STRATEGIC PLAN FOR THE LONDON ROAD FACILITY

Submitted by:

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Report No. 94009/G-3113, Revision 2
April 8, 1996

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INTRODUCTION

Advanced Medical Systems, Inc. (AMS) manufactured and fabricated sealed sources of ^{60}Co for teletherapy and radiography machines. Under the provisions of U. S. Nuclear Regulatory Commission (USNRC) license No. 34-19089-01, and as of the date of this report, AMS possesses approximately 55,000 curies of ^{60}Co, and 2,200 kilograms of depleted uranium (nickel plated) for use as shielding material.[1] Included are approximately 40 curies of radioactive material in a potentially dispersible form. This material, which consists primarily of dry solid waste, carbon granules and ion exchange resins, is stored in sealed 55-gallon drums or B-25 (steel) boxes. The types and quantities of licensed materials currently in the possession of AMS are shown in Table 1.

As part of its license compliance efforts, AMS is faced with completing a number of tasks ranging from license renewal to significant reductions in the existing radionuclide inventory. Timely completion of these activities is critical since they will ultimately result in streamlined routine operations, recovery of needed building/facility capabilities, and reduced regulatory demands on the operating staff.

However, due to limited personnel and financial resources, it is not possible for AMS to complete all of the outstanding activities in a single campaign. Therefore, to avoid unnecessary and negative financial impacts on the company, yet ensure steady and well-managed progress toward completion, the activities were prioritized based upon an activity's ability to improve the implementability of other activities, AMS's ability to fund the activity in the near-, intermediate- and long-term, and on the cost/benefit associated with the activity's timely completion. Table 2 shows the listing of the outstanding activities, along with their priorities (e.g., high priority, intermediate priority, and lower priority).[2]

A number of additional activities not shown in Table 2 will run concurrent with the prioritized activities. These include audit/assessment of the radiation protection program, upgrade of standard operating procedures, improvements in housekeeping, and attempts to increase community relations.

The remainder of this report contains additional discussion on each of the outstanding activities. Included is a brief discussion of the AMS strategy for each activity, the plan of action for completing the activity, a description of the current status (as of the date of this report) and an implementation schedule, where appropriate.

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[1] There is negligible radiological hazard associated with the depleted uranium inventory. Therefore, it is not addressed further in this report.

[2] In general, high priority items are scheduled for completion within the next year, intermediate priority items within the next one to three years, and lower priority items within the next three to five years.

Over the intermediate and long term, as actions are completed and as the scope/approach of specific activities (subitems) beco ne solidified, the individual action plans will be expanded and specific dates will be entered in the implementation schedules. Therefore, this report will be revised on a quarterly basis and numbered revisions will be issued.

HIGH PRIORITY ACTIONS

Complete the Remediation Report

In late 1994, the Northeast Ohio Regional Sewer District (NEORSD) intentionally isolated AMS access to regional sewage treatment system. This action rendered the facility drainage system non-functional, increased the hydrostatic pressure on the foundation structure, and caused groundwater to enter the basement of the AMS facility. After AMS made timely notification to the USNRC about the deteriorating conditions at the building, AMS initiated action to drain the basement, remove the ^{60}Co from the water in the basement, remediate the foundation drainage system, isolate the residual radioactivity in the manhole and sewer line exiting the facility to the London Road Interceptor, and remediate the residual radioactivity in the London Road interceptor.[3]

One commitment made to the USNRC as part of the remediation project was to provide a final report that contains a description of the events that led to the site conditions, a review of the remedial actions implemented and their results, and a summary of all data acquired during the process. However, since all remedial activities are not yet complete, the final remediation report is still being compiled. Outstanding items are disposition of water in the collapsible storage tanks, disposition of contaminated solids (e.g., soils and water treatment media), implementation of the long-range surveillance plan for residual radioactivity that exists outside of the AMS building (e.g., in the abandoned footer drains and lateral connection from the building to the London Road Interceptor), disposition of water in the WHUT Room, and remediation of the London Road Interceptor.

In regard to the residual water in the WHUT Room, AMS investigated the use of a stabilizing agent known as STERGO™. This product is a solid granular, cross-linked polymer that rapidly absorbs and retains large quantities of aqueous-based liquids. It was considered because it is non-toxic, will hold from 12 to 40 times its weight in aqueous solutions, and testing indicates that its capacity to retain liquids at high dose rates and large integrated doses is good. AMS's intent is to inject STERGO™ directly into the WHUT Room through the existing access holes where it will absorb residual liquids. The ventilation in the area then will be increased to facilitate slow evaporation.[4] AMS is awaiting the vendor's final testing of the holding capacity of STERGO™ under conditions of very high integrated exposures before proceeding further. In the meantime, to ensure no outward migration of the water in the WHUT room, water from the building foundation drainage system is tanked and sampled prior to discharge.

In regard to the contaminated solids from the excavation (rock, soil) that exist outside the AMS facility, a lined wooden structure was built on the south west quadrant of the property,

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[3] As of the date of this report, the NEORSD has not permitted AMS access to the London Road Interceptor. AMS's ability to complete the remediation is beyond its control.

[4] Even after full de-hydration, STERGO™ does not lose its capacity to re-absorb moisture. Therefore, should there be future incursions of water into the WHUT Room, its outward migration will be prevented.

approximately 200 feet from the building. Shortly, the solids will be transferred to the structure. The structure and its environs will then be posted pursuant to RSP-011, "Posting and Labeling", and will be included in the quarterly radiological surveillance program pursuant to RSP-008, "Instrumentation and Surveillance".

In regard to the long-range surveillance plan for residual radioactivity, AMS submitted the plan to the USNRC on September 5, 1995. After a December 14, 1995 submission of additional information, the plan was approved as modified by the USNRC on January 18, 1996. AMS intends to implement the provisions of the January 24, 1996 version of the plan as scheduled.

Once all of the actions associated with the water treatment and sewer remediation project are complete, the remediation report will be finalized and submitted to the USNRC. However, for reasons that are beyond AMS's control, remediation of the London Road Interceptor may be delayed significantly. Therefore, AMS may elect to submit the Remediation Report in advance and exclusive of this item. Table 3 shows the action plan for this task.

License Renewal Application

In early 1995, AMS submitted an application to renew its USNRC license under the provisions of timely renewal. After initial USNRC review of the application, a letter of deficiency was issued and additional information was requested. Subsequently, an in-house review of the application, in light of the short- and long-range plan of AMS, was completed. This review confirmed that the application was indeed cumbersome and permitted AMS little flexibility in achieving its intermediate- and long-term goals. Therefore, a significantly revised application was submitted on October 30, 1995.

On December 5, 1995, the USNRC asked AMS to provide copies of the Radiation Safety Procedures that were referenced in the revised application. These were transmitted to the USNRC in three (3) separate submittals dated January 3, 1996, February 13, 1996 and March 8, 1996. To date, AMS has received no additional response from the USNRC and continues to operate under the provisions of the existing license. Table 3 shows the action plan for this task.

Emergency Plan

As part of license renewal efforts, an emergency plan was submitted to the USNRC for review and comment. On June 7, 1995, after initial USNRC review of the Plan, a letter of deficiency was issued and additional information was requested. Because the magnitude of deficiencies was significant, a revised Plan was submitted on September 22, 1995. This revision was consistent with the guidance contained in USNRC Regulatory Guide 3.67 (1992), "Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities".

On February 28, 1996, the USNRC mailed comments on Revision 0 of the Emergency Plan. The AMS response to those comments was forwarded on March 22, 1996, along with the AMS response to comments received from the Ohio Environmental Protection Agency, the Ohio Emergency Management Agency, the Cuyahoga Emergency Management Assistance Center, the

Ohio Department of Health, and the City of Cleveland Division of Fire were forwarded to these agencies and to the USNRC.

On March 12, 1996, AMS received the results of a special inspection directed toward the structural integrity of the London Road facility. A number of the issues raised in the inspection report are pertinent to the Emergency Plan. The AMS response to those comments is currently being prepared.

Table 3 contains the action plan for this task.

Decommissioning Funding Plan

As part of the recent license renewal efforts, a decommissioning funding plan was submitted to the USNRC for review and comment. On August 17, 1995, after initial USNRC review of the Plan, a letter of deficiency was issued and additional information was requested. Specifically, the USNRC indicated that the January 1995 cost estimate and site characterization submitted by AMS "are no longer valid". However, the January 1995 estimate was based upon a "decontaminate and release" decommissioning option, which is not suitable for a facility like AMS where the primary radionuclide of concern has a radiological half life of only five years. Therefore, AMS prepared a Conceptual Decommissioning Plan for the facility pursuant to 10 CFR 40.46(d) that is based upon a "safe storage" decommissioning option.[5]

The Plan, which was submitted to the USNRC on October 20, 1995, describes the decommissioning objective for the facility and its basis, a description of the items to be decommissioned, the proposed decommissioning methodology, an ALARA analysis to support the proposed methodology, a cost estimate (1995 costs) for implementing the methodology, and a review schedule for ensuring the Plan's continued applicability for the duration of License No. 34-19089-01. Once approved by the USNRC, the Plan will be funded by the corporation and reviewed for continued applicability on a planned and periodic basis.

On March 20, 1996, the USNRC mailed comments on the Plan, along with a request for additional information. The AMS response to these comments is being prepared. Table 3 contains the action plan for this task.

Train First Responders in Emergency Plan Provisions

As part of its emergency response requirements, AMS must provide annual radiation safety training for first responders. Pursuant to the revised Emergency Plan, this training must include a review of items of mutual interest, instruction in emergency procedures, radiation protection guidelines, and the responder's anticipated role in an emergency. During the training session, the emergency response team activation scheme, notification procedures, and overall response coordination process will be reviewed.

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[5] Pending its concurrence with the Conceptual Decommissioning Plan, the USNRC did, in a January 8, 1996 letter to AMS, accept AMS's decommissioning financial assurance submittal based upon the January, 1995 cost estimate.

Within 60 days after USNRC approval of the revised Emergency Plan, a training session for first responders will be scheduled. After training is complete, agency attendance will be documented and letters of agreement will be updated, as necessary. The training sessions will be scheduled annually thereafter. Table 3 contains the action plan for this task.

Stage Emergency Exercise and Perform Critique

As part of its emergency response requirements, and in order to maintain emergency preparedness, AMS must conduct an emergency exercise on a planned and periodic basis. Within 60 days after all first responders have received initial training in the provisions of the AMS Emergency Plan, the emergency exercise will be scheduled and staged.

