ADVANCED MEDICAL SYSTEMS
LONDON ROAD FACILITY

FACILITY DECONTAMINATION PLAN

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FACILITY DECONTAMINATION PLAN
ADVANCED MEDICAL SYSTEMS
LONDON ROAD FACILITY

ADVANCED MEDICAL SYSTEMS
1020 LONDON ROAD
CLEVELAND, OHIO

Prepared by:

THEADOR J. HEBERT
General Manager, ATC Medical Groups

December 24, 1987

Reviewed by:

S.S. STEIN
President, ATC Medical Groups

December 24, 1987

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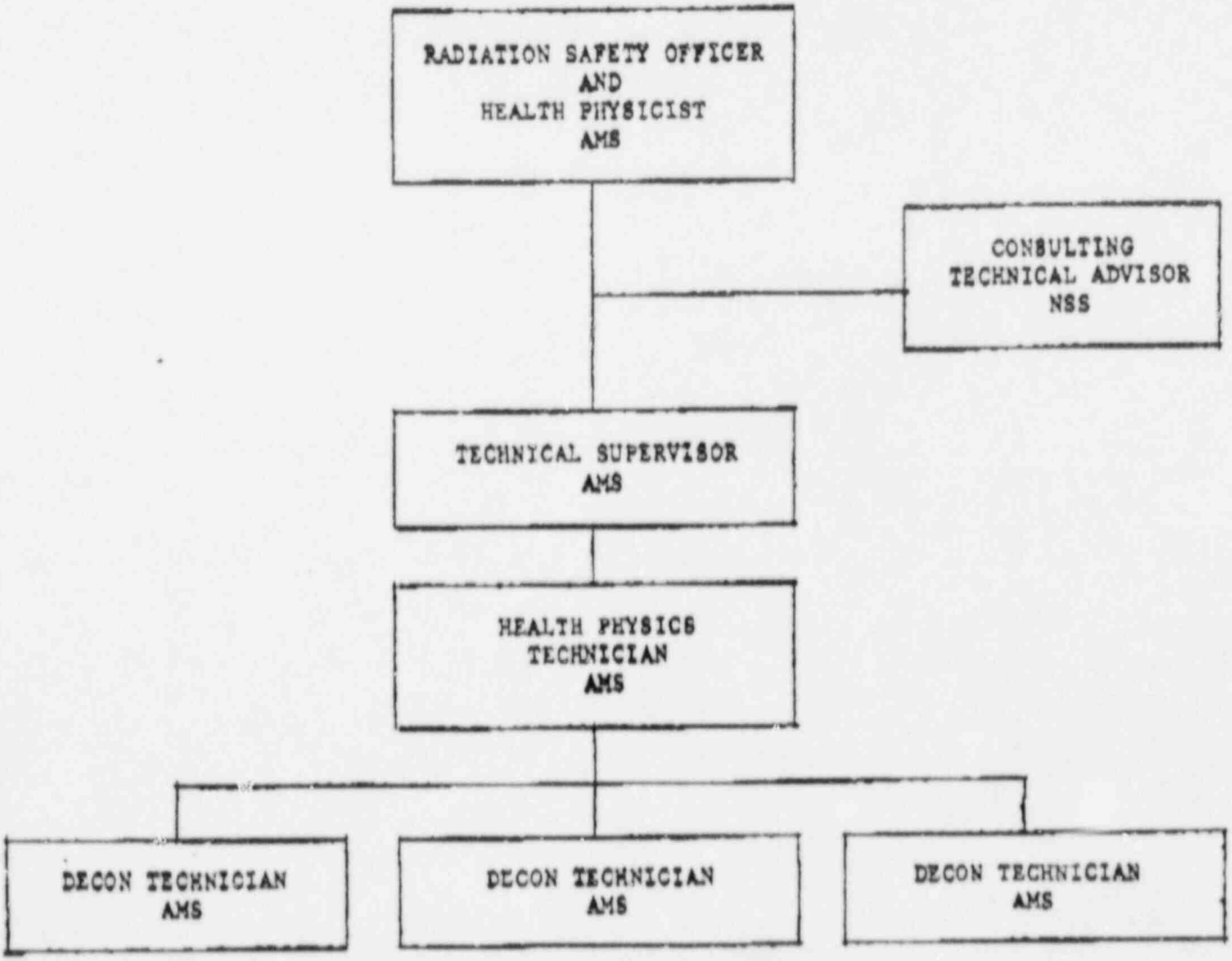
1.0 PURPOSE AND SCOPE

This revised document is intended to set forth the basic changes in organization and methods to be used for general decontamination of the London Road Facility. The information requested in "Enclosure A", Information to be Submitted in Response to License Condition No. 15.A is included.

2.0 ORGANIZATION

Advanced Medical Systems, Inc. (AMS) has contracted Nuclear Support Services, Inc. (NSS) to provide consulting and decontamination support services for the London Road Facility decon project. The proposed organization is detailed below. NSS will supply experienced decontamination technicians as requested by AMS. AMS will replace NSS decontamination personnel with personnel from AMS' company locations.

ORGANIZATIONAL CHART
LONDON ROAD DECONTAMINATION PROJECT



Responsibilities During Decon Project

2.1 AMS Radiation Safety Officer:

The Radiation Safety Officer has overall responsibility for the radiation protection program at the London Road Facility during the decon project. This is in accordance with the existing radioactive material license issued to AMS by the NRC.

2.2 AMS Health Physicist:

The Health Physicist will be responsible for the Health Physics Program as applicable to the decontamination project at the London Road Facility. Duties and responsibilities will include:

a. the Health Physicist and the facility Radiation Safety Officer will ensure all regulatory and specific license requirements are met;

b. review of decontamination and health physics procedures to be used during the project;

c. evaluating existing or potential radiological hazards which may impact the decontamination effort (including ALARA reviews of specific job tasks);

d. a Health Physicist and Radiation Safety Officer will assist the Technical Supervisor as necessary to insure timely completion of Decon Project.

2.3 NSS Consulting Technical Advisor:

The NSS Consulting Technical Advisor will, on request by AMS' Health Physicist or Radiation Safety Officer, advise on matters whenever performance problems should arise during the Decon Project. The General Manager shall also reserve the right to solicit the consulting services of the NSS Technical Advisor.

2.4 AMS Technical Supervisor:

The Technical Supervisor will be responsible for technical supervision and completion of the decontamination project activities. He will report to the AMS Radiation Safety Officer. The Technical Supervisor shall be physically present at the London Road Facility supervising and reviewing activities undertaken pursuant to this plan. Duties will include:

a. ensuring surveys are performed at locations and frequencies specified in the RWP's;

b. review of surveys and air samples for technical accuracy;

c. ensuring rad wastes are packaged and stored in accordance with facility procedures;

d. writing and review of decontamination and Health Physics procedure to be used during the Decon Project;

e. ALARA reviews of draft procedures;

f. planning and scheduling of decontamination tasks;

g. general supervision of health physics and decontamination activities during the project;

h. afteraction report.

2.5 AMS Health Physics Technician:

The Senior Health Physics Technician will report to the Technical Supervisor and will be responsible for the direct health physics coverage of decontamination activities. The Senior Health Physics Technician shall be physically present supervising all decontamination and cleanup activities undertaken pursuant to this Plan. Duties will include:

a. performing radiation, contamination, and airborne radioactive materials survey;

b. generating RWP's for the project;

c. exposure control of decontamination personnel working inside radiologically-controlled areas;

d. general facility contamination control;

e. gross sample counting.

2.6 Decontamination Personnel:

The decontamination crew will be comprised of experienced AMS personnel. These are experienced radiation workers under the AMS/NSS Decon project. All decon work will be performed under the direction of the Health Physics Technician. NSS will supply experienced consulting decon personnel as required to complete the project. One crew consisting of a minimum of three (3) Decon Technicians and one (1) Health Physics Technician will be utilized to complete the decon project.

3.0 TRAINING OF PERSONNEL

All personnel will participate in training which will meet or exceed the requirements of 10 CFR 19.12. Personnel who have received equivalent "Rad Worker" training (e.g., INPO Standardized General Employee Training) within the past year prior to assignment at AMS will require only facility site specific orientation training.

4.0 DECONTAMINATION - GENERAL

The preliminary sequence for facility decontamination is as follows:

1. Compliance
   a. reviews survey postings (3 weeks)
   b. relocation/shielding of sources (6 weeks)
   c. decontaminate areas outside RCA (2 weeks)
2. Decontaminate the Change Room (2 weeks)
3. Decontaminate the Shop Area and Airlock (6 weeks)

4. Ventilation Room
   a. decontamination of vent room (2 weeks)
   b. replace duct work (6 weeks)

5. Decontaminate the Decon Room (3 weeks)

6. Decontaminate the Stairwell (1 week)

7. Decontaminate the Basement (clean side) (7 weeks)

8. Decontaminate the Hot Cell (2 weeks)

NOTE: Any changes to the above sequence or extensions to the above duration of decontamination activities shall be approved in advance by the NRC Regional Administrator, Region III. Requests for changes shall be submitted to NRC in writing, including a description of the basis for the change.

4.1 Decontamination Techniques:

Decontamination techniques have been selected which will maintain liquid waste production and airborne radioactivity ALARA. No grit blasting or concrete scabbling is anticipated. Depending on the type of surface, dose rate levels and contamination levels or any combination of the following techniques may be used. Alternatively, other state-of-the-art techniques may be used as long as they minimise rad waste generation and maintain radiation exposure ALARA.

a. HEPA filtered wet/dry vac;

b. strippable coatings;

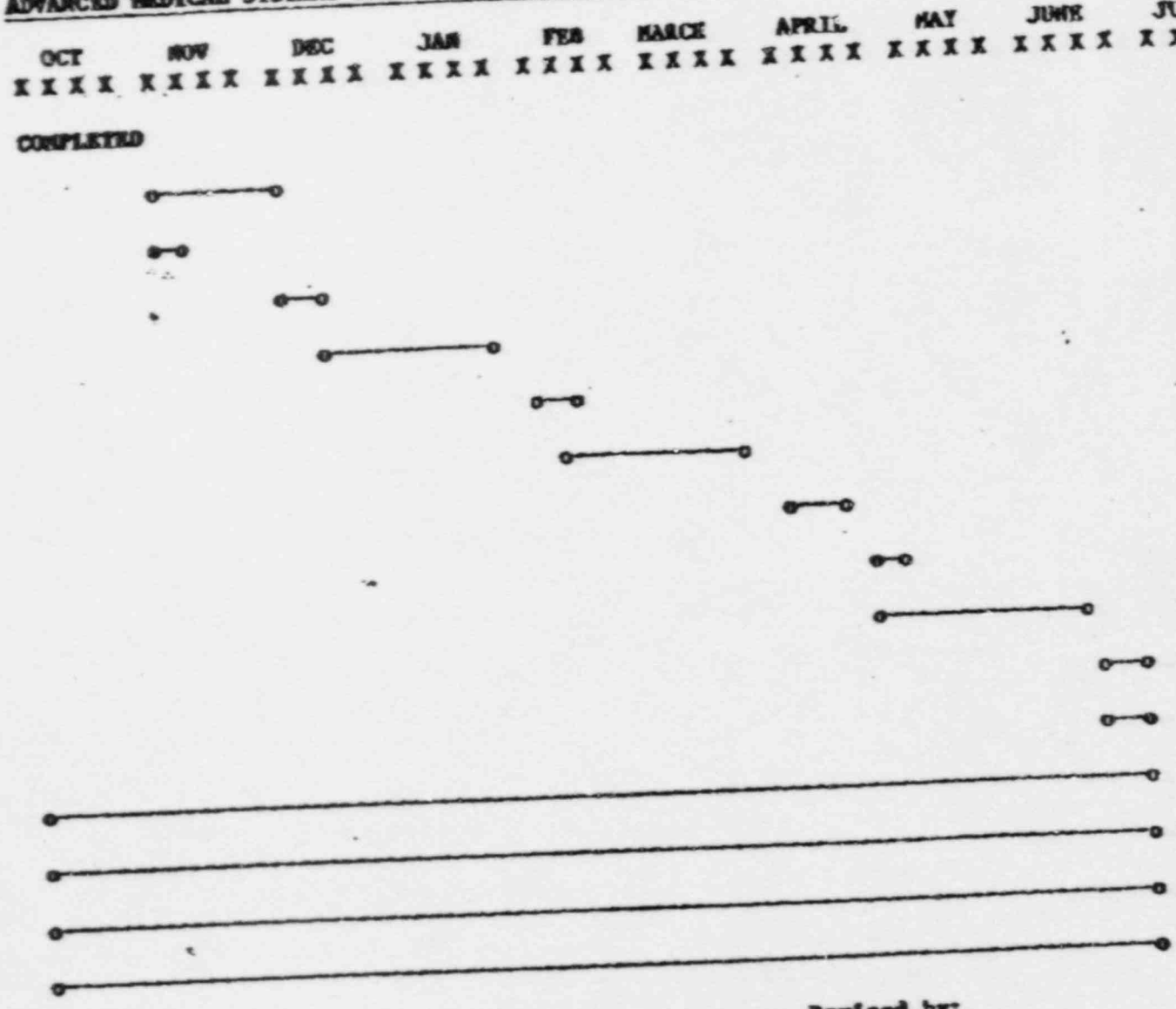
c. wet mop with industrial cleaner, or equivalent;

d. hand wiping of equipment and components with K-400 and/or Masslin cloths or equivalent.

