AMC medical group
Advanced Medical Systems, Inc.
1020 London Road
Cleveland, OH 44110
(216) 692-3270

August 14, 1996

Mr. J. R. Madera, Chief
Nuclear Materials Licensing Section
United States Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60523-4351

Re: Advanced Medical Systems Inc. (License No. 34-19089-01) Emergency Plan

Dear Mr. Madera:

Advanced Medical Systems, Inc. (AMS) is in receipt of your letter dated July 16, 1996 wherein comments on Revision 0 of the AMS Emergency Plan and our March 21, 1996 responses to your first set of comments were provided. Enclosed are our responses to your second set of comments, along with a description of our proposed follow-up actions.

Once you have approved these responses and follow-up actions, the Emergency Plan will be revised in accordance with our commitments. Revision 1 of the Plan will then be distributed to the USNRC and to those individuals on our "first responders" list. Shortly thereafter the first responders will be trained in the provisions of the Plan, and the first emergency drill will be scheduled.

AMS is operating under the conditions of its existing license until final action is taken on our revised renewal application. Consequently, these responses, and ultimately Revision 1 of the Emergency Plan, reflect some discontinuity between procedures that do not exist under the provisions of the current license and those that are proposed for the renewed license. We are hopeful that timely USNRC action on our revised renewal application will permit us to convert all procedural references in the Emergency Plan to the new Radiation Safety Procedures before Revision 1 of the Plan is ready for distribution.

If I can answer any questions or provide you with additional information, please call me at (216) 692-3270. We are looking forward to the USNRC's timely approval of our Emergency Plan.

Sincerely,

Stephen J. Haddock

Stephen J. Haddock, RSO

cc: D. Cesar
D. A. Miller, Esq. - Stavole & Miller
C. D. Berger, C.H.P. - IEM

RECEIVED
AUG 19 1996
REGION III

2-7-97

9610280234 XA

RESPONSE TO COMMENTS FROM
U. S. NUCLEAR REGULATORY COMMISSION

Agency Comment 1: The proposed actions appear to be adequate but it is still unclear how ADT will detect a power failure at the facility, or a disruption in telephone services. If ADT monitors the line such that it can promptly detect a loss of contact, a statement to that effect should be added to the plan.

AMS Response: Concur.

Action Taken: Footnote 22 on page 2-6 will be modified to read: "ADT Security Systems, Inc. provides the monitored alarm system for the facility. Part of their responsibility is to monitor the phone line so that power failure or disruption in telephone services are readily identified. When such a condition is detected, ADT contacts the individuals on the AMS call-back list. In the event of a fire or intruder alarm, ADT first places a call to the fire or police department, as applicable, and then contacts the individuals on the AMS call-back list."

Agency Comment 2: In addition to the proposed actions, the plan should contain a commitment to maintain a map showing the restricted areas, or some other warning sign, at each entrance that a first responder may use to enter the facility.

AMS Response: Concur.

Action Taken: The following footnote to line 17 on page 7-1, as modified, will be inserted: "A map showing the location of radiologically-restricted areas is located in the immediate proximity of the two enunciator panels (front door and the old lobby door) and at all other entrances to the building, including the loading dock entrance."

Agency Comment 3: Concerns about the technical basis for worst-case earthquake scenario remain unresolved at this time. We are in receipt of your response to NRC Inspection Report No. 030-16055/95006, and have forwarded it to our Headquarters office for review. Once we have received comments from NRC Headquarters staff, we will contact you via separate correspondence.

AMS Response: None Required.

Action Taken: None.

Agency Comment 4: The proposed actions are adequate for NRC approval; however, we believe it would be helpful if the sand shield in the basement and the access manholes on the first floor (as described in Section 1.2.3) were shown in the drawings. Please submit revised drawings.

AMS Response: The manholes on the first floor have been sealed and are no longer accessible. To include them in future versions of the drawing would serve no purpose.

Action Taken: When the maps are re-drawn, notation of the sand shield in the basement will be made.

Agency Comment 5: If offsite features significant to emergency response (as described in Section 1.2 of Regulatory Guide 3.67) are clearly labeled on the topographical map or an additional map of the site area, the proposed action will be adequate. Please make the necessary modifications and submit them for our review.

AMS Response: None required.

Action Taken: A copy of the revised topographic map is included herein as Attachment 1.

Agency Comment 6(a): The response is inadequate. With regard to packaged waste and surface contamination, the worst-case scenario must assume that the entire quantity authorized by the license is available for release unless some justification is provided to explain why it is unreasonable to make the assumption. [Other information provided]. The movement of the containers [of bulk cobalt-60] outside of [hardened areas of the facility] needs to be addressed. [Other information provided].

AMS Response: Concur.

Action Taken: Page 2-2, lines 1 through 3 will be modified to read: "in §71.71(c). The remainder of the sources are maintained in either the subterranean Source Garden, the vault-like Hot Cell, in lead/steel-encased source heads weighing approximately 4,000 pounds each, or in Type-B shipping containers weighing 8,100 pounds that were designed to withstand the accident conditions listed in §71.71. All of the canisters of bulk cobalt are contained in a Type B package. (The Type-B containers are, as of the date of this report, staged for shipment in the hardened area of the building. If shipment were not pending, the sources would be kept in the Source Garden or Hot Cell.) Consequently, the probability for major . . ."

Agency Comment 6(b): With regard to the assumption of a 10-meter release height, we consulted with inspection staff familiar with the site. It appears that most of the doors and windows through which a plume could be released are on the second floor, so we will accept the assumption of a 10-meter release height.

