

MAY 09 1996

96-39

REGIONAL TECHNICAL ASSISTANCE REQUEST FORM

Date: May 2, 1996

Mail or E-Mail to: Donald A. Cool, Director  
Division of Industrial and Medical Nuclear Safety, NMSS

From: *for* John R. Madera, Chief *Kevin L. Nall*  
Nuclear Materials Safety and Safeguards Branch, Region III

Licensee: Advanced Medical Systems (AMS) License No. 34-19089-01

- ☐ Control No. 98507
- ☐ Letter dated: April 12, 1996
- ☐ Suggested change in licensing procedure (enclosed):

☐ Problem/Issue:

On March 20, 1996, we issued a deficiency letter to AMS addressing concerns we had over their "Conceptual Decommissioning Plan" (CDP). Your staff provided input in the drafting of that letter (Attachment A). For your information we have attached a copy of the March 20 letter (Attachment B). On April 12, 1996, AMS submitted their response (Attachment C). We ask that you review their response and provide comments. For your information we have provided comments as noted below.

☐ Action Required:

☐ Recommended Action (with revisions): ☐ Approve or ☐ Reject

Remarks:

W116

The following issues need to be resolved:

1. The primary basis for which we feel AMS' cost estimate of 1.8 million dollars is low (see

our 8/17/96 letter - Attachment D) is that they have not adequately characterized the site to demonstrate with a reasonable level of confidence that the soil under the basement and WHUT room floor is not contaminated. In response to our concern, AMS hired a registered hydrogeologist, who states in a letter it is his opinion that "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." He further states that it is of his opinion that "additional sampling of soils below the basement and WHUT room floors should not be required." The letter, signed by Donald Jones, is dated April 11, 1996, and is attached to AMS' April 12 letter (Attachment C). The NRC needs to decide if it will accept the report. It is our opinion that the report should be accepted, and the issue of further sampling below the basement and WHUT room floors should be closed or, as an alternative, NRC should have it's own hydrogeologist evaluate the issue so that the Commission can determine whether or not to accept the report.

2. Based upon input from headquarters staff, we incorporated into our 3/20 letter, references to NUREG-0586 to address AMS' proposal to SAFSTOR radioactive material and waste. Specifically, we reference the NUREG as stating that deferred dismantlement could be a preferred option for source manufacturers who use short-lived nuclides that decay within a few weeks or months. We also stated that SAFSTOR periods are not discussed in the NUREG as being suitable for materials licensees. In their letter, AMS presents a differing interpretation of the NUREG. AMS feels that the NUREG recognizes SAFSTOR as an acceptable decommissioning alternative for "short-lived radionuclides" at power reactors as well as materials licensees. They also stated that the NUREG defines short-lived radionuclides as those with half-lives less than about 10 years. Please reference p. G-12 of the NUREG. The definition of short-lived radionuclides for purposes of the GEIS study are those which have a half-life of less than about 10 years. These differences in interpretation of the NUREG and the issue of allowing AMS to SAFSTOR material, need to be resolved. NRC must decide if it will accept the SAFSTOR method. Furthermore, if the decision is to accept SAFSTOR, then we feel AMS will need to make changes in their program to assure safe, long term storage of material. Clearly, storage and security of material in SAFSTOR for a period of no more than 50 years, as well as financial stability of a company will have an impact on the Commission's decision to grant SAFSTOR. It appears that these are issues a licensee must address before we would authorize SAFSTOR. Any additional guidance that you can provide which a licensee should address prior to authorization of SAFSTOR, would be appreciated. Please note that AMS referenced the Draft GEIS (1981) in their April 12 response; however, it appears that the content is the same as the final version (1988).

NOTE: AMS met with Region III and Headquarters management on May 7. AMS has indicated they are accepting bids to dispose of their bulk and sealed cobalt-60. In addition, it appears they may accept bids to dispose of boxed and drummed cobalt-60 contaminated waste. If this occurs, the only material remaining would be that which is in the plug in the hot cell (3351 curies of bulk and sealed cobalt-60, and 664 curies of cesium-137 according to AMS records), and facility contamination. AMS will be submitting a written proposal to Region III within 2 weeks. The proposal will outline their

*plan and request the NRC release funds that are currently secured in their decommissioning financial assurance instrument. If approved, this will have an impact on their cost estimate for decommissioning and conceptual decommissioning plan.*

*Headquarters Reviewer: \_\_\_\_\_*

*Regional Reviewer: Kevin Null*

*Reviewer Code: R2*

*Reviewer Phone No.: (708)829-9854      Fax No.: (708)515-1259*

*Request Needed by: \_\_/\_\_/\_\_ (date)      Form TAR-10*

*8/93*

*cc: Cindy Pederson*



## ATTACHMENT A

UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

November 3, 1995

MEMORANDUM TO: George Pangburn, Acting Chief  
Operations Branch  
Division of Industrial and Medical  
Nuclear Safety, NMSS

FROM: Michael F. Weber, Chief *Michael F. Weber*  
Low-Level Waste and Decommissioning  
Projects Branch  
Division of Waste Management, NMSS

SUBJECT: REVIEW OF ADVANCED MEDICAL SYSTEMS CONCEPTUAL  
DECOMMISSIONING PLAN

In response to your request, we reviewed the Advanced Medical Systems Conceptual Decommissioning Plan, dated October 20, 1995. We are attaching our comments.

License No. 034-19089-01  
Docket No. 030-16055

Attachment: As stated

CONTACT: T.C. Johnson, NMSS  
415-7299

9608220058

Comments on AMS Conceptual Decommissioning Plan

1. Items to be Decommissioned, pp. 2-9

We assume that the project manager agrees with the scope of the proposed decommissioning and that the sources of contamination are reasonably represented in the report.