Pursuant to the revised Emergency Plan, the exercise will include one or more of the accident scenarios postulated for the facility, and will involve off-site agencies that have provided letter agreements for support services (e.g., first responders). The scenario will not be known in advance by exercise participants, and a non-participating observer will provide an evaluation of the effort, along with recommendations for improvement.

The critique of the exercise will be used as a basis for modifying the Emergency Plan or for supplementing the training of off-site agencies. Deficiencies identified during critiques will be corrected and closure will be documented. As necessary, changes to the Emergency Plan, based upon the findings of the critique, will be implemented. Table 3 contains the action plan for this task.

INTERMEDIATE PRIORITY ACTIONS

Recover Hot Cell Capabilities

In order to decontaminate, leak test, package and ship sealed sources of ^{60}Co from the AMS facility, a functional hot cell is needed. Currently, the Hot Cell contains significant residual removable radioactivity. Consequently, cross-contamination of items that enter the Hot Cell is a concern. Therefore, AMS intended to recover sufficient Hot Cell capabilities to support inventory reduction efforts.

Shortly after issue of the initial version of this Strategic Plan, the Hot Cell capabilities that were needed to facilitate inventory reduction were evaluated. From this evaluation, it was determined that improved lighting and construction of a source transfer mechanism were the only items necessary to support initial inventory reduction. These items were implemented, a successful "trial run" of the system occurred on December 19, 1995, and the system became fully operational on December 27, 1995.

Return NPI Sources

There are currently 34 sealed sources in the AMS inventory that belong to Neutron Products Inc. (NPI). As part of on-going operations, AMS purchases sources from NPI for delivery to a customer. When the shipping cask is sent to NPI, one of the sources in the AMS permanent inventory is enclosed, thereby reducing the inventory.

AMS has attempted, without success, to escalate the return of all of the remaining sources now that Hot Cell capability has been recovered. Since NPI will accept only one returned source for each source shipped, the rate of reduction in the NPI inventory will significantly slower than expected. Nonetheless, AMS is proceeding with this task at the highest possible rate. As sources leave the London Road facility, the inventory log is debited. Table 3 contains the action plan for this task.

Identify a Market for Remaining Bulk Material

There are approximately 11,750 curies of bulk ^{60}Co metal in the AMS inventory. AMS is attempting to identify a domestic or foreign market for this material, prepare and submit whatever permit or license applications are necessary, package the material, and ship it to a buyer.

On March 20, 1996, AMS prepared and distributed a description of the type, form and curie content of the sources to a variety of agencies, including source distribution firms, government agencies, , and non-domestic agencies. Included with the description was a form soliciting the level of interest of each recipient. Once one or more markets are identified from this mailing, permitting requirements will be determined, applications will be filed, and materials will be packaged/shipped.

In light of the relatively small volume (but high activity) of the AMS source inventory, an attempt is being made to negotiate reduced disposal costs at a licensed low-level waste disposal facility.

To date, a project manager from the facility has been assigned and a cost estimate is being prepared. Table 3 contains the action plan for this task.

LOWER PRIORITY ACTIONS

Remove Plug in the Hot Cell

An estimated 4,000 curies of ^{60}Co in the form of sealed sources are located in a storage well in the Hot Cell. Because the well plug has become lodged in the well, these sources cannot be removed and included in the inventory reduction efforts. Therefore, AMS intends to dislodge the plug.

A methodology for dislodging the plug has been determined, and a contract for services has been let. Once the decision is made to proceed and the work plan and Radiation Work Permit have been completed, equipment and personnel will be staged, "dry runs" will be completed, and the plug will be removed. Table 3 contains the action plan for this task.

Decontaminate the Hot Cell

After the plug removal project is complete, significant residual radioactivity will likely exist within the Hot Cell. In order to ensure its continued usefulness, AMS intends to decontaminate the Hot Cell to levels necessary to support planned future operations.

The first step in the process will be determination of the methodology for Hot Cell decontamination. Once complete, the work plan will be prepared, outside services, if necessary, will be contracted, and the project will begin. Table 3 shows the action plan for this task.

Complete/Confirm the Physical Inventory and Transfer/Ship Remaining Sources

After removal of the plug, AMS will be able to confirm the physical inventory of licensable radioactive material present at the London Road facility. (AMS is obliged, by License Condition 14, to complete a physical inventory of all sources in its custody. In light of the low priority associated with this task, an amendment to License No. 34-19089-01 to postpone the inventory requirement may be necessary, depending upon the timeliness of action on AMS's recent license renewal application.) AMS then intends to identify a market for the remaining sources, evaluate their levels of residual radioactivity, decontaminate and leak test the sources as necessary, package the sources, and ship them to the purchaser. As sources leave the London Road facility, the inventory log will be debited appropriately. Table 3 contains the action plan for this task.

Disposition of Solid Waste at the Facility

As shown in Table 1, there is about 1,500 cubic feet of solid waste at the AMS facility. These materials are stored either within the AMS facility, or in a secured storage location within the fenced portion of the property. The disposition of this solid waste is dependent upon the decommissioning methodology selected for the facility, and upon the availability/cost of off-site disposal at the time of project initiation.

AMS intends to continually evaluate disposition options and select/implement the one that results in the lowest personnel exposures and disposal costs. Table 3 contains the action plan for this task.

Disposition of Treated Water in Collapsible Storage Tanks

As part of the 1995 sewer remediation project, approximately 100,000 gallons of water was treated by the methodology of sub-micron filtration and reverse osmosis in order to reduce its radionuclide content to below drinking water standards. There are approximately 40 microcuries of ^{60}Co in the water, which is currently stored in collapsible storage tanks at the London Road facility. The solubility of the residual radioactivity was confirmed using American Public Health Association's Method 7110 "Gross Alpha and Gross Beta Radioactivity (Total, Suspended, and Dissolved)" from Standard Methods for Examination of Water and Wastewater.

AMS requested and received permission from the U. S. Environmental Protection Agency (USEPA) and the USNRC to evaporate this water. However, due to delays and difficulties in implementing the treatment process that were beyond AMS's control, more than four times the original amount of water had to be treated to reduce its concentration of radioactive cobalt at a cost that went well-beyond the original projection. In light of the magnitude of these unbudgeted expenses, the evaporation option became significantly more costly. Therefore, AMS is pursuing other options for disposing of the water.

Since the treated water meets the USEPA's criteria for man-made radionuclides in drinking water pursuant to 40 CFR 141, and since it contains no other hazardous substances, its presence at the AMS facility poses no radiological risk. Therefore, there is no urgency to ensure its final disposition. Nonetheless, AMS will pursue a direct discharge option until such time as it becomes patently unattainable. At that time, the evaporation option will be re-visited in light of available financial resources. Table 3 contains the action plan for this task.

ON-GOING ACTIONS

Audit/Assessment of Radiation Protection Program

In light of changing operational issues, pending licensing activity, and the desire to "streamline" compliance efforts, AMS intends to perform a series of audits of its radiation protection program in order to compare AMS's performance to that required and/or recommended by existing license/permit provisions, U. S. Nuclear Regulatory Commission regulations, and standard industry practices (e.g., USNRC Regulatory Guides, ANSI, ASME and ASTM Standards, ICRP Publications, NCRP Publications). The audits will be performed by AMS personnel and consultants to AMS. They will involve initial review of applicable operating procedures, quality assurance procedures, and other pertinent documentation related to a particular performance issue.[6] The initial document review is performed in order to identify possible areas of failure or liability, and to derive an efficient schedule for on-site assessments. While on site, AMS compliance with existing procedures will be determined and areas of inefficiency or poor function, as compared to industry standards and practices, will be identified.

While the results of the audits are intended to be used for demonstrating compliance and/or to guide future program modifications or improvements, any findings of significant regulatory non-compliance or conditions of imminent hazard will be immediately reported to and addressed by the RSO. Immediately after renewal of License No. 34-19089-01, the Radiation Safety Committee will set the audit schedule. The general provisions have been incorporated into RSP-008, "Instrumentation and Surveillance".

Upgrade of Standard Operating Procedures

In response to audit findings, and in light of changing operational demands and licensing activities, the current collection of standard operating procedures (ISPs) were reviewed for continued applicability. Wherever possible, multiple procedures that address a single topic were combined, and out-dated procedures were revised. Consistency between procedures was confirmed and compliance with the requirements of the AMS Radiation Protection Program Plan was assured. Since October 10, 1995, the following new/revised procedures have been developed and approved by the Radiation Safety Committee, and submitted to the USNRC for review:

- RSP-001, Radiation Protection Program Plan
- RSP-002, Definitions

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[6] The following programmatic issues will be audited on a planned and periodic basis: Organization and Administration; Facilities and Equipment; Training in Radiation Protection; Radiation Exposure Control; ALARA Program; Contamination Control; Instrumentation and Surveillance; Posting and Labeling; Receipt and Control of Radioactive Material; Packaging and Transportation of Radioactive Materials; Control of Radioactive Waste; Radiation Protection Records; Documentation; Emergency Response and Notifications; and Quality Assurance in Radiological Protection.

- RSP-003, Control of Radiation Safety Procedures
- RSP-004, Radiation Protection Records
- RSP-005, ALARA Program
- RSP-006, Training and Qualifications of Radiation Protection Personnel
- RSP-007, Training in Radiation Protection
- RSP-008, Instrumentation and Surveillance
- RSP-009, Contamination Control
- RSP-010, Exposure Control
- RSP-011, Radiological Areas and Posting
- RSP-012, Control of Work
- RSP-013, Control of Radioactive Waste
- RSP-014, Receipt, Handling, and Identification of Radioactive Materials
- RSP-015, Packaging and Transportation of Radioactive Materials
- RSP-016, Emergency Response and Notifications
- RSP-017, Stop Work Authority
- RSP-018, Operation of the Gamma Spectrometer
- RSP-019, Assessment of Radioactivity in Water Samples

Immediately after renewal of License No. 34-19089-01, these procedures will be implemented in their entirety.

Housekeeping Improvements

Currently, there are only three permanent employees at the London Road facility. Therefore, only a small fraction of the available space is used for routine operations, office areas and storage. However, AMS has instituted improvements in housekeeping in the useable areas of the facility. Additional improvements will be implemented on an on-going basis. Since October 10, 1995, the following has taken place:

- The stairwell to the basement has been fully decontaminated and released for unrestricted use.

- The temporary restricted area in the warehouse that housed the water treatment equipment has been cleared and released for unrestricted use.

- Three (3) process batch tanks used for the water treatment project have been decontaminated.

