard Evaluation of the Confined Space. Write yes or no. If the hazard does not apply write N/A (not applicable)

Date _____

____Corrosive Materials

____Hot Equipment (Welding)

____Flammable Materials

____Toxic Materials

____Inert Gases

____Cleaning (i.e., chemical scrapping, water, etc.)

____Spark producing operations

____Liquids (Engulfment Potential)

____Drains open

____Pressure systems

____Mechanical (augers, moving parts, etc.)

____Electrical Wires or Equipment

### ISOLATION CHECKLIST

- Lines to vessel blanked or disconnected (yes or no)

____Liquids

____Electrical

### INITIAL ATMOSPHERIC TESTS

| | Concentration | | |
|---|---|---|---|
| | Top | Middle | Bottom |
| Oxygen Content - (Percent) [Limit 19.5% - 23.5%] _____ | | | |
| Explosibility (Percent of LEL) _____ [Limit less than 10%] | | | |
| Toxic Contaminant PPM _____ | | | |

How Tested? _____

Other _____

Remarks: _____

_____

Type of instrument(s) used _____ Last calibrated on _____

Time of reading: _____ Date _____

Atmospheric Tests performed by _____

(Signature)

Description of Hazard/Remediation

_____

_____

_____

_____

_____

_____

_____

Initial tests and Hazard Evalution performed by:

EXHIBIT "E"

LRL


# Northeast Ohio Regional Sewer District

3826 Euclid Avenue • Cleveland, Ohio 44115-2504 216 • 881 • 6600 FAX: 216 • 881 • 9709


December 21, 1995

Mr. James M. Taylor
Executive Director for Operations
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Re: Errors in NRC Inspection Report No. 030-16055/95005(DRSS)

Dear Mr. Taylor:

We were deeply troubled to receive Nuclear Regulatory Commission ("NRC") Inspection Report No. 030-16055/95005(DRSS), dated November 27, 1995, reviewed December 5, 1995, and approved December 4, 1995. This inspection report purports to reflect the results of NRC inspections that took place from April 3 to November 3, 1995. However, the contents of this inspection report are at odds with the facts as documented below.

We have attached a copy of the inspection report for your reference. We have also enclosed a copy of a videotape highlighting just a small portion of the pervasive violations of NRC regulations, good health physics practices, and ordinary safe working procedures at the Advanced Medical Systems, Inc. ("AMS") London Road facility during the period purportedly covered by the inspection report. We recite below some of the violations documented on the videotape in the context of the inspection report, to ensure that you see that our concern is fully justified.

As an initial point, both the transmittal letter and first page of the inspection report state that the purpose of the inspection was to determine whether the activities conducted by your licensee "were conducted safely and in accordance with NRC requirements." It is not clear under what authority the NRC may assess the safety of licensee conduct beyond compliance with specific NRC regulations, but it is clear that obvious safety violations were abundant at this facility during the period of inspection.

Referring to the excerpt of videotape taken July 5, 1995, you may readily observe unprotected workers in an un-shored excavation with heavy equipment in operation above them. You will also note that actual subsidence of the excavation is taking place. Similar operation of heavy equipment over an un-shored excavation may be seen in the excerpt of videotape taken July 7, 1995. In the July 28, 1995 excerpt you can see that the equipment being used to excavate is no longer level. It should be obvious that having unprotected workers in open, un-shored excavations with heavy equipment above them is unsafe.

It should be obvious that having unprotected workers in open, un-shored excavations with heavy equipment above them is unsafe.

Reference to Occupational Safety and Health Administration ("OSHA") rules regulating open-trench excavation may assist you in confirming that these are indeed unsafe practices.

In the July 28, 1995 excerpts, you may observe a confined space entry into one of the AMS manholes. You will observe that the confined space entry takes place with no apparent ongoing atmospheric monitoring whatsoever, hence with no indication of toxic or explosive gases. You will also see that a worker is left dangling in a harness unattended at the entry to the AMS manhole, and see the harness later come up without the worker in it. You will also see the same worker smoking at the mouth of the radiologically-controlled AMS manhole where explosive gases could well accumulate. It also appears that Robert Meschter, the AMS Radiation Safety Officer, may have lit the cigarette for him. It also appears that no radiological control is being exercised over materials being removed from the manhole.

Each of these illustrates an obviously unsafe practice. As in the case with open-trench excavation, reference to Occupational Safety and Health Administration ("OSHA") rules regarding confined space entry may assist you in confirming that these are indeed unsafe practices.

These several points illustrate that the activities conducted at the AMS London Road facility were not conducted in a safe manner. As NRC inspectors may be unfamiliar with safe excavation practices, safe confined space entry requirements, and OSHA regulations, these oversights may be explainable through mere ignorance of the applicable standards. They may have ignored these problems because of their lack of authority. If the latter is the case, the inspection report should not state that it is examining AMS' activities for "safety". However, the inspection report goes on to make a number of erroneous statements with respect to observation of safe radiological practices that appear to be within NRC inspector training.

As a predicate to the following comments, it must be first observed that the NRC inspection report confirms at pages 3 and 5 that the sewer discharge system owned by AMS, and particularly the four-inch discharge line and the underdrain system, were indeed radioactively contaminated. Accordingly, the conduct of AMS employees and AMS contractors should be evaluated in terms of activities in a known contaminated area. Viewed as such, the actions of the AMS employees and contractors were woefully deficient, and matched only by the NRC inspectors' failure to note such deficiencies.

For example, it is stated at page 6 of the inspection report:

> *All workers involved with the project received general radiation safety training from AMS, followed by training on the job-specific radiation work permit (RWP) 95-10.*
>
> *According to the RWP, workers were required to wear TLDs and pocket dosimeters at all times while working in restricted areas. Workers were also required to wear latex gloves when handling soil and water samples.*

The same RWP is discussed at page 4:

> *. . . Moreover, workers were required to wear full protective clothing (coveralls, hoods, booties, and gloves), in addition to using breathing zone air samplers, while working in contaminated areas.*

Page 6 of the inspection report falls short of stating full compliance with RWP 95-10. In fact, the report goes no further than to state, "The inspectors observed that workers wore proper dosimetry at all times, and wore latex gloves when handling soil and water samples." A cursory review of the videotape readily demonstrates that even this rudimentary requirement of good health physics practice and the RWP prepared was not observed.

For example, examine the videotape excerpts of July 5, 1995, in which workers are handling sections of the contaminated footers without gloves. Or see the excerpts from the July 11, 1995 videotape, in which the worker is using his bare hands to handle sections of the footer he has just broken up with a pick. This segment is particularly interesting, as he puts gloves on after handling the contaminated footers, apparently without washing his hands in the interim. Similarly, no protective gloves appear in the July 17, 1995 segment.

These are obvious failures to meet even the modest claim by the inspectors that "workers wore proper dosimetry at all times, and wore latex gloves when handling soil and water samples." That is, even the limited version of compliance stated by the NRC inspectors appears to be incorrect.

Beyond these multiple failures for AMS workers and contractors to wear gloves when handling radioactive materials, you will note many examples of failure to abide by the RWP mandate to *"wear full protective clothing (coveralls, hoods, booties, and gloves), in addition to using breathing zone air samplers, while working in contaminated areas."*

Note, for example, the workers in the contaminated excavation with no protective clothing whatsoever in the July 5, 1995 videotape excerpt. No breathing zone samplers are in evidence, either. In the July 7, 1995 excerpt, you can see that work is being performed in contaminated areas in short pants. In this same excerpt, you can also see a worker splashing contaminated water as he smashes at contaminated piping in the excavation with a breaker bar. The worker splashing the contaminated water is the one smoking the cigarette.[1] On the same day, you can see a worker in short pants in the truck bed into which contaminated dirt is poured. The truck, not surprisingly, has no liner.

In the July 11, 1995 excerpts, you can see a worker in a tee-shirt without gloves or face protection again smashing at the contaminated lines around the building. On this occasion you see him splashing himself in the face with contaminated water. There is no eyewash station for him to rinse his face, so he has a cigarette. In the July 13, 1995 excerpt, you can see workers again in short sleeves. On July 17, 1995, you can see a worker wearing no protective gear in a truck bed into which contaminated dirt is shoveled. The truck bed is still unlined.

You may also notice that there is a posting that some area is a "high radiation area." Which area is the high radiation area is not clear, as there is no apparent delimiting of areas at this facility throughout the project.

The extent of radioactive contamination at this site is indicated in the July 20, 1995 videotape excerpts, in which an AMS consultant states that soil samples may be too "hot" to handle. To be precise, he states that the soil samples being excavated are giving off 2 - 3 millirem/hour.

Notwithstanding the consultant's awareness of such high levels of contamination, the NRC inspectors do not make clear the efforts, if any, to characterize the contamination, nor do they unambiguously state the status of the AMS facility. The lack of clarity is exacerbated by the lack of precision in the inspectors' discussion of the activities themselves. For example, on page 5, the following may be found:

> *Soils in the area were surveyed by the licensee using a scintillation counter employing a 2 inch × 2 inch sodium iodide crystal. Any soil which exhibited radiation levels at or above 8 picocuries per gram (pCi/g)[3] was removed and placed in a posted, roped off area in the rear parking lot, near the building.*[4]

---

[1]Quite a bit of smoking is evident on these videotape excerpts, with most of it being done by the AMS Radiation Safety Officer. As it is he who provides radiation training to the non-radiation workers, his example of poor health physics practices is particularly troubling.

Footnote 4 to this text elaborates on this AMS procedure:

> *To be more precise, the soil was excavated using a backhoe. If any soil in the "scoop" exhibited readings at or above 8 pCi/g, the entire scoop of soil was considered potentially contaminated, and subsequently placed in the posted, roped off area in the rear parking lot.*

As you may recognize, sodium iodide crystal scintillation detectors do not provide readings in pCi/g. Hence, an important step has been left out of the discussion of how any material at this facility was characterized. Further, as to the tables attached to the inspection report, the MDA level for liquids of 20 - 60 pCi/l and for solids of 7 - 26 pCi are quite high, and do not seem to reflect best practices.