2. Decommissioning Cost Estimates, 2nd Para., p. 15

AMS is proposing to base its decommissioning financial assurance amount on a SAFSTOR approach using a 50 year storage period. In the Statement of Considerations for the 1988 decommissioning rulemaking (53 FR 24018) "the intent of the rule is to provide the necessary guidelines with regard to use of decommissioning alternatives in a manner which protects the public health and safety." In the 1988 rulemaking, provisions for deferring dismantlement are applicable only to power reactors where up to a 60 year period is specifically allowed. Deferred decommissioning for materials licensees and non-power reactors is not specifically allowed because the supporting analyses in the "Generic Environmental Impact Statement on Decommissioning Nuclear Facilities" (GEIS), NUREG-0586, showed that there would be no significant advantages to delaying decommissioning for these types of licensees. Factors that need to be considered in addressing decommissioning alternatives include the following:

- a. Occupational exposures
- b. Costs
- \* c. Waste disposal
- d. Financial viability of licensee
- e. Financial assurance provisions

In allowing up to a 60 year period for decommissioning power reactors, there is about an 80 percent saving in occupational exposures for the deferred option. The overall costs between DECON and SAFSTOR are about the same. For a 50 year SAFSTOR period the waste volumes are 90 percent less than with DECON. For a utility, utilities are considered to be fundamentally strong financial corporations due to the monopolistic system they operate in. Because the costs of DECON and SAFSTOR are similar, decommissioning financial assurance is provided at levels that could fund decommissioning even if a utility is unable to do so anytime during the SAFSTOR period.

\* The GEIS indicates that there may be cases for materials licensees where deferred decommissioning may be the most protective of public health and safety. In Chapter 14 of the GEIS, it is stated that deferred dismantlement could be a preferred option for source manufacturers which use short-lived nuclides that decay within a few weeks or months. However, longer SAFSTOR periods are not discussed as being suitable. This is especially the case of AMS, where there the viability of the corporation is tentative due to its substantive decommissioning obligations and the speculative nature of its limited business prospects for marketing teletherapy sources in the third world. By providing decommissioning financial assurance at a level that

Attachment

- 2 -

would not allow the complete remediation of the facility at any time during the SAFSTOR period, the public taxpayer could be forced to accept a decommissioning obligation that substantially exceeds the proposed level of funding.

3. Decommissioning Cost Estimates, 2nd Para., p. 15

AMS estimates that the SAFSTOR period maintenance and surveillance costs would be 4 staff-hours per week. Based on the contamination levels in the building, the groundwater seepage into the basement, restrictions on releasing water to the sewerage system, and possible structural damage to the building, this estimate appears to be very low. These low maintenance and surveillance costs substantially affect the long-term decommissioning costs.

4. Decommissioning Cost Estimates, 2nd Para., pp. 15-16

AMS is assuming that the lateral connection to the sewer system will remain in place during the SAFSTOR period. What is the rationale for this? There appears to be no cost beneficial reason to delay the remediation of this contamination.

5. Duration of Safe Storage Period, p. 19

The report states that the safe storage period is consistent with U.S. EPA policy. What policy is this? Note that our policy, embodied in the 1988 regulations, is that there is no significant benefit for delaying decommissioning at materials licensee facilities.

6. Table 3

Will a more detailed decommissioning cost estimate be submitted? This table is a summary of cost calculations, but does not provide sufficient detail for us to verify the cost estimates. We will review the detailed cost estimate when it is submitted.

ATTACHMENT B

MAR 20 1995

David Cesar, Vice President  
Advanced Medical Systems, Inc.  
121 North Eagle Street  
Geneva, Ohio 44041

Dear Mr. Cesar:

We have reviewed your letter dated October 20, 1995 with its accompanying "Conceptual Decommissioning Plan" (Plan). The letter and Plan were submitted in response to our August 17, 1995, deficiency letter.

The purpose of this letter is to summarize our review of your response. We will address: (1) the requirement for decommissioning financial assurance, (2) our August 17 letter and your response, and (3) the AMS Plan - SAFSTOR vs. DECON.

As you are aware, decommissioning financial assurance for the possession of byproduct material is required pursuant to 10 CFR Part 30, Section 35. This regulation requires certain licensees to submit a decommissioning funding plan (DFP), which includes a cost estimate and a financial assurance instrument, to cover the costs of future decommissioning in the event that decommissioning is required at the present time. In other words, 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. The amount of financial assurance required is based upon the quantity of material authorized on a license.

Our August 17 letter primarily discussed two issues which pertain to the cost estimate AMS submitted in support of decommissioning financial assurance. To summarize, the issues are: (1) NRC's request that AMS revise its facility characterization to include an assessment of the radiological conditions of the soil under the basement and WHUT room floors, and (2) incorporation of the current disposal costs at Barnwell into AMS' DFP. In your October 20 letter, you did not address issue (1). As stated in our letter, we are not confident that the three core samples taken through the basement slab prior to the flood are representative of the current radiological conditions of the soil under the basement and WHUT room floors. The presence of radioactivity under the floor would presumably increase the quantity of licensed material and therefore, increase the cost estimate for decommissioning financial assurance. Enclosed is a copy of our August 17 letter. 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 conditions.

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Contained within your Plan is a description of two methods for decommissioning the AMS facility - SAFSTOR and DECON, and the associated costs required for each method (910,000 dollars for the SAFSTOR option, and approximately 3.3 million dollars for the DECON option). After comparing and contrasting these two options, AMS proposes to establish approximately 910,000 dollars financial assurance based on a SAFSTOR approach using a 50 year storage period. The deferment of decommissioning through implementation of SAFSTOR is only applicable to power reactors. The Statement of Considerations for the 1988 decommissioning rulemaking (53 FR 24018) states, "The intent of the rule is to provide the necessary guidelines with regard to use of decommissioning alternatives in a manner which protects the public health and safety." In the 1988 rulemaking, provisions for deferring dismantlement are applicable only to power reactors where up to a 60 year period is specifically allowed. Deferred decommissioning for materials licensees and non-power reactors is not specifically allowed.