AMS Response: None required.

Action Taken: None.

Agency Comment 6(c): With regard to the calculations used to estimate potential offsite doses, your response acknowledges that the CAP88-PC code models a gradual release of radioactive material over 12 months and estimates does using several environmental pathways including the food and water pathways. [Other information provided]. We recommend that you [use the formula in Section 2.1.3 of NUREG-1140, with a stability class of D].

AMS Response: Concur.

Action Taken: Section 2.1.1 and Appendix C will be modified to incorporate the result of the recommended calculation methodology as additional support for the conclusions drawn.

Agency Comment 7: The plan should reflect your response that it is likely a tornado would impose structural damage to restricted areas that are not of "hardened" construction. The plan should also mention the possibility that some containers may be in these damage prone areas (during shipments, etc.) when a tornado strikes, and discuss whether the containers would be expected to withstand accident conditions. See the discussion in Item 6(a) above.

AMS Response: Concur.

Action Taken: Page 2-4, lines 1 through 3 will be modified to read: "The AMS building may incur structural damage in the event of tornado impact. Certain restricted areas (e.g., those that are not of "hardened" construction) may be included in the damage area. However, only the HEPA Room on the second floor contains any dispersible activity of consequence (e.g., two curies). (The remainder of the materials materials are stored in shipping containers that are designed to withstand accident conditions.) Consequently, the maximum dose to the nearest off-site resident from the dispersible activity would be only a fraction of that associated with the fire scenario, wherein 40 curies could potentially be dispersed. Therefore, the radiological impact of a tornado is likely to be minimal."

Agency Comment 8(a): The revised emergency action levels (EALs) are defined in terms of projected effluents and site boundary exposure rates. It is still unclear how the Emergency Manager will be able to project these conditions in a timely manner. It would be better to define EALs in terms of the quantity of material that would be needed to produce those conditions. The Emergency Manager then would be able to declare an emergency based simply on the location of the emergency and the amount of radioactive material in those areas.

AMS Response: Concur.

Action Taken: Attachment 1 of Appendix D will be revised in its entirety. Attachment 3 to this letter shows the revision.

Agency Comment 8(b): We also note that the proposed revision to Attachment 1 of Appendix D classifies a 20 mR/hr dose rate at the site boundary as an incident and indicates that an emergency will only be declared if the dose rate at the site boundary could exceed 100 mR/hr. These action levels are too high. [Additional information provided.] More appropriate action levels should be established.

AMS Response: Concur.

Action Taken: Attachment 1 of Appendix D will be revised in its entirety. Attachment 3 to this letter shows the revision.

Agency Comment 9: The plan should contain more detailed recommendations for offsite protection actions based on the worst-case accident scenarios defined in the plan. The initial recommendations should define the offsite areas where protection actions should be implemented. We note that you have not postulated any accidents with projected doses approaching 1 rem so it is unclear why you indicate that evacuations may be recommended. Your emergency classifications and protection action recommendations should be consistent with your accident analysis.

AMS Response: Concur.

Action Taken: Attachment 1 of Appendix D will be revised to address these issues. Attachment 3 to this letter shows the revisions.

Agency Comment 10: We believe that 90 minutes is too long for the first update. Sixty (60) minutes would be better. Please modify accordingly.

AMS Response: Concur.

Action Taken: After line 10 on Page 3-4, the following sentence will be added: "To ensure the information has been received by the offsite response organization, and to continuous understanding of the status of the emergency, an update call to each first responder for an Alert or a Site Area Emergency will be placed within 60 minutes of the initial notification. Subsequent updates will be as agreed upon between AMS and the responder during the first update call."

Agency Comment 11: The proposed actions will be adequate if agreement letters are obtained and submitted with the emergency plan.

AMS Response: None required.

Action Taken: Agreement letters will be submitted with the revised plan.

Agency Comment 12: The proposed actions are adequate. However, the emergency plan must provide reasonable assurance that a sufficient number of survey meters will be available since the local fire and police departments do not have the capability to perform radiation surveys.

AMS Response: Page 6-1, Section 6.4 describes the type and minimum number of survey instruments that will be available during an emergency.

Action Taken: None.

Agency Comment 13: The Ohio Department of Health needs to be added to Section 4.4 also.

AMS Response: Concur.

Action Taken: Section 4.4 of the Plan (page 4-3) will be modified to include the responsibilities of the USNRC Operations Center, the Ohio Department of Health, and the Ohio Emergency Management Agency.

Agency Comment 14: If AMS will rely on offsite firefighters to conduct search and rescue apparitions, the plan should include a statement to that affect.

AMS Response: Concur.

Action Taken: The following sentence will be added after line 7 of page 5-2: "The RSO will initiate and, if necessary, assist firefighters in search and rescue operations for individuals that are unaccounted for."

Agency Comment 15: Even though the footnote will be deleted, the response doesn't address the question of whether AMS personnel will be able to accompany firefighters during the fire if self-contained breathing apparatus is required to enter the building. If the assistance during fire fighting efforts mentioned int he plan is limited to conducting surveys outside of the building, that should be stated in the plan.

AMS Response: Partially concur. Those AMS employees who are trained in the use of self-contained breathing apparatus pursuant to 29 CFR 1910 may render assistance.