Certainly, no systematic evaluation of the facility or grounds approaching the NRC Draft Branch Technical Position on Site Characterization for Decommissioning Sites (NRC, 1992) has been conducted. Hence, this facility cannot be considered "characterized". Similarly, as nothing approaching the information contemplated by the Manual for Conducting Radiological Surveys in Support of License Termination, Draft NUREG/CR-5849 (J.D. Berger, ORISE, June 1992) has been developed, no part of this facility can be called "released".

Also, the implicit acceptance by the inspectors of leaving known contaminated piping in the ground (July 11, 1995) or simply covering a known contaminated area with a plastic tarp (July 24, 1995) or piling known contaminated material above ground (July 17, 1995) is very troubling. The idea that proper characterization and/or remediation would not take place because of poor shoring practices or the proximity of utility connections (*see* footnote 5 on page 6 of the inspection report) is also very troubling.

It puzzles us that such apparent violations are so easily recorded by the District, yet overlooked by NRC inspectors. Other aspects of the inspection report also puzzled us. For example, on page 7, the NRC chooses to forego finding AMS in violation of its license condition to remediate the London Road interceptor. The report states, "In fact, AMS has not yet been allowed to enter the interceptor."

This is grossly inaccurate and misleading, and all the more troubling because at least one of the NRC officials signing off on the inspection report actually knows that this statement is false. As was explained by telephone and confirmed in a November 1, 1995 letter to John Madera, the reason that AMS has failed to gain entry to the London Road interceptor is because they have unilaterally failed to properly arrange such entry. How it is that no violation is found when a licensee merely sits on its hands and ignores your license requirements is a mystery to us.

These videotape excerpts illustrate the District's concern with AMS confined space entry practices (*e.g.*, smoking in manhole, improper use of harness, etc.) and highlight the necessity of express conditions upon AMS and its contractors as a critical precondition to entry into the public sewer system.

Overall, NRC Inspection Report No. 030-16055/95005(DRSS) does not reflect the real conditions at the AMS facility nor accurately relate the activities that have taken place there. The extent to which the report diverges from the facts raises serious questions about NRC oversight of this licensee. We would appreciate your thorough review of the enclosed materials and appropriate follow-up investigation. As there are abundant violations apparent in these materials, we would recommend that the videotape not be shared with your licensee during the pendency of your investigation. We will be monitoring your enforcement follow-up closely.

Please call Richard Connelly, Manager of our Water Quality and Industrial Surveillance division, at (216) 641-6000, or Thomas Lenhart or Lawrence English of our Legal Department at (216) 881-6000, if you have any questions. Thank you for your assistance in this matter.

Very truly yours,

Erwin J. Odeal
Executive Director

encl.

cc: Richard N. Connelly
Thomas E. Lenhart
Lawrence K. English

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

December 4, 1995

Advanced Medical Systems
ATTN: David Cesar
Vice President
121 North Eagle Street
Geneva, OH 44041

Dear Mr. Cesar:

SUBJECT: NRC INSPECTION REPORT NO. 030-16055/95005(DRSS)

This refers to the inspection conducted by members of this office and NRC Headquarters on April 3 through November 3, 1995 at the London Road, Cleveland, Ohio facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the findings were discussed with those individuals identified in the enclosed report.

The areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observation of activities in progress.

No violations of NRC requirements were identified during the inspection.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

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

Sincerely,

James L. Caldwell

James L. Caldwell, Deputy Director
Division of Nuclear Materials Safety

License No. 34-19089-01
Docket No. 030-16055

Enclosure: Inspection Report
No. 030-16055/95005(DRSS)

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 030-16055/95005(DRSS)

License No. 34-19089-01 Category B Priority 1

Licensee: Advanced Medical Systems, Inc. (AMS)
1020 London Rd.
Cleveland, OH 44110

Inspection Dates: April 3 through November 3, 1995

Inspector: Michael F. Weber — 11/27/95
Michael F. Weber
Materials Inspector
Date

Reviewed By: John R. Madera — 12/5/95
John R. Madera, Chief
Nuclear Materials Licensing
Branch
Date

Approved By: James L. Caldwell — 12/4/95
James L. Caldwell, Deputy
Director, Division of
Nuclear Materials Safety
Date

Inspection Summary

Inspection on April 3 through November 3, 1995
(Report No. 030-16055/95005(DRSS))
Areas Inspected: This was a special inspection to determine whether activities authorized by the license, primarily the removal of contaminated water and soil in and around the AMS facility, were conducted safely and in accordance with NRC requirements.
Results: Of the areas inspected, no violations of NRC requirements were identified.

## DETAILS

1. Place of Use

Advanced Medical Systems, Inc. (AMS)
1020 London Rd.
Cleveland, OH 44110

2. Persons Contacted

*David Cesar - Vice President
*+Robert Meschter - Radiation Safety Officer
Steve Haddock - Isotope Handler
Chris Reed - Isotope Technician
*Carol Berger - Health Physicist (Contractor)
*Alan Duff - Project Manager (Contractor)
*Dwight Miller - Attorney for AMS
Various contract workers

*Present at exit meeting held on Aug. 29, 1995.
+Present at exit meeting held on Nov. 3, 1995.

3. Licensed Program

AMS is currently authorized to possess and use up to: (1) 150,000 curies of cobalt-60 as solid metal for storage only incident to waste disposal or transfer; (2) 135,000 curies of cobalt-60 in sealed sources for installation in, maintenance on, servicing and dismantling of, and training on teletherapy units; (3) 40,000 curies of cesium-137 for installation in, maintenance on, and servicing and dismantling of radiography and teletherapy units; (4) 4,040 kilograms of depleted uranium for shielding in radiography and teletherapy units; (5) 15,000 curies of cobalt-60 in non-NRC approved sealed sources for storage only; and (6) 15 millicuries of cobalt-60 in sealed sources for calibration of survey instruments. Prior to May 31, 1991, AMS was authorized to manufacture NRC approved sealed sources.

The license issued to AMS was originally issued on November 2, 1979, and was renewed on December 13, 1989, with an expiration date of December 31, 1994. The license was most recently amended on August 8, 1995. In November 1994, AMS submitted a timely renewal application, and the existing license continues to be effective pending completion of the NRC review of the renewal application.

4. Background

On October 21, 1994, the Executive Director of the Northeast Ohio Regional Sewer District (NEORSD) served an Order upon AMS indicating that the NEORSD would no longer provide wastewater treatment services for the AMS facility. On November 15, 1994, NEORSD installed plugs in

the AMS connections to the sewage treatment system. The sewer line plugs rendered non-functional the facility underdrain system which was designed to control ground water pressure on the foundation structure. This resulted in increasing water levels in the soil around the facility and, by mid-January 1995, ground water intrusion into the basement of the facility. The water in the basement became radioactively contaminated from facility surface contamination.

On March 17, 1995, AMS' license was amended to authorize the following activities: (1) process[1] water that was stored outside its facility in above-ground tanks, (2) simultaneously pump and process water in the sanitary sewer manhole and lateral, building sump pit and basement, (3) excavate areas around the facility to allow: (i) access to the radioactively contaminated four-inch sewer discharge line; and (ii) the radiological evaluation of the facility's underdrain system and surrounding soils, (4) immobilize the radioactive contamination present in the sewer discharge system owned by AMS, and (5) remediate the London Road interceptor in the vicinity of the abandoned facility lateral. These activities were required to be completed by June 17, 1995.

On June 16, 1995, the license was amended to provide new completion dates for the five items listed above. The excavation of areas around the facility was to be completed by July 7, 1995.

By letter dated June 29, 1995,[2] AMS indicated that because of continuing delays in receiving the necessary permits and authorizations, its scheduled completion date for the excavation project would be extended to July 21, 1995. By letter dated July 12, 1995, AMS indicated that, due to the delay associated with the additional excavation caused by inaccurate building drawings depicting the foundation drainage system, etc., the scheduled completion date would be further extended to July 28, 1995. On July 13, 1995, NRC informed AMS via telephone that, since AMS did not request a license amendment in either of these two letters, it was in violation of License Condition 19, and would continue to be in violation until its license was amended by NRC.

By letter dated July 21, 1995, AMS requested an amendment to its license to change the excavation completion dates, etc. By letter dated August 8, 1995, AMS indicated that the excavation project had been completed.

The failure to complete the excavation of areas around the AMS facility by July 7, 1995, constitutes a violation of License Condition 19. This failure constitutes a violation of minor significance and is being treated as a Non-Cited Violation, consistent with Section IV of the NRC Enforcement Policy.

One Non-Cited Violation of NRC requirements was identified.

---

[1] To "process" contaminated water means to remove Co-60 from the water.

[2] "29" is a typographical error, the correct number is "19."

5. Water Processing Project

As discussed above, on March 17, 1995, AMS' license was amended to authorize the following activities: (1) process water that was stored outside its facility in above-ground tanks, and (2) simultaneously pump and process water in its sanitary sewer manhole and lateral, building sump pit and basement. From early April to June 23, 1995, AMS contractors processed a total of nearly 100,000 gallons of water from these areas.

Most of the water processing equipment, including barrels containing processing wastes, was set up in the Isotope Warehouse, a restricted area. An AC powered Gamma Alarm, which gives audible and visual alarms if radiation levels exceed 2 mrem/hr, was located approximately 10 feet from the equipment, in an area often frequented by workers.

The inspectors continuously surveyed the processing equipment and surrounding areas. The highest reading on the water processing equipment was approximately 200 mrem/hr at the surface of the first carbon vessel. The highest reading on the surface of a waste drum was 7 mrem/hr. The exposure rates in the areas of the Isotope Warehouse most often frequented by workers were less than 1 mrem/hr; thus the inspectors never witnessed the Gamma Alarm in an alarm mode.

Sampling and storage tanks were located in the warehouse section of the building, an unrestricted area. Sample tanks were enclosed by wooden dikes/frames and plastic sheets in order to contain water if the tanks leaked. Additionally, a pump, equipped with a level trigger and connected to a hose to the basement, was located next to each sample tank. The only leaks observed by the inspectors occurred near the tanks' valves. These leaks were minor, produced puddles a few inches wide at the most, were always contained within the wooden dikes/frames, and did not cause contamination on the floor.