The supporting analyses in the "Generic Environmental Impact Statement on Decommissioning Nuclear Facilities" (GEIS), NUREG-0586, indicates that there may be cases for materials licensees where deferred decommissioning may be the most protective of public health and safety. In Chapter 14 of the GEIS, it is stated that deferred dismantlement could be a preferred option for source manufacturers which use short-lived nuclides that decay within a few weeks or months. However, longer SAFSTOR periods are not discussed as being suitable. In comparison to the utilities, the financial stability of many materials licensees is uncertain. Therefore, 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.

As presented in your plan, SAFSTOR is equivalent to decay-in-storage. Current NRC policy limits authorization for decay-in-storage to radionuclides with half-lives no greater than 120 days. NRC considers storage of radioactive waste with half-lives greater than 120 days as extended interim storage. Extended interim storage requires specific authorization. Furthermore, NRC policy states that extended interim storage of low level waste should not be a substitute for disposal to a licensed waste facility if access is available.

Therefore, unless a materials licensee does not have access to a disposal facility, all radioactive waste with half-lives exceeding 120 days should be shipped off-site. As stated in our October 31, 1995, letter regarding your application for renewal, we feel strongly that AMS should take the opportunity to ship its radioactive waste to Barnwell.

Table 3 to your Conceptual Decommissioning Plan entitled "Manpower and Cost Estimates" lacks the specificity the NRC needs to verify your cost estimate. A cost estimating table that organizes and provides an acceptable format to

D. Cesar

-3-

the NRC for determining decommissioning cost components and activities is illustrated in Appendix F to Regulatory Guide 3.66 (enclosed). It provides an extensive checklist of decommissioning activities that must be included in a decommissioning cost estimate. Resubmit your cost estimating table using the format provided in Appendix F.

We will continue our review of your application upon receipt of the information requested in this letter. Please reply in duplicate, within 30 days, and refer to Control Number 98507.

If you have any questions or require clarification on any of the information stated above, you may contact us at (708) 829-9887.

Sincerely,

Original Signed By  
John R. Madera, Chief  
Nuclear Materials Licensing Branch

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

Enclosures: As stated

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per  
3. Dec 1996  
3/15/96



# Advanced Medical Systems, Inc.

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

ATTACHMENT C

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, R. S. O.

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

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APR 17 1996

REGION III

APR 17 1996

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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 <sup>60</sup>Co of 93,110 Ci was requested<sup>1</sup>. 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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<sup>1</sup> 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 NECRSD'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<sup>2</sup>. 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),

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<sup>2</sup> 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).<sup>3</sup> 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 <sup>60</sup>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 WHU "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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<sup>3</sup> 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

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.

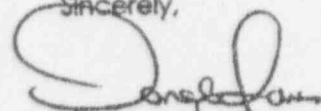
Corporate Office  
134 Holiday Court, Suite 306 • Annapolis, MD 21401  
Telephone: (410) 841-5552 • Fax: (410) 266-5588

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 <sup>2</sup>
Fume Hood	0	n/a	Ventilation ductwork	—	50 m
Hot Cells	1	27 m <sup>3</sup>	Amount of Wall Space	—	3100 m <sup>2</sup>
Lab Benches	0	n/a	Other	—	—
Sink and Drain	2	25 m		—	—

Table 3

Task	Work Days							Total Cost (\$)
	Super visor	Forem an	Techni cians	HP	Crafts men	Labor er	Total	
Decon/dismantle major components and/or processing storage tanks (Hot cell SAPSTOR and decon after SAPSTOR)	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 exhum 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 SAPSTOR	1 ea	2000
Office supplies, misc. other	1 lot	2000
Survey equipment	1 lot	4000
Decon equipment rental	4 mo.	20000
Misc. items for 50 yr. SAPSTOR	1 lot	50000
Total		116000

Table 5

Waste type	Volume (m <sup>3</sup> )	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 <sup>3</sup> )		
Surcharges - Per container			0 (\$)		
Surcharges - Disposal			0 (\$/ft <sup>3</sup> )		
Waste Type	Burial Volume (ft <sup>3</sup> )	Unit Cost of Burial (\$/ft <sup>3</sup> )	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

AUG 17 1995

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

Dear Mr. Cesar:

We have completed our review of your May 30, 1995 response to our March 30, 1995 deficiency letter regarding your cost estimate to decommission the London Road facility. We still feel that your cost estimate of \$1,795,612 does not realistically reflect the cost that will be required to decommission the facility. You have not demonstrated that the soil under the building is free of contamination, and your proposed disposal cost of \$181 per cubic foot appears to be an under estimate based on the recent opening of Barnwell in South Carolina.

As previously discussed in our March 30, 1995 letter, recent water problems at the site has resulted in two additional problems that may significantly impact the cost of decommissioning the London Road site. The two problems are: (1) the concrete slab may have to be removed from the WHUT room as a result of the water causing additional contamination of the concrete; and (2) the contaminated water may have caused extensive soil contamination under the basement slab. The impact of having to remove and dispose of the contaminated concrete, and to remove and dispose of significant quantities of contaminated soil may be several times greater than the initial estimate.

Furthermore, the flooding problems in the basement occurred after SEG's site characterization and cost estimate report of January 1995. Therefore, we believe that the three core samples through the basement floor prior to the flood may not possibly be representative of current soil conditions under the basement slab and WHUT room.

In your response to our question concerning the possibility of structural damage to the building due to recent water problems at the facility, you stated in item (3) on page 2 of your letter that no structural damage was observed, and that recent core borings "outside" the facility indicated no "significant" outside contamination exists. AMS has not performed an adequate site characterization to support these conclusions. In addition, your statement regarding "significant" outside contamination is a clear indicator that "outside" contamination, in fact, does exist.

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Your decommissioning cost is also based on a disposal cost of \$181 per cubic foot. A more realistic cost of approximately \$300 per cubic foot (based on July 1, 1995, reopening at Barnwell) base charge plus surcharges associated with curie content, weight, cask, etc., would be appropriate. This will result in a significant increase in decommissioning cost. Please adjust your cost estimate, accordingly.