Community Relations

In the past, issues or activities at AMS that required state, federal and local approvals were hampered due to lack of knowledge of AMS operations and/or an understanding of the fundamental principles of radiation and radioactivity on the part of decision-makers. In an effort to streamline future decision-making, AMS intends to mount a community relations program to acquaint various officials and members of the print and broadcast media with the AMS function, its capabilities, and its short-, intermediate-, and long-range plans. This will be accomplished through briefings, tours, and development/publication of hand-out materials and brochures. Since October 10, 1995, the following has taken place:

- A briefing with local print media representatives was held on October 31, 1995, which resulted in publication of an article that was favorable to AMS in the local press.

- Two briefings with City of Cleveland officials were arranged and invitations were issued. The briefing dates were August 29, 1995 and October 31, 1995. Although AMS received acceptances from the office of the Mayor and other individuals, no officials appeared for either briefing.

- A Cleveland City Council member (R. Coates) visited the London Road facility on November 22, 1995.

Reconnection of Sewer System to London Road Interceptor

Currently, the London Road facility does not have a direct connection to the regional sewer system. There are no sanitary discharges from the building, the roof drains discharge onto the ground surface, and all groundwater is pumped from a manhole on the property into storage tanks. Once a tank is full, the water is sampled and discharged. Since December 22,1995, approximately 61,000 gallons of water have been collected, analyzed, and found to be free of insoluble ^{60}Co. For operational reasons, and because current discharge paths do not comply with local building codes, AMS continues to pursue re-connection of all drainage paths to the London Road Interceptor through legal channels.

TABLES

Table 1 - Current Cobalt-60 Inventory

Item	Form	Material Description	Estimated Activity (Ci)
Licensed Material	Solid	Bulk Metal and Sealed Sources	54375
Packaged waste	Solid	Materials contained in high-level waste storage, LSA boxes and drums in the basement of the facility.	28
Packaged waste	Solid	Solid waste generated during the water treatment project.	0.4
Unpackaged waste	Solid/sludge	Materials contained in WHUT Room	51
Surface radioactivity	Solid	Uncharacterized surface activity in the restricted areas of the facility	1
TOTALS			54455

Table 2 - Action Plan Summary[7]

High Priority Activity	Intermediate Priority Activity	Lower Priority Activity
Submit the Remediation Report for the water treatment and sewer remediation project	Recover the capabilities of the Hot Cell.	Remove the plug in the Hot Cell and extract the remaining sources
Finalize site emergency plan.	Reduce the inventory of sealed sources and bulk cobalt.	Decontaminate the Hot Cell.
Submit conceptual decommissioning plan		Complete the physical inventory of sources.
Finalize decommissioning funding plan.		Ship out remaining sources
Finalize license renewal activities.		Address solid waste issues.
Implement training requirements of the approved site emergency plan (e.g., train first responders and perform emergency exercise and critique)		Pursue disposition of treated water that currently exists in the collapsible storage tanks.

[7] Shaded areas denote closure.

Table 3 - Action Plan for Each Task[8]

Primary Action Item	Sub-Item	Scheduled Start Date	Scheduled End Date	Current Status
Complete Remediation Report	Determine remedial alternative for the WHUT Room	8/29/95	10/3/95	Closed. Solidification has been identified as the preferred alternative.
	Determine storage methodology for contaminated solids	8/29/95	10/3/95	Closed. Construction of an above-ground storage container has been identified as the preferred alternative.
	Stabilize liquids that currently exist in the WHUT Room	10/3/95	3/1/96	Delayed pending receipt of technical information from vendor.
	Implement storage option for contaminated solids	10/3/95	4/30/96	Open
	Finalize and submit remediation report	8/1/95	TBD	Pending resolution of AMS/NEORSD litigation
	Begin direct discharge of ground and surface water from the AMS foundation drainage system.	1/15/96	TBD	Pending resolution of AMS/NEORSD litigation and reconnection of sewer system
License Renewal Application	Submit revised application	9/11/95	10/31/95	Closed. Application mailed to USNRC on 10/31/95
	Begin operations under provisions of renewed license.	1/1/96	TBD	Pending USNRC action on renewal application
Emergency Plan	Submit revised Emergency Plan to the USNRC	8/15/95	9/30/95	Closed. Plan mailed to USNRC and first responders on 9/26/95.
	Submit response to USNRC and agency comments on Revision 0 of Emergency Plan.	2/28/96	3/28/96	Closed. Comments mailed to USNRC and first responders on 3/22/96.
	Submit response to USNRC inspection report on structural integrity of the building	3/12/96	4/12/96	Open
	Begin operations under provisions of approved plan.	1/1/96	TBD	Pending USNRC approval of Emergency Plan.

[8] As actions are completed and as the scope/approach of specific activities (subitems) become solidified, the individual action plans will be expanded and specific dates will be entered in the implementation schedules. Changes will be noted in future revisions of this Plan. Shaded entries denote closure.

Primary Action Item	Sub-Item	Scheduled Start Date	Scheduled End Date	Current Status
Decommissioning Funding Plan	Submit Conceptual Decommissioning Plan	9/8/95	10/23/95	Closed. Plan mailed to USNRC on 10/20/95.
	Submit response to USNRC comments on Conceptual Decommissioning Plan.	3/20/96	4/20/96	Open
	Submit Decommissioning Funding Plan	10/21/95	TBD	Pending USNRC approval of Conceptual Decommissioning Plan
	Scheduled review of Conceptual Decommissioning Plan and Decommissioning Funding Plan for continued applicability	TBD	One (1) year after USNRC approval	Pending USNRC approval of Decommissioning Funding Plan
Recover Hot Cell Capabilities	Determine Hot Cell requirements for inventory reduction.	8/29/95	10/27/95	Closed.
	Specify Hot Cell recovery actions	11/1/95	12/1/95	Closed
	Implement recovery actions	12/1/95	1/1/95	Closed
Return NPI Sources	Evaluate residual radioactivity on NPI Sources	9/11/95	9/15/95	Closed.
	Determine decontamination methodology	9/25/95	11/24/95	Closed.
	Perform "trial run" of decontamination methodology.	11/1/95	12/20/95	Closed
	Decontaminate and leak test sources	12/20/95	1/1/97	Ongoing
	Package and ship sources	12/20/95	1/1/97	Ongoing
Identify a Market for Remaining Bulk Cobalt	Identify domestic market possibilities	8/1/95	12/31/96	Closed.
	Identify foreign market possibilities	11/1/95	12/31/96	Closed.
	Prepare and mail solicitation letters to market possibilities.	2/15/96	4/1/96	Closed Letters mailed on 3/22/96
	Determine and implement permitting requirements	12/31/96	6/1/97	Unscheduled
	Complete contracts with purchasers	TBD	TBD	Unscheduled
	Package and ship sources	TBD	TBD	Unscheduled

Primary Action Item	Sub-Item	Scheduled Start Date	Scheduled End Date	Current Status
Train First Responders in Emergency Plan Provisions	Receive USNRC approval of the Emergency Plan	10/20/95	TBD	Pending response from USNRC
	Schedule initial first responder training session	10 days after USNRC approval	TBD	Unscheduled pending USNRC approval of the Emergency Plan
	Complete training and documentation	60 days after USNRC approval	TBD	Unscheduled
	Obtain updated letters of agreement, as necessary	TBD	TBD	Unscheduled
	Schedule refresher training	TBD	TBD	Unscheduled
Implement an Emergency Exercise and Critique	Schedule emergency exercise	60 days after completion of training	TBD	Unscheduled pending completion of first-responder training
	Prepare scenario	TBD	TBD	Partially complete
	Contract outside observer	TBD	TBD	List of qualified personnel prepared.
	Initiate emergency exercise	TBD	TBD	Unscheduled
	Generate critique report	TBD	TBD	Unscheduled
	Modify Emergency Plan in light of critique findings	TBD	TBD	Unscheduled
Remove Plug in Hot Cell	Determine methodology for plug removal	7/1/95	8/1/95	Closed
	Generate specifications plan for plug removal	7/1/95	8/1/95	Closed
	Issue Request for Quotation for plug removal	7/1/95	8/1/95	Closed
	Review bids and issue contract for services	7/1/95	8/1/95	Closed
	Prepare work plan and Radiation Work Permit	TBD	TBD	Unscheduled
	Mobilize personnel and equipment	TBD	TBD	Unscheduled
	Train personnel in provisions of work plan	TBD	TBD	Unscheduled
	Perform dress rehearsals	TBD	TBD	Unscheduled
	Remove plug	TBD	TBD	Unscheduled

Primary Action Item	Sub-Item	Scheduled Start Date	Scheduled End Date	Current Status
Decontaminate the Hot Cell	Specify Hot Cell decontamination methodology and clean-up criteria	TBD	TBD	Unscheduled pending plug removal
	Generate work plan for decontamination activities	TBD	TBD	Unscheduled
	Contract decontamination services, as necessary	TBD	TBD	Unscheduled
	Mobilize equipment and personnel	TBD	TBD	Unscheduled
	Complete decontamination	TBD	TBD	Unscheduled
	Request amendment to License Condition 14 to postpone the physical inventory requirement pending plug removal.	5/1/98	6/30/98	Open pending action by USNRC on October, 1995 license renewal application
Complete/Confirm Inventory and Transfer/Ship Remaining Sources	Confirm physical inventory of remaining sealed sources	TBD	TBD	Unscheduled pending final decontamination of Hot Cell
	Evaluate residual radioactivity on remaining sources	TBD	TBD	Unscheduled
	Decontaminate and leak test sources	TBD	TBD	Unscheduled
	Obtain shipping cask	TBD	TBD	Unscheduled
	Package and ship sources	TBD	TBD	Unscheduled
Disposition of Solid Waste at the Facility	Evaluate disposition options in light of Conceptual Decommissioning Plan	10/1/95	TBD	Pending USNRC approval of Conceptual Decommissioning Plan
	Select the preferred option based upon an ALARA analysis.	TBD	TBD	Unscheduled
	Characterize the materials.	TBD	TBD	Unscheduled
	Prepare necessary permits and licenses	TBD	TBD	Unscheduled
	Implement the preferred option	TBD	TBD	Unscheduled
Disposition of Treated Water in Collapsible Storage Tanks	Identify disposition options.	8/1/95	TBD	Open
	Prepare necessary permits and licenses	TBD	TBD	Unscheduled
	Implement preferred disposition option.	TBD	TBD	Unscheduled

Advanced Medical Systems, Inc.