All workers involved with the water processing project were required to receive general radiation safety training from AMS, followed by training on the job-specific radiation work permit (RWP) 95-10. The inspectors audited several training sessions and noted that the training was very thorough in that it fully covered basic radiation safety topics as well as AMS specific information.

The inspectors interviewed nearly all of the contract workers and determined that they had received and understood the required training.

According to the RWP, workers were required to wear film badges and pocket dosimeters at all times while working in restricted areas. (All persons entering the facility are required to wear pocket dosimeters). Moreover, workers were required to wear full protective clothing (coveralls, hoods, booties, and gloves), in addition to using breathing zone air samplers, while working in contaminated areas. Workers were also required to wear latex gloves when handling water samples.

The inspectors observed that workers wore proper dosimetry at all times, wore proper protective clothing and used breathing zone air samplers while in contaminated areas, and wore latex gloves when handling water samples.

Regarding surveys, the RWP required performance of ambient radiation surveys prior to entering a work area, along with routine surveys to assess changing radiological conditions. Prior to leaving a work area, workers were required to frisk themselves, and any equipment and materials with them.

The inspectors observed that the workers performed ambient radiation surveys and frisks as required.

No violations of NRC requirements were identified.

6. Excavation Project

As discussed above, on March 17, 1995, AMS' license was amended to authorize the following activities: (1) excavate areas around the facility to allow: (i) access to the radioactively contaminated four-inch sewer discharge line; and (ii) the radiological evaluation of the facility's underdrain system and surrounding soils, (2) immobilize the radioactive contamination present in the sewer discharge system owned by AMS (this, of course, necessitated the installation of a new manhole), and (3) remediate the London Road interceptor in the vicinity of the abandoned facility lateral. The work on these activities began in late June, and, with the exception of the remediation of the London Road interceptor, ended in mid-August, 1995.

Following the installation of the new manhole, a trench (between 13 and 15 feet deep) was dug nearby, on the east side of the building, in order to locate the four-inch discharge line between the building's foundation and the old manhole. The line was unearthed, and the inner surface was found to be contaminated. The line was subsequently severed, and then capped with cement. In contrast to the building drawings from the 1950s, this line was not connected to the underdrain system at this location. Soils in that area were surveyed by the licensee using a scintillation counter employing a 2 inch x 2 inch sodium iodide crystal. Any soil which exhibited radiation levels at or above 8 picocuries per gram (pCi/g)[3] was removed and placed in a posted, roped off area in the rear parking lot, near the building.[4]

The excavation continued along the east and south sides of the building.

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[3] The maximum soil concentration for cobalt-60 in an unrestricted area is 8 pCi/g (Order Establishing Criteria and Schedule for Decommissioning the Bloomsburg, PA Site (Safety Light Corporation), 57 FR 6136, February 20, 1992).

[4] To be more precise, the soil was excavated using a backhoe. If any soil in the "scoop" exhibited readings at or above 8 pCi/g, the entire scoop of soil was considered potentially contaminated, and subsequently placed in the posted, roped off area in the rear parking lot.

Here, the underdrain system, at a depth of approximately 13 feet, was unearthed and found to be contaminated. The contaminated piping and any soil which exhibited radiation levels at or above 8 pCi/g were removed.

The excavation was halted in the area of the Source Garden, due to calculated exposure rates of more than 30,000 mrem/hr near the underdrain system (approximately 13 feet below the ground surface). These high exposure rates result from the storage of approximately 20,000 curies of Co-60 in the Source Garden.

The underdrain system north of the Source Garden was then unearthed, and again found to be contaminated. Moreover, a tee connecting the four-inch discharge line to the underdrain system was discovered. The line was subsequently severed, and then capped with cement. The underdrain system continued another 13 feet north past the tee connection, where it terminated. Approximately four feet of this length ran beneath the Isotope Shop air lock slab. As before, the contaminated piping and any soil (with the exception of some fill under the Isotope Shop airlock[5]) which exhibited radiation levels at or above 8 pCi/g were removed.

The entire underdrain system, with the exception of the drains near the Source Garden, was then replaced and the trenches filled with clean gravel and soil. In the area near the Source Garden, new drains were laid outside of the abandoned drains, and were connected to the new system. In order to prevent rain water, etc., from reaching the abandoned drains, a cement "wall" was installed underground between the abandoned system and the new system. In addition, the ground surface between the building and the new drains was sloped from the building toward the new system and covered with an impermeable plastic liner. The new underdrain system was then connected to the new manhole.

All workers involved with the project received general radiation safety training from AMS, followed by training on the job-specific radiation work permit (RWP) 95-10.

According to the RWP, workers were required to wear TLDs and pocket dosimeters at all times while working in restricted areas. Workers were also required to wear latex gloves when handling soil and water samples. Prior to leaving a work area, workers were required to frisk themselves, and any equipment and materials with them.

The inspectors observed that workers wore proper dosimetry at all times, and wore latex gloves when handling soil and water samples.

Regarding surveys, the RWP required performance of ambient radiation surveys prior to entering a work area, along with routine surveys to

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[5] Most, but not all, of the soil and gravel in this area under the Isotoope Shop air lock slab was removed by the backhoe. The removal was not completed due to: (1) the dangers of a cave-in, due to the large amount of gravel in the area, (2) the proximity of a gas line, and (3) the proximity of an electric substation. The new underdrain system terminated approximately nine feet north past the former location of the tee connection; thus it did not extend into the area under the slab.

assess changing radiological conditions. Prior to leaving a work area, workers were required to frisk themselves, and any equipment and materials with them.

The inspectors observed that the workers performed ambient radiation surveys and frisks as required.

Regarding the requirement to remediate the London Road interceptor, License Condition 19.F. of Amendment 32 required that: (1) AMS coordinate the remediation of the interceptor with NEORSD,[6] and (2) the project be completed by June 17, 1995. On June 6, 1995, the license was amended to require that: (1) the project begin by no later than July 8, 1995, and (2) AMS notify NRC no later than July 14, 1995, to confirm initiation of the project, and to provide an estimated completion date. AMS and NEORSD have been negotiating/discussing the project since at least December, 1994. To date, very little progress has been made; in fact, AMS has not yet been allowed to enter the interceptor. This is necessary in order for AMS to evaluate the contamination of the interceptor, and develop a remediation plan. NRC continues to monitor the status of this project.

No violations of NRC requirements were identified.

7. Confirmatory Measurements

From March 27 to July 6, 1995, the Region III Mobile Environmental Radiation Laboratory (Lab) was stationed in the Cleveland area to aid in the inspection effort. The Lab, and later the Region III Laboratory in Illinois, were used by NRC to: (1) measure the Co-60 concentration in the water after it was processed, and (2) determine the solubility characteristics of the Co-60 in the processed water.

At AMS, the processed water was first pumped into one of four 2500 gallon sample tanks located inside the building. For each sample tank, the water was recirculated for one hour, and then two one-liter samples were taken - one for NRC, one for AMS.

NRC's water samples were counted on a gamma spectroscopy system in the Region III mobile laboratory, or in the Region III laboratory in Illinois. The minimum detectable activity (MDA) at each laboratory varied between approximately 20 and 60 picocuries per liter (pCi/l). If Co-60 was detected above the MDA, then a solubility test was performed. The method used to determine solubility was ASTM D-1888-78, "Standard Test Methods for Particulate and Dissolved Matter, Solids, or Residue in Water," which is listed in NRC Information Notice (IN) 94-07 as the first of two acceptable methods which may be used for the radioanalysis of suspended solids in water. Briefly, this method involves passing the processed water through a 0.45 micron filter, and then analyzing the filter for gamma radioactivity. For the filter analyses, the MDA at

[6] The London Road interceptor is owned by NEORSD, not AMS.

each laboratory varied between approximately 7 and 26 pCi. If any activity of Co-60 above the MDA was detected on the filter, then the Co-60 was considered insoluble; otherwise, the Co-60 was considered soluble.

In all cases, NRC's solubility tests on the processed water pumped to the storage bladders revealed no detectable Co-60 on the filters. (See Table 1.)

8. Facility Security and Postings

The AMS building is equipped with an automatic security system for both physical protection of the facility and fire detection and suppression. In addition, during the excavation project, AMS provided a security guard when AMS staff were not present at the facility.

Regarding postings, all restricted, radiation, and contaminated areas inside and outside the AMS building were properly posted throughout the water processing and excavation projects.

No violations of NRC requirements were identified.

9. Personnel Radiation Protection - External

As indicated earlier, workers were required to wear TLDs and pocket dosimeters at all times while working in restricted areas. AMS monthly external exposure reports reveal that from January through the end of August, 1995, the highest total exposure for a worker was 295 mrem. The total exposure for all workers was 1125 mrem. (See Table 2.) This is well below the standards for occupational workers as found in 10 CFR 20.1201.

10. Exit Meeting

Exit meetings were held with those individuals and at those times indicated in Section 2 of this Inspection Report.