Due to the recent flooding problems and the contamination that was discovered under the isotope shop slab airlock and in the under drain system, please submit a revised characterization of the facility that includes a scientific assessment of the radiological conditions of the soil under the basement slab and WHUT room. We would expect that a re-characterization of the site and incorporation of current disposal cost at Barnwell into your decommission financial plan will dramatically increase your cost estimate to decommission the facility.

Given these recent events/discoveries at the 1020 London Road site, we feel that the January 1995 cost estimate and site characterization are no longer valid. Enclosed is a copy of the Draft Branch Technical Position on Site Characterization for Decommissioning that you should use to re-characterize the facility.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 98507.

If you have any questions, please feel free to contact me at (708) 829-5834.

Sincerely,

Original Signed By  
John R. Madera, Chief  
Nuclear Materials Licensing Section

License No.: 34-19089-01

Docket No.: 030-16055

Enclosure: Draft Branch Technical Position  
On Site Characterization for  
Decommissioning

DOCUMENT NAME: M:\03016055.DF5

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DATE	08/16/95	<input checked="" type="checkbox"/>	08/16/95	<input checked="" type="checkbox"/>	08/16/95	<input checked="" type="checkbox"/>	08/16/95	<input checked="" type="checkbox"/>	

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

August 16, 1996

96-39

MEMORANDUM TO: John R. Madera, Chief  
Nuclear Materials Safety and Safeguards Branch  
Region III

FROM: Donald A. Cool, Director  
Division of Industrial and  
Medical Nuclear Safety, NMSS

SUBJECT: TECHNICAL ASSISTANCE REQUEST CONCERNING ADVANCED MEDICAL  
SYSTEMS, INC., LICENSE NO. 34-19089-01, LETTER DATED  
APRIL 12, 1996

I am responding to your Technical Assistance Request (TAR), Control Number 98507 (Attachment), that requested review and comment of a letter response from Advanced Medical Systems, Inc. (AMS) dated April 12, 1996. A March 20, 1996, letter from Region III to AMS indicated that AMS had not demonstrated that the soil under the building was free of contamination, and that AMS' proposed disposal cost for the radioactive waste was underestimated. The April 12, 1996, AMS letter provided comments to the Region III letter, a report and findings of a registered hydrologist to address the concern about the possibility of contamination under the building, and a more detailed estimate for a SAFSTOR alternative. Your TAR requested review and comment, specifically on whether the findings in the hydrologist's report are acceptable, and whether the NRC will accept the SAFSTOR method of decommissioning of this facility.

With regard to the hydrologist's report and the need for further sampling of soils below the basement/WHUT room floors, we agree with the Region that the hydrologist's report be accepted. It is unlikely that there is significant contamination of the soil beneath the floor of the basement or WHUT room based on:

- 1) the hydraulic gradient during the flooding of the basement from the soils to the basement;
- 2) the hydraulic gradient since the removal of the water from the basement and the installation of the new footer drain has been toward the footer drain system and the basement has remained dry, indicating that the soils surrounding the basement are hydraulically connected to the footer drain system; and
- 3) no contamination has been found in the water removed from the footer drain system.

CONTACT: Joe DeCicco, IMNS  
(301) 415-7833

w/17

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AUG 22 1996

For contamination to leach or leak from the basement, it would have to be somewhat soluble. Therefore, the contamination, if released, would likely show up in the footer drain system that appears to be hydraulically connected to the soils surrounding the basement.

Some contamination of the soils below the basement can not be completely ruled out, but widespread contamination is unlikely given the information at hand. The cost of remediation of small areas of soil contamination, if they exist, could easily be covered if a contingency is applied to the cost estimate of decommissioning of the site. If further information comes to light at a later date, indicating more extensive contamination than anticipated here, the cost estimates should be adjusted then.

With regard to the acceptable method of decommissioning, the March 20, 1996, letter to Mr. David Cesar continues to be our position. In that letter, we provided our reasons why SAFSTOR would not be an option, and that the Generic Environmental Impact Statement (GEIS), NUREG-0586 states in Chapter 14 that SAFSTOR for some materials facilities would be an advantage if the materials are relatively short-lived and would decay to levels permitting unrestricted use of the facility in a short time. AMS contends that the GEIS shows SAFSTOR as an acceptable alternative for materials licensees and cites page 04, section 0.2.4 and page 14-9, section 14.3.2.2 as support for materials licensees decommissioning. A careful reading of the citations shows that the intention of the GEIS was to allow use of a safe storage period of a few days to a few months, and not a period of decades of years. The deferment of decommissioning through SAFSTOR is only applicable to power reactors.

With regards to the adequacy of decommissioning cost estimates for the London Road facility, the \$3.3M may not be realistic in reflecting the total cost. We are concerned because the cost estimate does not address the following: 1) disposal of the 2,200 kilograms of depleted uranium inventory; 2) removal and disposal of the 11,700 curies of bulk cobalt-60 metal and the 49,000 curies of cobalt-60 sealed sources; 3) the remote decontamination techniques for the Hot Cell and the WHUT Room (generally remote techniques are used when exposure rates exceed 5 R per hour; the Hot Cell has a range from 12 to 200 R per hour, and the WHUT Room a range of 50 to 240 R per hour); 4) the work difficulty factors associated with the decommissioning (when remote techniques are used, significant amounts of time are lost due to the high exposure areas, access in and out of these areas, and maintenance of equipment; and 5) the disposal charges for curie content or special handling of high activity packages, or for transportation of shielded casks materials, which can substantially increase waste management costs. In addition, the cost estimate to decontaminate/decommission a similar facility was \$17M; therefore, the cost estimate of \$3.3M may be off by several times the actual cost to decommission the site.