Action Taken: Page 5-2, line 10 will be modified to read: ". . . during fires. However, if the use of self-contained breathing apparatus is required for entry, only those AMS personnel who are qualified in the use of such devices will assist in rescue operations. Those that are not qualified will assist firefighters by conducting surveys outside of the building only. Radiation monitoring instrumentation will be made . . ."

Agency Comment 16: Pencil-type pocket dosimeters that use a thin filament are susceptible to false readings if they are bumped or dropped. Pocket dosimeters are susceptible to environmental conditions also. We believe that more reliable dosimeters should be provided for emergency response personnel. Please address this issue.

AMS Response: As stated in our March 21, 1996 response, AMS does not consider pocket dosimeters to be necessarily less reliable than other dosemeter types. If subject to insult beyond their performance specifications, they will, in fact, fail. However, other than a catastrophic insult that complete destroys the dosimeter, a dosimeter that is bumped or dropped will discharge and consequently "read high". A damaged TLD-based dosimeter almost always "reads low". Furthermore, a pocket dosimeter is no less able to withstand environmental impacts such as water and heat than is a conventional TLD-based dosimeter. Finally, the pocket meter provides the added advantage of "real time" monitoring that is not possible with TLD-based dosimeters.

Action Taken: Page 6-2, line 3 will be modified to read: ". . respirators (full face). In addition, and at the discretion of the RSO, TLD-based dosimeters may be issued to emergency personnel."

Agency Comment 17: The response fails to provide a basis for NRC to find there is reasonable assurance that an operable survey meter will be available during an emergency. [Additional information provided.] The plan must provide reasonable assurance that an inoperable survey meter will not prevent response personnel from performing initial assessments. This assurance could be provided by a second survey meter, or more frequent operational checks (weekly would be acceptable).

AMS Response: Concur.

Action Taken: Page 6-2, line 6 will be modified to read: ". . . availability are checked weekly and confirmed to be present and functional."

Agency Comment 18: Although a statement describing typical calibration intervals and operational check frequencies is preferred, referencing Radiation Safety Procedure No. RSP-008 is acceptable. A copy of this procedure should be provided for information when the plan is resubmitted.

AMS Response: None required.

Action Taken: For information only, a copy of Radiation Safety Procedure No. RSP-008, "Instrumentation and Surveillance" is included herein as Attachment 2. Since RSP-008 is subject to revision, the August 14, 1996 version shown in Attachment 2 should not be considered a part of the Emergency Plan.

Agency Comment 19: The regulations in 10 CFR 30.35(g) require that records important to decommissioning be retained until the license is terminated. The plan should describe the provisions for ensuring that records of incidents are retained until the license is terminated.

AMS Response: Concur.

Action Taken: Page 8-1, line 7 will be modified to read: ". . . is included in ISP-37 (See Appendix D) and in Radiation Safety Procedure No. RSP-004, "Radiation Protection Records". All records important to decommissioning shall be retained until license termination."

ATTACHMENT 1
REVISED TOPOGRAPHICAL MAP

Returned to RTII per their request.

ATTACHMENT 2
RSP-008, "INSTRUMENTATION AND SURVEILLANCE"

Advanced Medical Systems, Inc.

INSTRUMENTATION AND SURVEILLANCE	Procedure: RSP-008	Revision No.: 000
	Page: 1 of 25	Date: August 15, 1996
	Approved by (Vice President):	
	Approved by (RSO):	
	Approved by (RSC Chair):	

TABLE OF CONTENTS

CONTROLLED COPY NO. : _____

1 PURPOSE

This procedure describes the requirements for calibration and use of radiation survey instruments, and for performing radiological surveillance at the Advanced Medical Systems, Inc. (AMS) facility on London Road.

2 SCOPE

This procedure applies to all radiological instrumentation and surveys conducted by AMS employees, visitors and contractors at the London Road facility pursuant to Radiation Protection Program Plan provisions, and for radiation protection purposes. Instruments that are not used for radiation protection purposes are exempt from the requirements of this procedure.

3 REFERENCES

3.1 U. S. Nuclear Regulatory Commission Radioactive Material License Number 34-19089-01

3.2 American National Standard Institute, "Radiation Protection Instrumentation Test and Calibration," N323-1978m, 1977.

3.3 Instrument instruction manuals published by the instrument manufacturers.

3.4 U.S. NRC Regulatory Guide 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As is Reasonably Achievable".

3.5 U.S. NRC Regulatory Guide 8.21, "Health Physics Surveys for Byproduct Material at NRC-Licensed Processing and Manufacturing Plants," 1979.

3.6 National Bureau of Standards, "NVLAP Dosimetry LAP Handbook - Operational and Technical Requirements of the Laboratory Accreditation Program for Personnel Dosimetry Processors", NBS 85-3170, May, 1985.

3.7 American National Standards Institute, "Personnel Dosimetry Performance - Criteria for Testing", ANSI N13.11, 1983.

3.8 Advanced Medical Systems, Inc. Radiation Safety Procedure No. RSP-001, "Radiation Protection Program Plan".

3.9 Advanced Medical Systems, Inc. Radiation Safety Procedure No. RSP-004, "Radiation Protection Records".

3.10 Advanced Medical Systems, Inc. Radiation Safety Procedure No. RSP-009, "Contamination Control".

3.11 Advanced Medical Systems, Inc. Radiation Safety Procedure No. RSP-011, "Radiological Areas and Posting".

3.12 Advanced Medical Systems, Inc. Radiation Safety Procedure No. RSP-014, "Receipt, Handling and Identification of Radioactive Materials".