5.0 DECONTAMINATION - SPECIFICS

The best and most appropriate decon methods will be used inside the facility-controlled areas. The following is AMS' general intent, but is subject to change depending on changing conditions.

ADVANCED MEDICAL SYSTEMS DECONTAMINATION SCHEDULE



Revised by:

James E. Elkins

James E. Elkins, Vice President

NOTE: The above schedule is based on starting work not later than Monday, November 2, 1987. Systems decontamination began on Monday, November 2, 1987 and all work is on schedule.

Last Revised 10/23/87

DEC 22 '87 17:06 ATC GENEVA IEC-23-'87 14:59 T-K-H STEEL 2368310515 #179-12 P.9

5.1 Phase I; Compliance:

AMS will provide all personnel with site specific training and will ensure that all personnel are trained as per the existing regulations. AMS will evaluate the radiation detection equipment on site and ensure that the calibration, method and frequency currently being used by good health physics practices. All radiological posting will be brought into compliance and will be consistent with good health physics practices (any area or equipment with greater than 220 DPM/100cm^2 loose surface activity will be considered contaminated).

5.2 Phase II; Removal or Storage of High Level Waste or Equipment:

All high level waste and equipment that causes excessive dose rates or radiation areas outside the facility-controlled areas will be either shielded, disposed of, or stored in a location where their presence will not cause excessive dose rates in the areas to be deconned. This action will reduce the radiation area worker exposure received during the project.

5.3 Phase III; Decontamination of Areas Outside the Facility-Controlled Areas:

Any additional areas or equipment located outside of the existing facility-controlled areas that are contaminated will be decontaminated to 220 DPM/100cm^2 or posted and controlled as RCA's. Clean areas (uncontrolled) will be maintained as such during the Decon Project.

5.4 Phase IV: Decontamination of Controlled Areas:

Upon completion of Phase II, when the dose rates have been reduced by relocation of high level Rad Waste, decontamination will begin starting in the overhead and progressing to the floor. All accessible surfaces in the facility-controlled areas will be decontaminated to less than 43,000 DPM/100cm^2, approximately 20% of the limits specified in NRC Regulation Guide 8.21 for restricted areas. In consideration of the ALARA principal, where practical, surfaces inside controlled areas will be decontaminated to less than 1,000 DPM/100cm^2. The above action levels do not apply to the Hot Cell. An attempt will be made to decontaminate the Hot Cell to the following levels:

a. levels that can be controlled and maintained remotely;

b. levels that will reduce the internal and external exposure to personnel who may have to remove from or place items into the Hot Cell.

5.5 Method of Decontamination:

Decontamination will be performed primarily using an industrial-type cleaner along with lint-free rags, masslin or the equivalent. AMS will use state-of-the-art decon methods designed to minimize liquid radioactive waste generated during the decon. AMS will attempt to avoid using any methods of decon that tend to concentrate radioactivity resulting in additional dose rate problems and high radiation areas. The radioactive waste generated from this type of decon (i.e., masslin wipe) can be easily handled and packaged for disposal and can be manipulated in a manner that will not cause excessive doses to personnel handling it. AMS will utilize the best technology currently available to the nuclear industry to support the Facility decontamination project.

5.6 Special Instruction Concerning the WHUT Room:

Due to excessive dose rates (greater than 1,000 R/Hr general area), AMS proposes that the WHUT Room not be entered or decontaminated at the present time. Instead, AMS proposes that the room entrance be shielded and sealed off to prevent any further access. The cost/benefit ratio of decontaminating this room is unacceptable at the present time. (See Attachments A and B.) The room and its equipment have been isolated, and there is no further need to enter the room or use the equipment. The risk of overexposing personnel in this room is extremely high, and serious injury to personnel could result. After the room is sealed, the drains to the waste tank will be plugged so additional liquid waste cannot be channeled into the room. AMS proposes that decontamination of the WHUT Room be addressed when the London Road Facility is scheduled for final decommissioning.

6.0 RADIATION PROTECTION PROGRAM - ADMINISTRATIVE

Overall responsibility for the facility Radiation Protection Program will rest with the AMS Radiation Safety Officer. The Radiation Protection Program for decontamination project activities will be the responsibility of the AMS Health Physicist, the NSS Consulting Technical Advisor and the AMS Technical Supervisor. This includes development of temporary health physics operating procedures and guidelines, as required, to insure adequate controls for the facility decontamination project. The following general areas will be addressed:

Access Control - Radiologically-Controlled Areas
Administrative Exposure Controls
Air Sampling and Evaluation
ALARA Review Process
Anti-C Clothing - Selection and Use
HEPA Filtered Vacuum Cleaner - Use and Maintenance
Personnel Monitoring
Personnel Decontamination
Portable Ventilation - Use and Maintenance
Posting of Radiologically-Controlled Areas
Respiratory Protection
Temporary Shielding

7.0 RADIATION PROTECTION PROGRAM - TECHNICAL

7.1 Instrumentation

a. The Eberline RO-2a Ion Chamber or equivalent will be used as the primary dose rate survey meter during the project; gamma dose rates to 50 R/Hr with beta measurement capability.

b. One 6112B Teletector or equivalent will be available for measuring gamma dose rates to 1,000 R/Hr.

c. An Eberline MS-3 Miniscaler, Ludlum 2200, or equivalent scaler will be used for smear and air sample gross beta counting (thin window pancake GM detector). An NAI scaler will also be used when needed.

All fixed and portable survey instrumentation will be calibrated at least semi-annually against known standards.

7.2 Contamination Control:

The use of "Rad Tape" and step-off pads will be incorporated into facility-controlled area operations. Multiple step-off pads may be used within contaminated areas to prevent tracking from areas of higher contamination. Personnel 'frisking' will be performed using a Ludlum 177 with 44-9 detectors (thin window pancake) or equivalent instruments.

7.3 Air Sampling:

Continuous general area air samples will be collected during decontamination work. RAS-1 or equivalent samplers with glass fiber filters (e.g., Gelman A-E or HV-70) will be used for sample collection. Samples will be changed out at the end of each working shift, or as needed, following the completion of any area decon task, or following any event deemed likely to have created a potential airborne situation. An Eberline AMS-3 Continuous Air Monitor, or equivalent, will be used to continuously monitor airborne activity in the work areas, background permitting. The fixed filter sample may also be used in place of a general area sample. The sample pump and electronics will be calibrated at least semi-annually to known standards.

7.4 Ventilation:

A portable HEPA filtered ventilation unit will be used to supplement existing building ventilation. These units will be used as localized ventilation to reduce any airborne activity generated during certain decon activities.

7.5 Rad Waste Management:

All waste generated will be packaged in accordance with facility procedures and DOT limits. AMS will minimize the generation of any liquid rad waste to the extent reasonably possible.

8.0 EQUIPMENT AND SUPPLIES FOR DECON PROJECT

Cloth Anti-C clothing
Disposable plastic or paper suits
Powered air purifying respirators
Cotton glove liners
Disposable vinyl gloves
Rubber gloves
Skull caps
Hoods

RO-2a Ion Chambers (2)
6112B Teletectors (1)
MS-3 Miniscaler or equivalent with shielded smear holder, SH-4 or equivalent and pancake GM detector
RAS air sample pump, or equivalent with filter head and filters (Gelman A-E, HV-70 or equivalent glass fiber filters)
Dosimetry, each person; whole body, finger ring for hands, Continuous Air Monitor, Eberline AMS-3, or equivalent

8.0 EQUIPMENT AND SUPPLIES FOR DECON PROJECT (Cont'd)

Smear papers, Nucon cloth, or equivalent
Masslin cloths
55-gallon drum liners
1 gallon "zip lock" bags
Kraft paper
Extension cords for TP&L
Paint scrapers
Airless sprayer

Portable HEPA ventilation cart, 1,000 cfm minimum
Mops and mop heads
17-H drums, approved for Spec. 7A
High density concrete blocks for shielding

9.0 RESUMES OF KEY NSS PERSONNEL

The resumes of key NSS personnel assigned to support the decon project in accordance with the organizational chart requirements of Section 2.0 (Organization) has been included with this Facility Decontamination Plan for informational purposes only.

Should AMS not have properly-trained personnel as replacements, AMS will obtain these replacements from NSS.

NSS CONSULTING PERSONNEL

NAME	TITLE
Robert Flournoy	NSS Health Physicist
James Elkins	NSS Technical Advisor
Joe Harverson	NSS Technical Supervisor
Roy Gill	NSS Senior HP Technician

(See Attachment C.)

AMS DECONTAMINATION PERSONNEL

Robert Jucius	AMS Health Physicist
Timothy Cox	AMS HP Technician and Technical Supervisor
Steve McDermott	AMS HP Technician

(Resumes Attached)

9.1 Any changes to the above-named key AMS assigned personnel shall be approved in advance by the NRC Regional U.S. Nuclear Regulatory Commission, Washington, DC 20555. Copies shall also be sent to the Assistant General Counsel for Enforcement at the same address and the Regional Administrator, NRC Region III, 799 Roosevelt Road, Glen Ellyn, Illinois 60137. If such a person requests a hearing, that person shall set forth with particularity the manner in which the petitioner's interest is adversely affected by this Order and shall address the criteria set forth in 10 CFR 2.714(d). A REQUEST FOR HEARING SHALL NOT STAY THE IMMEDIATE EFFECTIVENESS OF THIS CONFIRMATORY ORDER.

ALLEN BRODSKY, SC.D.
HEALTH / RADIOLOGICAL PHYSICIST

18418 KOPLAND ROAD
DERWOOD, MD 20855

August 11, 1987

Dr. Seymour S. Stein, President
Advanced Medical Systems, Inc.
One Factory Row
Geneva, OH 44041

Dear Dr. Stein:

On Wednesday, August 5, 1987, I visited with you and your staff -- Theador J. Hebert, Howard R. Irwin, and William Turbett -- and toured and surveyed the operations of your company, Advanced Medical Systems, Inc., at 1020 London Road, Cleveland, Ohio. Enclosed are my major conclusions about the radiation safety aspects of your cobalt-60 source manufacturing operations at the London Road facility.

In summary, I conclude that your operations are not a significant danger to the public health and safety, whereas at the same time the economic benefits of your operations and the medical treatment benefits of your products, Cobalt Teletherapy machines for the treatment of cancer have obvious benefit to society. Thus, I believe that it is consistent with the "as low as reasonably achievable" provisions of Section 20.1(c) of the regulations, Title 10, CFR, Part 20, to state that your plant is in sufficient compliance with regulations that no drastic actions that would jeopardize your business are warranted to immediately improve safety. On the other hand, I have made some suggestions in the enclosed pages for the improvement of safety and reductions of exposures "ALARA" that can be implemented by your own staff in the course of operations. I recommend that you support and assist your staff in carrying out these recommendations, and also ensure that your continued radiation safety surveys are consistent with the survey program given in Regulatory Guide 8.21, which I left with your staff.

Enclosed is the Curriculum Vitae that you requested, with several references checked that I hope will be of help to you in meeting safety and regulatory requirements.

Sincerely yours,

Allen Brodsky

Allen Brodsky, Sc.D., CHP, DABR
Certified Health/Radiological
Physicist

Enclosures: Conclusions of Visit
Curriculum Vitae

cc: Theador J. Hebert, General Mgr., ATC Medical Group

ADVANCED MEDICAL SYSTEMS AUDIT REPORT

by

Allen Brodsky, Sc.D., CHP
16412 Kipling Road
Derwood, MD 20855

August 10, 1987

This report presents the conclusions of my survey, and the observations on which they are based, during my visit to the London Road facility on August 5, 1987.

CONCLUSIONS

1. Your operations do not present a significant risk to public health and safety, nor are they likely to present such a risk in the future if they continue to be conducted according to the procedures under which you have been operating. Considering the nature of your operations, filling source containers with metallic pellets of cobalt-60, I believe that your operations also would not present a significant risk to the public even in the event of a serious fire, earthquake or other such catastrophe.

2. Your operations appear to meet all of the important requirements of the regulations of the U. S. Nuclear Regulatory Commission, based on my tour of your operations, discussions with your plant personnel, examination of your records, and spot measurements of contamination and radiation levels together with an assessment of occupancy times. However, it would be desirable to reduce contamination levels in the decontamination area and other areas more often entered by personnel, in compliance with the "as low as reasonably achievable" (ALARA) provisions of Title 10, CFR, Part 20. The word "reasonably" must, as provided in the regulations, take into account the very substantial economic and health benefits of your particular product (which is important in the treatment of cancer); thus, although I believe that your staff should be able to devise ways to reduce contamination levels in your plant, there is no justification for imposition of requirements or expenses of a degree that would endanger your ability to produce and market your product.

3. I was particularly gratified to find no undue contamination in unrestricted areas within your plant, even in front of the hot cell where the Co-60 pellets are handled in unsealed form. Levels in these areas were all below about E(-6) microcuries/square centimeter, consistent with the appropriate action level in Regulatory Guide 8.21 for intermediate toxicity beta-gamma emitters in unrestricted areas. This indicates to me that personnel have been carefully following the appropriate procedures for removing protective clothing before leaving the contaminated areas behind the hot cell. I noted that these areas are appropriately locked and posted with warning signs as required by 10 CFR Part 20.