Since changes in assumptions can have a significant impact on the total decommissioning cost, it is recommended that we require AMS to conduct a detailed characterization of the existing buildings, and develop a cost

John Madera

- 3 -

estimate that addresses the decontamination methods. This is especially important since AMS was recently given a license amendment that allows AMS to significantly reduce their inventory.

Attachments: As stated

MAY 09 1996

90-39

REGIONAL TECHNICAL ASSISTANCE REQUEST FORM

Date: May 2, 1996

Mail or E-Mail to: Donald A. Cool, Director  
Division of Industrial and Medical Nuclear Safety, NMSS

From: *for* John R. Madera, Chief *Kevin A. Hall*  
Nuclear Materials Safety and Safeguards Branch, Region III

Licensee: Advanced Medical Systems (AMS) License No. 34-19089-01

- ☐ Control No. 98507
- ☐ Letter dated: April 12, 1996
- ☐ Suggested change in licensing procedure (enclosed):

☐ Problem/Issue:

On March 20, 1996, we issued a deficiency letter to AMS addressing concerns we had over their "Conceptual Decommissioning Plan" (CDP). Your staff provided input in the drafting of that letter (Attachment A). For your information we have attached a copy of the March 20 letter (Attachment B). On April 12, 1996, AMS submitted their response (Attachment C). We ask that you review their response and provide comments. For your information we have provided comments as noted below.

☐ Action Required:

☐ Recommended Action (with revisions): ☐ Approve or ☐ Reject

*Dupet*  
*130*

Remarks:

The following issues need to be resolved:

1. The primary basis for which we feel AMS' cost estimate of 1.8 million dollars is low (see

Attachment

*[Handwritten signature]*

our 8/17/96 letter - Attachment D) is that they have not adequately characterized the site to demonstrate with a reasonable level of confidence that the soil under the basement and WHUT room floor is not contaminated. In response to our concern, AMS hired a registered hydrogeologist, who states in a letter it is his opinion that "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." He further states that it is of his opinion that "additional sampling of soils below the basement and WHUT room floors should not be required." The letter, signed by Donald Jones, is dated April 11, 1996, and is attached to AMS' April 12 letter (Attachment C). The NRC needs to decide if it will accept the report. It is our opinion that the report should be accepted, and the issue of further sampling below the basement and WHUT room floors should be closed or, as an alternative, NRC should have it's own hydrogeologist evaluate the issue so that the Commission can determine whether or not to accept the report.

2. Based upon input from headquarters staff, we incorporated into our 3/20 letter, references to NUREG-0586 to address AMS' proposal to SAFSTOR radioactive material and waste. Specifically, we reference the NUREG as stating that deferred dismantlement could be a preferred option for source manufacturers who use short-lived nuclides that decay within a few weeks or months. We also stated that SAFSTOR periods are not discussed in the NUREG as being suitable for materials licensees. In their letter, AMS presents a differing interpretation of the NUREG. AMS feels that the NUREG recognizes SAFSTOR as an acceptable decommissioning alternative for "short-lived radionuclides" at power reactors as well as materials licensees. They also stated that the NUREG defines short-lived radionuclides as those with half-lives less than about 10 years. Please reference p. G-12 of the NUREG. The definition of short-lived radionuclides for purposes of the GEIS study are those which have a half-life of less than about 10 years. These differences in interpretation of the NUREG and the issue of allowing AMS to SAFSTOR material, need to be resolved. NRC must decide if it will accept the SAFSTOR method. Furthermore, if the decision is to accept SAFSTOR, then we feel AMS will need to make changes in their program to assure safe, long term storage of material. Clearly, storage and security of material in SAFSTOR for a period of no more than 50 years, as well as financial stability of a company will have an impact on the Commission's decision to grant SAFSTOR. It appears that these are issues a licensee must address before we would authorize SAFSTOR. Any additional guidance that you can provide which a licensee should address prior to authorization of SAFSTOR, would be appreciated. Please note that AMS referenced the Draft GEIS (1981) in their April 12 response; however, it appears that the content is the same as the final version (1988).

NOTE: AMS met with Region III and Headquarters management on May 7. AMS has indicated they are accepting bids to dispose of their bulk and sealed cobalt-60. In addition, it appears they may accept bids to dispose of boxed and drummed cobalt-60 contaminated waste. If this occurs, the only material remaining would be that which is in the plug in the hot cell (3351 curies of bulk and sealed cobalt-60, and 664 curies of cesium-137 according to AMS records), and facility contamination. AMS will be submitting a written proposal to Region III within 2 weeks. The proposal will outline their

*plan and request the NRC release funds that are currently secured in their decommissioning financial assurance instrument. If approved, this will have an impact on their cost estimate for decommissioning and conceptual decommissioning plan.*

*Headquarters Reviewer: \_\_\_\_\_*

*Regional Reviewer: Kevin Null*

*Reviewer Code: R2*

*Reviewer Phone No.: (708)829-9854      Fax No.: (708)515-1259*

*Request Needed by: \_\_/\_\_/\_\_ (date)      Form TAR-10*

*8/93*

*cc: Cindy Pederson*



## ATTACHMENT A

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

November 3, 1995

MEMORANDUM TO: George Pangburn, Acting Chief  
Operations Branch  
Division of Industrial and Medical  
Nuclear Safety, NMSS

FROM: Michael F. Weber, Chief *Michael F. Weber*  
Low-Level Waste and Decommissioning  
Projects Branch  
Division of Waste Management, NMSS

SUBJECT: REVIEW OF ADVANCED MEDICAL SYSTEMS CONCEPTUAL  
DECOMMISSIONING PLAN

In response to your request, we reviewed the Advanced Medical Systems Conceptual Decommissioning Plan, dated October 20, 1995. We are attaching our comments.

License No. 034-19089-01  
Docket No. 030-16055

Attachment: As stated

CONTACT: T.C. Johnson, NMSS  
415-7299

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Comments on AMS Conceptual Decommissioning Plan1. Items to be Decommissioned, pp. 2-9

We assume that the project manager agrees with the scope of the proposed decommissioning and that the sources of contamination are reasonably represented in the report.