TABLE 1 - Results of NRC's Analysis of Processed Water Pumped to Storage Bladders

| Water Sample Collection Date | NRC Sample Number | Concentration (pCi/l) (Water Sample) | Activity (pCi) (Filter Sample) |
|---|---|---|---|
| 3/27/95 | 2 | 28 ± 8 | < 7 |
| 3/27/95 | 4 | < 19 | < 7 |
| 3/28/95 | 5 | 35 ± 8 | < 9 |
| 3/28/95 | 6 | < 41 | < 10 |
| 3/28/95 | 7 | 81 ± 18 | < 8 |
| 4/10/95 | 10 | < 39 | < 9 |
| 4/24/95 | 17 | < 42 | N/A |
| 5/1/95 | 20 | 39 ± 7 | < 6 |
| 4/29/95 | 21 | < 46 | N/A |
| 4/26/95 | 22 | 131 ± 23 | < 7 |
| 4/29/95 | 23 | 194 ± 27 | < 25 |
| 5/16/95 | 24 | 162 ± 25 | < 25 |
| 5/19/95 | 26 | 126 ± 23 | < 11 |
| 5/22/95 | 27 | 187 ± 26 | < 11 |
| 5/23/95 | 28 | < 52 | N/A |
| 6/5/95 | 29 | < 21 | N/A |
| 6/6/95 | 30 | < 20 | N/A |
| 6/5/95 | 31 | < 22 | N/A |
| 5/31/95 | 32 | < 47 | N/A |
| 5/31/95 | 33 | 54 ± 10 | < 26 |
| 5/31/95 | 34 | < 45 | N/A |
| 5/31/95 | 35 | < 53 | N/A |
| 6/2/95 | 36 | < 57 | N/A |
| 6/6/95 | 119 | < 44 | < 8 |
| 6/6/95 | 120 | 110 ± 16 | < 7 |
| 6/13/95 | 121 | 178 ± 19 | < 9 |
| 6/13/95 | 122 | 66 ± 13 | < 9 |

| | | | |
|---|---|---|---|
| 6/13/95 | 123 | 232 ± 21 | < 9 |
| 6/13/95 | 124 | 23 ± 7 | < 11 |
| 6/11/95 | 125 | < 23 | N/A |
| 6/13/95 | 126 | 193 ± 16 | < 12 |
| 6/9/95 | 127 | 63 ± 10 | < 11 |
| 6/8/95 | 128 | < 16 | N/A |
| 6/11/95 | 129 | 38 ± 10 | < 9 |
| 6/6/95 | 130 | 93 ± 20 | < 8 |
| 6/6/95 | 131 | < 20 | < 8 |
| 6/19/95 | 132 | 82 ± 12 | < 12 |
| 6/7/95 | 133 | 87 ± 22 | < 8 |
| 6/6/95 | 134 | 107 ± 32 | Unavailable |
| 6/21/95 | 135 | 332 ± 53 | < 11 |
| 6/13/95 | 136 | < 22 | < 9 |
| 6/13/95 | 137 | 294 ± 32 | < 9 |
| 6/14/95 | 138 | 287 ± 33 | < 8 |
| 6/15/95 | 139 | 199 ± 13 | < 9 |
| 6/14/95 | 140 | 438 ± 43 | < 11 |
| 6/21/95 | 141 | 21 ± 8 | < 6 |
| 6/13/95 | 142 | < 21 | N/A |
| 6/7/95 | 143 | 93 ± 18 | < 8 |
| 6/8/95 | 144 | < 20 | N/A |

NOTES:

(1) For the water analysis, the MDA varied between approximately 20 and 60 pCi/l. For the filter analyses, the MDA varied between approximately 7 and 26 pCi.

(2) All results less than the MDA are listed as "< x" where "x" represents the numerical value of the MDA.

(3) All results greater than the MDA are listed with errors. The errors are twice the standard deviation.

(4) "N/A" or Not Applicable signifies that the concentration of Co-60 in the water sample was below the MDA, thus, the solubility test was not performed. (As a check, the solubility test was performed on some samples with concentrations less than the MDA.)

(5) "Unavailable" signifies that one water sample was lost, thus the solubility test was not performed.

TABLE 2 - External Exposures to AMS and Contract Workers

| Worker | Monthly External Exposure (millirem) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1/95 | 2/95 | 3/95 | 4/95 | 5/95 | 6/95 | 7/95 | 8/95 | Total |
| 1 | nd | nd | nd | nd | 20 | nd | nd | nd | 20 |
| 2 | 10 | 20 | nd | nd | nd | 160 | 10 | nd | 200 |
| 3 | 10 | 10 | 10 | nd | 40 | 160 | 20 | 45 | 295 |
| 4 | -- | -- | nd | nd | nd | 10 | nd | 30 | 40 |
| 5 | -- | -- | nd | 20 | 50 | 20 | -- | -- | 90 |
| 6 | -- | -- | nd | 10 | 60 | 170 | nd | 30 | 270 |
| 7 | -- | -- | -- | -- | -- | 170 | -- | -- | 170 |
| 8 | -- | -- | -- | -- | -- | -- | -- | 40 | 40 |
| 9 | -- | -- | -- | -- | -- | nd | nd | -- | 0 |
| 10 | -- | -- | -- | -- | -- | nd | nd | -- | 0 |
| 11 | -- | -- | -- | -- | -- | nd | nd | -- | 0 |
| | | | | | | | | Total | 1125 |

NOTES:

(1) "nd" means the dose is below the dosimetry vendor's minimal measurable quantity. A value of zero was substituted for nd in the calculation of each worker's total dose.

EXHIBIT "F"

Original ... Copy to Larry English and EDO

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

RECEIVED
EXECUTIVE DIRECTOR'S OFFICE

February 1, 1996

FEB - 8 1996

RECEIVED NORTHEAST OHIO REGIONAL SEWER DISTRICT
FEB - 9 1996
Legal Department
N. E. O.

Erwin J. Odeal
Executive Director
Northeast Ohio Regional
Sewer District
3826 Euclid Avenue
Cleveland, Ohio 44115-2504

Dear Mr. Odeal:

I am responding to your December 21, 1995 letter to Mr. James M. Taylor, NRC's Executive Director for Operations. Your letter discussed NRC Inspection Report No. 030-16055/95005 (DRSS), concerning Advanced Medical Systems, Inc. (AMS).

Your letter expresses the view that the inspection report does not reflect the real conditions at the AMS facility nor accurately relate the activities that have taken place there. In addition, you indicate that the videotape shows pervasive violations of NRC regulations, good health physics practices, and ordinary safe working procedures at the AMS facility during the time period covered by the inspection report.

We have carefully reviewed your letter and videotape. This includes having a radiation specialist not associated with this inspection perform an independent review of your letter and videotape, and the inspection report.

Some of your concerns, e.g., potentially unsafe excavation practices and potentially unsafe confined space entries, are under the jurisdiction of the Occupational Safety and Health Administration (OSHA). Per the Memorandum of Understanding between NRC and OSHA ("Worker Protection at NRC-Licensed Facilities," 53 Fed. Reg. 43950 (October 31, 1988)), we will forward your letter and a copy of the videotape to OSHA. These concerns are not addressed further in this letter.

The remaining concerns regarding contamination control, high radiation areas, handling of soil samples, radiation detection and analysis equipment, characterization of AMS site, abandoned footer drains, radiological control of material, and remediation of the London Road interceptor are under the jurisdiction of NRC. We have reviewed each concern including the characterization in your letter, the videotape, the inspection report, and other applicable documentation. The results of this review are presented in Enclosure 1 to this letter.

Based on our review, we have concluded that the inspection report reflects and accurately relates the real conditions at the AMS facility and the activities that have taken place there. Moreover, we do not find that sufficient

evidence exists to warrant further investigation of whether violations of NRC regulations occurred at AMS during the time period covered by the inspection. However, we note that examples of not following good health physics practices were evident at AMS, although they did not constitute violations of NRC requirements. This will be reviewed with AMS during the next inspection.

As a measure of how safely, from a radiological perspective, the projects at AMS were carried out, the thermoluminescent dosimeter (TLD) personnel exposure records were reviewed. As discussed in the inspection report, the doses received by the workers during the water processing project, and especially the excavation project, were very low, as shown in Enclosure 2, when compared to the 5000 millirem annual dose limit. The doses were especially low during the month of July, when nearly all the excavation work took place. Judging by this criteria, the conclusions of the inspection report are valid.

Finally, our report includes the statement that AMS has not yet been allowed to enter the NEORSD interceptor. Your letter indicates that this statement is grossly inaccurate and misleading, and alludes to an NRC official signing the inspection report knowing that this statement was false. We believe that the statement is factual, although it could be misinterpreted. NRC recognizes that AMS and NEORSD have failed to agree on arrangements for entrance into the interceptor. However, based on your assertion, we are forwarding a copy of your letter and this response to NRC's Office of the Inspector General for appropriate action.

Should you have any further questions regarding AMS, please do not hesitate to contact Geoffrey Wright, Acting Deputy Director, Division of Nuclear Materials Safety, Region III, who can be reached at (708) 829-9801.

Sincerely,

Hubert J. Miller
Regional Administrator

Docket No. 030-16055
License No. 34-19089-01

Enclosures: 1. Review of Concerns under Jurisdiction of NRC
2. External Exposures to AMS and Contract Workers
3. AMS Radiation Work Permit
4. Readings from Sodium Iodide Crystal Scintillation Detector

See Attached Distribution

cc w/encls:
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Enclosure 1

Review of Concerns Under Jurisdiction of NRC

A. Contamination Control

1. Use of protective equipment

Pursuant to 10 C.F.R. § 20.1101(b), licensees are required to use, to the extent practicable, procedures and engineering controls to achieve radiation doses to workers and members of the public that are as low as is *reasonably* achievable (ALARA). The inspection report covered two projects at AMS, the water processing project, and the excavation project. The radiological hazards associated with the water processing project were greater than those of the excavation project. This is especially true regarding the potential for personnel contamination resulting from airborne cobalt-60 (Co-60). Thus, the procedures and engineering controls used to achieve radiation doses ALARA to workers and members of the public for the water project were more stringent than those for the excavation project. This concept was incorporated into AMS' Radiation Work Permit (RWP) 95-10, as discussed below. (We have enclosed RWP 95-10 as Enclosure 3.)

During the water project, it was necessary for workers to occasionally enter the Isotope Shop and the basement, both of which are contaminated areas, located inside the AMS facility. Note that, at AMS, the phrase *contaminated area* has a precise meaning, an area where removable contamination levels exceed 1000 disintegrations per 100 square centimeters (dpm/100 $cm^2$).[1] According to AMS survey records, the average removable contamination levels in the Isotope Shop and basement were at least 50,000 dpm/100 $cm^2$. As discussed in the inspection report, the inspectors observed that, during the water processing project, workers wore full protective clothing (coveralls, hoods, booties, and gloves), in addition to using breathing zone air samplers, while working in those contaminated areas. This level of protective clothing and equipment was required by RWP 95-10 as well as AMS procedures.