1020 London Rd.
Cleveland, Ohio 44110
216-692-3270

PRIORITY ROUTING

First		Second	
RA	HAS	RC	
DRA	HAS	EIC	HAS
DRP		SGA	
DRS		OI	
ONMS		PAO	
DRMA			

FILE HAS

orig + 1

April 8, 1996

Mr. Hubert Miller
Regional Administrator, Region III
United States Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60523-4351

Re: Strategic Plan (USNRC License No. 34-19089-01)

Dear Mr. Miller:

On August 29, 1995, a meeting was held at the request of Advanced Medical Systems, Inc. (AMS) to discuss an action plan for addressing outstanding issues that are of mutual interest to AMS and the USNRC in a timely fashion but within the resources currently available to AMS. In that meeting, AMS agreed to submit to the USNRC a written plan for meeting its short-term, intermediate-term and long-term objectives. That plan was, in fact, submitted on October 11, 1995.

Included in the plan was a commitment to provide quarterly updates on AMS's progress toward meeting its goals. Enclosed is Revision 2 of the "Strategic Plan for the London Road Facility", which is being submitted in response to our commitment. If you have any questions or if I can provide you with additional information, please call me at (216) 692-3270. You may expect to receive Revision 3 of the plan in July of 1996.

Sincerely,

Robert Meschter

Robert Meschter, R.S.O.

cc: D. Cesar
D. A. Miller, Esq. - Stavole & Miller
C. D. Berger, C.H.P. - IEM
Assistant General Counsel for Hearings and Enforcement, USNRC
D. A. Cool - Director, Division of Industrial and Medical Nuclear Safety, USNRC
C. D. Pederson - Director, Division of Radiation Safety and Safeguards, USNRC
J. Caldwell - Deputy Director, Division of Radiation Safety and Safeguards, USNRC
M. Weber - Region III, USNRC

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STRATEGIC PLAN FOR THE LONDON ROAD FACILITY

Submitted by:

Advanced Medical Systems, Inc.
1020 London Road
Cleveland, Ohio 44110
(216) 692-3270

Report No. 94009/G-3113, Revision 2
April 8, 1996

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INTRODUCTION

Advanced Medical Systems, Inc. (AMS) manufactured and fabricated sealed sources of ^{60}Co for teletherapy and radiography machines. Under the provisions of U. S. Nuclear Regulatory Commission (USNRC) license No. 34-19089-01, and as of the date of this report, AMS possesses approximately 55,000 curies of ^{60}Co, and 2,200 kilograms of depleted uranium (nickel plated) for use as shielding material.[1] Included are approximately 40 curies of radioactive material in a potentially dispersible form. This material, which consists primarily of dry solid waste, carbon granules and ion exchange resins, is stored in sealed 55-gallon drums or B-25 (steel) boxes. The types and quantities of licensed materials currently in the possession of AMS are shown in Table 1.

As part of its license compliance efforts, AMS is faced with completing a number of tasks ranging from license renewal to significant reductions in the existing radionuclide inventory. Timely completion of these activities is critical since they will ultimately result in streamlined routine operations, recovery of needed building/facility capabilities, and reduced regulatory demands on the operating staff.

However, due to limited personnel and financial resources, it is not possible for AMS to complete all of the outstanding activities in a single campaign. Therefore, to avoid unnecessary and negative financial impacts on the company, yet ensure steady and well-managed progress toward completion, the activities were prioritized based upon an activity's ability to improve the implementability of other activities, AMS's ability to fund the activity in the near-, intermediate- and long-term, and on the cost/benefit associated with the activity's timely completion. Table 2 shows the listing of the outstanding activities, along with their priorities (e.g., high priority, intermediate priority, and lower priority).[2]

A number of additional activities not shown in Table 2 will run concurrent with the prioritized activities. These include audit/assessment of the radiation protection program, upgrade of standard operating procedures, improvements in housekeeping, and attempts to increase community relations.

The remainder of this report contains additional discussion on each of the outstanding activities. Included is a brief discussion of the AMS strategy for each activity, the plan of action for completing the activity, a description of the current status (as of the date of this report) and an implementation schedule, where appropriate.

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[1] There is negligible radiological hazard associated with the depleted uranium inventory. Therefore, it is not addressed further in this report.

[2] In general, high priority items are scheduled for completion within the next year, intermediate priority items within the next one to three years, and lower priority items within the next three to five years.

Over the intermediate and long term, as actions are completed and as the scope/approach of specific activities (subitems) become solidified, the individual action plans will be expanded and specific dates will be entered in the implementation schedules. Therefore, this report will be revised on a quarterly basis and numbered revisions will be issued.

HIGH PRIORITY ACTIONS

Complete the Remediation Report

In late 1994, the Northeast Ohio Regional Sewer District (NEORSD) intentionally isolated AMS access to regional sewage treatment system. This action rendered the facility drainage system non-functional, increased the hydrostatic pressure on the foundation structure, and caused groundwater to enter the basement of the AMS facility. After AMS made timely notification to the USNRC about the deteriorating conditions at the building, AMS initiated action to drain the basement, remove the ^{60}Co from the water in the basement, remediate the foundation drainage system, isolate the residual radioactivity in the manhole and sewer line exiting the facility to the London Road Interceptor, and remediate the residual radioactivity in the London Road interceptor.[3]

One commitment made to the USNRC as part of the remediation project was to provide a final report that contains a description of the events that led to the site conditions, a review of the remedial actions implemented and their results, and a summary of all data acquired during the process. However, since all remedial activities are not yet complete, the final remediation report is still being compiled. Outstanding items are disposition of water in the collapsible storage tanks, disposition of contaminated solids (e.g., soils and water treatment media), implementation of the long-range surveillance plan for residual radioactivity that exists outside of the AMS building (e.g., in the abandoned footer drains and lateral connection from the building to the London Road Interceptor), disposition of water in the WHUT Room, and remediation of the London Road Interceptor.

In regard to the residual water in the WHUT Room, AMS investigated the use of a stabilizing agent known as STERGO™. This product is a solid granular, cross-linked polymer that rapidly absorbs and retains large quantities of aqueous-based liquids. It was considered because it is non-toxic, will hold from 12 to 40 times its weight in aqueous solutions, and testing indicates that its capacity to retain liquids at high dose rates and large integrated doses is good. AMS's intent is to inject STERGO™ directly into the WHUT Room through the existing access holes where it will absorb residual liquids. The ventilation in the area then will be increased to facilitate slow evaporation.[4] AMS is awaiting the vendor's final testing of the holding capacity of STERGO™ under conditions of very high integrated exposures before proceeding further. In the meantime, to ensure no outward migration of the water in the WHUT room, water from the building foundation drainage system is tanked and sampled prior to discharge.

In regard to the contaminated solids from the excavation (rock, soil) that exist outside the AMS facility, a lined wooden structure was built on the south west quadrant of the property.

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[3] As of the date of this report, the NEORSD has not permitted AMS access to the London Road Interceptor. AMS's ability to complete the remediation is beyond its control.

[4] Even after full de-hydration, STERGO™ does not lose its capacity to re-absorb moisture. Therefore, should there be future incursions of water into the WHUT Room, its outward migration will be prevented.

approximately 200 feet from the building. Shortly, the solids will be transferred to the structure. The structure and its environs will then be posted pursuant to RSP-011, "Posting and Labeling", and will be included in the quarterly radiological surveillance program pursuant to RSP-008, "Instrumentation and Surveillance".

In regard to the long-range surveillance plan for residual radioactivity, AMS submitted the plan to the USNRC on September 5, 1995. After a December 14, 1995 submission of additional information, the plan was approved as modified by the USNRC on January 18, 1996. AMS intends to implement the provisions of the January 24, 1996 version of the plan as scheduled.

Once all of the actions associated with the water treatment and sewer remediation project are complete, the remediation report will be finalized and submitted to the USNRC. However, for reasons that are beyond AMS's control, remediation of the London Road Interceptor may be delayed significantly. Therefore, AMS may elect to submit the Remediation Report in advance and exclusive of this item. Table 3 shows the action plan for this task.

License Renewal Application

In early 1995, AMS submitted an application to renew its USNRC license under the provisions of timely renewal. After initial USNRC review of the application, a letter of deficiency was issued and additional information was requested. Subsequently, an in-house review of the application, in light of the short- and long-range plan of AMS, was completed. This review confirmed that the application was indeed cumbersome and permitted AMS little flexibility in achieving its intermediate- and long-term goals. Therefore, a significantly revised application was submitted on October 30, 1995.

On December 5, 1995, the USNRC asked AMS to provide copies of the Radiation Safety Procedures that were referenced in the revised application. These were transmitted to the USNRC in three (3) separate submittals dated January 3, 1996, February 13, 1996 and March 8, 1996. To date, AMS has received no additional response from the USNRC and continues to operate under the provisions of the existing license. Table 3 shows the action plan for this task.

Emergency Plan

As part of license renewal efforts, an emergency plan was submitted to the USNRC for review and comment. On June 7, 1995, after initial USNRC review of the Plan, a letter of deficiency was issued and additional information was requested. Because the magnitude of deficiencies was significant, a revised Plan was submitted on September 22, 1995. This revision was consistent with the guidance contained in USNRC Regulatory Guide 3.67 (1992), "Standard Format and Content for Emergency Plans for Fuel Cycle and Materials Facilities".

On February 28, 1996, the USNRC mailed comments on Revision 0 of the Emergency Plan. The AMS response to those comments was forwarded on March 22, 1996, along with the AMS response to comments received from the Ohio Environmental Protection Agency, the Ohio Emergency Management Agency, the Cuyahoga Emergency Management Assistance Center, the

Ohio Department of Health, and the City of Cleveland Division of Fire were forwarded to these agencies and to the USNRC.

On March 12, 1996, AMS received the results of a special inspection directed toward the structural integrity of the London Road facility. A number of the issues raised in the inspection report are pertinent to the Emergency Plan. The AMS response to those comments is currently being prepared.

Table 3 contains the action plan for this task.

Decommissioning Funding Plan

As part of the recent license renewal efforts, a decommissioning funding plan was submitted to the USNRC for review and comment. On August 17, 1995, after initial USNRC review of the Plan, a letter of deficiency was issued and additional information was requested. Specifically, the USNRC indicated that the January 1995 cost estimate and site characterization submitted by AMS "are no longer valid". However, the January 1995 estimate was based upon a "decontaminate and release" decommissioning option, which is not suitable for a facility like AMS where the primary radionuclide of concern has a radiological half life of only five years. Therefore, AMS prepared a Conceptual Decommissioning Plan for the facility pursuant to 10 CFR 40.46(d) that is based upon a "safe storage" decommissioning option.[5]

The Plan, which was submitted to the USNRC on October 20, 1995, describes the decommissioning objective for the facility and its basis, a description of the items to be decommissioned, the proposed decommissioning methodology, an ALARA analysis to support the proposed methodology, a cost estimate (1995 costs) for implementing the methodology, and a review schedule for ensuring the Plan's continued applicability for the duration of License No. 34-19089-01. Once approved by the USNRC, the Plan will be funded by the corporation and reviewed for continued applicability on a planned and periodic basis.