3.13 Advanced Medical Systems, Inc. Radiation Safety Procedure No. RSP-015, "Packaging and Transportation of Radioactive Materials".

3.14 Advanced Medical Systems, Inc. Radiation Safety Procedure No. RSP-019, "Operation of the AMS Smear Counter".

4 DEFINITIONS

The definition of terms used in this RSP that may not be commonly understood shall be found in RSP-002, "Definitions".

5 PROCEDURE

5.1 Responsibilities

5.1.1 The Vice President shall supply adequate resources to ensure compliance with this procedure.

5.1.2 The Radiation Safety Officer (RSO) shall:

5.1.2.1 Assure the adequacy of the radiation survey and instrumentation program.

5.1.2.2 Ensure current and proper calibration of all radiation detection instruments in the active inventory.

5.1.2.3 Maintain instrument calibration certificates on file for all radiation detection instruments in the active inventory.

5.1.2.4 Assure that all radiological surveillance is performed pursuant to this procedure.

5.1.2.5 Assure that all Radiation Protection Technicians are properly trained in the provisions of this procedure.

5.1.2.6 Verify compliance with this procedure during planned and periodic audits of the radiation protection program.

5.1.3 Radiation Protection Technicians shall:

5.1.3.1 Verify that only calibrated radiation detection instruments are used.

5.1.3.2 Follow this procedure when performing radiological surveillance activities.

5.1.3.3 Periodically review this procedure.

5.2 Survey Program

5.2.1 Radiation surveys shall be performed, as necessary, to evaluate:

5.2.1.1 The magnitude of radiation exposures to personnel performing routine operations, maintenance, and/or research and development.

5.2.1.2 Fixed and removable contamination on equipment and materials to be released from the London Road facility.

5.2.1.3 The radiological status of the London Road facility with respect to applicable USNRC licensing requirements.

5.2.1.4 Radiological conditions in the event of non-routine circumstances (e.g., spills, decontamination efforts, special activities).

5.2.2 Radiation surveys for official purposes shall be performed by Radiation Protection Technicians who are qualified in accordance with RSP-006.

5.2.3 All official radiation surveys shall be documented on a survey form (Attachment 1, or equivalent).

5.3 Radiation Survey Instruments

5.3.1 Instrumentation used by Radiation Protection Technicians shall be of sufficient sensitivity and accuracy to assess the radiation exposure rates from radioactive materials which may be found at the London Road facility; detect the presence of radioactive materials on tools, equipment, clothing, and personnel at all levels which may be found at AMS; and of sufficient quantity to support on-going or planned operations.

5.3.2 The basis for selection of instruments for use at AMS shall include:

5.3.2.1 Quality of radiation to be measured.

5.3.2.2 Sensitivity required.

5.3.2.3 Purpose of the survey.

5.3.3 Instruments maintained in the active inventory shall be evaluated and tested, and documentation obtained, as appropriate, for the following:

5.3.3.1 Physical construction

5.3.3.2 Effect of shock, sound, vibration, electric transients, RF energy, magnetic fields and high humidity

5.3.3.3 Extent of switching transients, capacitance effects, geotropism and static charge effects

5.3.3.4 Power supply, including stability and battery life

5.3.3.5 Range, sensitivity, linearity, detection limit, and response to overload conditions

5.3.3.6 Accuracy and reproducibility precision

5.3.3.7 Energy dependence

5.3.3.8 Angular dependence

5.3.3.9 Response to ionizing radiation other than those being measured

5.3.3.10 Temperature and pressure dependence on measurements

Note: These tests are normally performed by the manufacturer and credit may be taken for the manufacturer's evaluation and testing. If credit is taken for manufacturer's testing, a copy of the test results, in the form of instrumentation manuals or specification sheets, should be maintained along with instrument records.

5.4 Instrument Calibration

5.4.1 Instruments shall be calibrated every six (6) months and following significant repairs to the ratemeter and/or detector.

Note: Cable and battery changes may not necessitate re-calibration, depending upon whether such action induces response changes.

5.4.2 Each ratemeter should be calibrated with a specific detector, designated by the detector serial number.

Note: The use of a ratemeter with a different detector may constitute the use of an un-calibrated meter.

5.4.3 A contractor shall provide the calibration services using radiation sources which are traceable to the National Institute of Standards and Technology (NIST).

5.4.4 Instruments shall be calibrated according to the guidelines of ANSI-N323-1978, "Radiation Instrumentation Test and Calibration".

5.4.5 The contractor shall be the manufacturer of the instrument or an individual/firm that has been pre-qualified by the RSO.

5.4.6 Calibration schedules should be staggered to maintain at least one calibrated contamination survey meter, one calibrated ambient exposure rate instrument, one calibrated high-range exposure rate instrument, and one calibrated stationary smear counter at the London Road facility at all times.

5.5 Pre-operational Checks

5.5.1 Prior to each use, or daily when kept in use, each instrument shall be checked for the following, as applicable:

5.5.1.1 Battery function

5.5.1.2 Response to a reference source.

5.5.1.3 Reset Button function.

5.5.1.4 Audible response function.

5.5.1.5 Physical damage.

5.5.1.6 Current calibration sticker

5.5.1.7 Response to background radiation.

Note: response to background radiation should be determined at a location that is in the vicinity of but not near known radiation sources or radiation-producing machines.

5.5.2 Instruments failing any pre-operational check shall be taken out of service, segregated from other instruments, tagged as "out of service", and repaired prior to use.