2. Decommissioning Cost Estimates, 2nd Para., p. 15

AMS is proposing to base its decommissioning financial assurance amount on a SAFSTOR approach using a 50 year storage period. In the Statement of Considerations for the 1988 decommissioning rulemaking (53 FR 24018) "the intent of the rule is to provide the necessary guidelines with regard to use of decommissioning alternatives in a manner which protects the public health and safety." In the 1988 rulemaking, provisions for deferring dismantlement are applicable only to power reactors where up to a 60 year period is specifically allowed. Deferred decommissioning for materials licensees and non-power reactors is not specifically allowed because the supporting analyses in the "Generic Environmental Impact Statement on Decommissioning Nuclear Facilities" (GEIS), NUREG-0586, showed that there would be no significant advantages to delaying decommissioning for these types of licensees. Factors that need to be considered in addressing decommissioning alternatives include the following:

- a. Occupational exposures
- b. Costs
- \* c. Waste disposal
- d. Financial viability of licensee
- e. Financial assurance provisions

In allowing up to a 60 year period for decommissioning power reactors, there is about an 80 percent saving in occupational exposures for the deferred option. The overall costs between DECON and SAFSTOR are about the same. For a 50 year SAFSTOR period the waste volumes are 90 percent less than with DECON. For a utility, utilities are considered to be fundamentally strong financial corporations due to the monopolistic system they operate in. Because the costs of DECON and SAFSTOR are similar, decommissioning financial assurance is provided at levels that could fund decommissioning even if a utility is unable to do so anytime during the SAFSTOR period.

- \* The GEIS indicates that there may be cases for materials licensees where deferred decommissioning may be the most protective of public health and safety. In Chapter 14 of the GEIS, it is stated that deferred dismantlement could be a preferred option for source manufacturers which use short-lived nuclides that decay within a few weeks or months. However, longer SAFSTOR periods are not discussed as being suitable. This is especially the case of AMS, where the viability of the corporation is tentative due to its substantive decommissioning obligations and the speculative nature of its limited business prospects for marketing teletherapy sources in the third world. By providing decommissioning financial assurance at a level that

Attachment

- 2 -

would not allow the complete remediation of the facility at any time during the SAFSTOR period, the public taxpayer could be forced to accept a decommissioning obligation that substantially exceeds the proposed level of funding.

3. Decommissioning Cost Estimates, 2nd Para., p. 15

AMS estimates that the SAFSTOR period maintenance and surveillance costs would be 4 staff-hours per week. Based on the contamination levels in the building, the groundwater seepage into the basement, restrictions on releasing water to the sewerage system, and possible structural damage to the building, this estimate appears to be very low. These low maintenance and surveillance costs substantially affect the long-term decommissioning costs.

4. Decommissioning Cost Estimates, 2nd Para., pp. 15-16

AMS is assuming that the lateral connection to the sewer system will remain in place during the SAFSTOR period. What is the rationale for this? There appears to be no cost beneficial reason to delay the remediation of this contamination.

5. Duration of Safe Storage Period, p. 19

The report states that the safe storage period is consistent with U.S. EPA policy. What policy is this? Note that our policy, embodied in the 1988 regulations, is that there is no significant benefit for delaying decommissioning at materials licensee facilities.

6. Table 3

Will a more detailed decommissioning cost estimate be submitted? This table is a summary of cost calculations, but does not provide sufficient detail for us to verify the cost estimates. We will review the detailed cost estimate when it is submitted.

ATTACHMENT B

MAR 29 1995

David Cesar, Vice President  
Advanced Medical Systems, Inc.  
121 North Eagle Street  
Gereva, Ohio 44041

Dear Mr. Cesar:

We have reviewed your letter dated October 20, 1995 with its accompanying "Conceptual Decommissioning Plan" (Plan). The letter and Plan were submitted in response to our August 17, 1995, deficiency letter.

The purpose of this letter is to summarize our review of your response. We will address: (1) the requirement for decommissioning financial assurance, (2) our August 17 letter and your response, and (3) the AMS Plan - SAFSTOR vs. DECON.

As you are aware, decommissioning financial assurance for the possession of byproduct material is required pursuant to 10 CFR Part 30, Section 35. This regulation requires certain licensees to submit a decommissioning funding plan (DFP), which includes a cost estimate and a financial assurance instrument, to cover the costs of future decommissioning in the event that decommissioning is required at the present time. In other words, 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. The amount of financial assurance required is based upon the quantity of material authorized on a license.

Our August 17 letter primarily discussed two issues which pertain to the cost estimate AMS submitted in support of decommissioning financial assurance. To summarize, the issues are: (1) NRC's request that AMS revise its facility characterization to include an assessment of the radiological conditions of the soil under the basement and WHUT room floors, and (2) incorporation of the current disposal costs at Barnwell into AMS' DFP. In your October 20 letter, you did not address issue (1). As stated in our letter, we are not confident that the three core samples taken through the basement slab prior to the flood are representative of the current radiological conditions of the soil under the basement and WHUT room floors. The presence of radioactivity under the floor would presumably increase the quantity of licensed material and therefore, increase the cost estimate for decommissioning financial assurance. Enclosed is a copy of our August 17 letter. 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 conditions.

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Contained within your Plan is a description of two methods for decommissioning the AMS facility - SAFSTOR and DECON, and the associated costs required for each method (910,000 dollars for the SAFSTOR option, and approximately 3.3 million dollars for the DECON option). After comparing and contrasting these two options, AMS proposes to establish approximately 910,000 dollars financial assurance based on a SAFSTOR approach using a 50 year storage period. The deferment of decommissioning through implementation of SAFSTOR is only applicable to power reactors. The Statement of Considerations for the 1988 decommissioning rulemaking (53 FR 24018) states, "The intent of the rule is to provide the necessary guidelines with regard to use of decommissioning alternatives in a manner which protects the public health and safety." In the 1988 rulemaking, provisions for deferring dismantlement are applicable only to power reactors where up to a 60 year period is specifically allowed. Deferred decommissioning for materials licensees and non-power reactors is not specifically allowed.