On March 20, 1996, the USNRC mailed comments on the Plan, along with a request for additional information. The AMS response to these comments is being prepared. Table 3 contains the action plan for this task.

Train First Responders in Emergency Plan Provisions

As part of its emergency response requirements, AMS must provide annual radiation safety training for first responders. Pursuant to the revised Emergency Plan, this training must include a review of items of mutual interest, instruction in emergency procedures, radiation protection guidelines, and the responder's anticipated role in an emergency. During the training session, the emergency response team activation scheme, notification procedures, and overall response coordination process will be reviewed.

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[5] Pending its concurrence with the Conceptual Decommissioning Plan, the USNRC did, in a January 8, 1996 letter to AMS, accept AMS's decommissioning financial assurance submittal based upon the January, 1995 cost estimate.

Within 60 days after USNRC approval of the revised Emergency Plan, a training session for first responders will be scheduled. After training is complete, agency attendance will be documented and letters of agreement will be updated, as necessary. The training sessions will be scheduled annually thereafter. Table 3 contains the action plan for this task.

Stage Emergency Exercise and Perform Critique

As part of its emergency response requirements, and in order to maintain emergency preparedness, AMS must conduct an emergency exercise on a planned and periodic basis. Within 60 days after all first responders have received initial training in the provisions of the AMS Emergency Plan, the emergency exercise will be scheduled and staged.

Pursuant to the revised Emergency Plan, the exercise will include one or more of the accident scenarios postulated for the facility, and will involve off-site agencies that have provided letter agreements for support services (e.g., first responders). The scenario will not be known in advance by exercise participants, and a non-participating observer will provide an evaluation of the effort, along with recommendations for improvement.

The critique of the exercise will be used as a basis for modifying the Emergency Plan or for supplementing the training of off-site agencies. Deficiencies identified during critiques will be corrected and closure will be documented. As necessary, changes to the Emergency Plan, based upon the findings of the critique, will be implemented. Table 3 contains the action plan for this task.

INTERMEDIATE PRIORITY ACTIONS

Recover Hot Cell Capabilities

In order to decontaminate, leak test, package and ship sealed sources of ^{60}Co from the AMS facility, a functional hot cell is needed. Currently, the Hot Cell contains significant residual removable radioactivity. Consequently, cross-contamination of items that enter the Hot Cell is a concern. Therefore, AMS intended to recover sufficient Hot Cell capabilities to support inventory reduction efforts.

Shortly after issue of the initial version of this Strategic Plan, the Hot Cell capabilities that were needed to facilitate inventory reduction were evaluated. From this evaluation, it was determined that improved lighting and construction of a source transfer mechanism were the only items necessary to support initial inventory reduction. These items were implemented, a successful "trial run" of the system occurred on December 19, 1995, and the system became fully operational on December 27, 1995.

Return NPI Sources

There are currently 34 sealed sources in the AMS inventory that belong to Neutron Products Inc. (NPI). As part of on-going operations, AMS purchases sources from NPI for delivery to a customer. When the shipping cask is sent to NPI, one of the sources in the AMS permanent inventory is enclosed, thereby reducing the inventory.

AMS has attempted, without success, to escalate the return of all of the remaining sources now that Hot Cell capability has been recovered. Since NPI will accept only one returned source for each source shipped, the rate of reduction in the NPI inventory will significantly slower than expected. Nonetheless, AMS is proceeding with this task at the highest possible rate. As sources leave the London Road facility, the inventory log is debited. Table 3 contains the action plan for this task.

Identify a Market for Remaining Bulk Material

There are approximately 11,750 curies of bulk ^{60}Co metal in the AMS inventory. AMS is attempting to identify a domestic or foreign market for this material, prepare and submit whatever permit or license applications are necessary, package the material, and ship it to a buyer.

On March 20, 1996, AMS prepared and distributed a description of the type, form and curie content of the sources to a variety of agencies, including source distribution firms, government agencies, , and non-domestic agencies. Included with the description was a form soliciting the level of interest of each recipient. Once one or more markets are identified from this mailing, permitting requirements will be determined, applications will be filed, and materials will be packaged/shipped.

In light of the relatively small volume (but high activity) of the AMS source inventory, an attempt is being made to negotiate reduced disposal costs at a licensed low-level waste disposal facility.

To date, a project manager from the facility has been assigned and a cost estimate is being prepared. Table 3 contains the action plan for this task.

LOWER PRIORITY ACTIONS

Remove Plug in the Hot Cell

An estimated 4,000 curies of ^{60}Co in the form of sealed sources are located in a storage well in the Hot Cell. Because the well plug has become lodged in the well, these sources cannot be removed and included in the inventory reduction efforts. Therefore, AMS intends to dislodge the plug.

A methodology for dislodging the plug has been determined, and a contract for services has been let. Once the decision is made to proceed and the work plan and Radiation Work Permit have been completed, equipment and personnel will be staged, "dry runs" will be completed, and the plug will be removed. Table 3 contains the action plan for this task.

Decontaminate the Hot Cell

After the plug removal project is complete, significant residual radioactivity will likely exist within the Hot Cell. In order to ensure its continued usefulness, AMS intends to decontaminate the Hot Cell to levels necessary to support planned future operations.

The first step in the process will be determination of the methodology for Hot Cell decontamination. Once complete, the work plan will be prepared, outside services, if necessary, will be contracted, and the project will begin. Table 3 shows the action plan for this task.

Complete/Confirm the Physical Inventory and Transfer/Ship Remaining Sources

After removal of the plug, AMS will be able to confirm the physical inventory of licensable radioactive material present at the London Road facility. (AMS is obliged, by License Condition 14, to complete a physical inventory of all sources in its custody. In light of the low priority associated with this task, an amendment to License No. 34-19089-01 to postpone the inventory requirement may be necessary, depending upon the timeliness of action on AMS's recent license renewal application.) AMS then intends to identify a market for the remaining sources, evaluate their levels of residual radioactivity, decontaminate and leak test the sources as necessary, package the sources, and ship them to the purchaser. As sources leave the London Road facility, the inventory log will be debited appropriately. Table 3 contains the action plan for this task.

Disposition of Solid Waste at the Facility

As shown in Table 1, there is about 1,500 cubic feet of solid waste at the AMS facility. These materials are stored either within the AMS facility, or in a secured storage location within the fenced portion of the property. The disposition of this solid waste is dependent upon the decommissioning methodology selected for the facility, and upon the availability/cost of off-site disposal at the time of project initiation.

AMS intends to continually evaluate disposition options and select/implement the one that results in the lowest personnel exposures and disposal costs. Table 3 contains the action plan for this task.

Disposition of Treated Water in Collapsible Storage Tanks

As part of the 1995 sewer remediation project, approximately 100,000 gallons of water was treated by the methodology of sub-micron filtration and reverse osmosis in order to reduce its radionuclide content to below drinking water standards. There are approximately 40 microcuries of ^{60}Co in the water, which is currently stored in collapsible storage tanks at the London Road facility. The solubility of the residual radioactivity was confirmed using American Public Health Association's Method 7110 "Gross Alpha and Gross Beta Radioactivity (Total, Suspended, and Dissolved)" from Standard Methods for Examination of Water and Wastewater.

AMS requested and received permission from the U. S. Environmental Protection Agency (USEPA) and the USNRC to evaporate this water. However, due to delays and difficulties in implementing the treatment process that were beyond AMS's control, more than four times the original amount of water had to be treated to reduce its concentration of radioactive cobalt at a cost that went well-beyond the original projection. In light of the magnitude of these unbudgeted expenses, the evaporation option became significantly more costly. Therefore, AMS is pursuing other options for disposing of the water.

Since the treated water meets the USEPA's criteria for man-made radionuclides in drinking water pursuant to 40 CFR 141, and since it contains no other hazardous substances, its presence at the AMS facility poses no radiological risk. Therefore, there is no urgency to ensure its final disposition. Nonetheless, AMS will pursue a direct discharge option until such time as it becomes patently unattainable. At that time, the evaporation option will be re-visited in light of available financial resources. Table 3 contains the action plan for this task.

ON-GOING ACTIONS

Audit/Assessment of Radiation Protection Program

In light of changing operational issues, pending licensing activity, and the desire to "streamline" compliance efforts, AMS intends to perform a series of audits of its radiation protection program in order to compare AMS's performance to that required and/or recommended by existing license/permit provisions, U. S. Nuclear Regulatory Commission regulations, and standard industry practices (e.g., USNRC Regulatory Guides, ANSI, ASME and ASTM Standards, ICRP Publications, NCRP Publications). The audits will be performed by AMS personnel and consultants to AMS. They will involve initial review of applicable operating procedures, quality assurance procedures, and other pertinent documentation related to a particular performance issue.[6] The initial document review is performed in order to identify possible areas of failure or liability, and to derive an efficient schedule for on-site assessments. While on site, AMS compliance with existing procedures will be determined and areas of inefficiency or poor function, as compared to industry standards and practices, will be identified.

While the results of the audits are intended to be used for demonstrating compliance and/or to guide future program modifications or improvements, any findings of significant regulatory non-compliance or conditions of imminent hazard will be immediately reported to and addressed by the RSO. Immediately after renewal of License No. 34-19089-01, the Radiation Safety Committee will set the audit schedule. The general provisions have been incorporated into RSP-008, "Instrumentation and Surveillance".

Upgrade of Standard Operating Procedures

In response to audit findings, and in light of changing operational demands and licensing activities, the current collection of standard operating procedures (ISPs) were reviewed for continued applicability. Wherever possible, multiple procedures that address a single topic were combined, and out-dated procedures were revised. Consistency between procedures was confirmed and compliance with the requirements of the AMS Radiation Protection Program Plan was assured. Since October 10, 1995, the following new/revised procedures have been developed and approved by the Radiation Safety Committee, and submitted to the USNRC for review:

- RSP-001, Radiation Protection Program Plan
- RSP-002, Definitions

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[6] The following programmatic issues will be audited on a planned and periodic basis: Organization and Administration; Facilities and Equipment; Training in Radiation Protection; Radiation Exposure Control; ALARA Program; Contamination Control; Instrumentation and Surveillance; Posting and Labeling; Receipt and Control of Radioactive Material; Packaging and Transportation of Radioactive Materials; Control of Radioactive Waste; Radiation Protection Records; Documentation; Emergency Response and Notifications; and Quality Assurance in Radiological Protection.