4. The most serious risk of your operations, as recognized by requirements incorporated into your license by the Nuclear Regulatory Commission, is the risk of inadvertent exposure to your own personnel through some accident or oversight, since extremely high radiation levels exist within the hot cell, and in the old waste storage areas in the basement. I recommend that no entry into the hot cell itself be allowed until the hot cell is adequately decontaminated remotely, by use of the manipulators and by your own personnel who are familiar with the equipment and operations. I also recommend that no efforts to decontaminate the basement areas be carried out until your personnel devise effective decontamination agents and methods, tested in areas of lesser contamination. Considering your own scientific and technical expertise in chemistry and engineering, I believe that you and your staff should be able to devise appropriate agents and procedures within the next few months. I am enclosing separately the formulation of "Schubert's Solution", which we used effectively for decontaminating various surfaces, as well as human skin, in a number of cases at the University of Pittsburgh. Perhaps this could be mixed with the gel mentioned by Mr. Hetart to obtain an effective agent that would chelate Co-60 contamination and contain it within the gel until removal, thus avoiding either the soaking of the contamination further into wall and floor surfaces, or resuspension as an inhalation risk to your workers. This mixture should also be relatively safe for use by your staff.

Thus, efforts should be made to reduce the contamination levels that have been increasing in your laboratory and decontamination areas, and to reduce the exposure levels in your waste tank areas. However, these efforts should be carefully planned and carried out by your own staff, only after methods and agents are devised to ensure that your personnel do not receive more radiation dosage from the decontamination efforts that they would receive from normal operation. Decontamination operations, and related facility improvements, should also not be carried out until methods, equipment and procedures are devised to ensure that any further releases of radioactivity to the environment will be at least as low as the annual releases to date.

3. I examined the airborne effluent data and found that concentrations in air released to unrestricted areas were well below 10 CFR Part 20 concentration limits for those areas for the years 1985, 1986 and 1987. I did not examine the data for earlier years. I also calculated the total airborne effluent for each year (to date for 1987) and divided these values by the total throughput (Curies of Co-60 handled and placed into sources) for respective years. The resulting ratios are estimates of probabilities of releasing an atom of Co-60 to the environment as a result of your operations, e[illegible] probabilities of 5 E(-12), 4 E(-9) and 2 E(-8), for years 1985, 1986 and 1987, respectively. Although all of these values are low and indicate adequate filtration of effluent, they seem to be creeping upward. Possibly this upward trend is related to the upward trend of contamination within your restricted areas, but the causes should be investigated so that this trend may be reversed.

I also made my own measurements of contamination of the filter paper that sampled the stack effluent, when the paper was removed from the sampler by Mr. Howard Irwin. The lack of any detectable contamination on this

filter, even with my portable end-window survey meter, provides me with an approximate, but independent, measurement that confirms the low concentrations of activity recorded in your logbooks.

6. Although the above observations do not reveal excessive radioactivity releases to the environment, it would be appropriate to consider replacing the single absolute filters, in each effluent path in the stack plenum, with two in series in each respective path, considering the level of activity that may be handled, and the desirability of "defense in depth" (see the article I mentioned, Am. Industrial Hygiene Assoc. J. 26, 294-310, 1965, Table 1). However, this replacement may be done without disruption to your operations, and in the normal course of plant upgrading, since the probability of a significant environmental release from your plant is demonstrated to be low. (I consider from the nature of the material that you handle, that even considering the deteriorated state of your waste storage facilities, the relative probability of public exposure to Co-60 through the waste water or ground pathways is negligible compared to the probability of exposure to airborne Co-60 (even though this is low).)

7. No entry of personnel into the hot cell should be allowed in any case without the use of full face respirators, properly fitted, tested and maintained, even for rapid actions or instances. Neither should any further personnel entry into the hot cell be allowed until the interior surfaces of the cell are decontaminated, by remote operations, to the point where personnel may enter the cell and maintain exposures that are ALARA (and well below permissible quarterly limits, if possible).

8. Body burden measurements on Howard Irwin, Radiation Safety Officer, should continue to be carried out at frequencies of about each 6 months, until his indicated burden falls below about 1 nanocurie. This is necessary in order to confirm that the inhaled Co-60 remains as an insoluble particulate in the lung, which appears to be the case so far. The long-term measurements are also necessary for determining his total committed internal dose. In all cases that I have handled, individual variations in metabolic parameters have been such that only long-term measurements of body and organ retention have allowed the more accurate and valid assessments of individual radiation dose. His body burden measurements should continue to include the same measurements, with the same equipment and geometry, as used previously. This is necessary so that the relative retention function may be defined over a period of several years. This inhalation incident appears to be relatively unique in your operations, but explainable in terms of the waste processing activities that were carried out by Mr. Irwin two days before his initial determination of an internal Co-60 body burden. This incident does not seem to be indicative of a generally high level of internal exposure to your employees, although the potential is there. So current precautions against inhalation exposure must be continued, including efforts to reduce loose surface contamination, as good housekeeping practices as feasible, and processing procedures that will minimize the spread of additional contamination. Mr. Irwin's internal dose can not at present be concluded to have exceeded any regulatory limits, but the intake is at a level such that only a long-term evaluation would allow an accurate estimate of intake and total internal dose commitment.

9. Although I have indicated above that certain additional efforts should be directed at exposure prevention and reduction, my assessment of the operations indicates that there is no serious or immediate danger to the public health and safety that would warrant drastic actions of any kind that would jeopardize the economic welfare of your company and its employees, or deprive society of the healing values of your product.

5.5 Method of Decontamination:
Decontamination will be performed primarily using an industrial type cleaner along with lint-free rags, masslin or the equivalent. NSS will use state of the art decon methods designed to minimize liquid radioactive waste generated during the decon. NSS will attempt to avoid using any methods of decon that tend to concentrate radioactivity resulting in additional dose rate problems and high radiation areas. The radioactive waste generated from this type of decon (i.e. masslin wipe) can be easily handled and packaged for disposal and can be manipulated in a manner that will not cause excessive dose to personnel handling it. NSS will utilize the best technology currently available to the nuclear industry to support the Facility decontamination project.

REFERENCE (B) Extracted From NSS Proposed Decontamination Plan.

5.6 Special Instruction Concerning The WHUT Room:
Due to excessive dose rates, (greater than 1000 R/Hr general area), NSS proposes that the WHUT Room not be entered or decontaminated at the present time. Instead, NSS proposes that the room entrance be shielded and sealed off to prevent any further access. The cost/benefit ratio of decontaminating this room is unacceptable at the present time. The room and its equipment have been isolated and there is no further need to enter room or use the equipment. The risk of overexposing personnel in this room is extremely high and serious personnel injury could result. After the room is sealed, the drains to the waste tank will be plugged so additional liquid waste can not be channeled into the room. NSS proposes that decontamination of the WHUT Room be addressed when the London Road Facility is scheduled for final decommissioning.

TJH 10-18-87

6.0 RADIATION PROTECTION PROGRAM - ADMINISTRATIVE
Overall responsibility for the facility Radiation Protection Program will rest with the A.M.S. Radiation Safety Officer. The Radiation Protection Program for decontamination project activities will be the responsibility of the NSS Health Physicist, the NSS Technical Advisor and the NSS Technical Supervisor. This includes development of temporary health physics operating procedures and guidelines, as required, to insure adequate controls for the facility decontamination project. The following general areas will be addressed:

Access Control - Radiologically Controlled Areas
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Air Sampling and Evaluation
ALARA Review Process
Anti-C Clothing - Selection and Use
HEPA Filtered Vacuum Cleaner - Use and Maintenance
Personnel Monitoring
Personnel Decontamination
Portable Ventilation - Use and Maintenance
Posting of Radiologically Controlled Areas
Respiratory Protection
Temporary Shielding

ATTACHMENT C

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

DEC 11 1987

Advanced Medical Systems, Inc.
ATTN: Mr. T. J. Hebert
General Manager
One Factory Row
Geneva, OH 44041

License No. 34-19089-01
EA 87-212

Gentlemen:

This is a written response to your October 28, 1987 letter requesting that three additional individuals be authorized to perform work pursuant to your Nuclear Support Services, Inc. "Facility Decontamination Plan" (NSS Plan) submitted to the NRC by letter dated October 20, 1987. This letter confirms, in writing, what was previously discussed in an October 30, 1987 telephone conversation between you and members of my staff and a November 9, 1987 telephone conversation between Mr. James Elkins of NSS and Dr. Bruce Mallett of my staff. As discussed in the November 9, 1987 conversation with Mr. Elkins, we are also responding to a telecopy request, dated November 2, 1987, from NSS which requested that Mr. Leland R. Schroeder be added to the list of individuals performing the duties of NSS Senior HP Technician in the NSS Plan.

Based upon our review and in accordance with Section IV.A.1.f. of the Confirmatory Order Modifying License, Effective Immediately (Order) dated October 30, 1987, I hereby revise the Order as follows.

1. Messrs. Michael Williams, Roland Hanson, and James Dietrich may perform the duties of NSS Senior Health Physics Technician and NSS Technical Supervisor as described in Sections 2 and 9 of the NSS Plan.

2. Mr. Leland R. Schroeder may perform the duties of NSS Senior Health Physics Technician as described in Sections 2 and 9 of the NSS Plan.

Should you have any questions regarding this approval, please contact Dr. Bruce S. Mallett of my staff at (312) 790-5612.

Sincerely,

A. Bert Davis
Regional Administrator

cc w/ltr dtd 10/28/87:
DCD/DCB (RIDS)

8712170128 1p

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

BACKGROUND

Senior health physics technician and site coordinator, supervising the activities of Health Physics Technicians and technicians during the conduct of decontamination procedures. 1975-1986.

EDUCATION AND TRAINING

Greensburg Salem High School. 1974.
RAD Services HP Site Training Program, Salem, NJ. 1978-1979.
Elliott Training Center, Greensburg, PA. 1977. Welder Certification.

EXPERIENCE

11/03/86 - 12/14/86 Hilbert & Associates, Saratoga Springs, NY
Senior HP Technician. Elgin Watch Site Cleanup.

10/14/85 - 10/14/86 RP&C Valve
Certified Welder.

1975 - 1984 CONTRACT WORK for the following:

*Bartlett (1980-1983) as Senior Health Physics Technician.

*Chem Nuclear (1980-1984) as HP Technician.

*Combustion Engineering (1980-1983) as HP Technician.

*IRM (1976-1981) as HP Technician.

*Nuclear Support Services (1981) as HP Technician.

*RAD Services, Inc. (1978-1980) as HP Technician.

*Westinghouse Electric (1975-1977) as HP Technician.

Specific Assignments Were As Follows:

11/21/83 - 12/18/83 Zion Station, Zion, IL
Mechanical Technician. Installing thermocouples on reactor heads. Contractor: Combustion Engineering

10/26/83 - 12/18/83 Turkey Point, Miami, FL
Mechanical Technician. Installing thermocouples on reactor heads. Contractor: Combustion Engineering

09/08/83 - 09/14/83 D.C. Cook, Bridgeman, MI
Mechanical Technician. Installing thermocouples on reactor heads. Contractor: Combustion Engineering

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

EXPERIENCE (Cont'd)

08/08/83 - 08/31/83 Combustion Engineering
C-E Laboratories, Windsor, CT
Senior Health Physics Technician. Shipping and receiving of radioactive materials according to DOT standards. Contractor: Combustion Engineering

05/23/83 - 08/02/83 Florida Power & Light Company
St. Lucie Nuclear Plant, Ft. Pierce, FL
Site Coordinator. Coordinated and supervised for 20 health physics and decon technicians. Contractor: Combustion Engineering

04/06/83 - 05/06/83 Georgia Power Company
Plant E.I. Hatch, Baxley, GA
Senior Health Physics Technician. Provided coverage for work in turbine rx and radwaste buildings. Contractor: Bartlett, Plymouth, Mass.

01/03/83 - 03/03/83 Philadelphia Electric Company
Peach Bottom Nuclear Plant, Delta, PA
Senior Health Physics Technician. Responsible for rad, air, and smear surveys and routine job coverage in turbine, reactor and radwaste buildings. Contractor: Bartlett

07/26/82 - 11/12/82 Southern California Edison
San Onofre, San Clemente, CA
Health Physics Technician. H.P. Support for auxiliary and containment buildings. Contractor: Combustion Engineering

02/17/82 - 05/01/82 Southern California Edison
San Onofre, San Clemente, CA
Health Physics Technician. Night Shift Decon Foreman of 20-man decon crew. Supervised decon of containment and auxiliary buildings and supported eddy current testing of steam generators. Performed pre- and post-decon surveys. Contractor: Combustion Engineering

10/01/81 - 11/18/81 Metropolitan Edison Company
Three Mile Island-Unit II, Middletown, PA
Health Physics Technician. H.P. Support of auxiliary building. Contractor: Metropolitan Edison Co.

09/01/81 - 09/30/81 Duke Power Company
Oconee, Charlotte, NC
Health Physics Technician. HP Support of containment and auxiliary buildings. Contractor: Nuclear Support Services

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

EXPERIENCE (Cont'd)

07/08/81 - 08/06/81 Metropolitan Edison Company
Three Mile Island-Unit II, Middletown, PA
Health Physics Technician. H.P. Support of auxiliary building. Contractor: Metropolitan Edison Co..