For the excavation project, the Co-60 present in the soil and in the footer drains was not in a form which would likely cause an airborne problem. Thus, this type of contamination did not require the use of full protective clothing and air samplers, as was required for the water project. This flexibility regarding protective equipment was incorporated into RWP 95-10, under "Protective Equipment," as follows:

[1] AMS ISP Manual, issued January 1995, page 30.

*Other Precautions and Special Instructions: Specific precautions and protective equipment needs to be determined by RSO as work progresses. Requirements subject to change based upon real-time survey results.*

During the NRC inspection, the inspectors observed that radiological surveys were regularly performed in the trenches during the excavation work. This fact is supported by the videotape included with NEORSD's letter.

In order to determine if the workers and equipment became contaminated with Co-60, the workers were required to frisk themselves and their equipment prior to leaving a trench. The release criteria for personnel and equipment was the background radiation level. The inspectors observed that the workers properly conducted these frisks, as required. The inspectors did not observe any personnel frisks in which the background levels were exceeded. In addition, according to AMS, the release criteria was never exceeded by workers, and was exceeded only a few times by equipment, which was subsequently decontaminated.

2. Handling material without wearing gloves

The videotape shows workers, without gloves, handling potentially contaminated footer pipes. We agree; this is not a good health physics practice, and will be reviewed with AMS during the next inspection. However, the safety significance is mitigated by the fact that the workers properly frisked themselves and their equipment prior to leaving a trench, as discussed above. Please note that NRC's inspection program is based on selective observations of representative licensee activities. During the inspection, the inspectors did not observe AMS workers not wearing gloves when necessary. In fact, as documented in the inspection report, "The inspectors observed that workers wore proper dosimetry at all times, and wore latex gloves when handling soil and water samples." NRC inspectors were not continually present at AMS while these projects were underway, nor were they always observing the excavation work. While at AMS, the inspectors performed other duties such as surveying the excavated dirt and other areas, interviewing workers, observing the frisks referred to above, auditing radiation safety training, and assisting with a structural integrity inspection.

3. Splashing water onto a worker's face

The videotape shows a worker breaking the four inch line, and getting water splashed onto his face. The fact that the worker failed to use a face shield is not a good health physics practice, although it is not a violation of NRC requirements. This will be reviewed with AMS during the next inspection. However, our review of this incident indicates that the "contaminated water" to which NEORSD's letter refers was likely clean, ground water. The

videotape reveals that this incident occurred several days after: (1) the four inch line coming from the AMS building was broken, (2) the contaminated water from inside the pipe was either pumped into an outside storage tank or drained into the ground, and finally (3) the pipe was capped with cement and brick at both "broken ends." The AMS manhole, to which the other section of this four inch line was still connected, contained a small amount of ground water, from continual ground water seepage. Throughout the spring and summer of 1995, ground water entered this manhole, and was subsequently pumped to outdoor storage tanks. Throughout the same time period, samples from these storage tanks were collected and analyzed by AMS prior to processing. With the exception of some samples taken in late March 1995, the samples always had concentrations of Co-60 which were less than the EPA drinking water standard of 218 picocuries per liter (pCi/l). Thus, it is likely that the water which splashed onto the worker's face was clean, ground water. The fact that contamination was not identified on any worker leaving a trench supports this conclusion.

4. Unlined truck bed carrying contaminated soil

The dump truck used to transport contaminated soil at AMS did not have a liner in the truck bed. Rather than using a liner, AMS decided to implement a survey program, which required routine surveys of the truck. NRC inspectors observed that AMS workers routinely surveyed the truck for both external exposure and removable contamination. In addition, according to AMS, before the truck was allowed to leave AMS at the end of the project, it was thoroughly surveyed, and a few spots (which turned out to be clumps of dirt) with above background readings were decontaminated. Thus, the survey program negated the need for the truck liner.

B. High Radiation Areas

Certain outside areas at AMS were posted as high radiation areas. NEORSD's letter indicates that there was some confusion about which areas were high radiation areas. Our review of the videotape indicates that the high radiation area signs were held up by yellow tape, with the tape serving as the high radiation area boundary or marker. The high radiation areas which were visibly marked were located at the west side of the building, and outside the Source Garden. This method of marking radiation areas is standard practice, and was emphasized during the general radiation safety training given to the workers.

C. Handling of Soil Samples

The videotape shows an AMS contractor stating that certain soil samples were too "hot" for the NEORSD representatives present at AMS to handle. The contractor later states that the samples had radiation levels of 2-3 millirem per hour (mrem/hr).

After carefully reviewing this segment of the videotape, it appears that the contractor was suggesting that the NEORSD representatives refrain from taking these samples since: (1) the samples would have caused unnecessary exposure to the NEORSD representatives, and (2) the samples may have caused the NEORSD representatives to exceed their annual dose limits. The NEORSD representatives who were present at AMS are considered members of the public, not radiation workers. Members of the public may not receive more than 100 mrem per year total effective dose equivalent. Moreover, members of the public are generally not monitored for radiation exposure. Radiation workers, such as AMS contractors involved in this project, may receive up to 5000 mrem per year total effective dose equivalent, and are monitored for radiation exposure. Thus, it appears that the AMS contractor was exhibiting good health physics judgement in recommending that the NEORSD representatives not take these samples.

D. Radiation Detection and Analysis Equipment

1. Readings from scintillation detector

NEORSD's letter indicates that sodium iodide crystal scintillation detectors do not provide readings in picocuries per gram (pCi/g). We agree with that statement. The author of the inspection report chose not to discuss how AMS contract health physicists used detector efficiency and instrument software to calculate an equivalent reading in pCi/g. For clarification, an example of this type of calculation is shown in Enclosure 4.

2. Minimum detectable activities

NEORSD's letter indicates that the minimum detectable activities (MDAs) achieved by NRC counting equipment "are quite high, and do not seem to reflect best practices." As discussed in the inspection report, the inspection of the water processing project included NRC analyses of the processed water. NRC analyses were done to confirm the reasonableness of AMS' results. It was AMS' responsibility to analyze each sample of processed water to determine if the water could be pumped to a storage bladder. The MDAs obtained by AMS' contract laboratory were less than 20 pCi/l. The MDAs achieved by NRC counting equipment (20 to 60 pCi/l) were adequate for the purpose of confirming AMS' results.

E. Characterization of AMS Site

NEORSD's letter contains the statements: "No systematic evaluation of the facility or grounds approaching the NRC Draft Branch Technical Position on Site Characterization for Decommissioning Sites (NRC, 1992) has been conducted. Hence, this facility cannot be considered 'characterized'. Similarly, as nothing approaching the information contemplated by the Manual for Conducting Radiological Surveys in Support of License Termination, Draft NUREG/CR-5 849 (J.D. Berger, ORISE, June 1992) has been developed, no part of this facility can be

called 'released'." We agree with these statements; however, because AMS is neither decommissioning its site, nor terminating its NRC license, these types of evaluations are not necessary at this time. If and when AMS moves to decommission the site or terminate its license, the guidance in the referenced documents would be applicable.

AMS has stored on its grounds slightly contaminated soil from the excavation project. As explained below in Item G.2, NRC believes that the storage of this soil does not present a radiological hazard to the neighborhood around the AMS facility.

F. Abandoned Footer Drains

1. Contaminated footer drains left in ground

NEORSD's letter refers to the fact that some contaminated piping was left in the ground. This piping, actually a section of the footer drain, is located approximately 13 feet underground, in the vicinity of the Source Garden. The Source Garden is a storage area for radioactive sources, located at the corner of the basement of the AMS facility. By letter dated July 19, 1995, AMS indicated that due to the inventory of approximately 20,000 curies of Co-60 in the Source Garden, exposure rates in the vicinity of these footer drains were calculated to be 30,000 mrem/hr or more. The exposure rates above ground at waist level are less than 0.1 mrem/hr. This 300,000 to 1 reduction in exposure rate is due to the shielding effect of the ground, and the distance from the sources in the Source Garden. The decision to leave this footer drain in the ground as opposed to subjecting workers to a 30,000 mrem/hr radiation field was based on ALARA and good health physics principles. This issue will have to be addressed at the time of decommissioning.

2. Plastic tarp covers contaminated area

In NEORSD's letter, exception is taken to "covering a known contaminated area with a plastic tarp (July 24, 1995)." As described in AMS' July 19, 1995 letter, a copy of which was mailed to NEORSD, the plastic tarp covers the ground over the abandoned footer drains referred to above. The tarp extends between the AMS building and a trench filled with concrete known as the "slurry wall." This slurry wall meets the building's foundation and thus surrounds the abandoned footer drains. The tarp and slurry wall were designed to minimize the potential for water infiltration into the abandoned area (e.g., from rain and melting snow), and migration of contamination out of the abandoned area, respectively. The new footer drains were placed farther from the building, outside the slurry wall. Water from the new footer drains has been collected and subsequently analyzed by AMS' contract laboratory, as well as NEORSD, and found to be radiologically clean. This indicates that the contamination from the abandoned footer drains has not migrated into the new system.

The water in the footer drains will continue to be collected and monitored to determine if the new footer drains remain radiologically clean.

G. Radiological Control of Material

1. Materials removed from manhole

NEORSD's letter describes excerpts from the videotape where, on July 28, 1995, "It also appears that no radiological control is being exercised over materials being removed from the manhole." Our review of the videotape indicates that AMS workers adequately surveyed the materials removed from the manhole. Thus, it appears that radiological control was being exercised.

2. Storage of contaminated soil above ground

NEORSD's letter refers to the fact that AMS is storing contaminated soil above ground. During the excavation project, any excavated soil which exhibited radiation levels near or above 8 pCi/g was temporarily placed on a plastic tarp, in a posted, roped off area in the rear parking lot, near the building. The soil was covered with a plastic tarp when the excavation work was not in progress. By letter dated January 15, 1996, AMS indicated that a lined, wooden structure was being built at the AMS site to secure and house the soil.