- RSP-003, Control of Radiation Safety Procedures
- RSP-004, Radiation Protection Records
- RSP-005, ALARA Program
- RSP-006, Training and Qualifications of Radiation Protection Personnel
- RSP-007, Training in Radiation Protection
- RSP-008, Instrumentation and Surveillance
- RSP-009, Contamination Control
- RSP-010, Exposure Control
- RSP-011, Radiological Areas and Posting
- RSP-012, Control of Work
- RSP-013, Control of Radioactive Waste
- RSP-014, Receipt, Handling, and Identification of Radioactive Materials
- RSP-015, Packaging and Transportation of Radioactive Materials
- RSP-016, Emergency Response and Notifications
- RSP-017, Stop Work Authority
- RSP-018, Operation of the Gamma Spectrometer
- RSP-019, Assessment of Radioactivity in Water Samples

Immediately after renewal of License No. 34-19089-01, these procedures will be implemented in their entirety.

Housekeeping Improvements

Currently, there are only three permanent employees at the London Road facility. Therefore, only a small fraction of the available space is used for routine operations, office areas and storage. However, AMS has instituted improvements in housekeeping in the useable areas of the facility. Additional improvements will be implemented on an on-going basis. Since October 10, 1995, the following has taken place:

- The stairwell to the basement has been fully decontaminated and released for unrestricted use.

- The temporary restricted area in the warehouse that housed the water treatment equipment has been cleared and released for unrestricted use.

- Three (3) process batch tanks used for the water treatment project have been decontaminated.

Community Relations

In the past, issues or activities at AMS that required state, federal and local approvals were hampered due to lack of knowledge of AMS operations and/or an understanding of the fundamental principles of radiation and radioactivity on the part of decision-makers. In an effort to streamline future decision-making, AMS intends to mount a community relations program to acquaint various officials and members of the print and broadcast media with the AMS function, its capabilities, and its short-, intermediate-, and long-range plans. This will be accomplished through briefings, tours, and development/publication of hand-out materials and brochures. Since October 10, 1995, the following has taken place:

- A briefing with local print media representatives was held on October 31, 1995, which resulted in publication of an article that was favorable to AMS in the local press.

- Two briefings with City of Cleveland officials were arranged and invitations were issued. The briefing dates were August 29, 1995 and October 31, 1995. Although AMS received acceptances from the office of the Mayor and other individuals, no officials appeared for either briefing.

- A Cleveland City Council member (R. Coates) visited the London Road facility on November 22, 1995.

Reconnection of Sewer System to London Road Interceptor

Currently, the London Road facility does not have a direct connection to the regional sewer system. There are no sanitary discharges from the building, the roof drains discharge onto the ground surface, and all groundwater is pumped from a manhole on the property into storage tanks. Once a tank is full, the water is sampled and discharged. Since December 22,1995, approximately 61,000 gallons of water have been collected, analyzed, and found to be free of insoluble ^{60}Co. For operational reasons, and because current discharge paths do not comply with local building codes, AMS continues to pursue re-connection of all drainage paths to the London Road Interceptor through legal channels.

TABLES

Table 1 - Current Cobalt-60 Inventory

Item	Form	Material Description	Estimated Activity (Ci)
Licensed Material	Solid	Bulk Metal and Sealed Sources	54375
Packaged waste	Solid	Materials contained in high-level waste storage, LSA boxes and drums in the basement of the facility.	28
Packaged waste	Solid	Solid waste generated during the water treatment project.	0.4
Unpackaged waste	Solid/sludge	Materials contained in WHUT Room	51
Surface radioactivity	Solid	Uncharacterized surface activity in the restricted areas of the facility	1
TOTALS			54455

Table 2 - Action Plan Summary[7]

High Priority Activity	Intermediate Priority Activity	Lower Priority Activity
Submit the Remediation Report for the water treatment and sewer remediation project	Recover the capabilities of the Hot Cell.	Remove the plug in the Hot Cell and extract the remaining sources
Finalize site emergency plan.	Reduce the inventory of sealed sources and bulk cobalt.	Decontaminate the Hot Cell.
Submit conceptual decommissioning plan		Complete the physical inventory of sources.
Finalize decommissioning funding plan.		Ship out remaining sources
Finalize license renewal activities.		Address solid waste issues.
Implement training requirements of the approved site emergency plan (e.g., train first responders and perform emergency exercise and critique)		Pursue disposition of treated water that currently exists in the collapsible storage tanks.

[7] Shaded areas denote closure.

Table 3 - Action Plan for Each Task[8]

Primary Action Item	Sub-Item	Scheduled Start Date	Scheduled End Date	Current Status
Complete Remediation Report	Determine remedial alternative for the WHUT Room	8/29/95	10/3/95	Closed. Solidification has been identified as the preferred alternative.
	Determine storage methodology for contaminated solids	8/29/95	10/3/95	Closed. Construction of an above-ground storage container has been identified as the preferred alternative.
	Stabilize liquids that currently exist in the WHUT Room	10/3/95	3/1/96	Delayed pending receipt of technical information from vendor.
	Implement storage option for contaminated solids	10/3/95	4/30/96	Open
	Finalize and submit remediation report	8/1/95	TBD	Pending resolution of AMS/NEORSD litigation
	Begin direct discharge of ground and surface water from the AMS foundation drainage system.	1/15/96	TBD	Pending resolution of AMS/NEORSD litigation and reconnection of sewer system
License Renewal Application	Submit revised application	9/11/95	10/31/95	Closed. Application mailed to USNRC on 10/31/95
	Begin operations under provisions of renewed license.	1/1/96	TBD	Pending USNRC action on renewal application
Emergency Plan	Submit revised Emergency Plan to the USNRC	8/15/95	9/30/95	Closed. Plan mailed to USNRC and first responders on 9/26/95.
	Submit response to USNRC and agency comments on Revision 0 of Emergency Plan.	2/28/96	3/28/96	Closed. Comments mailed to USNRC and first responders on 3/22/96.
	Submit response to USNRC inspection report on structural integrity of the building	3/12/96	4/12/96	Open
	Begin operations under provisions of approved plan.	1/1/96	TBD	Pending USNRC approval of Emergency Plan.

[8] As actions are completed and as the scope/approach of specific activities (subitems) become solidified, the individual action plans will be expanded and specific dates will be entered in the implementation schedules. Changes will be noted in future revisions of this Plan. Shaded entries denote closure.

Primary Action Item	Sub-Item	Scheduled Start Date	Scheduled End Date	Current Status
Decommissioning Funding Plan	Submit Conceptual Decommissioning Plan	9/8/95	10/23/95	Closed. Plan mailed to USNRC on 10/20/95.
	Submit response to USNRC comments on Conceptual Decommissioning Plan.	3/20/96	4/20/96	Open
	Submit Decommissioning Funding Plan	10/21/95	TBD	Pending USNRC approval of Conceptual Decommissioning Plan
	Scheduled review of Conceptual Decommissioning Plan and Decommissioning Funding Plan for continued applicability	TBD	One (1) year after USNRC approval	Pending USNRC approval of Decommissioning Funding Plan
Recover Hot Cell Capabilities	Determine Hot Cell requirements for inventory reduction.	8/29/95	10/27/95	Closed.
	Specify Hot Cell recovery actions	11/1/95	12/1/95	Closed
	Implement recovery actions	12/1/95	1/1/95	Closed
Return NPI Sources	Evaluate residual radioactivity on NPI Sources	9/11/95	9/15/95	Closed.
	Determine decontamination methodology	9/25/95	11/24/95	Closed.
	Perform "trial run" of decontamination methodology.	11/1/95	12/20/95	Closed
	Decontaminate and leak test sources	12/20/95	1/1/97	Ongoing
	Package an ship sources	12/20/95	1/1/97	Ongoing
Identify a Market for Remaining Bulk Cobalt	Identify domestic market possibilities	8/1/95	12/31/96	Closed.
	Identify foreign market possibilities	11/1/95	12/31/96	Closed.
	Prepare and mail solicitation letters to market possibilities.	2/15/96	4/1/96	Closed Letters mailed on 3/22/96
	Determine and implement permitting requirements	12/31/96	6/1/97	Unscheduled
	Complete contracts with purchasers	TBD	TBD	Unscheduled
	Package and ship sources	TBD	TBD	Unscheduled

Primary Action Item	Sub-Item	Scheduled Start Date	Scheduled End Date	Current Status
Train First Responders in Emergency Plan Provisions	Receive USNRC approval of the Emergency Plan	10/20/95	TBD	Pending response from USNRC
	Schedule initial first responder training session	10 days after USNRC approval	TBD	Unscheduled pending USNRC approval of the Emergency Plan
	Complete training and documentation	60 days after USNRC approval	TBD	Unscheduled
	Obtain updated letters of agreement, as necessary	TBD	TBD	Unscheduled
	Schedule refresher training	TBD	TBD	Unscheduled
Implement an Emergency Exercise and Critique	Schedule emergency exercise	60 days after completion of training	TBD	Unscheduled pending completion of first-responder training
	Prepare scenario	TBD	TBD	Partially complete
	Contract outside observer	TBD	TBD	List of qualified personnel prepared.
	Initiate emergency exercise	TBD	TBD	Unscheduled
	Generate critique report	TBD	TBD	Unscheduled
	Modify Emergency Plan in light of critique findings	TBD	TBD	Unscheduled
Remove Plug in Hot Cell	Determine methodology for plug removal	7/1/95	8/1/95	Closed
	Generate specifications plan for plug removal	7/1/95	8/1/95	Closed
	Issue Request for Quotation for plug removal	7/1/95	8/1/95	Closed
	Review bids and issue contract for services	7/1/95	8/1/95	Closed
	Prepare work plan and Radiation Work Permit	TBD	TBD	Unscheduled
	Mobilize personnel and equipment	TBD	TBD	Unscheduled
	Train personnel in provisions of work plan	TBD	TBD	Unscheduled
	Perform dress rehearsals	TBD	TBD	Unscheduled
	Remove plug	TBD	TBD	Unscheduled