06/04/81 - 06/08/81 Carolina Power & Light Company
H.B. Robinson, Raleigh, NC
Health Physics Technician. H.P. Support of containment building. Contractor: IRM

04/11/81 - 05/13/81 Philadelphia Electric Company
Peach Bottom, Delta, PA
Health Physics Technician. H.P. Support of containment and auxiliary buildings. Contractor: Bartlett

10/07/80 - 08/29/81 Southern California Edison
San Onofre-Unit I, San Clemente, CA
Health Physics Technician. Head Technician of balance of plant and coverage of steam generators sleeving project. Contractor: Combustion Engineering

08/22/80 - 09/29/80 Duke Power
Oconee, Charlotte, NC
Health Physics Technician. Handled rad waste: solidification and elimination of waste. Contractor: Chem Nuclear

07/13/80 - 08/14/80 VEPCO
Surry Power Station, Surry, VA
Health Physics Technician. Steam generators replacement. Contractor: IRM

06/08/80 - 06/22/80 Crystal River Plant, Crystal River, FL
Health Physics Technician. Covered control rod drive repair. Contractor: Bartlett

05/10/80 - 06/04/80 Omaha Public Powe, Ft. Calhoun, NB
Health Physics Technician. Covered reactor coolant pump repair. Contractor: Combustion Engineering

03/31/80 - 05/01/80 Toledo Edison Company
Davis-Bessie, Toledo, OH
Health Physics Technician. Smear, air and rad surveys; work crew controls; and multi-channel analyzer.
Contractor: RAD Services

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

EXPERIENCE (Cont'd)

11/05/79 - 03/20/80 — Duquesne Power Company
Beaver Valley-Unit I, Shippingport, PA
Health Physics Technician. Smear, air and rad surveys; work crew controls; and multi-channel analyzer., Contractor: RAD Services

09/15/79 - 10/05/79 — Consumer Power Company
Palisades, Covert, MI
Health Physics Technician. Smears, air sampling and work crew control. Contractor: RAD Services

11/19/78 - 08/01/79 — Public Service Electric & Gas Company
Salem Plant, Salem, NJ
Health Physics Technician. Decon crew for auxiliary and containment buildings; coverage for routine and outage conditions, contamination, rad and air surveys; rad waste shipments; laundry; court room control points; and covered divers in the fuel pool. Contractor: RAD Services

03/09/77 - 03/25/77 — Wisconsin-Michigan Power Company
Point Beach, Two Creeks, WI
Technician. Eddy current, sludge lancing surveys around steam generators, and plugging of steam generators. Contractor: Combustion Engineering

12/02/76 - 03/05/77 — Westinghouse, Waltz Mill, PA
Technician. Decon tools and shipment. Contractor: Westinghouse

11/01/76 - 11/30/76 — Carolina Power & Light Company
H.B. Robinson, Raleigh, NC
Technician. Eddy current, sludge lancing surveys around steam generators, and plugging of steam generators. Contractor: IRM

10/20/76 - 10/26/76 — Wisconsin-Michigan Power Company
Point Beach Nuclear, Two Creeks, WI
Technician. Eddy current, sludge lancing surveys around steam generators, and plugging of steam generators. Contractor: RAD Services

10/01/76 - 10/15/76 — Southern California Edison
San Onofre, San Clemente, CA
Technician. Eddy current and sludge lancing surveys around steam generators. Contractor: Combustion Engineering.

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

EXPERIENCE (Cont'd)

09/17/76 - 09/30/76 VEPCO
Surry Power Station, Surry, VA
Technician. Tube removal, sludge lancing, eddy current and survey work crew control. Contractor: IRM

05/19/76 - 05/21/76 VEPCO
Surry Nuclear Power Station, Surry, VA
Technician. Tube removal, sludge lancing, eddy current and survey work crew control. Contractor: IRM, Annapolis, MD

03/01/76 - 04/30/76 Commonwealth Edison Company
Zion Nuclear Station, Zion, IL
Technician. Sludge lancing, eddy current and surveys around steam generators. Contractor: Combustion Engineering

02/16/76 - 02/26/76 Wisconsin Public Service
Kewaunee Nuclear Power Plant, Kewaunee, WI
Technician. Eddy current testing of steam generators, surveys of equipment being shipped off-site, tube removal, sludge lancing and surveys of steam generators. Contractor: RAD Services

09/22/75 - 09/27/75 Florida Power & Light Company
Turkey Point, Miami, FL
Technician. Eddy current testing of steam generators, and surveys of equipment being shipped off-site. Contractor: RAD Services.

08/04/75 - 08/06/75 Florida Power & Light Company
Turkey Point, Miami, FL
Technician. Eddy current testing of steam generators, and surveys of equipment being shipped off site. Contractor: RAD Services.

ROBERT A. JUCIUS
Principal Physicist

EDUCATION

B.S. in Engineering Physics - University of Maine - 1965

Additional Training Courses:

Basic Radiation Protection, Bureau of Rad Health
Medical X-Ray Protection, Bureau of Rad Health
Thermoluminescent Dosimetry Workshop
Cobalt Source Handlers Seminar
X-ray Technology
AAPM Summer School; Diagnostic Radiological Physics
Workshop on the Uses of Bracytherapy
Writing for Engineers and Technicians
Effective Presentation
Physiology
Work Effectiveness
Accounting for Managers & Professionals
Interpersonal Management Skills
Management Discussion Skills II
Career Development Planning Seminar
Teletherapy Installation and Service
Teletherapy Installation and Service Transfer

ORGANIZATIONS AND PROFESSIONAL SOCIETIES:

Member: Health Physics Society (HPS)
Chairman and Member: NEMA CT Technical and Standards Committee
Member: Regulatory Affairs Professional Society (RAPS)
Associate Member: American Association of Physicist in Medicine (AAPM)
Contributing Member: Society for Radiological Engineering (SRE)
Member: Cleveland Area Medical Physicist (CAMP)
Member: ICRU Committee on Nomenclature in CT

PUBLICATIONS

Jucius, R.A.: "CTDI as a Function of CT Beam Profile Measured to Comply with New CDRH Regulations"; Paper Presented at the 27th Annual Meeting of the AAPM, August 1985

Jucius, R.A.; Kambic, G.X.; "Measurement of Computed Tomography X-Ray Fields Utilizing the Partial Volume Effect"; Med. Phys. 7,379-382 (1980)

Jucius, R.A.; Non-Invasive kVp Measurement of CT Systems Using a Mass Attenuation Comparator"; Works in Progress Paper Presented at the 21st Annual Meeting of the AAPM, August 1979

Jucius, R.A.; Radiation and You; Technicare, Solon, OH, Pub. 960067, March 1977, November, 1980

Jucius, R.A.; "Kambic, G.S.; "Radiation Dosimetry in Computed Tomography (CT)"; SPIE Proc., Applications of Optical Instrumentation in Medicine VI 127, 268-295 (1977)

Jucius, R.A.; "Radiation Safety and You"; General Electric Company, Milwaukee, Wisconsin, Dir. 13698, April 1972

ROBERT A. JUCIUS
Principal Physicist

EXPERIENCE (continued)

1969 to 1976 - G E - Medical Systems Division - Milwaukee, WI

Health Physicist - Regulatory Department - Radiation Safety Officer

* Responsible for maintaining a radiation safety program for field personnel, and maintaining the NRC and applicable State Licenses for installation and servicing of isotope therapy equipment. Additional training with large radioactive sources included: Teletherapy installation and Service Courses with AECL of Canada and more than 15 teletherapy installations and source transfers.

* Coordinated initial reports on x-ray and CT systems.

* Developed test methods for engineering, manufacturing, and service to comply with the Health and Safety act.

* Maintained three Nuclear Regulatory Commission licenses and four State Radioactive Material Licenses.

* Provided consultation on regulations, health physics and radiation safety programs throughout the department.

* Education and Training included:
Medical X-Ray Protection Course - U.S. Public Health Service.
Teletherapy Installation and Service Course - AECL - Toronto, Canada.
Teletherapy Installations and Source Transfers with following: Theratron 780 installation; Theratron 60 installation; Theratron 80 installation; Eldorado 6 installation; Theratron 80 source transfers; Eldorado 6 source transfers; Theratron Jr. source transfers; and Eldorado 8 source transfers.

1968 to 1969 - Isotopes A Teledyne Company, NASA - Greenbelt, MD

Health Physicist

* Evaluated radiological hazards, performed special radiation safety studies, calculated dose rates, body deposition, and recommended safe radiation work techniques.

1967 to 1968 - Newport News Shipbuilding and Dry Dock Company - N.N., VA

Health Physicist - Assigned to nuclear overhaul and refueling

* Estimated radiation levels, calculated exposure rates and determined temporary shielding requirements

* Conducted training classes for Rad Con Personnel

ROBERT A. JUCIUS
Principal Physicist

EXPERIENCE (continued)

1965 to 1967 - U.S. Army Nuclear Defense Lab. - Edgewood Arsenal, MD

Health Physics Engineering Technician

* Responsible for radiation protection and laboratory safety including radiation surveys, leak testing of sealed sources, calibration of radiation detection equipment, evaluation of personnel monitoring techniques and equipment, and special projects.

STEPHEN M. McDERMOTT
Senior Health Physics Decon/RadCon Technician

BACKGROUND

Radiation Control Work Center Supervisor and Leading Radiation Control Supervisor (RCSS) June 1982 - June 1986. USS Enterprise, US Navy.

EDUCATION AND TRAINING

*Lakeland Community College, Kirtland, Ohio - 2 years

*Machinist Mate "A" School, US Navy; August 1980 - October 1980

*US Navy Nuclear power school courses of Study (Nov. 1980 - July 1981)

Math
Physics
Thermodynamics
Reactor Principles
Chemistry
Material Fundamentals
Radiological Fundamentals
Mechanical Theory
Electrical Theory

*US Nuclear Prototype Training Unit, July 1981 - Jan. 1982

Practical "Hands On" training in operation and maintenance of land-based Nuclear Reactor.
Qualified as basic radiation worker
Practical training in contamination control and radiation exposure control

*Engineering Laboratory Technician School (ELT) Courses of Study, Feb. 1982 - April 1982

Chemistry
Radiological Fundamentals
Theory and operation of radiation and contamination detection instruments
Theory and operation of personnel exposure monitoring devices
Decontamination procedures
Control and transfer of radioactive material

*Radioactive Materials Shipping School - November 1983

Instrumentation Training:

Radiation Survey Instruments

A/N PDR 27
A/N PDR 45
A/N PDR 66
A/N PDR 70

STEPHEN M. McDERMOTT
Senior Health Physics Decon/RadCon Technician

Instrumentation Training: (Cont'd)

Contamination Survey Instruments

A/N PDR 56
RM3/DT-304
E-140N/DT-304

Personnel Monitoring Devices
CaF_2 Thermoluminescent Dosimeters

EXPERIENCE

1980 - 1986 U.S. Navy

December 1984 - April 1986
RadCon Work Center Supe-visor and leading RadCon Shift Supervisor (RCSS). Responsible for supervision of up to 15 ELT's with duties including routine radiation surveys, contamination surveys, personnel exposure monitoring and preventative maintenance scheduling.

Leading Petty Officer for Radiological Controls Workcenter. Engineering Laboratory Technician (ELT) - Performed chemical and radiological analyses on reactor and steam plant waters, implemented chemistry and radiological controls procedures for nuclear propulsion plants. Radiological controls shift supervisor (RCSS), ultimate responsibility for shift.

Determined RadCon requirements for major evolutions, USS Enterprise operations included: Operational Readiness Exam (ORE) (April 1984), Operational Reactor Safeguards Exams (ORSE) (April and Dec. 1984)

Performed as Leading Petty Officer for SRA 85, supervised 7 Second Class and 8 Third Class Petty Officers. During this time, work was performed on a control rod drive mechanism replacement. Support for 3 steam generator repair and inspections and support for primary valve maintenance in the propulsion plants.

In addition, performed the following:

*Coordination of RadCon support to work centers.

*Coordination of shipyard activities for all phases of nuclear plant maintenance as RCSS.

*Monitored personnel exposure.

*Responsible for accountability, packaging and transfer of radioactive materials.

*Scheduled preventative maintenance associated with reactor support.

*RadCon assistant work center - Supervisor and RCSS.

STEPHEN M. McDERMOTT
Senior Health Physics Decon/RadCon Technician

EXPERIENCE (Cont'd)

*Scheduled and performed plant surveys and routine maintenance.

*Performed chemical and Radiological analyses on reactor and steam plant waters.

*Implemented chemistry and radiological control procedures for nuclear propulsion plants.

*Conducted RadCon operational readiness examinations for The USS Enterprise.

*Decontaminated room areas and equipment associated with reactors and propulsion plants.

August 1984 - December 1984
RadCon Assistant Work Center Supervisor and RCSS. Routine plant surveys and maintenance personnel scheduling.

May 1983 - August 1984
Radiological controls watchstander. Qualified RCSS. Radiological controls watch, Engineering Laboratory Technician (ETL). Performed chemical and radiological analyses on reactor and steam plant waters. Implemented chemistry and radiological controls procedures and nuclear propulsion plants surveys. Petty Officer, 3M-301, General Damage Control. Participated in SRA 83, REFTRA 83, ORE 84, ORSE 84.

June 1982 - May 1983
Chemistry watchstander. Responsible for chemistry control of primary and secondary systems.

Special Assignment Experience:

*RadCon watchstander for replacement of ion exchanger resin of 8 reactor plants.

*Work center supervisor and RCSS for primary side steam generator repair.

*Work center supervisor and RCSS for control rod drive mechanism replacement.

*RCSS during Drydock maintenance period.