5.5.3 Each instrument shall be labeled with a unique identifier (e.g., serial number of detector and ratemeter) to enable traceability to surveys and records.

5.6 Survey Methods for Determining Ambient Gamma (General Area) Exposure Rates

5.6.1 Surveys shall be performed with a portable radiation survey instrument that is sensitive to gamma radiation (e.g., sodium iodide detector, microR meter, ionization chamber).

5.6.2 The instrument shall be turned on and permitted to stabilize (approximately 30 seconds) before proceeding further.

5.6.3 Pre-operational checks, as described in Section 5.5, shall have been completed before proceeding further.

5.6.4 Surveys shall be conducted by walking slowly over the area of interest with the detector held at a height of approximately one meter above the ground (waist high).

5.6.4.1 An increase in the audible response or in the needle/indicator movement may indicate the presence of radioactivity.

5.6.4.2 The instrument shall be held stationary in the locations where the increased response is noted.

5.6.5 Readings shall be recorded on a survey form (Attachment 1 or equivalent).

Note: Carefully evaluate the position of the range selector switch when observing the meter reading.

5.6.5.1 Any comments and notations that may be necessary for interpretation of results should be recorded on the survey form.

5.6.5.2 The individual performing the survey shall sign and date the completed survey form.

5.7 Monitoring Methods for Determining Ambient Gamma (General Area) Exposure Rates

5.7.1 Ambient gamma exposure rates shall be measured using thermoluminescent dosimeters (calcium sulfate or equivalent with a nominal detection limit of one millirem, or lithium fluoride with a nominal detection limit of five millirem)

5.7.2 Dosimeters shall be packaged in a weather-proof container or casing and mounted at a height of one meter above the ground surface.

5.7.3 At least one "background" dosimeter shall be deployed at a location that is representative of but remove from the work site.

5.7.4 Dosimetry services for routine use and for area monitoring, including dosimeters and processing equipment, shall be accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) in all applicable categories, except neutron.

5.7.5 The RSO shall ensure that dosimeter issuance, retrieval, handling, storage, and processing practices; personnel training and qualifications; quality assurance; documentation; calibration; and record keeping practices meet the minimum conditions for accreditation by NVLAP, and the requirements of ANSI N13.11.

5.7.6 The RSO shall ensure that the dosimetry devices are calibrated by the vendor to measure dose equivalent directly or indirectly through calibration factors.

5.7.7 Deployment, Storage, and Retrieval of Primary Dosimeters

5.7.7.1 The RSO shall ensure retrieval and processing of dosimetry devices at least once every calendar quarter.

5.7.7.2 Dosimetry devices may be processed less frequently than quarterly at the discretion of the RSO.

Note: If the results of quarterly monitoring are consistently below the device's detection limit, consideration should be given for extending the deployment period.

5.8 Survey Methods for Determining Contact Exposure Rates on Equipment Surfaces

5.8.1 [illegible] shall be performed with a portable radiation survey instrument that is sensitive to gamma radiation (e.g., sodium iodide detector, microR meter).

5.8.2 The instrument shall be turned on and permitted to stabilize (approximately 30 seconds) before proceeding further.

5.8.3 Pre-operational checks, as described in Section 5.5, shall have been completed before proceeding further.

5.8.4 Surveys shall be conducted by holding the instrument stationary with the detector end of the instrument approximately 0.25 inch from the surface of the item being evaluated.

5.8.5 Readings shall be recorded on the survey form.

Note: Carefully evaluate the position of the range selector switch when observing the meter reading.

5.8.5.1 Any comments and notations that may be necessary for interpretation of the results should be recorded on the survey form.

5.8.5.2 The individual performing the survey shall sign and date the completed survey form.

5.9 Survey Methods for Determining the Extent of Total Contamination on Surfaces

5.9.1 Total (fixed plus removable) contamination shall be measured by direct survey with portable radiation survey instruments sensitive to beta/gamma radiation (e.g., Geiger-Mueller detector with a pancake detector) or alpha radiation (e.g., alpha scintillation detector)

5.9.2 The instrument shall be turned on and permitted to stabilize (approximately 30 seconds) before proceeding further.

5.9.3 Pre-operational checks, as described in Section 5.5, shall have been completed before proceeding further.

5.9.4 Surveys shall be conducted by moving the detector at a rate of approximately two inches per second at a distance of no greater than 0.25 inch above the surface.

5.9.4.1 An increase in the audible response or in the needle/indicator movement may indicate the presence of radioactivity.

5.9.4.2 The detector shall be held stationary over the areas where the increased response was noted.

5.9.5 Survey points with the highest count rates shall be identified and recorded on the survey form, along with an estimate of the physical dimensions of the area with elevated readings.

5.9.5.1 Any comments and notations that may be necessary for interpretation of the results should be recorded on the survey form.

5.9.5.2 The individual performing the survey shall sign and date the completed survey form.

Note: Carefully evaluate the position of the range selector switch when observing the meter reading.

5.10 Survey Methods for Determining the Extent of Loose Contamination on Surfaces

5.10.1 Loose contamination shall be measured with dry disc smears wiped over a surface area of at least 100 cm^2.

5.10.1.1 A filter paper disc shall be placed on the surface to be smeared.

5.10.1.2 The disc shall be moved over an "S"-shaped area using moderate pressure, covering approximately 100 cm^2 (16 in^2), or about 20 inches in length, or the entire surface, if it is less than 100 cm^2 in area.

5.10.1.3 The disc smear shall be placed in a sample holder such that individual smears are separated from each other to prevent cross contamination (e.g., smear booklet or glassine envelope).