During an NRC inspection on November 3, 1995, an inspector measured a maximum exposure rate of 0.06 mrem/hr at the boundary of the roped off area. At approximately 15 meters away from the boundary, the exposure rate from the soil is indistinguishable from the background radiation levels in Cleveland of approximately 0.005-0.01 mrem/hr. Thus, NRC believes that the storage of this soil does not present a radiological hazard to the neighborhood around the AMS facility.

H. Remediation of London Road Interceptor

1. Requirements of license condition

NEORSD's letter refers to NRC License Condition No. 19, which requires AMS to remediate the London Road interceptor. The initial activities of this remediation project include AMS making a confined space entry into the NEORSD system in order to evaluate the contamination of the interceptor. This evaluation is necessary for AMS to develop an appropriate remediation plan. These activities must be coordinated with NEORSD.

We have been monitoring the progress of the negotiations between AMS and NEORSD regarding the arrangements for entrance into the NEORSD system. We are aware of the fact that by December 1994,

negotiations between AMS and NEORSD were underway regarding the confined space entry. We are also aware that these negotiations have not yet concluded. Thus, the confined space entry into the NEORSD has not yet been made.

Regarding the aforementioned license condition, we consider the initiation of the project to include the negotiations between AMS and NEORSD regarding the arrangements for entrance into the NEORSD system. We continue to monitor the status of this project.

2. Entrance into interceptor

NEORSD objects to the statement in the inspection report which indicated that AMS has not yet been allowed to enter the NEORSD interceptor. Though the statement is factual, it could be misinterpreted. NRC recognizes that AMS and NEORSD have failed to agree on arrangements for entrance into the interceptor.

Enclosure 2

External Exposures to AMS and Contract Workers

| Monthly External Exposure (millirem) | | | | | | |
|---|---|---|---|---|---|---|
| Worker | Water Processing Project | | | Excavation Project | | |
| | 4/95 | 5/95 | 6/95 | 7/95 | 8/95 | YTD Total |
| 1 | nd | 20 | nd | nd | nd | 20 |
| 2 | nd | nd | 160 | 10 | nd | 200 |
| 3 | nd | 40 | 160 | 20 | 45 | 295 |
| 4 | nd | nd | 10 | nd | 30 | 40 |
| 5 | 20 | 50 | 20 | -- | -- | 90 |
| 6 | 10 | 60 | 170 | nd | 30 | 270 |
| 7 | -- | -- | 170 | -- | -- | 170 |
| 8 | -- | -- | -- | -- | 40 | 40 |
| 9 | -- | -- | nd | nd | -- | 0 |
| 10 | -- | -- | nd | nd | -- | 0 |
| 11 | -- | -- | nd | nd | -- | 0 |
| | | | | | Total | 1125 |

NOTES:

(1) "YTD" means year to date.

(2) "nd" means the dose is below the dosimetry vendor's minimal measurable quantity. A value of zero was substituted for nd in the calculation of each worker's total dose.

Enclosure 3

# AMS Radiation Work Permit (RWP) 95-10

# RADIATION WORK PERMIT
## ISP-38B

| | |
|---|---|
| Permit No: 95-10 (Rev. 1) | Type: ■ Job Specific □ Extended |
| Expiration Date: 6-15-95 | |

| | |
|---|---|
| Description and Location of Work: | Water Treatment and Remediation of Lateral Sewer Connection. Work locations are (a) ISA and ISA Basement Water removal, (b) site where water processing equipment is staged, and (c) site of excavations on exterior south and southeast wall of the building. Work procedures described elsewhere (see RSO). |

### SURVEY INFORMATION

| | |
|---|---|
| General Area Dose Rates (mR/hr): | (a) Basement to 50; ISA to 60<br>(b) To be determined<br>(c) Less than 1 |
| Maximum Accessible Dose Rates (mR/hr): | (a) Basement to 1000; ISA to 200<br>(b) To be determined<br>(c) Less than 1 |
| Removable Contamination (dpm/100 $cm^2$): | (a) Basement to $10^6$; ISA to 200,000, with 50,000 average<br>(b) To be determined<br>(c) To be determined. Dose rates and contamination status to be established during excavation and when water levels in manhole and pit drop. |

### ALARA REVIEW

| | |
|---|---|
| Estimated Total Dose: | Actual Total Dose: |
| Pre-Job Briefing by: RSO and HP Technician | Post-Job Briefing by: RSO |

Dose Reduction Techniques to be Employed: Continuous health physics coverage required. Specific dose reduction techniques to be determined by HP Technician as work progresses. General ALARA commitments and procedures are described in Attachment 1.

### DOSIMETRY REQUIREMENTS

| | | | | |
|---|---|---|---|---|
| TLD/Film Badge ■ | Finger Ring ■ | SRPD (200mR) ■ | SRPD (1R) □ | SRPD(5R) □ |

Other (Specify): To be determined by RSO as radiological conditions change.

### PROTECTIVE EQUIPMENT

| | | | | |
|---|---|---|---|---|
| Coveralls ■ | Lab Coat □ | Hood ■ | Rubber Gloves ■ | Booties ■ |
| Rubbers □ | Respirator □ | Taped Seams ■ | HP Coverage ■ | Air Sampling ■ (BZA) |

Other Precautions and Special Instructions: Specific precautions and protective equipment needs to be determined by RSO as work progresses. Requirements subject to change based upon real-time survey results. General health and safety procedures are described in Attachment 2.

Authorized by: R Greenlee 4-17-95

Terminated by:

# ATTACHMENT 1 to RWP

AMS has the responsibility for providing a work-place environment in which employees, visitors and contractors are adequately protected from hazards, including the hazards associated with exposure to radiation and radioactive material. While the exposures associated with the water treatment and sewer remediation operations are expected to be low, all exposures are assumed to entail some risk to the employee. Therefore, AMS has adopted the following three principles to govern all work activities with the potential for exposure to radiation or radioactive materials:

1. No activity or operation will be conducted unless its performance will produce a net positive benefit.

2. All radiation exposures will be kept as low as reasonably achievable (ALARA) considering economic and societal costs.

3. No individual will receive radiation doses in excess of federal or administrative limits.

In addition to administrative controls implicit in this Plan, close attention to the basic radiation protection principles of "time, distance, shielding, and contamination control" is required. Since the act of filtration and ion exchange tends to concentrate activity from a large volume of water into a much smaller confined space, the project manager will alert those in the vicinity of the operation that dose rates may (will) increase over a period of time during daily Tailgate Safety Training. Safeguards to minimize unnecessary exposure will include performance of ambient radiation surveys prior to entering the area, along with planned and periodic routine surveys to assess changing radiological conditions, and communication of survey results to all operations personnel. In addition, no maintenance will be performed on water treatment, excavating, or other equipment without performance of a pre-job survey. Finally, administrative requirements for exit surveys and personnel dosimetry will provide confirmation of the adequacy of the ALARA program.

# ATTACHMENT 2 to RWP

Existing health and safety procedures and the provisions of the AMS Radiation Protection Program contain the worker protection requirements for any operations that occur at the London Road plant. Therefore, all work performed with licensed materials at the AMS facility will be completed under the direction of the AMS Radiation Safety Officer, the provisions of AMS License No. 34-19089-01, and the AMS ISP Manual. To address specific radiological issues during water treatment and sewer remediation, on-site health and safety will be monitored continuously by a health physics technician (HP Technician) operating under the direction of the AMS Radiation Safety Officer.

There will be one HP Technician for every 10 contractor personnel. The technician will provide tailgate safety training, implement the personnel monitoring program, perform release surveys for personnel and equipment as necessary, and maintain records generated as part of this work plan (Plan).

This Plan will remain in effect throughout the water treatment and sewer remediation operation.[1] Changes to the Plan to accommodate static or dynamic conditions may be made by the AMS Radiation Safety Officer after approval by the AMS Isotope Committee. The following are the health and safety responsibilities for each member of the operations team:

- The HP Technician is responsible for the implementation of this Plan.
- The AMS Radiation Safety Officer is responsible for providing oversight for implementation of this Plan and making changes to the Plan to reflect field situations that were not anticipated during the Plan's initial development. Changes in the Plan can only be made by the AMS Radiation Safety Officer and must be approved by the AMS Isotope Committee.
- The team leader of the contractor personnel is responsible for ensuring field implementation of the Plan. This includes communicating site requirements to all personnel on the job, field supervision, and consultation with the AMS Radiation Safety Officer regarding appropriate changes to the Plan.
- The team members are responsible for understanding and complying with all site health and safety requirements, including proper maintenance of health and safety equipment and facilities. This understanding will be documented by the signature of each team member on an attendance sheet for the briefing.

---

[1] In the event of a discrepancy between this Plan and existing AMS Health and Safety policy, the AMS policy will prevail.

*Site Entry*

The HP Technician will enter the work area before any work begins in order to verify that work zones are established. The daily site entry procedure will include the following:

- Qualitatively assess the wind direction and stay apprised of it throughout the day, identifying the direction during the tailgate safety meeting;
- Confirm the proper placement of emergency information and operational status of equipment.
- Visually scan for signs of actual or potential life or health threatening hazards;
- Note the physical conditions of the site and determine potential exposure pathways;
- Identify new boundaries of the work zones; and
- Document site activities in a "Field Activity Daily Log", including observations related to field conditions and the site, and samples collected.

*Employee Training*

Employee training in radiation protection will be provided to each contractor employee prior to the start of water treatment and sewer remediation operations. Training will consist of an oral presentation, hand-out of materials, and completion of the form entitled "Statement of Training", ISA-37B. The oral presentation shall address the following:

- Potential contaminants which may be encountered;
- The hazards associated with the potential contaminants
- Protective measures described in this Plan and the provisions of the AMS site-wide Radiation Protection Program;
- Work zone setup and decontamination procedures; and
- Emergency procedures.

Tailgate safety meetings will be conducted at the beginning of each shift or whenever new personnel arrive at the job site in order to discuss health and safety procedures to be followed during the day's work activity. The information discussed will be recorded on a "Tailgate Safety Meeting" form and will serve as confirmation that the information was discussed with those persons whose signature is on the form.