ADVANCED MEDICAL SYSTEMS
LONDON ROAD FACILITY

FACILITY DECONTAMINATION PLAN

FACILITY DECONTAMINATION PLAN
ADVANCED MEDICAL SYSTEMS
LONDON ROAD FACILITY

ADVANCED MEDICAL SYSTEMS
1020 LONDON ROAD
CLEVELAND, OHIO

Prepared by:

THEADOR J. HEBERT
General Manager, ATC Medical Groups

December 24, 1987

Reviewed by:

S.S. STEIN
President, ATC Medical Groups

December 24, 1987

TABLE OF CONTENTS

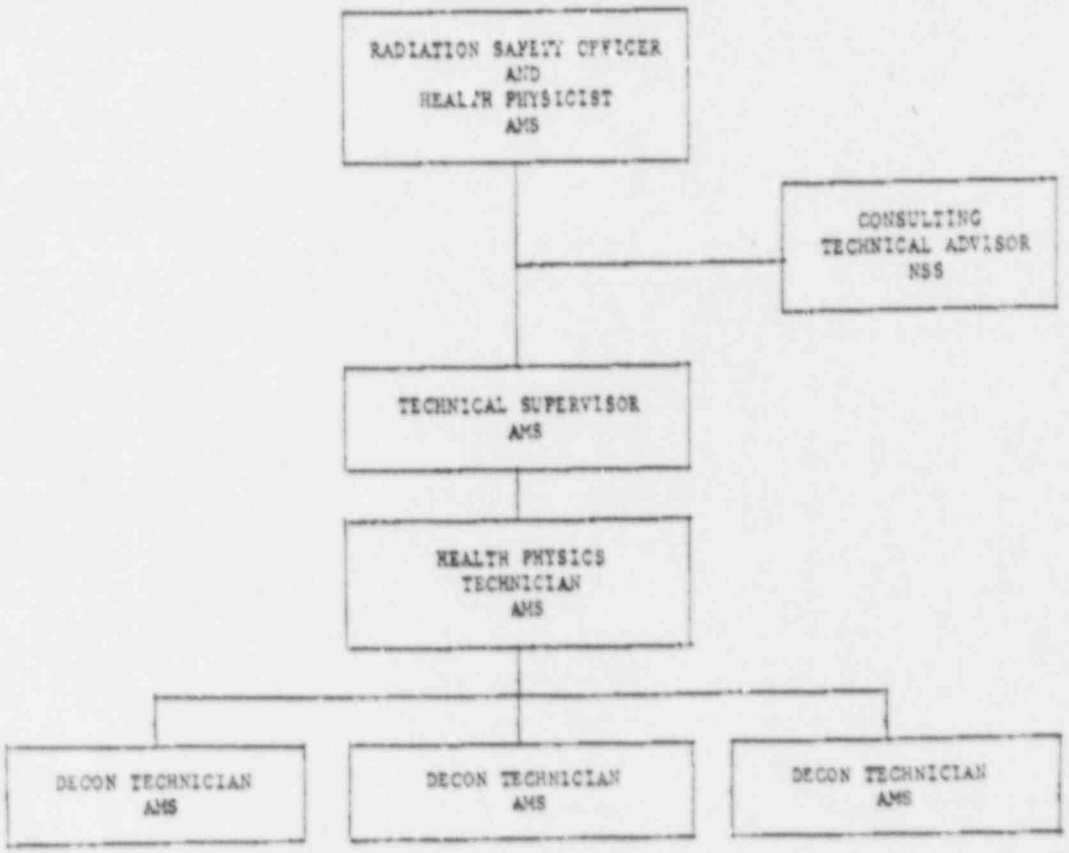
1.0 PURPOSE AND SCOPE

This revised document is intended to set forth the basic changes in organization and methods to be used for general decontamination of the London Road Facility. The information requested in "Enclosure A", Information to be Submitted in Response to License Condition No. 15.A is included.

2.0 ORGANIZATION

Advanced Medical Systems, Inc. (AMS) has contracted Nuclear Support Services, Inc. (NSS) to provide consulting and decontamination support services for the London Road Facility decon project. The proposed organization is detailed below. NSS will supply experienced decontamination technicians as requested by AMS. AMS will replace NSS decontamination personnel with personnel from AMS' company locations.

ORGANIZATIONAL CHART
LONDON ROAD DECONTAMINATION PROJECT



Responsibilities During Decon Project

2.1 AMS Radiation Safety Officer:

The Radiation Safety Officer has overall responsibility for the radiation protection program at the London Road Facility during the decon project. This is in accordance with the existing radioactive material license issued to AMS by the NRC.

2.2 AMS Health Physicist:

The Health Physicist will be responsible for the Health Physics Program as applicable to the decontamination project at the London Road Facility. Duties and responsibilities will include:

a. the Health Physicist and the facility Radiation Safety Officer will ensure all regulatory and specific license requirements are met;

b. review of decontamination and health physics procedures to be used during the project;

c. evaluating existing or potential radiological hazards which may impact the decontamination effort (including ALARA reviews of specific job tasks);

d. a Health Physicist and Radiation Safety Officer will assist the Technical Supervisor as necessary to insure timely completion of Decon Project.

2.3 NSS Consulting Technical Advisor:

The NSS Consulting Technical Advisor will, on request by AMS' Health Physicist or Radiation Safety Officer, advise on matters whenever performance problems should arise during the Decon Project. The General Manager shall also reserve the right to solicit the consulting services of the NSS Technical Advisor.

2.4 AMS Technical Supervisor:

The Technical Supervisor will be responsible for technical supervision and completion of the decontamination project activities. He will report to the AMS Radiation Safety Officer. The Technical Supervisor shall be physically present at the London Road Facility supervising and reviewing activities undertaken pursuant to this plan. Duties will include:

a. ensuring surveys are performed at locations and frequencies specified in the RWP's;

b. review of surveys and air samples for technical accuracy;

c. ensuring rad wastes are packaged and stored in accordance with facility procedures;

d. writing and review of decontamination and Health Physics procedure to be used during the Decon Project;

e. ALARA reviews of draft procedures;

f. planning and scheduling of decontamination tasks;

g. general supervision of health physics and decontamination activities during the project;

h. afteraction report.

2.5 AMS Health Physics Technician:

The Senior Health Physics Technician will report to the Technical Supervisor and will be responsible for the direct health physics coverage of decontamination activities. The Senior Health Physics Technician shall be physically present supervising all decontamination and cleanup activities undertaken pursuant to this Plan. Duties will include:

a. performing radiation, contamination, and airborne radioactive materials survey;

b. generating RWP's for the project;

c. exposure control of decontamination personnel working inside radiologically-controlled areas;

d. general facility contamination control;

e. gross sample counting.

2.6 Decontamination Personnel:

The decontamination crew will be comprised of experienced AMS personnel. These are experienced radiation workers under the AMS/NSS Decon project. All decon work will be performed under the direction of the Health Physics Technician. NSS will supply experienced consulting decon personnel as required to complete the project. One crew consisting of a minimum of three (3) Decon Technicians and one (1) Health Physics Technician will be utilized to complete the decon project.

3.0 TRAINING OF PERSONNEL

All personnel will participate in training which will meet or exceed the requirements of 10 CFR 19.12. Personnel who have received equivalent "Rad Worker" training (e.g., INPO Standardized General Employee Training) within the past year prior to assignment at AMS will require only facility site specific orientation training.

4.0 DECONTAMINATION - GENERAL

The preliminary sequence for facility decontamination is as follows:

1. Compliance
   a. reviews survey postings (3 weeks)
   b. relocation/shielding of sources (6 weeks)
   c. decontaminate areas outside RCA (2 weeks)

2. Decontaminate the Change Room (2 weeks)

3. Decontaminate the Shop Area and Airlock (6 weeks)

4. Ventilation Room
   a. decontamination of vent room (2 weeks)
   b. replace duct work (6 weeks)

5. Decontaminate the Decon Room (3 weeks)

6. Decontaminate the Stairwell (1 week)

7. Decontaminate the Basement (clean side) (7 weeks)

8. Decontaminate the Hot Cell (2 weeks)

NOTE: Any changes to the above sequence or extensions to the above duration of decontamination activities shall be approved in advance by the NRC Regional Administrator, Region III. Requests for changes shall be submitted to NRC in writing, including a description of the basis for the change.

4.1 Decontamination Techniques:

Decontamination techniques have been selected which will maintain liquid waste production and airborne radioactivity ALARA. No grit blasting or concrete scabbling is anticipated. Depending on the type of surface, dose rate levels and contamination levels or any combination of the following techniques may be used. Alternatively, other state-of-the-art techniques may be used as long as they minimize rad waste generation and maintain radiation exposure ALARA.

a. HEPA filtered wet/dry vac;

b. strippable coatings;

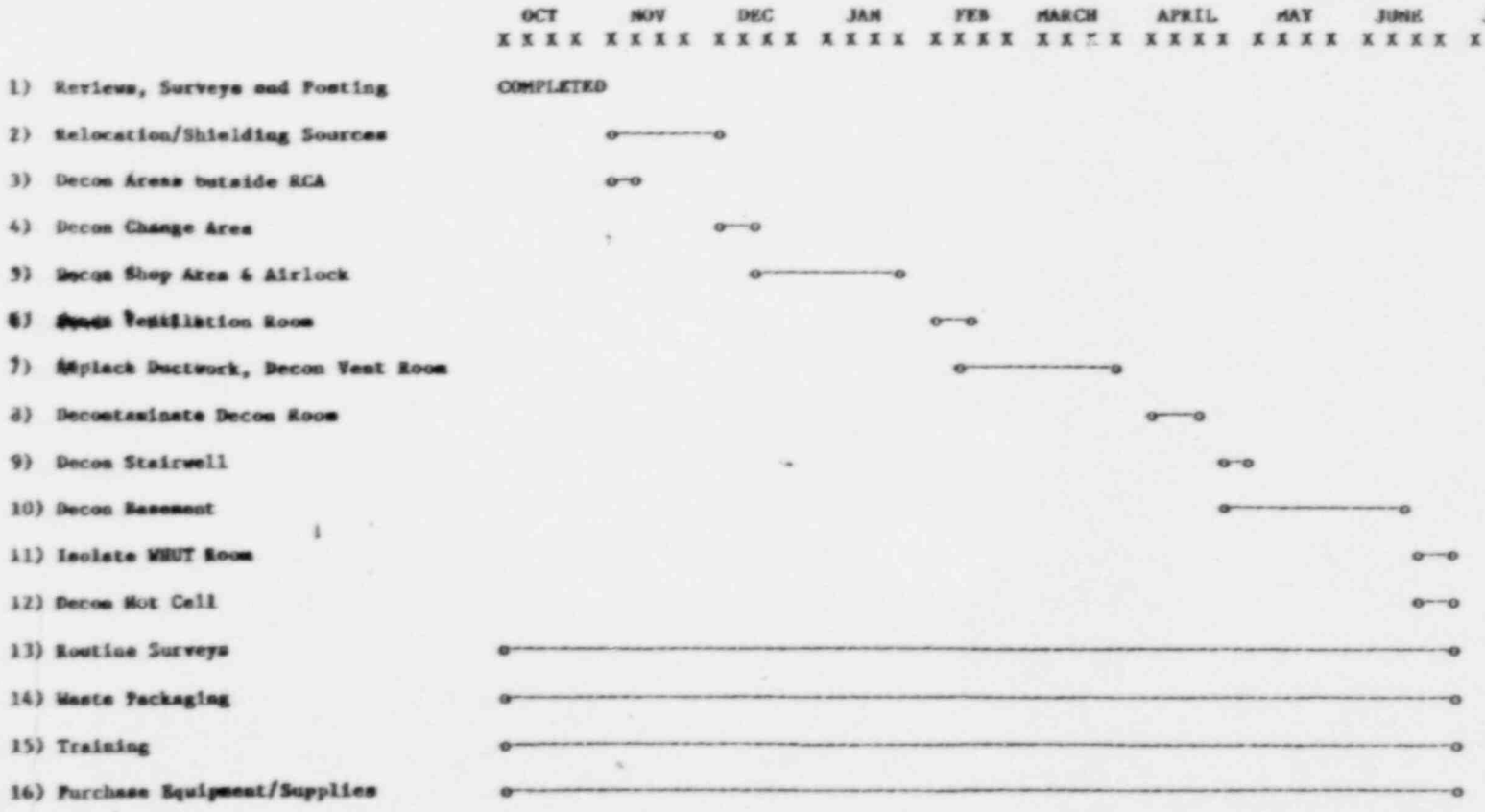
c. wet mop with industrial cleaner, or equivalent;

d. hand wiping of equipment and components with K-400 and/or Masslin cloths or equivalent.

5.0 DECONTAMINATION - SPECIFICS

The best and most appropriate decon methods will be used inside the facility-controlled areas. The following is AMS' general intent, but is subject to change depending on changing conditions.

ADVANCED MEDICAL SYSTEMS DECONTAMINATION SCHEDULE



Revised by:

James E. Elkins

James E. Elkins, Vice President

NOTE: The above schedule is based on starting work not later than Monday, November 2, 1987. Systems decontamination began on Monday, November 2, 1987 and all work is on schedule.

Last Revised 10/23/87

DEC 28 '87 13:49 P10

5.1 Phase I; Compliance:

AMS will provide all personnel with site specific training and will ensure that all personnel are trained as per the existing regulations. AMS will evaluate the radiation detection equipment on site and ensure that the calibration, method and frequency currently being used by good health physics practices. All radiological posting will be brought into compliance and will be consistent with good health physics practices (any area or equipment with greater than 220 DPM/100cm^2 loose surface activity will be considered contaminated).

5.2 Phase II; Removal or Storage of High Level Waste or Equipment:

All high level waste and equipment that causes excessive dose rates or radiation areas outside the facility-controlled areas will be either shielded, disposed of, or stored in a location where their presence will not cause excessive dose rates in the areas to be deconned. This action will reduce the radiation area worker exposure received during the project.