Primary Action Item	Sub-Item	Scheduled Start Date	Scheduled End Date	Current Status
Decontaminate the Hot Cell	Specify Hot Cell decontamination methodology and clean-up criteria	TBD	TBD	Unscheduled pending plug removal
	Generate work plan for decontamination activities	TBD	TBD	Unscheduled
	Contract decontamination services, as necessary	TBD	TBD	Unscheduled
	Mobilize equipment and personnel	TBD	TBD	Unscheduled
	Complete decontamination	TBD	TBD	Unscheduled
	Request amendment to License Condition 14 to postpone the physical inventory requirement pending plug removal.	5/1/98	6/30/98	Open pending action by USNRC on October, 1995 license renewal application
Complete/Confirm Inventory and Transfer/Ship Remaining Sources	Confirm physical inventory of remaining sealed sources	TBD	TBD	Unscheduled pending final decontamination of Hot Cell
	Evaluate residual radioactivity on remaining sources	TBD	TBD	Unscheduled
	Decontaminate and leak test sources	TBD	TBD	Unscheduled
	Obtain shipping cask	TBD	TBD	Unscheduled
	Package and ship sources	TBD	TBD	Unscheduled
Disposition of Solid Waste at the Facility	Evaluate disposition options in light of Conceptual Decommissioning Plan	10/1/95	TBD	Pending USNRC approval of Conceptual Decommissioning Plan
	Select the preferred option based upon an ALARA analysis.	TBD	TBD	Unscheduled
	Characterize the materials.	TBD	TBD	Unscheduled
	Prepare necessary permits and licenses	TBD	TBD	Unscheduled
	Implement the preferred option	TBD	TBD	Unscheduled
Disposition of Treated Water in Collapsible Storage Tanks	Identify disposition options.	8/1/95	TBD	Open
	Prepare necessary permits and licenses	TBD	TBD	Unscheduled
	Implement preferred disposition option.	TBD	TBD	Unscheduled

April 11, 1996

Robert Meschter
Radiation Safety Officer
Advanced Medical Systems, Inc.
1020 London Road
Cleveland, OH 44110

Dear Mr. Meschter:

This is to confirm the telephone conversation between you and Messrs. John Madera and Michael Weber of my staff, on April 10, 1996, regarding your April 9, 1996 letter. In your letter, you requested a 60-day extension to the deadline contained in our March 12, 1996 letter, which transmitted NRC Inspection Report No. 030-16055/95006(DNMS). During the telephone conversation, we indicated that our March 12, 1996 letter requested that, within 30 days of the letter's date, AMS provide its plans and schedule for completing an assessment of the structural integrity of the AMS building. In your April 9, 1996 letter, you indicated that AMS is scheduling an independent evaluation of the building's structural integrity, and that we will receive a complete response to our March 12, 1996 letter by June 12, 1996. Your notification satisfies our request for AMS' plans and schedule for completing the structural integrity assessment. Therefore, a 60-day extension is unnecessary.

Sincerely,

Original signed by

Geoffrey C. Wright, Acting Deputy Director
Division of Nuclear Materials Safety

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

See Attached Distribution

C/45

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Advanced Medical Systems, Inc.
1020 London Rd.
Cleveland, Ohio 44110
216-692-3270

April 12, 1996

Mr. John R. Madera, Chief
Nuclear Materials Licensing Section
U. S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60532-4351

Re: Conceptual Decommissioning Plan for Advanced Medical Systems Inc. (License No. 34-19089-01, Control No. 98507

Dear Mr. Madera:

Advanced Medical Systems, Inc. (AMS) is in receipt of your March 20, 1996 letter to David Cesar wherein comments on our Conceptual Decommissioning Plan were provided. Enclosed are our responses to your comments, along with a description of our proposed follow-up actions.

Once you have approved these comments, the Plan will be funded by the corporation and reviewed for continued applicability at the agreed-upon schedule. In the meantime, if you have any questions or if I can provide you with additional information please call me at (216) 692-3270.

Sincerely,

Robert Meschter

Robert Meschter, R. S. O.

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

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RESPONSE TO USNRC COMMENTS ON THE AMS CONCEPTUAL DECOMMISSIONING PLAN

Agency Comment: The cost estimate and financial assurance instrument must cover the decommissioning costs if decommissioning began today, as opposed to a projected decommissioning date in the future.

AMS Response: The Conceptual Decommissioning Plan forwarded to you on October 3, 1995 was based upon the SAFSTOR decommissioning methodology. The intent of the Conceptual Decommissioning Plan, in concert with the decommissioning funding requirement of 10 CFR 40.36, is that the USNRC would implement a similar decommissioning methodology should it be forced to draw on the financial assurance. Included in the cost estimate (Table 3) is $362,000 dollars dedicated to weekly facility surveillance and maintenance for the duration of the safe storage period. The eventual goal of SAFSTOR is release of the site for unrestricted use. Therefore, the cost of on-going surveillance/maintenance, eventual decontamination and waste disposal is included in the cost estimate shown in Table 3 of the conceptual Decommissioning Plan. Because these funds are already dedicated, there would be no additional financial burden to the taxpayers of the state in the unlikely event of an AMS default during the term of its license.

Action Taken: No additional action required.

Agency Comment: The amount of financial assurance required should be based upon the quantity of material authorized on a license.

AMS Response: Concur. However, on November 9, 1995, AMS submitted a revised license renewal application wherein a materials limit for ^{60}Co of 93,110 Ci was requested[1]. To date, the USNRC has taken no action on this application. The current license limit is 300,000 Ci, but it has been at least three (3) years since AMS has had in excess of 100,000 Ci of material in site. Therefore, it is inappropriate to require AMS to provide financial assurance for an inventory that is significantly above the likely inventory at any point in time simply because action has not yet been taken on AMS's application to modify the limit.

Action Taken: No additional action required. However, timely USNRC action on our November 9, 1995 renewal application would be greatly appreciated.

Agency Comment: Please submit an evaluation of the radiological conditions of the soil under the basement and WHUT room floors or justify why the three core samples should be considered representative of the current radiological condition.

AMS Response: AMS maintains that the soils upon which the London Road building was constructed have the same radiological character now as they did before the 1995 flood. The following are our reasons for this position:

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[1] The requested limit was set to accommodate possession and sale of sealed sources as well as the radioactivity that exists in solid waste and residual radioactivity on building surfaces.

(1) Throughout the period of time that the basement of the London Road flooded due to the NEORSD's intentional blocking of all discharge paths, AMS maintained a minimal pressure differential between the inside and outside water levels in order to minimize uplift on the floor slab and eliminate the possibility of "back flow" of contaminated water to areas outside of the building. AMS's pumping efforts clearly provided the necessary level of pressure control. In fact, USNRC Inspection Report No. 030-16055/95006(DNMS) stated that, with the exception of one location on the second floor of the building, "the reinforced concrete core structure of the 1958 building that forms the hot cell, the WHUT room, the original radiography room, the source garden and the front and back basements was found to be in good condition". Furthermore, the inspector found "no additional signs of distress" on the basement slab, and concluded that "there was no observable significant impact on the structural integrity of the 1958 building as a result of the basement flooding event". Therefore, the structural evidence supports our that the radiological conditions of the soil under the basement and the WHUT room have not changed since the three core samples were taken in 1994 (e.g., before the flooding).

(2) During the 1995 sewer remediation project, AMS determined that the shale layer upon which the building is built and which formed the base of the existing footer drains, did not contain detectable radioactivity. In fact, no detectable activity was identified during the remediation other than that in the existing drain tile and fill material upon which they rested. Therefore, the radiological evidence from the remediation project supports our that the radiological conditions of the soil under the basement and the WHUT room are equivalent to the pre-flood conditions.

(3) Between the 1995 completion date of the sewer remediation project and the date of this letter, over 80,000 gallons of water have been pumped from the foundation drainage system, confirmed to be "clean" through laboratory analyses, and discharged[2]. This indicates that no mobile contamination is under the basement or in the new drainage system.

(4) Included herein as Attachment 1 is a Registered Hydrogeologist's report wherein he concludes that the new foundation drain is hydraulically connected to the soils under the basement floor, and that it is unlikely that contamination migrated from the basement to these soils.

In summary, the findings of the USNRC Inspection Report, the fact that the water being pumped from the foundation drains is radiologically benign, and the hydraulic connection between the soils under the building and the foundation drain all serve to support our position that the soils were not contaminated from the basement flood. Until the basement has been fully decontaminated, attempts to breach the integrity of the floor for the sole purpose of securing additional confirmation runs the risk of injecting contamination into the sub-basement environment where none currently appears to exist.

Action Taken: Page 8, line 14 of the Conceptual Decommissioning Plan will be modified to read: ". . . did not occur. However, if information is obtained at some time in the future to invalidate this assumption (e.g., if contamination is detected in the remediated foundation drainage system),

---

[2] Cobalt-60 was identified in one 3,000-gallon batch (e.g., hold-up tank No. 880), as I reported in my letter of February 26, 1996 to Cynthia Pederson, USNRC Region III. However, the source of this material was the tank itself, which was used as a process tank during the water treatment project. The residual cobalt-60 that was in the tank when the foundation drain water was transferred to it was later removed by filtration.

this Plan will be revised to include the cost of addressing the additional contamination during decommissioning."

Agency Comment: The deferment of decommissioning through implementation of SAFSTOR is only applicable to power reactors. The GEIS (NUREG-0586) indicates that deferred dismantlement could be a preferred option only for radionuclides that decay within a few weeks or months. By providing decommissioning financial assurance below a level that would fund complete remediation of the facility at any time during the SAFSTOR period, the public taxpayer would be forced to accept a decommissioning obligation that substantially exceeds the proposed level of funding

AMS Response: AMS takes exception to this comment for the following reasons:

(1) The GEIS shows that SAFSTOR is an acceptable decommissioning alternative for "short lived radionuclides" at power reactors *as well as* for materials licensees (see page 0-4, section 0.2.4 and page 14-9, section 14.3.2.2).[3] Furthermore, on page G-8 of the GEIS, the definition of short-lived radionuclides is given as "those radioactive isotopes with half-lives less than about 10 years". Since the ^{60}Co at AMS, a materials licensee, has a radiological half life of approximately five (5) years, the GEIS is supportive of decommissioning by the methodology of SAFSTOR for materials licensees.

(2) The GEIS does state that use of a "safe storage period of a few days to a few months may allow the radioactivity to decay to low enough levels that no further decontamination required" (see page 14-9, section 14.3.2.2) for a reference sealed source and radiochemical manufacturer. But the GEIS also states that while generic criteria were used for development of the report, "each facility can present problems that are unique to its decommissioning" (see page 14-4, section 14.2). The reference facility used to derive the findings for sealed source production was a generic manufacturer of sealed sources that carried "out their operations in small batches in glove boxes, hoods or remote operation cells, and contamination outside these structures is limited almost entirely to the ventilation ducts and filters" (see pages 14-4 and 14-5, section 14.2). The radiological conditions at AMS are distinctly different since there is extensive area contamination, significant solid waste recovered from remediation of the old sewer system, and there is a facility that was closed to all access under the authorization of the USNRC (e.g., the WHUT Room). Therefore, strict application of the GEIS' recommendations for the reference sealed source manufacturer to all sealed source manufacturers is inappropriate.