*Medical Program*

Any team member who develops a lost-time illness or sustains a lost-time injury during water treatment or sewer remediation operations will be examined by a physician. The physician must certify that the employee is fit to return to work before further participation in the effort.

*Emergency Procedures*

This Plan is established to allow operations to be conducted without adverse impacts on worker health and safety. In the event of an accident or other emergency situation, appropriate measures will be taken in order to reduce the impact on worker health and safety.

Minor accidents will be handled on site by the HP Technician and the team leader. The work area will have a first aid kit to handle minor incidents. Should there be an incident that cannot be handled by the team leader (e.g., a major accident, fire, or chemical release), then the AMS Radiation Safety Officer will be informed of the location and type of incident, and the need for assistance. The HP Technician will notify the AMS Radiation Safety Officer of all first aid cases so that the potential for radionuclide uptake through wounds can be assessed.

In the event that outside medical attention is needed, the hospital designated by the AMS Radiation Safety Officer will be used. Arrangements will be made by the AMS Radiation Safety Officer prior to the start of remediation activities for this hospital to accept injured personnel. The AMS Radiation Safety Officer (or designee) will accompany injured persons to the hospital to perform contamination monitoring prior to treatment, and to assist in decontamination activities as directed by the physician. A list of emergency response telephone numbers will be compiled and distributed during tailgate safety training. Prior to the start of each day's work activities, the nearest AMS telephone will be identified for use during an emergency. The list of emergency phone numbers will be readily available on site, along with a plant map and directions to the nearest hospital.

*Contamination Controls*

To assure radioactive materials remain under the control of AMS, each worker involved in water treatment or sewer remediation operations will be frisked prior to leaving the work area. Equipment and materials will be frisked and decontaminated, as necessary, prior to exiting the work area. The release criteria for personnel and equipment are 1,000 dpm/100 $cm^2$ removable activity, and 5,000 dpm/100 $cm^2$ total (fixed plus removable) activity, with the maximum total (fixed plus removable) activity not to exceed 15,000 dpm/100 $cm^2$ over an area of not more than 100 $cm^2$. Records of these actions will be maintained on a "Radiological Survey Form" and a "Radiological Survey Map". Contamination control during sample collection shall include the following:

- Personnel will wear latex gloves to collect and handle samples.
- The sample port will be located in an area readily accessible to personnel.
- An impervious area under the sample port from which water can be readily absorbed with rags should a small spill or drop occur.

- The drawing of the sample itself will be controlled with a valve that is manually-operated by the individual taking the sample.

***Protective Clothing***

The initial level of protection for on-site operations in contaminated areas will be tyvek coveralls, booties, and gloves, and other items as shown on the Radiation Work Permit. Activities involving liquids, fines, or heavy equipment require the use of hard hats, safety glasses with side shields, and steel-toed safety shoes. Upgrading of the level of protection will be based on ambient conditions as work proceeds. The AMS Radiation Safety Officer will be notified if it is deemed necessary to upgrade to a higher level of protection.

***External Exposure Monitoring***

Personnel shall be assigned a film-based dosimeter for use throughout the on-site operations. Assignment, use, retrieval, and processing shall be coordinated by the AMS Radiation Safety Officer pursuant to AMS Standard Operating Procedures for Radiation Protection. The Radiation Safety Officer shall evaluate the need for enclosing the dosimeters in protective covers (plastic bags), and shall document the methodology for use in interpreting the results of dosimeter processing. In addition, personnel will wear self-reading pocket dosimeters (or an equivalent self-reading device), with usage and readings recorded on a "RWP Sign-in Sheet", ISP-38C. Chambers with residual readings of 50% full scale will be re-charged prior to issue.

***Release of Treated Water***

Processed water will be stored, initially, in above-ground storage tanks. Samples will be collected from the tanks by a pre-determined procedure (see RSO). Samples shall be collected in large (two liter) bottles and/or one liter Marinelli beakers. No preservatives shall be used. Sufficient sample will be collected to permit it to be "split" (in volume) with the USNRC. Two samples will be collected per tank. The water will be dipped from the tank through the open manway or taken from a sample port on the recirculation pump when the tank has been "turned over" a pre-determined number of times. Sample ports shall not have a dead-leg or static line leading to the valve, so flushing prior to filling the sample bottle is not necessary.

For process control purposes, samples will be analyzed in the AMS gamma spectrometry system, using NIST-traceable sources (water equivalent density) of $^{60}Co$ for system calibration. For confirmatory analysis, as necessary, the samples shall be sent for analysis to Quanterra, Inc., a commercial analytical laboratory in (St. Louis, Missouri. There the $^{60}Co$ concentration will be determined by the methodology of gamma spectroscopy. A minimum detection limit of 20 to 30 pCi per liter has been specified. The solubility of Co in samples containing "detectable" activity, up to a maximum of 200 pCi per liter, will be demonstrated by the methodology of the American Public Health Association's Method 7110, "Gross Alpha and Gross Beta Radioactivity (Total, Suspended, and Dissolved)" from Standard Methods for the Examination of Water and Wastewater.

Water in the storage tanks that meets the release criteria (e.g., consistent with Information Notice 94-07, "Solubility Criteria for Liquid Effluent Release to Sanitary Sewerage Under the Revised

10 CFR Part 20") may be discharged or stored in collapsible storage containers. (Water held in the collapsible storage tanks may be evaporated at a nominal rate of 300-700 gallons per 24-hour day.) Water that does not meet the release criteria will be re-processed or evaporated.

### *Solid Waste Management*

Soils excavated or removed during remediation activities that contain $^{60}Co$ in concentrations in excess of eight (8) pCi/gram will be disposed of by conventional means at the discretion of the contractor personnel. Soils that exceed eight (8) pCi of $^{60}Co$ per gram, along with any other solid waste (resins, spent filters) containing detectable $^{60}Co$, will be stored in the basement of the AMS facility. Protective clothing and other compactable items worn in a contaminated area will be frisked to determine the level of removable and total contamination. Those that do not meet the release criteria of 1,000 dpm/100 $cm^2$ removable activity, and 5,000 dpm/100 $cm^2$ total (fixed plus removable) activity will be placed into drums and stored in the basement of the AMS facility.

### *Noise Monitoring and Abatement*

The water treatment and excavation contractors shall provide noise monitoring during heavy equipment operations pursuant to their procedures and specifications. As necessary, noise abatement methods and/or hearing protection shall be provided by the contractors.

### *Control of Fugitive Dust*

The excavation contractor shall ensure that dust is controlled through the use of water spray or containment, if necessary.

### *Forms*

All completed health and safety forms will be maintained on site by the HP Technician until completion of the project. At that time, they will be relinquished to the AMS Radiation Safety Officer who will maintain them as AMS records.

IEM
Integrated Environmental Management, Inc.

9040 Executive Park Drive, Suite 205
Knoxville, TN 37923
Phone: (615) 531-9140
Fax: (615) 531-9130

1680 East Gude Drive, Suite 305
Rockville, MD 20850
Phone: (301) 762-0502
Fax: (301) 762-0638

April 13, 1995

Mr. Robert Meschter, RSO
Advanced Medical Systems, Inc.
1020 London Road
Cleveland, Ohio 44110

Re: Radiation Work Permit for the Water Treatment Project

Dear Mr. Meschter:

Enclosed is Revision 1 of the referenced item. A change was made to the discussion on Contamination Controls (Attachment 2) to permit treatment contractors and other personnel knowledgeable of basic frisking techniques, to frisk themselves out of the controlled areas. This modification eliminates the need to have the HP perform all frisks, but still ensures that we will maintain our basic commitments to control contamination.

Pursuant to your in-house radiological safety procedures, I believe this revision must be approved by you and by the Advanced Medical Systems, Inc. Radiation Safety Committee prior to implementation. If you or the Committee require additional changes, please let me know and I will forward additional revisions to you immediately thereafter. At your earliest convenience and periodically thereafter, you should "re-visit" the entire contents of the RWP to ensure its continued applicability. The USNRC is interpreting the contents of the RWP strictly. Therefore, it is imperative that it be kept up to date.

Sincerely,

Carol D. Berger

Carol D. Berger, C.H.P.

cc: D. Cesar
D. Miller
File 94009

# RADIATION WORK PERMIT
## ISP-38B

| | |
|---|---|
| Permit No: 95-10 3-24-95 | Type: ■ Job Specific □ Extended |
| Expiration Date: 6-15-95 | |

| | |
|---|---|
| Description and Location of Work: | Water Treatment and Remediation of Lateral Sewer Connection. Work locations are (a) ISA and ISA Basement Water removal, (b) site where water processing equipment is staged, and (c) site of excavations on exterior south and southeast wall of the building. Work procedures described elsewhere (see RSO). |

### SURVEY INFORMATION

| | |
|---|---|
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| Maximum Accessible Dose Rates (mR/hr): | (a) Basement to 1000; ISA to 200.<br>(b) To be determined<br>(c) Less than 1 |
| Removable Contamination (dpm/100 $cm^2$): | (a) Basement to $10^6$; ISA to 200,000, with 50,000 average<br>(b) To be determined<br>(c) To be determined. Dose rates and contamination status to be established during excavation and when water levels in manhole and pit drop. |

### ALARA REVIEW

| | |
|---|---|
| Estimated Total Dose: | Actual Total Dose: |
| Pre-Job Briefing by: RSO and HP Technician | Post-Job Briefing by: RSO |

Dose Reduction Techniques to be Employed: Continuous health physics coverage required. Specific dose reduction techniques to be determined by HP Technician as work progresses. General ALARA commitments and procedures are described in Attachment 1.

### DOSIMETRY REQUIREMENTS

| | | | | |
|---|---|---|---|---|
| TLD/Film Badge ■ | Finger Ring ■ | SRPD (200mR) ■ | SRPD (1R) □ | SRPD(5R) □ |

Other (Specify): To be determined by RSO as radiological conditions change.