5.3 Phase III; Decontamination of Areas Outside the Facility-Controlled Areas:

Any additional areas or equipment located outside of the existing facility-controlled areas that are contaminated will be decontaminated to 220 DPM/100cm^2 or posted and controlled as RCA's. Clean areas (uncontrolled) will be maintained as such during the Decon Project.

5.4 Phase IV: Decontamination of Controlled Areas:

Upon completion of Phase II, when the dose rates have been reduced by relocation of high level Rad Waste, decontamination will begin starting in the overhead and progressing to the floor. All accessible surfaces in the facility-controlled areas will be decontaminated to less than 43,000 DPM/100cm^2, approximately 20% of the limits specified in NRC Regulation Guide 8.21 for restricted areas. In consideration of the ALARA principal, where practical, surfaces inside controlled areas will be decontaminated to less than 1,000 DPM/100cm^2. The above action levels do not apply to the Hot Cell. An attempt will be made to decontaminate the Hot Cell to the following levels:

a. levels that can be controlled and maintained remotely;

b. levels that will reduce the internal and external exposure to personnel who may have to remove from or place items into the Hot Cell.

5.5 Method of Decontamination:

Decontamination will be performed primarily using an industrial-type cleaner along with lint-free rags, masslin or the equivalent. AMS will use state-of-the-art decon methods designed to minimize liquid radioactive waste generated during the decon. AMS will attempt to avoid using any methods of decon that tend to concentrate radioactivity resulting in additional dose rate problems and high radiation areas. The radioactive waste generated from this type of decon (i.e., masslin wipe) can be easily handled and packaged for disposal and can be manipulated in a manner that will not cause excessive doses to personnel handling it. AMS will utilize the best technology currently available to the nuclear industry to support the Facility decontamination project.

5.6 Special Instruction Concerning the WHUT Room:

Due to excessive dose rates (greater than 1,000 R/Hr general area), AMS proposes that the WHUT Room not be entered or decontaminated at the present time. Instead, AMS proposes that the room entrance be shielded and sealed off to prevent any further access. The cost/benefit ratio of decontaminating this room is unacceptable at the present time. (See Attachments A and B.) The room and its equipment have been isolated, and there is no further need to enter the room or use the equipment. The risk of overexposing personnel in this room is extremely high, and serious injury to personnel could result. After the room is sealed, the drains to the waste tank will be plugged so additional liquid waste cannot be channeled into the room. AMS proposes that decontamination of the WHUT Room be addressed when the London Road Facility is scheduled for final decommissioning.

6.0 RADIATION PROTECTION PROGRAM - ADMINISTRATIVE

Overall responsibility for the facility Radiation Protection Program will rest with the AMS Radiation Safety Officer. The Radiation Protection Program for decontamination project activities will be the responsibility of the AMS Health Physicist, the NSS Consulting Technical Advisor and the AMS Technical Supervisor. This includes development of temporary health physics operating procedures and guidelines, as required, to insure adequate controls for the facility decontamination project. The following general areas will be addressed:

Access Control - Radiologically-Controlled Areas
Administrative Exposure Controls
Air Sampling and Evaluation
ALARA Review Process
Anti-C Clothing - Selection and Use
HEPA Filtered Vacuum Cleaner - Use and Maintenance
Personnel Monitoring
Personnel Decontamination
Portable Ventilation - Use and Maintenance
Posting of Radiologically-Controlled Areas
Respiratory Protection
Temporary Shielding

7.0 RADIATION PROTECTION PROGRAM - TECHNICAL

7.1 Instrumentation

a. The Eberline RO-2a Ion Chamber or equivalent will be used as the primary dose rate survey meter during the project; gamma dose rates to 50 R/Hr with beta measurement capability.

b. One 6112B Teletector or equivalent will be available for measuring gamma dose rates to 1,000 R/Hr.

c. An Eberline MS-3 Miniscaler, Ludlum 2200, or equivalent scaler will be used for smear and air sample gross beta counting (thin window pancake GM detector). An NAI scaler will also be used when needed.

All fixed and portable survey instrumentation will be calibrated at least semi-annually against known standards.

7.2 Contamination Control:

The use of "Rad Tape" and step-off pads will be incorporated into facility-controlled area operations. Multiple step-off pads may be used within contaminated areas to prevent tracking from areas of higher contamination. Personnel 'frisking' will be performed using a Ludlum 177 with 44-9 detectors (thin window pancake) or equivalent instruments.

7.3 Air Sampling:

Continuous general area air samples will be collected during decontamination work. RAS-1 or equivalent samplers with glass fiber filters (e.g., Gelman A-# or HV-70) will be used for sample collection. Samples will be changed out at the end of each working shift, or as needed, following the completion of any area decon task, or following any event deemed likely to have created a potential airborne situation. An Eberline AMS-3 Continuous Air Monitor, or equivalent, will be used to continuously monitor airborne activity in the work areas, background permitting. The fixed filter sample may also be used in place of a general area sample. The sample pump and electronics will be calibrated at least semi-annually to known standards.

7.4 Ventilation:

A portable HEPA filtered ventilation unit will be used to supplement existing building ventilation. These units will be used as localized ventilation to reduce any airborne activity generated during certain decon activities.

7.5 Rad Waste Management:

All waste generated will be packaged in accordance with facility procedures and DOT limits. AMS will minimize the generation of any liquid rad waste to the extent reasonably possible.

8.0 EQUIPMENT AND SUPPLIES FOR DECON PROJECT

Cloth Anti-C clothing
Disposable plastic or paper suits
Powered air purifying respirators
Cotton glove liners
Disposable vinyl gloves
Rubber gloves
Skull caps
Hoods

RO-2a Ion Chambers (2)
6112B Teletectors (1)
MS-3 Miniscaler or equivalent with shielded smear holder, SN-4 or equivalent and pancake GM detector
RAS air sample pump, or equivalent with filter head and filters (Gelman A-E, HV-70 or equivalent glass fiber filters)
Dosimetry, each person; whole body, finger ring for hands, Continuous Air Monitor, Eberline AMS-3, or equivalent

8.0 EQUIPMENT AND SUPPLIES FOR DECON PROJECT (Cont'd)

Smear papers, Nucon cloth, or equivalent
Masslin cloths
55-gallon drum liners
1 gallon "zip lock" bags
Kraft paper
Extension cords for TP&L
Paint scrapers
Airless sprayer

Portable HEPA ventilation cart, 1,000 cfm minimum
Mops and mop heads
17-H drums, approved for Spec. 7A
High density concrete blocks for shielding

9.0 RESUMES OF KEY NSS PERSONNEL

The resumes of key NSS personnel assigned to support the decon project in accordance with the organizational chart requirements of Section 2.0 (Organization) has been included with this Facility Decontamination Plan for informational purposes only.

Should AMS not have properly-trained personnel as replacements, AMS will obtain these replacements from NSS.

NSS CONSULTING PERSONNEL

NAME	TITLE
Robert Flournoy	NSS Health Physicist
James Elkins	NSS Technical Advisor
Joe Harverson	NSS Technical Supervisor
Roy Cill	NSS Senior HP Technician

(See Attachment C.)

AMS DECONTAMINATION PERSONNEL

Robert Jucius	AMS Health Physicist
Timothy Cox	AMS HP Technician and Technical Supervisor
Steve McDermott	AMS HP Technician

(Resumes Attached)

9.1 Any changes to the above-named key AIS assigned personnel shall be approved in advance by the NRC Regional U.S. Nuclear Regulatory Commission, Washington, DC 20555. Copies shall also be sent to the Assistant General Counsel for Enforcement at the same address and the Regional Administrator, NRC Region III, 799 Roosevelt Road, Glen Ellyn, Illinois 60137. If such a person requests a hearing, that person shall set forth with particularity the manner in which the petitioner's interest is adversely affected by this Order and shall address the criteria set forth in 10 CFR 2.714(d). A REQUEST FOR HEARING SHALL NOT STAY THE IMMEDIATE EFFECTIVENESS OF THIS CONFIRMATORY ORDER.

ATTACHMENT A

ALLEN BRODSKY, SC.D.
HEALTH / RADIOLOGICAL PHYSICIST

18418 KIPLING ROAD
DERWOOD, MD 20855

August 11, 1987

Dr. Seymour S. Stein, President
Advanced Medical Systems, Inc.
One Factory Row
Geneva, OH 44041

Dear Dr. Stein:

On Wednesday, August 5, 1987, I visited with you and your staff -- Theador J. Hebert, Howard R. Irwin, and William Turbett -- and toured and surveyed the operations of your company, Advanced Medical Systems, Inc., at 1020 London Road, Cleveland, Ohio. Enclosed are my major conclusions about the radiation safety aspects of your cobalt-60 source manufacturing operations at the London Road facility.

In summary, I conclude that your operations are not a significant danger to the public health and safety, whereas at the same time the economic benefits of your operations and the medical treatment benefits of your products, Cobalt Teletherapy machines for the treatment of cancer have obvious benefit to society. Thus, I believe that it is consistent with the "as low as reasonably achievable" provisions of Section 20.1(c) of the regulations, Title 10, CFR, Part 20, to state that your plant is in sufficient compliance with regulations that no drastic actions that would jeopardize your business are warranted to immediately improve safety. On the other hand, I have made some suggestions in the enclosed pages for the improvement of safety and reductions of exposures "ALARA" that can be implemented by your own staff in the course of operations. I recommend that you support and assist your staff in carrying out these recommendations, and also ensure that your continued radiation safety surveys are consistent with the survey program given in Regulatory Guide 8.21, which I left with your staff.

Enclosed is the Curriculum Vitae that you requested, with several references checked that I hope will be of help to you in meeting safety and regulatory requirements.

Sincerely yours,

Allen Brodsky

Allen Brodsky, Sc.D., CHP, DABR
Certified Health/Radiological
Physicist

Enclosures: Conclusions of Visit
Curriculum Vitae

cc: Theador J. Hebert, General Mgr., ATC Medical Group

ADVANCED MEDICAL SYSTEMS AUDIT REPORT

by

Allen Brodsky, Sc.D., CHP
16412 Kipling Road
Derwood, MD 20855

August 10, 1987

This report presents the conclusions of my survey, and the observations on which they are based, during my visit to the London Road facility on August 5, 1987.

CONCLUSIONS

1. Your operations do not present a significant risk to public health and safety, nor are they likely to present such a risk in the future if they continue to be conducted according to the procedures under which you have been operating. Considering the nature of your operations, filling source containers with metallic pellets of cobalt-60, I believe that your operations also would not present a significant risk to the public even in the event of a serious fire, earthquake or other such catastrophe.

2. Your operations appear to meet all of the important requirements of the regulations of the U. S. Nuclear Regulatory Commission, based on my tour of your operations, discussions with your plant personnel, examination of your records, and spot measurements of contamination and radiation levels together with an assessment of occupancy times. However, it would be desirable to reduce contamination levels in the decontamination area and other areas more often entered by personnel, in compliance with the "as low as reasonably achievable" (ALARA) provisions of Title 10, CFR, Part 20. The word "reasonably" must, as provided in the regulations, take into account the very substantial economic and health benefits of your particular product (which is important in the treatment of cancer); thus, although I believe that your staff should be able to devise ways to reduce contamination levels in your plant, there is no justification for imposition of requirements or expenses of a degree that would endanger your ability to produce and market your product.

3. I was particularly gratified to find no undue contamination in unrestricted areas within your plant, even in front of the hot cell where the Co-60 pellets are handled in unsealed form. Levels in these areas were all below about E(-6) microcuries/square centimeter, consistent with the appropriate action level in Regulatory Guide 8.21 for intermediate toxicity beta-gamma emitters in unrestricted areas. This indicates to me that personnel have been carefully following the appropriate procedures for removing protective clothing before leaving the contaminated areas behind the hot cell. I noted that these areas are appropriately locked and posted with warning signs as required by 10 CFR Part 20.

4. The most serious risk of your operations, as recognized by requirements incorporated into your license by the Nuclear Regulatory Commission, is the risk of inadvertent exposure to your own personnel through some accident or oversight, since extremely high radiation levels exist within the hot cell, and in the old waste storage areas in the basement. I recommend that no entry into the hot cell itself be allowed until the hot cell is adequately decontaminated remotely, by use of the manipulators and by your own personnel who are familiar with the equipment and operations. I also recommend that no efforts to decontaminate the basement area be carried out until your personnel devise effective decontamination agents and methods, tested in areas of lesser contamination. Considering your own scientific and technical expertise in chemistry and engineering, I believe that you and your staff should be able to devise appropriate agents and procedures within the next few months. I am enclosing separately the formulation of "Schubert's Solution", which we used effectively for decontaminating various surfaces, as well as human skin, in a number of cases at the University of Pittsburgh. Perhaps this could be mixed with the gel mentioned by Mr. Hebert to obtain an effective agent that would chelate Co-60 contamination and contain it within the gel until removal, thus avoiding either the soaking of the contamination further into wall and floor surfaces, or resuspension as an inhalation risk to your workers. This mixture should also be relatively safe for use by your staff.

Thus, efforts should be made to reduce the contamination levels that have been increasing in your laboratory and decontamination areas, and to reduce the exposure levels in your waste tank areas. However, these efforts should be carefully planned and carried out by your own staff, only after methods and agents are devised to ensure that your personnel do not receive more radiation dosage from the decontamination efforts that they would receive from normal operation. Decontamination operations, and related facility improvements, should also not be carried out until methods, equipment and procedures are devised to ensure that any further releases of radioactivity to the environment will be at least as low as the annual releases to date.