5.10.2 Each smear may be submitted to an analytical laboratory for determination of gross alpha and/or gross beta activity (disintegrations per minute) or may be counted in-house pursuant to RSP-019.

5.11 Survey Methods for Determining Airborne Radioactivity

5.11.1 Airborne radioactivity shall be collected with an air pump connected to a filter cartridge.

5.11.1.1 Either low (2 lpm or less) or high (greater than 2 lpm) volume pumps may be used.

5.11.1.2 The flow rate shall be determined with a flow calibrator immediately prior to use of breathing zone samplers.

5.11.1.3 The battery status of battery-powered pumps shall be determined immediately prior to use.

5.11.1.4 The filter cartridge should contain a membrane filter, rather than a glass fiber filter.

5.11.2 Air shall be drawn through the filter for a pre-determined duration or until visible dust loading or decreased flow is noted.

5.11.3 The filter shall be removed from the cartridge and placed in a sample holder such that individual filters are separated from each other to prevent cross contamination (e.g., smear booklet or glassine envelope).

5.11.4 Each filter may be submitted to an analytical laboratory for determination of gross alpha activity (disintegrations per minute) or may be counted in-house pursuant to RSP-019.

5.12 Analysis of Samples by an Analytical Laboratory

5.12.1 A chain-of-custody record (Attachment 3) shall be initiated by the individual collecting or overseeing the collection of samples.

Note: A copy of this form should accompany the samples throughout transportation and analyses; any break in custody or evidence of tampering shall be documented.

5.12.2 Sample custody shall be assigned to one individual at a time in order to prevent confusion of responsibility.

Note: Custody is maintained when (1) the sample is under direct surveillance by the assigned individual, (2) the sample is maintained in a tamper-free or tamper-evident container, or (3) the sample is within a controlled-access facility.

5.12.3 Samples should be submitted to a radioanalytical laboratory for analysis, along with the completed "Request for Analysis" form used by the laboratory.

5.12.4 The samples shall be packaged and shipped to the laboratory by overnight carrier in order to demonstrate chain of custody.

Note: The "Request for Analysis" form and the chain of custody form shall accompany the shipment.

5.12.5 Each sample shall be analyzed for gross alpha and/or gross beta activity, with a nominal minimum detectable activity specification of 1.0 picocurie per sample.

5.12.6 The laboratory shall have written procedures that document the laboratory's analytical capabilities for gross alpha/beta activity and a QA/QC program which assures the validity of the analytical results.

5.13 Routine Surveillance Program

5.13.1 A surveillance program to assess the radiological status of the London Road facility shall be performed.

5.13.2 The surveillance program shall include the restricted and unrestricted areas shown in Attachments 3 through 10.

5.13.3 Ambient gamma exposure rates shall be measured as described in Sections 5.6 and 5.7.

5.13.4 Total contamination shall be measured by direct surveys as described in Section 5.9.

5.13.5 Loose contamination shall be measured with dry disc smears as described in Section 5.10.

5.13.6 Airborne radioactivity shall be measured as described in Section 5.11.

5.13.7 Other non-radiological checks, verifications and inspections may be performed as part of the radiological surveillance program.

5.13.8 The frequency of surveillance shall be as shown in Attachments 3 through 10.

6 EXEMPTION PROVISIONS

Variances and exceptions to the requirements of this RSP shall be permitted pursuant to the written authorization of the RSO and the Vice President.

7 DOCUMENTATION

7.1 All records pertinent to this procedure shall be maintained pursuant to RSP-004.

7.2 The following records shall be maintained:

7.2.1 Instrument calibration and maintenance records.

7.2.2 Manufacturer instruction manuals for each type of rate meter and detector.

7.2.3 Radiological Survey Forms

7.2.4 Reports from dosimeter processor(s)

8 ATTACHMENTS

8.1 Attachment 1 - Survey Form

8.2 Attachment 2 - Chain of Custody Form

8.3 Attachment 3 - Routine (Daily) Surveillance Program

8.4 Attachment 4 - Routine (Every Two Weeks) Surveillance Program

8.5 Attachment 5 - Routine (Monthly) Surveillance Program

8.6 Attachment 6 - Routine (Quarterly) Surveillance Program

8.7 Attachment 7 - Routine (Every Six Months) Surveillance Program

8.8 Attachment 8 - Routine (Annual) Surveillance Program

8.9 Attachment 9 - Routine (Every Two Years) Surveillance Program

8.10 Attachment 10 - Routine (Every Five Years) Surveillance Program

ATTACHMENT 1
RADIOLOGICAL SURVEY FORM

Instrument:	S/N:	Cal Due:	RWP No.	Date:	Time:
Instrument:	S/N:	Cal Due:	Area:		
Instrument:	S/N:	Cal Due:	Purpose:		
Survey Performed By (Print):	Survey Performed By (Signature):	Reviewed by (Signature):	Review Date:		

Contamination Results (dpm/100 cm^2)

No:	Location	Cor. CPM	DPM
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			

Symbols:

○ = Smear Location
□ = Air Sample Location
β = Beta Measurement
C = Contact Reading
⊠ = Step off Pad
◘ = Floor drain
-x-x- = Restricted Area Boundary
RM = Radioactive Materials Storage
R = Radiation Area
H = High Radiation Area
V = Very High Radiation Area

ATTACHMENT 2

ADVANCED MEDICAL SYSTEMS, INC.
ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference No. _____