The supporting analyses in the "Generic Environmental Impact Statement on Decommissioning Nuclear Facilities" (GEIS), NUREG-0586, indicates that there may be cases for materials licensees where deferred decommissioning may be the most protective of public health and safety. In Chapter 14 of the GEIS, it is stated that deferred dismantlement could be a preferred option for source manufacturers which use short-lived nuclides that decay within a few weeks or months. However, longer SAFSTOR periods are not discussed as being suitable. In comparison to the utilities, the financial stability of many materials licensees is uncertain. Therefore, 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.

As presented in your plan, SAFSTOR is equivalent to decay-in-storage. Current NRC policy limits authorization for decay-in-storage to radionuclides with half-lives no greater than 120 days. NRC considers storage of radioactive waste with half-lives greater than 120 days as extended interim storage. Extended interim storage requires specific authorization. Furthermore, NRC policy states that extended interim storage of low level waste should not be a substitute for disposal to a licensed waste facility if access is available.

Therefore, unless a materials licensee does not have access to a disposal facility, all radioactive waste with half-lives exceeding 120 days should be shipped off-site. As stated in our October 31, 1995, letter regarding your application for renewal, we feel strongly that AMS should take the opportunity to ship its radioactive waste to Barnwell.

Table 3 to your Conceptual Decommissioning Plan entitled "Manpower and Cost Estimates" lacks the specificity the NRC needs to verify your cost estimate. A cost estimating table that organizes and provides an acceptable format to

D. Cesar

-3-

the NRC for determining decommissioning cost components and activities is illustrated in Appendix F to Regulatory Guide 3.66 (enclosed). It provides an extensive checklist of decommissioning activities that must be included in a decommissioning cost estimate. Resubmit your cost estimating table using the format provided in Appendix F.

We will continue our review of your application upon receipt of the information requested in this letter. Please reply in duplicate, within 30 days, and refer to Control Number 98507.

If you have any questions or require clarification on any of the information stated above, you may contact us at (708) 829-9887.

Sincerely,

Original Signed By  
John R. Madera, Chief  
Nuclear Materials Licensing Branch

License No. 34-19089-01

Docket No. 030-16055

Enclosures: As stated

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per  
S. DeCicco  
3/15/96



# Advanced Medical Systems, Inc.

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

ATTACHMENT C

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, 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 <sup>60</sup>Co of 93,110 Ci was requested<sup>1</sup>. 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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<sup>1</sup> 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.<sup>2</sup> 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),

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<sup>2</sup> 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).<sup>3</sup> 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 <sup>60</sup>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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<sup>3</sup> 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**

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.

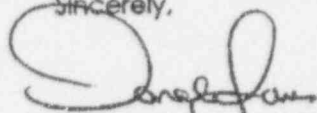
Corporate Office  
134 Holiday Court, Suite 306 • Annapolis, MD 21401  
Telephone: (410) 841-5552 • Fax: (410) 266-5588

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 <sup>2</sup>
Fume Hood	0	n/a	Ventilation ductwork	--	50 m
Hot Cells	1	27 m <sup>3</sup>	Amount of Wall Space	--	3100 m <sup>2</sup>
Lab Benches	0	n/a	Other	--	--
Sink and Drain	2	25 m		--	--

Table 3

Task	Work Days							Total Cost (\$)
	Super visor	Foreman	Technicians	HP	Crafts men	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 system, 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 exhum 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	1 ea	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 <sup>3</sup> )	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 <sup>3</sup> )		
Surcharges - Per container			0 (\$)		
Surcharges - Disposal			0 (\$/ft <sup>3</sup> )		
Waste Type	Burial Volume (ft <sup>3</sup> )	Unit Cost of Burial (\$/ft <sup>3</sup> )	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

ATTACHMENT D

AUG 17 1995

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

Dear Mr. Cesar:

We have completed our review of your May 30, 1995 response to our March 30, 1995 deficiency letter regarding your cost estimate to decommission the London Road facility. We still feel that your cost estimate of \$1,795,612 does not realistically reflect the cost that will be required to decommission the facility. You have not demonstrated that the soil under the building is free of contamination, and your proposed disposal cost of \$181 per cubic foot appears to be an under estimate based on the recent opening of Barnwell in South Carolina.

As previously discussed in our March 30, 1995 letter, recent water problems at the site has resulted in two additional problems that may significantly impact the cost of decommissioning the London Road site. The two problems are: (1) the concrete slab may have to be removed from the WHUT room as a result of the water causing additional contamination of the concrete; and (2) the contaminated water may have caused extensive soil contamination under the basement slab. The impact of having to remove and dispose of the contaminated concrete, and to remove and dispose of significant quantities of contaminated soil may be several times greater than the initial estimate.

Furthermore, the flooding problems in the basement occurred after SEG's site characterization and cost estimate report of January 1995. Therefore, we believe that the three core samples through the basement floor prior to the flood may not possibly be representative of current soil conditions under the basement slab and WHUT room.

In your response to our question concerning the possibility of structural damage to the building due to recent water problems at the facility, you stated in item (3) on page 2 of your letter that no structural damage was observed, and that recent core borings "outside" the facility indicated no "significant" outside contamination exists. AMS has not performed an adequate site characterization to support these conclusions. In addition, your statement regarding "significant" outside contamination is a clear indicator that "outside" contamination, in fact, does exist.

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Your decommissioning cost is also based on a disposal cost of \$181 per cubic foot. A more realistic cost of approximately \$300 per cubic foot (based on July 1, 1995, reopening at Barnwell) base charge plus surcharges associated with curie content, weight, cask, etc., would be appropriate. This will result in a significant increase in decommissioning cost. Please adjust your cost estimate, accordingly.