5. I examined the airborne effluent data and found that concentrations in air released to unrestricted areas were well below 10 CFR Part 20 concentration limits for those areas for the years 1985, 1986 and 1987. I did not examine the data for earlier years. I also calculated the total airborne effluent for each year (to date for 1987) and divided these values by the total throughput (Curies of Co-60 handled and placed into sources) for respective years. The resulting ratios are estimates of probabilities of releasing an atom of Co-60 to the environment as a result of your operations, and give probabilities of 5 E(-12), 4 E(-9) and 2 E(-8), for years 1985, 1986 and 1987, respectively. Although all of these values are low and indicate adequate filtration of effluent, they seem to be ramping upward. Possibly this upward trend is related to the upward trend of contamination within your restricted areas, but the causes should be investigated so that this trend may be reversed.

I also made my own measurements of contamination of the filter paper that sampled the stack effluent, when the paper was removed from the sampler by Mr. Howard Irwin. The lack of any detectable contamination on this

filter, even with my portable end-window survey meter, provides me with an approximate, but independent, measurement that confirms the low concentrations of activity recorded in your logbooks.

6. Although the above observations do not reveal excessive radioactivity releases to the environment, it would be appropriate to consider replacing the single absolute filters, in each effluent path in the stack plenum, with two in series in each respective path, considering the level of activity that may be handled, and the desirability of "defense in depth" (see the article I mentioned, Am. Industrial Hygiene Assoc. J. 26, 294-310, 1965, Table 1). However, this replacement may be done without disruption to your operations, and in the normal course of plant upgrading, since the probability of a significant environmental release from your plant is demonstrated to be low. (I consider from the nature of the material that you handle, that even considering the deteriorated state of your waste storage facilities, the relative probability of public exposure to Co-60 through the waste water or ground pathways is negligible compared to the probability of exposure to airborne Co-60 (even though this is low).)

7. No entry of personnel into the hot cell should be allowed in any case without the use of full face respirators, properly fitted, tested and maintained, even for rapid actions or instances. Neither should any further personnel entry into the hot cell be allowed until the interior surfaces of the cell are decontaminated, by remote operations, to the point where personnel may enter the cell and maintain exposures that are ALARA (and well below permissible quarterly limits, if possible).

8. Body burden measurements on Howard Irwin, Radiation Safety Officer, should continue to be carried out at frequencies of about each 6 months, until his indicated burden falls below about 1 nanocurie. This is necessary in order to confirm that the inhaled Co-60 remains as an insoluble particulate in the lung, which appears to be the case so far. The long-term measurements are also necessary for determining his total committed internal dose. In all cases that I have handled, individual variations in metabolic parameters have been such that only long-term measurements of body and organ retention have allowed the more accurate and valid assessments of individual radiation dose. His body burden measurements should continue to include the same measurements, with the same equipment and geometry, as used previously. This is necessary so that the relative retention function may be defined over a period of several years. This inhalation incident appears to be relatively unique in your operations, but explainable in terms of the waste processing activities that were carried out by Mr. Irwin two days before his initial determination of an internal Co-60 body burden. This incident does not seem to be indicative of a generally high level of internal exposure to your employees, although the potential is there. So current precautions against inhalation exposure must be continued, including efforts to reduce loose surface contamination, as good housekeeping practices as feasible, and processing procedures that will minimize the spread of additional contamination. Mr. Irwin's internal dose can not at present be concluded to have exceeded any regulatory limits, but the intake is at a level such that only a long-term evaluation would allow an accurate estimate of intake and total internal dose commitment.

9. Although I have indicated above that certain additional efforts should be directed at exposure prevention and reduction, my assessment of the operations indicates that there is no serious or immediate danger to the public health and safety that would warrant drastic actions of any kind that would jeopardize the economic welfare of your company and its employees, or deprive society of the healing values of your product.

5.5 Method of Decontamination:
Decontamination will be performed primarily using an industrial type cleaner along with lint-free rags, masslin or the equivalent. NSS will use state of the art decon methods designed to minimize liquid radioactive waste generated during the decon. NSS will attempt to avoid using any methods of decon that tend to concentrate radioactivity resulting in additional dose rate problems and high radiation areas. The radioactive waste generated from this type of decon (i.e. masslin wipe) can be easily handled and packaged for disposal and can be manipulated in a manner that will not cause excessive dose to personnel handling it. NSS will utilize the best technology currently available to the nuclear industry to support the Facility decontamination project.

REFERENCE (B) Extracted From NSS Proposed Decontamination Plan.

5.6 Special Instruction Concerning The WWUT Room:
Due to excessive dose rates, (greater than 1000 R/Hr general area), NSS proposes that the WWUT Room not be entered or decontaminated at the present time. Instead, NSS proposes that the room entrance be shielded and sealed off to prevent any further access. The cost/benefit ratio of decontaminating this room is unacceptable at the present time. The room and its equipment has been isolated and there is no further need to enter room or use the equipment. The risk of overexposing personnel in this room is extremely high and serious personnel injury could result. After the room is sealed, the drains to the waste tank will be plugged so additional liquid waste can not be channeled into the room. NSS proposes that decontamination of the WWUT Room be addressed when the London Road Facility is scheduled for final decommissioning.

TJH 10-28-87

6.0 RADIATION PROTECTION PROGRAM - ADMINISTRATIVE
Overall responsibility for the facility Radiation Protection Program will rest with the A.M.S. Radiation Safety Officer. The Radiation Protection Program for decontamination project activities will be the responsibility of the NSS Health Physicist, the NSS Technical Advisor and the NSS Technical Supervisor. This includes development of temporary health physics operating procedures and guidelines, as required, to insure adequate controls for the facility decontamination project. The following general areas will be addressed:

Access Control - Radiologically Controlled Areas
Administrative Exposure Controls
Air Sampling and Evaluation
ALARA Review Process
Anti-C Clothing - Selection and Use
HEPA Filtered Vacuum Cleaner - Use and Maintenance
Personnel Monitoring
Personnel Decontamination
Portable Ventilation - Use and Maintenance
Posting of Radiologically Controlled Areas
Respiratory Protection
Temporary Shielding

ATTACHMENT C

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

DEC 11 1987

Advanced Medical Systems, Inc.
ATTN: Mr. T. J. Hebert
General Manager
One Factory Row
Geneva, OH 44041

License No. 34-19089-01
EA 87-212

Gentlemen:

This is a written response to your October 28, 1987 letter requesting that three additional individuals be authorized to perform work pursuant to your Nuclear Support Services, Inc. "Facility Decontamination Plan" (NSS Plan) submitted to the NRC by letter dated October 20, 1987. This letter confirms, in writing, what was previously discussed in an October 30, 1987 telephone conversation between you and members of my staff and a November 9, 1987 telephone conversation between Mr. James Elkins of NSS and Dr. Bruce Mallett of my staff. As discussed in the November 9, 1987 conversation with Mr. Elkins, we are also responding to a telecopy request, dated November 2, 1987, from NSS which requested that Mr. Leland R. Schroeder be added to the list of individuals performing the duties of NSS Senior HP Technician in the NSS Plan.

Based upon our review and in accordance with Section IV.A.1.f. of the Confirmatory Order Modifying License, Effective Immediately (Order) dated October 30, 1987, I hereby revise the Order as follows.

1. Messrs. Michael Williams, Roland Hanson, and James Dietrich may perform the duties of NSS Senior Health Physics Technician and NSS Technical Supervisor as described in Sections 2 and 9 of the NSS Plan.

2. Mr. Leland R. Schroeder may perform the duties of NSS Senior Health Physics Technician as described in Sections 2 and 9 of the NSS Plan.

Should you have any questions regarding this approval, please contact Dr. Bruce S. Mallett of my staff at (312) 790-5612.

Sincerely,

A. Bert Davis
Regional Administrator

cc w/ltr dtd 10/28/87:
DCD/DCB (RIDS)

~~8712170128~~

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

BACKGROUND

Senior health physics technician and site coordinator, supervising the activities of Health Physics Technicians and technicians during the conduct of decontamination procedures. 1975-1986.

EDUCATION AND TRAINING

Greensburg Salem High School, 1974.
RAD Services HP Site Training Program, Salem, NJ. 1978-1979.
Elliott Training Center, Greensburg, PA. 1977. Welder Certification.

EXPERIENCE

11/03/86 - 12/14/86 Hilbert & Associates, Saratoga Springs, NY
Senior HP Technician. Elgin Watch Site Cleanup.

10/14/85 - 10/14/86 RP&C Valve
Certified Welder.

1975 - 1984 CONTRACT WORK for the following:

*Bartlett (1980-1983) as Senior Health Physics Technician.

*Chem Nuclear (1980-1984) as HP Technician.

*Combustion Engineering (1980-1983) as HP Technician.

*IRM (1976-1981) as HP Technician.

*Nuclear Support Services (1981) as HP Technician.

*RAD Services, Inc. (1978-1980) as HP Technician.

*Westinghouse Electric (1975-1977) as HP Technician.

Specific Assignments Were As Follows:

11/21/83 - 12/18/83 Zion Station, Zion, IL
Mechanical Technician. Installing thermocouples on reactor heads. Contractor: Combustion Engineering

10/26/83 - 12/18/83 Turkey Point, Miami, FL
Mechanical Technician. Installing thermocouples on reactor heads. Contractor: Combustion Engineering

09/06/83 - 09/14/83 D.C. Cook, Bridgeman, MI
Mechanical Technician. Installing thermocouples on reactor heads. Contractor: Combustion Engineering

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

EXPERIENCE (Cont'd)

08/08/83 - 08/31/83 Combustion Engineering
C-E Laboratories, Windsor, CT
Senior Health Physics Technician. Shipping and receiving of radioactive materials according to DOT standards. Contractor: Combustion Engineering

06/23/83 - 08/02/83 Florida Power & Light Company
St. Lucie Nuclear Plant, Ft. Pierce, FL
Site Coordinator. Coordinated and supervised for 20 health physics and decon technicians. Contractor: Combustion Engineering

04/06/83 - 05/06/83 Georgia Power Company
Plant E.I. Hatch, Baxley, GA
Senior Health Physics Technician. Provided coverage for work in turbine rx and radwaste buildings. Contractor: Bartlett, Plymouth, Mass.

01/03/83 - 03/03/83 Philadelphia Electric Company
Peach Bottom Nuclear Plant, Delta, PA
Senior Health Physics Technician. Responsible for rad, air, and smear surveys and routine job coverage in turbine, reactor and radwaste buildings. Contractor: Bartlett

07/26/82 - 11/12/82 Southern California Edison
San Onofre, San Clemente, CA
Health Physics Technician. H.P. Support for auxiliary and containment buildings. Contractor: Combustion Engineering

02/17/82 - 05/01/82 Southern California Edison
San Onofre, San Clemente, CA
Health Physics Technician. Night Shift Decon Foreman of 20-man decon crew. Supervised decon of containment and auxiliary buildings and supported eddy current testing of steam generators. Performed pre- and post-decon surveys. Contractor: Combustion Engineering

10/01/81 - 11/18/81 Metropolitan Edison Company
Three Mile Island-Unit II, Middletown, PA
Health Physics Technician. H.P. Support of auxiliary building. Contractor: Metropolitan Edison Co.

09/01/81 - 09/30/81 Duke Power Company
Oconee, Charlotte, NC
Health Physics Technician. HP Support of containment and auxiliary buildings. Contractor: Nuclear Support Services

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

EXPERIENCE (Cont'd)

07/08/81 - 08/06/81 Metropolitan Edison Company
Three Mile Island-Unit II, Middletown, PA
Health Physics Technician. H.P. Support of auxiliary building. Contractor: Metropolitan Edison Co..

06/04/81 - 06/08/81 Carolina Power & Light Company
H.B. Robinson, Raleigh, NC
Health Physics Technician. H.P. Support of containment building. Contractor: IRM

04/11/81 - 05/13/81 Philadelphia Electric Company
Peach Bottom, Delta, PA
Health Physics Technician. H.P. Support of containment and auxiliary buildings. Contractor: Bartlett

10/07/80 - 08/29/81 Southern California Edison
San Onofre-Unit I, San Clemente, CA
Health Physics Technician. Head Technician of balance of plant and coverage of steam generators sleeving project. Contractor: Combustion Engineering

08/22/80 - 09/29/80 Duke Power
Oconee, Charlotte, NC
Health Physics Technician. Handled rad waste: solidification and elimination of waste. Contractor: Chem Nuclear

07/13/80 - 08/14/80 VEPCO
Surry Power Station, Surry, VA
Health Physics Technician. Steam generators replacement. Contractor: IRM

06/08/80 - 06/22/80 Crystal River Plant, Crystal River, FL
Health Physics Technician. Covered control rod drive repair. Contractor: Bartlett

05/10/80 - 06/04/80 Omaha Public Powe, Ft. Calhoun, NB
Health Physics Technician. Covered reactor coolant pump repair. Contractor: Combustion Engineering

03/31/80 - 05/01/80 Toledo Edison Company
Davis-Bessie, Toledo, OH
Health Physics Technician. Smear, air and rad surveys; work crew controls; and multi-channel analyzer. Contractor: RAD Services

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

EXPERIENCE (Cont'd)

11/05/79 - 03/20/80 Duquesne Power Company
Beaver Valley-Unit 1, Shippingport, PA
Health Physics Technician. Smear, air and rad surveys; work crew controls; and multi-channel analyzer., Contractor: RAD Services

09/15/79 - 10/05/79 Consumer Power Company
Palisades, Covert, MI
Health Physics Technician. Smears, air sampling and work crew control. Contractor: RAD Services

11/19/78 - 08/01/79 Public Service Electric & Gas Company
Salem Plant, Salem, NJ
Health Physics Technician. Decon crew for auxiliary and containment buildings; coverage for routine and outage conditions, contamination, rad and air surveys; rad waste shipments; laundry; court room control points; and covered divers in the fuel pool. Contractor: RAD Services

03/09/77 - 03/25/77 Wisconsin-Michigan Power Company
Point Beach, Two Creeks, WI
Technician. Eddy current, sludge lancing surveys around steam generators, and plugging of steam generators. Contractor: Combustion Engineering

12/02/76 - 03/05/77 Westinghouse, Waltz Mill, PA
Technician. Decon tools and shipment. Contractor: Westinghouse

11/01/76 - 11/30/76 Carolina Power & Light Company
H.B. Robinson, Raleigh, NC
Technician. Eddy current, sludge lancing surveys around steam generators, and plugging of steam generators. Contractor: IRM

10/20/76 - 10/26/76 Wisconsin-Michigan Power Company
Point Beach Nuclear, Two Creeks, WI
Technician. Eddy current, sludge lancing surveys around steam generators, and plugging of steam generators. Contractor: RAD Services

10/01/76 - 10/15/76 Southern California Edison
San Onofre, San Clemente, CA
Technician. Eddy current and sludge lancing surveys around steam generators. Contractor: Combustion Engineering.