(1) Advanced Medical Systems, Inc.	(7) Samples Shipment Date	(5) Bill to:
(2) Sample Team Leader	(8) Lab Destination	
(3) Task No.	(9) Lab Contact	
(4) Project Manager	(12) Technical Contact/Phone	(10) Report to:
(6) Purchase Order No.	(13) Carrier/Waybill No.	
(11) Required Report Date		

ONE SAMPLE PER LINE

(14) Sample Number	(15) Sample Description/Type	(16) Date/Time Collected	(17) Container Type	(18) Sample Volume	(19) Preservative	(20) Requested Testing Program

(23) Special Instructions

(24) Possible Hazard Identification
Non-hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐

(25) Sample Disposal
Return to Client ☐ Disposal by Lab ☐ Archive _____ months

(26) Relinquished by: (signature, date, time):	Received by: (signature, date, time)
Relinquished by: (signature, date, time):	Received by: (signature, date, time)
Relinquished by: (signature, date, time):	Received by: (signature, date, time)

ATTACHMENT 2 (contd.)
INSTRUCTIONS FOR COMPLETING THIS FORM

1. Advanced Medical Systems, Inc.
2. **Sample Team Leader**: List the name of the team taking these samples.
3. **Task No.**: Indicate the **AMS** task number, if applicable.
4. **Project Manager**: Record the project manager's name.
6. **Purchase Order No.**: Non-**AMS** personnel should use this space to record the purchase order number authorizing the analysis of these samples. **AMS** and **AMS** subcontractors should leave this space blank if a project number has been given for billing.
7. **Samples Shipment Date**: Indicate the date these samples are shipped to the laboratory.
8. **Lab Destination**: Indicate the laboratory designated for sample shipment. Do not list more than one lab on this form. Be certain before sending samples that the laboratory you are designating is aware of the shipment and is capable of accepting these sample types and has available capacity.
9. **Lab Contact**: Give the name of the laboratory contact (typically the lab's project manager).
10. **Report to**: Give the name, address and phone number of the person to receive the data report for these samples.
11. **Required Re, D** ecord the date which you and the laboratory contact have determined the results will be reported (include verbal or final report as appro e).
12. **Technical Contact/Phone**: Indicate the name of the person to be contacted in case of any questions regarding these samples and the phone number where the contact may be reached the day the samples arrive in the laboratory.
13. **Carrier/Waybill Number**: If you are sending the samples by a commercial carrier such as Airborne or Federal Express, record the courier company name and the waybill or airbill number under which these samples will be shipped (Example - Fed-Ex/#513631771).
14. **Sample Number**: List the complete, unique identification number of each sample. These numbers must correspond with the identification numbers on the sample containers and the field sample collection document(s).
15. **Sample Description/Type**: Provide a short physical description of the sample and the sample type such as soil, sediment, sludge, water, wipe, air, concentrated waste or bulk.
16. **Date/Time Collected**: Record date and exact time each sample was collected. Use a 24-hour clock; i.e., 1645 not 4:45 p.m.
17. **Container Type**: Indicate the volume, color and type of the sample container used (Example - 1 gallon amber glass, 1 liter clear plastic, 40 milliliter clear glass).
18. **Sample Volume**: Estimate the amount of sample in the container. For air samples, indicate the volume of air sampled.
19. **Preservative**: Indicate what type of preservative, if any, has been used for the samples (Example - ice to 4°C nitric acid, hydrochloric acid).
20. **Requested Testing Program**: List the analyses to be performed on each sample by method number or quotation number.
23. **Special Instructions**: Use this space to record any special instructions to the lab regarding the processing of these samples.
24. **Possible Hazard Identification**: Indicate all hazard classes associated with the sample(s).
25. **Sample Disposal**: Indicate how the samples should be disposed of following analysis. The lab may charge for packing, additional archiving and disposal.

26 **Signatures**: When releasing custody of these samples, use the "Relinquished By" space to sign your full legal name, date and time of release. After verifying that all samples are present, the person receiving the samples must sign the "Received By" space to take custody of the samples.

ATTACHMENT 3
ROUTINE (DAILY) SURVEILLANCE PROGRAM

Week Ending Sunday, _____

Item	Action	Comments	Completed by (Initials/date)						
			Mo	Tu	We	Th	F	Sa	Su
Air Monitor Chart	Inspect for abnormal readings								
Cell Manometer	Record reading	Limits are 0.2 to 0.4							
Panalarm	Visual inspection	Lights are dim							
Gamalarms	Visual inspection	Lights are green							
Boiler and Air Conditioner	Visual inspection								
Air Compressor	Blow down								
Stack sampler	Check flow and pressure								
Lab counters	background and source check	Smear counter and gamma spectrometer							
Check sources	Inventory								
Pump House Emergency Supplies	Inventory once per week	Confirm instrument calibration and functionality.							