(3) In evaluating decommissioning alternatives, there are considerations that go beyond immediate license termination and release of the site for unrestricted use. Both DECON and SAFSTOR will result in unrestricted release of the site. However, the GEIS clearly states that the overwhelming advantage of SAFSTOR at a facility like AMS is the reduction in occupational exposure and the quantities of radioactive waste from radioactive decay. The ALARA analysis shown on page 16 of the Conceptual Decommissioning Plan further demonstrates this advantages.

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[3] U. S. Nuclear Regulatory Commission, "Draft Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities", NUREG-0586, January, 1981.

(4) The mission of the USNRC is to ensure adequate protection of the public health and safety, the common defense and security, and the environment from the use of nuclear materials in the United States. The USNRC and its licensees share a common responsibility to protect the public health and safety. Once a facility like AMS has reached the end of its useful life, there is no question that it must be decommissioned. However, decommissioning means that the facility must be placed in a condition such that there is no unreasonable risk to public health and safety. It would be contrary to the mission of the USNRC to categorically reject the SAFSTOR option as a decommissioning alternative for AMS. Furthermore, since the eventual goal of SAFSTOR is release of the site for unrestricted use, and since the cost of on-going surveillance maintenance, as well as eventual decontamination and waste disposal is included in the cost estimate for the Conceptual Decommissioning Plan, there would be no additional financial burden to the taxpayers of the state.

(5) The USNRC, in its October 20, 1988 letter to Dr. Seymour S. Stein (AMS), concurred with AMS's February 8, 1988 and July 6, 1988 request to delay decontamination of the WHUT Room until personnel exposure rates are reduced significantly. (In the July 6th letter, AMS stated that: "To move this material from its present safe concealment through the general public environment merely to deposit it at another safe concealment presents unreasonable and unnecessary man-rem exposure and risk to the public health and safety at an unjustifiable exposure".) Since the Conceptual Decommissioning Plan that is the subject of this letter was developed with similar concerns in mind, AMS respectfully requests that the USNRC reconsider its current position on SAFSTOR in light of its previous position that "isolation can be carried out safely with some benefit in the reduction in occupational exposure and waste requiring disposal" (see page 1 of the October 20, 1988 letter from A. Bert Davis to Dr. Stein).

Action Taken: None required.

Agency Comment: Table 3 to your Conceptual Decommissioning Plan entitled "Manpower and Cost Estimates" lacks the specificity the NRC needs to verify your cost estimate. Resubmit your cost estimating table using the format provided [citation given].

AMS Response: Concur.

Action Taken: Included herein as Attachment 2 is additional cost information for the SAFSTOR option. This information is presented in the same format as Appendix F of USNRC Regulatory Guide 3.66, "Standard Format and Content of Financial Assurance Mechanisms Required for Decommissioning Under 10 CFR Parts 30, 40, 70 and 72" (June, 1990).

ATTACHMENT 1

Quality
Environmental
Solutions, Inc.

April 11, 1996

Ms. Carol D. Berger
Integrated Environmental Management, Inc.
1680 East Guide Drive
Suite 305
Rockville, Maryland 20850

Dear Carol:

I have reviewed the letter dated March 20, 1996 from the U. S. Nuclear Regulatory Commission (NRC) to your customer, AMS, regarding the Conceptual Decommissioning Plan of the AMS Facility. It is my opinion that, based upon the effect of the hydraulic gradient in the vicinity of the basement when the basement contained water, the additional sampling of soils below the basement and the WHUT room floors should not be required. According to the evidence, it is unlikely that contamination migrated from the building to these soils, and, therefore, conditions in the soils would not have changed due to the flooding of the basement referenced in the NRC's letter.

Following is a brief recap of the evidence and the historical events:

1. Prior to the flooding, three core samples were obtained from native soils under the basement in the vicinity of the WHUT room. Contamination was not discovered in any of the samples;

2. Based upon a suspected discharge of radioactive contamination, the outfall of the AMS Building basement drainage system was plugged by the local sewer authority. As a result, ground water that normally was carried off site by the drainage system began to accumulate and enter the basement;

3. Prior to the removal of the water from the basement, monitoring records show the water elevation in the drainage system to be higher than the water level in the basement. Additionally, during the removal of water from the basement, the surface elevation of the basement water was intentionally maintained below the water elevation in the drain system;

4. Since the flooding, the basement drainage system was closed in place and has been replaced with a new subsurface perimeter-drain system; and,

5. The new drain system is utilized to remove ground water from the soils around the basement by pumping collected water into aboveground storage. Contamination has not been discovered in the removed water, and the water has been discharged to the local sewer. Since the initiation of the pumping, the basement has been dry.

Corporate Office
134 Holiday Court, Suite 306 • Annapolis, MD 21401
Telephone: (410) 841-5552 • Fax: (410) 266-5588

My conclusion that soil conditions did not change during the period when the basement was flooded is based upon the following:

1. The original drainage system created a local sink, collecting ground water from the basement vicinity and maintaining the ground water level below the basement floor. The water level observed in the drain is representative of conditions in the surrounding soils. In addition to intercepting ground water flowing toward the basement, the new drainage system is also hydraulically connected to the soils surrounding the basement floor;

2. The differential water levels between the drainage system and the basement during the period in which the basement contained water indicate a positive hydraulic gradient from the surrounding soils toward the basement. Water would not leak out of the basement under these conditions; and,

3. If water was leaking from the basement, contamination could be expected to show up in the water that is collected by the new drain system. Therefore, the lack of contamination in the removed water also indicates that the ground-water flow was toward the basement during its flooded period.

Thank you for the opportunity to be of service on this project. Please call me at 410-841-5552 if you have any questions regarding this letter.

Sincerely,

Donald E. Jones, P.G.
Registered Hydrogeologist

ATTACHMENT 2

Cost Estimating Table - SAFSTOR Alternative
(USNRC Regulatory Guide 3.66, Appendix F)

Table 1

Planning and Preparation						
Task	Work Days					Total Cost ($)
	Supervisor	Foreman	HP	Clerical	Total	
Preparation of Documentation for Regulatory Agencies	4	4	2	0.5	10.5	4560
Submittal of Decommissioning Plan to NRC when required by 10 CFR 30.36	10	10	10	1	31	14560
Development of work plans	10	10	10	1	31	14560
Procurement of Special equipment	2	2	0	0.5	4.5	1680
Staff training	1	1	1	0.5	3.5	1620
Characterization of radiological condition of the facility (including soil and tailings analysis or groundwater analysis, if applicable)	20	20	5	2	47	19520
Other	0	0	0	0	0	0
Total	47	47	28	5.5	127.5	56400

Table 2

Position	Unit Cost for Workers		Worker Cost/year ($)
	Basic Salaries ($/yr)	Overhead Rate (%)	
Supervisor	60000	100	120000
Foreman	40000	100	80000
Craftsman	30000	100	60000
Technician	30000	100	60000
Health Physicist	80000	100	160000
Laborer	30000	100	60000
Clerical	20000	100	40000

Decontamination and/or dismantling of Radioactive Facility components					
	No.	Dimensions		No.	Dimensions
Glove Boxes	0	n/a	Amount of Floor Space	--	200 m^2
Fume Hood	0	n/a	Ventilation ductwork	--	50 m
Hot Cells	1	27 m^3	Amount of Wall Space	--	3100 m^2
Lab Benches	0	n/a	Other	--	--
Sink and Drain	2	25 m		--	--

Table 3

Task	Work Days							Total Cost ($)
	Supervisor	Foreman	Technicians	HP	Craftsmen	Laborer	Total	
Decon/dismantle major components and/or processing storage tanks (Hot cell SAFSTOR and decon after SAFSTOR)	10	10	20	2	0	15	57	17680
Decon/dismantle laboratories, fume hoods, glove boxes, benches, etc.	--	--	--	--	--	--	--	--
Decon/dismantle waste areas (radwaste area, scrap recovery, other) WHUT room	3	12	15	3	0	15	48	14400
Decon/dismantle service facilities (maintenance shop, decontamination areas, ventilation systems, other) includes HEPA system and misc. Areas	14	55	65	8	22	65	229	65920
Decon/dismantle waste treatment facilities and storage areas on site (including exhume and package contaminated soil and tailings, if any)	--	--	--	--	--	--	--	--
Monitor for compliance, reclean and monitor, if necessary	2	8	10	2	0	10	32	9600
Other (e.g., contractor fees)	80	0	0	0	0	0	80	38400

Table 4

Equipment/supply	Quantity	Cost
Personnel protective equipment	1 lot	18000
Misc. Decon supplies	1 lot	20000
Security system upgrade SAFSTOR	1ea	2000
Office supplies, misc. other	1 lot	2000
Survey equipment	1 lot	4000
Decon equipment rental	4 mo.	20000
Misc. items for 50 yr. SAFSTOR	1 lot	50000
Total		116000

Table 5

Waste type	Volume (m^3)	No. Of containers	Type of Container	Unit Cost of Container	Cost of Container
LLW	2.83	1	B-25	500	500
Asbestos	0.59	4	Drum	35	140
Total	3.42	5	--	--	640

Table 6

Distance shipped	2525 (miles)
Unit Cost for shipment	2.65 ($/mile/truckload)
Additional Charges - Overweight	0 ($/mile)
Additional Charges - Surcharge	0 ($/mile)

Waste Type	No. Of shipments	Unit Cost for shipping ($)	Distance Shipped (miles)	Surcharge ($)	Transportation Cost ($)
LLW	1	2.654	700	0	1855
Asbestos	1	2.65	1825	0	4836
Total					6691

Table 7

Burial Charges	340 ($/ft^3)
Surcharges - Per container	0 ($)
Surcharges - Disposal	0 ($/ft^3)

Waste Type	Burial Volume (ft^3)	Unit Cost of Burial ($/ft^3)	Surcharge ($)	Burial Cost ($)
Class A - LLW	100	340	0	34000
Asbestos	21	150	0	3150
Total				37150

Table 8

Restoration of Contaminated Areas on Facility Ground						
Task	Work Days					Total Cost ($)
	Supervisor	Foreman	HP	Clerical	Total	
Backfill and restore site	0	0	0	0	0	0

Table 9

Final Radiation Survey						
Task	Work Days					Total Cost ($)
	Supervisor	Foreman	HP	Clerical	Total	
Outdoor release survey	36	40	20	1	87	43040
Building release survey	12	15	6	0.5	33.5	14480
Total	48	55	26	1.5	130.5	57520

Table 10

Site Stabilization, Long-Term Surveillance (if applicable)						
Task	Work Days					Total Cost ($)
	Supervisor	Foreman	HP	Clerical	Total	
On-going building maintenance and surveys (50 yr)	125	600	62.5	125	912.5	312000