TIMOTHY D. COX
Senior Health Physics Technician and Site Coordinator

EXPERIENCE (Cont'd)

09/17/76 - 09/30/76 VEPCO
Surry Power Station, Surry, VA
Technician. Tube removal, sludge lancing, eddy current and survay work crew control. Contractpr: IRM

05/19/76 - 05/21/76 VEPCO
Surry Nuclear Power Station, Surry, VA
Technician. Tube removal, sludge lancing, eddy current and survey work crew control. Contractor: IRM, Annapolis, MD

03/01/76 - 04/30/76 Commonwealth Edison Comany
Zion Nuclear Station, Zion, IL
Technician. Sludge lancing, eddy current and surveys around steam generators. Contractor: Combustion Engineering

02/16/76 - 02/26/76 Wisconsin Public Service
Kewaunee Nuclear Power Plant, Kewaunee, WI
Technician. Eddy current testing of steam generators, surveys of equipment being shipped off-site, tube removal, sludge lancing and surveys of steam generators. Contractor: RAD Services

09/22/75 - 09/27/75 Florida Power & Light Company
Turkey Point, Miami, FL
Technician. Eddy current testing of steam generators, and surveys of equipment being shipped off-site. Contractor: RAD Services.

08/04/75 - 08/06/75 Florida Power & Light Company
Turkey Point, Miami, FL
Technician. Eddy current testing of steam generators, and surveys of equipment being shipped off site. Contractor: RAD Services.

ROBERT A. JUCIUS
Principal Physicist

EXPERIENCE (continued)

1965 to 1967 - U.S. Army Nuclear Defense Lab. - Edgewood Arsenal, MD

Health Physics Engineering Technician

- Responsible for radiation protection and laboratory safety including radiation surveys, leak testing of sealed sources, calibration of radiation detection equipment, evaluation of personnel monitoring techniques and equipment, and special projects.

ROBERT A. JUCIUS
Principal Physicist

EDUCATION

B.S. in Engineering Physics - University of Maine - 1965

Additional Training Courses:

Basic Radiation Protection, Bureau of Rad Health
Medical X-Ray Protection, Bureau of Rad Health
Thermoluminescent Dosimetry Workshop
Cobalt Source Handlers Seminar
X-ray Technology
AAPM Summer School; Diagnostic Radiological Physics
Workshop on the Uses of Bracytherapy
Writing for Engineers and Technicians
Effective Presentation
Physiology
Work Effectiveness
Accounting for Managers & Professionals
Interpersonal Management Skills
Management Discussion Skills II
Career Development Planning Seminar
Teletherapy Installation and Service
Teletherapy Installation and Service Transfer

ORGANIZATIONS AND PROFESSIONAL SOCIETIES:

Member: Health Physics Society (HPS)
Chairman and Member: NEMA CT Technical and Standards Committee
Member: Regulatory Affairs Professional Society (RAPS)
Associate Member: American Association of Physicist in Medicine (AAPM)
Contributing Member: Society for Radiological Engineering (SRE)
Member: Cleveland Are Medical Physicist (CAMP)
Member: ICRU Committee on Nomenclature in CT

PUBLICATIONS

Jucius, R.A.: "CTDI as a Function of CT Beam Profile Measured to Comply with New CDRH Regulations"; Paper Presented at the 27th Annual Meeting of the AAPM, August 1985

Jucius, R.A.; Kambic, G.X.; "Measurement of Computed Tomography X-Ray Fields Utilizing the Partial Volume Effect"; Med. Phys. 7,379-382 (1980)

Jucius, R.A.; Non-Invasive kVp Measurement of CT Systems Using a Mass Attenuation Comparator"; Works in Progress Paper Presented at the 21st Annual Meeting of the AAPM, August 1979

Jucius, R.A.; Radiation and You; Technicare, Solon, OH, Pub. 960067, March 1977, November, 1980

Jucius, R.A.; "Kambic, G.S.; "Radiation Dosimetry in Computed Tomography (CT)"; SPIE Proc., Applications of Optical Instrumentation in Medicine VI 127, 268-295 (1977)

Jucius, R.A.; "Radiation Safety and You"; General Electric Company, Milwaukee, Wisconsin, Dir. 13698, April 1972

ROBERT A. JUCIUS
Principal Physicist

EXPERIENCE:

1987 - CDI Corporation - Solon, Ohio

* Assigned to Technicare/GE transfer of services.

* Work on the transfer of regulatory programs and closeout existing Technicare Programs.

* Develop and implement health, radiation, safety and environmental protection programs for GE Solon.

1976 to 1987 - Technicare, A Johnson & Johnson Company - Solon, Ohio

Senior Principal Physicist (1982-1987)
Principal Physicist (1979-1982)
Senior Physicist (1976-1979)

* Radiation Safety Officer, maintained Nuclear Regulatory Commission (NRC) License. Provided consultation on State and Federal Regulations as they affected the diagnostic medical equipment. Established policies throughout the company on Radiation Safety Procedures. Supervised radiation training and monitoring program for personnel in Solon, Ohio and at local offices.

* Health Physicist, evaluate radiological hazards, supervise personnel monitoring program and NRC license.

* Managed regulatory affairs, including developing compliance guidelines and interfacing with government agencies.

* Developed innovative methods (Ke wrote the book) to measure and characterize CT Dose. The methods are a recognized standard.

* Developed a new method to measure x-ray energy.

* Developed specifications for CT Systems that thoroughly defined all aspects of the system performance.

* Coordinated, through the management of the Computerized Radiation Therapy Treatment Planning (Deltaplan) Project, the creation of comprehensive documentation for the RTP System that is effective and innovative for this product.

* Familiar with the following Regulations: (1) USNRC Title 10; (2) Investigational Devices Exemption Regulations (IDE); (3) Premarket Notification [510(k)]; (4) Good Manufacturing Practices (GMP); (5) Radiation Control for Health and Safety Act of 1968; (6) Premarket Approval Procedures (PMA); (7) Medical Device Reporting Regulation (MDR); and (8) Proposed FDA inspection of Software in Medical Devices.

ROBERT A. JUCIUS
Principal Physicist

EXPERIENCE (continued)

1969 to 1976 - G E - Medical Systems Division - Milwaukee, WI

Health Physicist - Regulatory Department - Radiation Safety Officer

* Responsible for maintaining a radiation safety program for field personnel, and maintaining the NRC and applicable State Licenses for installation and servicing of isotope therapy equipment. Additional training with large radioactive sources included: Teletherapy installation and Service Courses with AECL of Canada and more than 15 teletherapy installations and source transfers.

* Coordinated initial reports on x-ray and CT systems.

* Developed test methods for engineering, manufaccuring, and service to comply with the Health and Safety act.

* Maintained three Nuclear Regulatory Commission licenses and four State Radioactive Material Licenses.

* Provided consultation on regulations, health physics and radiation safety programs throughout the department.

* Education and Training included:
Medical X-Ray Protection Course - U.S. Public Health Service.
Teletherapy Installation and Service Course - AECL - Toronto, Canada.
Teletherapy Installations and Source Transfers with following: Theratron 780 installation; Theratron 60 installation; Theratron 80 installation; Eldorado 6 installation; Theratron 80 source transfers; Eldorado 6 source transfers; Theratron Jr. source transfers; and Eldorado 8 source transfers.

1968 to 1969 - Isotopes A Teledyne Company, NASA - Greenbelt, MD

Health Physicist

* Evaluated radiological hazards, performed special radiation safety studies, calculated dose rates, body deposition, and recommended safe radiation work techniques.

1967 to 1968 - Newport News Shipbuilding and Dry Dock Company - N.N., VA

Health Physicist - Assigned to nuclear overhaul and refueling

* Estimated radiation levels, calculated exposure rates and determined temporary shielding requirements

* Conducted training classes for Rad Con Personnel

STEPHEN M. McDERMOTT
Senior Health Physics Decon/RadCon Technician

BACKGROUND

Radiation Control Work Center Supervisor and Leading Radiation Control Supervisor (RCSS) June 1982 - June 1986. USS Enterprise, US Navy.

EDUCATION AND TRAINING

*Lakeland Community College, Kirtland, Ohio - 2 years

*Machinist Mate "A" School, US Navy; August 1980 - October 1980

*US Navy Nuclear power school courses of Study (Nov. 1980 - July 1981)

Math
Physics
Thermodynamics
Reactor Principles
Chemistry
Material Fundamentals
Radiological Fundamentals
Mechanical Theory
Electrical Theory

*US Nuclear Prototype Training Unit, July 1981 - Jan. 1982

Practical "Hands On" training in operation and maintenance of land-based Nuclear Reactor.
Qualified as basic radiation worker
Practical training in contamination control and radiation exposure control

*Engineering Laboratory Technician School (ELT) Courses of Study, Feb. 1982 - April 1982

Chemistry
Radiological Fundamentals
Theory and operation of radiation and contamination detection instruments
Theory and operation of personnel exposure monitoring devices
Decontamination procedures
Control and transfer of radioactive material

*Radioactive Materials Shipping School - November 1983

Instrumentation Training:

Radiation Survey Instruments

A/N PDR 27
A/K PDR 45
A/N PDR 66
A/N PDR 70

STEPHEN M. McDERMOTT
Senior Health Physics Decon/RadCon Technician

Instrumentation Training: (Cont'd)

Contamination Survey Instruments

A/N PDR 56
RM3/DT-304
E-140N/DT-304

Personnel Monitoring Devices
CaF_2 Thermoluminescent Dosimeters

EXPERIENCE

1980 - 1986 U.S. Navy

December 1984 - April 1986
RadCon Work Center Supervisor and leading RadCon Shift Supervisor (RCSS). Responsible for supervision of up to 15 ELT's with duties including routine radiation surveys, contamination surveys, personnel exposure monitoring and preventative maintenance scheduling.

Leading Petty Officer for Radiological Controls Workcenter. Engineering Laboratory Technician (ELT) - Performed chemical and radiological analyses on reactor and steam plant waters, implemented chemistry and radiological controls procedures for nuclear propulsion plants. Radiological controls shift supervitor (RCSS), ultimate responsibility for shift.

Determined RadCon requirements for major evolutions. USS Enterprise operations included: Operational Readiness Exam (ORE) (April 1984), Operational Reactor Safeguards Exams (ORSE) (April and Dec. 1984)

Performed as Leading Petty Officer for SRA 85, supervised 7 Second Class and 8 Third Class Petty Officers. During this time, work was performed on a control rod drive mechanism replacement. Support for 3 steam generator repair and inspections and support for primary valve maintenance in the propulsion plants.

In addition, performed the following:

*Coordination of RadCon support to work centers.

*Coordination of shipyard activities for all phases of nuclear plant maintenance as RCSS.

*Monitored personnel exposure.

*Responsible for accountability, packaging and transfer of radioactive materials.

*Scheduled preventative maintenance associated with reactor support.

*RadCon assistant work center - Supervisor and RCSS.

STEPHEN M. McDERMOTT
Senior Health Physics Decon/RadCon Technician

EXPERIENCE (Cont'd)

*Scheduled and performed plant surveys and routine maintenance.

*Performed chemical and Radiological analyses on reactor and steam plant waters.

*Implemented chemistry and radiological control procedures for nuclear propulsion plants.

*Conducted RadCon operational readiness examinations for The USS Enterprise.

*Decontaminated room areas and equipment associated with reactors and propulsion plants.

August 19[illegible] December 1984
RadCon Assistant Work Center Supervisor and RCSS. Routine plant surveys and maintenance personnel scheduling.

May 1983 - August 1984
Radiological controls watchstander. Qualified RCSS. Radiological controls watch, Engineering Laboratory Technician (ETL). Performed chemical and radiological analyses on reactor and steam plant waters. Implemented chemistry and radiological controls procedures and nuclear propulsion plants surveys. Petty Officer, 3M-301, General Damage Control. Participated in SRA 83, REFTRA 83, ORE 84, ORSE 84.

June 1982 - May 1983
Chemistry watchstander. Responsible for chemistry control of primary and secondary systems.

Special Assignment Experience:

*RadCon watchstander for replacement of ion exchanger resin of 8 reactor plants.

*Work center supervisor and RCSS for primary side steam generator repair.

*Work center supervisor and RCSS for control rod drive mechanism replacement.

*RCSS during Drydock maintenance period.