ATTACHMENT 4
ROUTINE (EVERY TWO WEEKS) SURVEILLANCE PROGRAM

Month/Year______________________

Item	Action	Comments/Notes	Date Completed	Completed By (signature)
Emergency Generator	Start/test			
Emergency Lighting	Test			
Contaminated Area Accesses (doors)	Contamination Survey	Clean Side		

ATTACHMENT 5
ROUTINE (MONTHLY) SURVEILLANCE PROGRAM

Month/Year _____

Item	Action	Comments/Notes	Date Completed	Completed By (signature)
Restricted Areas	Contamination and Ambient Gamma Surveys	Ambient gamma only on roofs		
AMS-Controlled Areas	Contamination and Ambient Gamma Surveys			
Gamalarms	Source test and alarm check	Attach source/ distance calculate		
Air Monitoring System	Check			
WHUT Room	Visual Inspection			
Emergency Generator	Check battery			
Ventilation System	Visual Inspection			
Air Monitor Strip Chart	Change paper			
Personnel Dosimeters	Exchange	Whole body and extremity dosimeters		
Area dosimeters	Exchange	Building dosimeters		
Fire and Safety Systems	Visual Inspection	Security and Insurance Co. inspection		

ATTACHMENT 6
ROUTINE (QUARTERLY) SURVEILLANCE PROGRAM

Quarter/Year ____________________

Item	Action	Comments/Notes	Date Completed	Completed By (signature)
Non-AMS-Controlled Areas	Contamination and Ambient Gamma Surveys			
Radiation Safety Committee	Meeting			
Area Dosimeters	Exchange	Perimeter dosimeters		

ATTACHMENT 7
ROUTINE (EVERY SIX MONTHS) SURVEILLANCE PROGRAM

Year_______________________

Item	Action	Comments/Notes	Date Completed	Completed By (signature)
Portable Survey Instruments	Calibration			
Facility Perimeter	Ambient gamma survey			
Calibration sources	Leak Test			
Materials Inventory	Correct for decay			
Self-reading Pocket Dosimeters	Calibration			
Stack Monitor	Calibration			

ATTACHMENT 8
ROUTINE (ANNUAL) SURVEILLANCE PROGRAM

Year _____

Item	Action	Comments/Notes	Date Completed	Completed By (signature)
Form USNRC-5	Prepare and mail	Mail to individuals and USNRC		
Radiation Protection Technician Training	Annual refresher			
Authorized User Training	Annual refresher			
Training Emergency Responders	Annual refresher	First responders only		
Routine Urine Bioassay Sampling	Collect and analyze samples			
Abandoned Lateral Surveillance	Annual review of Surveillance Plan by team members	Report 94009/G-125		
Abandoned Lateral Surveillance	Perform ambient gamma surveys at locations specified in Report 94009/G-125	Perform surveys in April or May		
Abandoned Lateral Surveillance	Collect and analyze water samples as specified in Report 94009/G-125	Collect samples in April or May		
Radiation Protection Program and Records	Internal Audit			

ATTACHMENT 9
ROUTINE (EVERY TWO YEARS) SURVEILLANCE PROGRAM

Year____________________

Item	Action	Comments/Notes	Date Due	Date Completed	Completed By (signature)
Radiation Protection Program and Records	External Audit				
Emergency Plan	Perform Emergency Drill				

ATTACHMENT 10
ROUTINE (EVERY FIVE YEARS) SURVEILLANCE PROGRAM

Item	Action	Comments/Notes	Date Due	Date Completed	Completed By (signature)
Hot Cell	Check automatic damper seals				
Sealed sources	Perform physical inventory				
USNRC License No. 34-190 .J-01	Submit renewal application				
Certification of Compliance for GE-500 Shipping Containers	Submit renewal application		1/1/2000		
Quality Assurance Program for GE-500 Shipping	Submit renewal application		1/1/2000		
IAEA Certificate	Submit renewal application		1/1/2000		
Certificate of Compliance for C/9 Head Packaging	Submit renewal application				

ATTACHMENT 3
PROPOSED REVISION TO ATTACHMENT 1 OF APPENDIX D

Proposed Revision to Attachment 1 of Appendix D

Event Type	Mechanism	Action Levels	Class	Notifications	Actions	I/E Report	Critique
F = Fire; X = Explosion; IJ = Injury; P - Personnel Exposure; SP = Spill; L = Loss/Theft; T = Transportation; NP = Natural Phenomenon; O = Other							
Building security compromised	L, IJ, P	Indication of unauthorized entry	Unusual Event	USNRC Region III	RSO secures condition.	No	no
	L, IJ, P	Confirmation of unauthorized entry with potential for intruder exposures in excess of 100 mR	Incident	USNRC Region III City of Cleveland Police Department	Operating staff to a state of readiness; provide off-site authorities with sequence of events	yes	no
	L, IJ, P	Confirmation of theft of less than 0.5 Ci of licensed material	Incident	USNRC Region III City of Cleveland Police Department	Operating staff to a state of readiness; provide off-site authorities with sequence of events; assist in return of materials.	yes	yes
	L, IJ, P	Confirmation of theft of greater than 0.5 Ci of licensed material	Alert	First Responders USNRC Command Center	Operating staff to a state of readiness; provide off-site authorities with sequence of events	yes	yes
Loss of Electrical Power	P	Hot cell door in open position with personnel exposures of less than 250 mrad	Unusual Event	Cleveland Public Power	RSO secures condition	no	no
	P	Hot cell door in open position with personnel exposures in excess of 250 mrad	Incident	Cleveland Public Power USNRC Region III	RSO secures condition	yes	no
Minor spill	SP, IJ, T	Unexpected airborne activity in the building <10 DAC over 24 hours	Incident	None	RSO secures condition	yes	no
	SP, P, T	Unexpected exposure rates in the building <20 mR/hr	Incident	None	RSO secures condition	yes	no
Major Spill	SP, IJ, P, T, F	Unexpected Airborne activity in the building >10 DAC over 24 hours or exposure rates in the building > 20 mR/hr	Incident	USNRC Region III	Operating staff to state of readiness	yes	no