### PROTECTIVE EQUIPMENT

| | | | | |
|---|---|---|---|---|
| Coveralls ■ | Lab Coat □ | Hood ■ | Rubber Gloves ■ | Booties ■ |
| Rubbers □ | Respirator □ | Taped Seams ■ | HP Coverage ■ | Air Sampling ■ (BZA) |

Other Precautions and Special Instructions: Specific precautions and protective equipment needs to be determined by RSO as work progresses. Requirements subject to change based upon real-time survey results. General health and safety procedures are described in Attachment 2.

Authorized by: R Meredith 3-24-95

Terminated by: R Meredith 4-17-95

# ATTACHMENT 1 to RWP

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*Site Entry*

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- Personnel will wear latex gloves to collect and handle samples.
- The sample port will be located in an area readily accessible to personnel.
- An impervious area under the sample port from which water can be readily absorbed with rags should a small spill or drop occur.

- The drawing of the sample itself will be controlled with a valve that is manually-operated by the individual taking the sample.

*Protective Clothing*

The initial level of protection for on-site operations in contaminated areas will be tyvek coveralls, booties, and gloves, and other items as shown on the Radiation Work Permit. Activities involving liquids, fines, or heavy equipment require the use of hard hats, safety glasses with side shields, and steel-toed safety shoes. Upgrading of the level of protection will be based on ambient conditions as work proceeds. The AMS Radiation Safety Officer will be notified if it is deemed necessary to upgrade to a higher level of protection.

*External Exposure Monitoring*

Personnel shall be assigned a film-based dosimeter for use throughout the on-site operations. Assignment, use, retrieval, and processing shall be coordinated by the AMS Radiation Safety Officer pursuant to AMS Standard Operating Procedures for Radiation Protection. The Radiation Safety Officer shall evaluate the need for enclosing the dosimeters in protective covers (plastic bags), and shall document the methodology for use in interpreting the results of dosimeter processing. In addition, personnel will wear self-reading pocket dosimeters (or an equivalent self-reading device), with usage and readings recorded on a "RWP Sign-in Sheet", ISP-38C. Chambers with residual readings of 50% full scale will be re-charged prior to issue.

*Release of Treated Water*

Processed water will be stored, initially, in above-ground storage tanks. Samples will be collected from the tanks by a pre-determined procedure (see RSO). Samples shall be collected in large (two liter) bottles and/or one liter Marinelli beakers. No preservatives shall be used. Sufficient sample will be collected to permit it to be "split" (in volume) with the USNRC. Two samples will be collected per tank. The water will be dipped from the tank through the open manway or taken from a sample port on the recirculation pump when the tank has been "turned over" a pre-determined number of times. Sample ports shall not have a dead-leg or static line leading to the valve, so flushing prior to filling the sample bottle is not necessary.

For process control purposes, samples will be analyzed in the AMS gamma spectrometry system, using NIST-traceable sources (water equivalent density) of $^{60}Co$ for system calibration. For confirmatory analysis, as necessary, the samples shall be sent for analysis to Quanterra, Inc., a commercial analytical laboratory in (St. Louis, Missouri. There the $^{60}Co$ concentration will be determined by the methodology of gamma spectroscopy. A minimum detection limit of 20 to 30 pCi per liter has been specified. The solubility of $^{60}Co$ in samples containing "detectable" activity, up to a maximum of 200 pCi per liter, will be demonstrated by the methodology of the American Public Health Association's Method 7110, "Gross Alpha and Gross Beta Radioactivity (Total, Suspended, and Dissolved)" from Standard Methods for the Examination of Water and Wastewater.

Once the analytical results have been received and validated, water in the storage tanks that meets the release criteria (e.g., consistent with Information Notice 94-07, "Solubility Criteria for Liquid

Effluent Release to Sanitary Sewerage Under the Revised 10 CFR Part 20") may be discharged or stored in collapsible storage containers. (Water held in the collapsible storage tanks may be evaporated at a nominal rate of 300-700 gallons per 24-hour day.) Water that does not meet the release criteria will be re-processed or evaporated.

*Solid Waste Management*

Soils excavated or removed during remediation activities that contain $^{60}Co$ in concentrations in excess of eight (8) pCi/gram will be disposed of by conventional means at the discretion of the contractor personnel. Soils that exceed eight (8) pCi of $^{60}Co$ per gram, along with any other solid waste (resins, spent filters) containing detectable $^{60}Co$, will be stored in the basement of the AMS facility. Protective clothing and other compactable items worn in a contaminated area will be frisked to determine the level of removable and total contamination. Those that do not meet the release criteria of 1,000 dpm/100 $cm^2$ removable activity, and 5,000 dpm/100 $cm^2$ total (fixed plus removable) activity will be placed into drums and stored in the basement of the AMS facility.

*Noise Monitoring and Abatement*

The water treatment and excavation contractors shall provide noise monitoring during heavy equipment operations pursuant to their procedures and specifications. As necessary, noise abatement methods and/or hearing protection shall be provided by the contractors.

*Control of Fugitive Dust*

The excavation contractor shall ensure that dust is controlled through the use of water spray or containment, if necessary.

*Forms*

The following pages are copies of the forms that may be used in addition to those specified in the AMS ISP Manual. All completed health and safety forms will be maintained on site by the HP Technician until completion of the project. At that time, they will be relinquished to the AMS Radiation Safety Officer who will maintain them as AMS records.

Enclosure 4

Readings from Sodium Iodide Crystal Scintillation Detector

Calculate the screening criteria[1] for a rectangular volume of soil containing a uniform distribution of 8 pCi/g of Co-60, with the following assumptions:

Soil volume: $61\,cm \times 61\,cm \times 5\,cm$

Soil density: $1.65\,g/cm^3$

Detector height: $100\,cm$

Activity: $\left(\frac{8\,pCi}{g}\right)\left(\frac{1.65\,g}{cm^3}\right)(5cm)\,(61cm)^2 = 2.5 \times 10^5\,pCi$

Instrument efficiency: $0.1\,mR/hr = 117,000\,counts/min$ (provided by the instrument manufacturer)

Exposure rate over soil: $2.6 \times 10^{-4}\,mR/hr$ (calculated using the Microshield code, using the assumptions listed above)

Equivalent count rate:

$$\left(\frac{2.6 \times 10^{-4}\,mR}{hr}\right)\left(\frac{117,000\,counts}{min}\right)\left(\frac{1}{0.1\,mR/hr}\right) = 304\,counts/min$$

Therefore, the screening criteria is 300 counts per minute above background.

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[1] As explained in the inspection report, workers surveyed the excavated soil with a sodium iodide crystal scintillation detector. Generally, each survey took place after each scoop of soil was removed from the ground by the backhoe. These surveys were not used to precisely determine the Co-60 concentration of the soil; rather, they were used to quickly determine if the soil contained Co-60 in concentrations near or above the 8 pCi/g unrestricted area limit. The screening criteria is the radiation level, in units of counts per minute, as measured by the scintillation detector, which was used to make this determination. If the readings from the soil were near or greater than the screening criteria, then the soil was assumed to be contaminated, and it was subsequently placed in a posted restricted area in AMS' back parking lot. On the other hand, if the readings from the soil were well below the screening criteria, the dirt was assumed to be free of contamination, and it was later used as clean fill in the excavated trenches.

EXHIBIT "G"

Northeast Ohio Regional Sewer District

3826 Euclid Avenue • Cleveland, Ohio 44115-2504 216 • 881 • 6600 FAX: 216 • 881 • 9709

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

March 3, 1993

Mr. James Taylor
Executive Director for Operations
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Request for action on License #34-19089-01

Dear Mr. Taylor:

The Northeast Ohio Regional Sewer District ("District") was informed by the NRC in May, 1991 that Cobalt-60 had been discovered in ash piles at the District's Southerly Wastewater Treatment Center. This ash is the result of the incineration of sewage sludge at the facility. The ash in the areas where Cobalt is present is primarily ash from the early 1980s, with some contamination in ash of more recent vintage.

The District's independent review of NRC and Ohio Department of Health records indicate that Advanced Medical Systems, Inc., which operates a Cobalt-60 source manufacturing operation on London Road, Cleveland, Ohio under NRC License #34-19089-01 is the source of the Cobalt-60 at the Southerly Treatment Center.

The above conclusion is based on several facts. First, AMS is the only licensee in the District's service area authorized to process Cobalt-60 in a loose metallic form consistent with the form present in the ash. AMS is also the only entity (except for the former owner of the London Road facility) that has reported discharging Cobalt-60 to the sanitary sewer system leading to Southerly. In addition to the approximately 200 millicuries the AMS has reported in its discharge records, there is considerable circumstantial evidence that spills or other actions by AMS may have resulted in substantially greater discharges to the sewer system. NRC documents present ample evidence of Cobalt-60 contamination at the London Road facility, including numerous drains inside the building. In addition to contamination inside the building, AMS has received a NRC Notice of Violation due to excessive exposure rates in the sewer connecting the building to the public sewer system. This sewer line has been classified as a restricted area, which effectively denies the District access to the manhole used for sampling industrial discharges.

The NRC has consistently taken the position that unless the NRC can prove that AMS exceeded the discharge limits set forth in 10 CFR 20.303 there is no action that can be taken against AMS. Furthermore, the NRC contends that the District, by virtue of coming into possession of the Cobalt, is now responsible for any and all costs associated with the remediation/storage of the Cobalt. The District believes these positions are grossly unfair to the ratepayers of the District and are without justification.

The District, therefore, pursuant to 10 CFR 2.206 requests that the NRC take the following actions:

1) Modify AMS License #34-19089-01 to require that AMS assume all costs resulting from the off-site release of Cobalt-60 that has been deposited at the Southerly Treatment Center; and

2) Order AMS to decontaminate the sewer connecting the London Road facility with the public sewer at London Road and continue downstream with such decontamination to the extent AMS/NRC sampling indicates is necessary.

The District believes that these requested actions can be taken by the NRC based on the documentation already present in NRC files. If you elect not to take these actions, please provide the District with an explanation as to why the sewage ratepayers of Greater Cleveland are the appropriate persons to assume the cost of remediation.

Very truly yours,

William B. Schatz
General Counsel

WBS/td

cc: Richard Bangart, NRC
E. J. Odeal
T. E. Lenhart
R. Connelly
B. Koh

(taylor)