Due to the recent flooding problems and the contamination that was discovered under the isotope shop slab airlock and in the under drain system, please submit a revised characterization of the facility that includes a scientific assessment of the radiological conditions of the soil under the basement slab and WHUT room. We would expect that a re-characterization of the site and incorporation of current disposal cost at Barnwell into your decommission financial plan will dramatically increase your cost estimate to decommission the facility.

Given these recent events/discoveries at the 1020 London Road site, we feel that the January 1995 cost estimate and site characterization are no longer valid. Enclosed is a copy of the Draft Branch Technical Position on Site Characterization for Decommissioning that you should use to re-characterize the facility.

We will continue our review of your application upon receipt of this information. Please reply in duplicate, within 30 days, and refer to Control Number 98507.

If you have any questions, please feel free to contact me at (708) 829-9834.

Sincerely,

Original Signed By  
John R. Madera, Chief  
Nuclear Materials Licensing Section

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

Enclosure: Draft Branch Technical Position  
On Site Characterization for  
Decommissioning

DOCUMENT NAME: M:\03016055.DF5

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DATE	08/16/95	<i>KK</i>	08/16/95	<i>Encl</i>	08/16/95	<i>Encl</i>	08/16/95	<i>Encl</i>		

OFFICIAL RECORD COPY



# Advanced Medical Systems, Inc.

1020 London Road  
Cleveland, OH 44110  
(216) 692-3270

*Aut C Kevin*

August 30, 1996

Mr. Roy Caniano  
Deputy Director  
Division of Nuclear Materials Safety  
United States Nuclear Regulatory Commission  
801 Warrenville Road  
Lisle, Illinois 60523-4351

Re: Conceptual Decommissioning Plan - USNRC License No. 34-19089-01

Dear Mr. Caniano:

As required in provision 24(A) of Amendment No. 44 of the referenced license, enclosed is Revision 1 of the "Conceptual Decommissioning Plan for the London Road Facility". This revision, which assumes that the work specified in the June 10, 1996 proposal for the Building Recovery Project is complete, contains the decommissioning objective and its basis, a description of the items to be decommissioned, a description of 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.<sup>1</sup>

To expedite your review, I have also enclosed additional cost information for the preferred decommissioning 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.

If you have any questions or if I can provide you with additional information, please call me at (216) 692-3270. I am looking forward to timely USNRC approval of Revision 1 of the Plan.

Sincerely,

*Stephen J. Haddock*  
Stephen J. Haddock, R.S.O.

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

Enc. 1 - Conceptual Decommissioning Plan  
Enc. 2 - Cost Estimating Table

*w/18*

<sup>1</sup> In regard to provision 24(A) of Amendment 44, a revised Decommissioning Funding Plan with the new decommissioning financial instrument (e.g., the revised stand-by letter of credit) was submitted to the USNRC on August 26, 1996.

*9702110233*

SEP 3 1996

Reg. Guide 3.66 (Appendix F) Cost Estimating Table for SAFSTOR Alternative

Table 1

Planning and Preparation						
Task	Work Days					Total Cost (\$)
	Supervisor	Foreman	ITP	Clerical	Total	
Preparation of Documentation for Regulatory Agencies	4	4	4	.5	12.5	3796
Submittal of Decommissioning Plan to NRC when required by 10 CFR 30.36	10	10	10	1	31	9464
Development of work plans	10	10	10	1	31	9464
Procurement of Special equipment	2	2	1	.5	5.5	1508
Staff training	1	1	1	.5	3.5	988
Characterization of radiological condition of the facility (including soil and tailings analysis or groundwater analysis, if applicable)	2	5	2	1	10	2600
Other	0	0	0	0	0	0
Total	29	32	28	4.5	93.5	27820

Table 2

Position	Unit Cost for Workers		Worker Cost/year (\$)
	Basic Salaries (\$/yr)	Overhead Rate (%)	
Supervisor	60000	30	78000
Foreman	40000	30	52000
Craftsman	30000	30	39000
Technician	30000	30	39000
Health Physicist	80000	30	104000
Laborer	30000	30	39000
Clerical	20000	30	26000

Decontamination and/or dismantling of Radioactive Facility components					
	No.	Dimensions		No.	Dimensions
Glove Boxes	0	n/a	Amount of Floor Space	—	15 m <sup>2</sup>
Fume Hood	0	n/a	Ventilation duct work	—	0 m
Hot Cells	1	27 m <sup>3</sup>	Amount of Wall Space	—	55 m <sup>2</sup>
Lab Benches	0	n/a	Other	—	—
Sink and Drain	0	n/a		—	—

Table 3

Task	Work Days							Total Cost (\$)
	Super visor	Fore man	Techni cians	HP	Crafts men	Labor er	Total	
Decon/dismantle major components and/or processing storage tanks (Hot cell SAFSTOR and decontamination after SAFSTOR)	5	5	10	5	2	10	37	8112
Decon/dismantle waste areas (radwaste area, scrap recovery, other) WHUT room	8	8	15	10	2	15	58	13312
Monitor for compliance, reclean and monitor, if necessary	1	4	5	1	0	5	16	3120
Other (e.g., contractor fees)	20	—	—	—	—	—	10	6240
Total								30784

Table 4

Equipment/supply	Quantity	Cost
Personnel protective equipment	1 lot	20000
Misc. Decon supplies	1 lot	25000
Security system upgrade SAFSTOR	1 each	2000
Office supplies, misc. other	1 lot	2000
Survey equipment	1 lot	4000
Decon equipment rental	1 month	15000
Misc. items for 20 yr. SAFSTOR	1 lot	20000
Total		88000

Table 5

Waste type	Volume (m <sup>3</sup> )	No. Of containers	Type of Container	Unit Cost of Container	Cost of Container
LLW	1.4	1	B-25	500	500
Total	3.42	1			500

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	2.65	700	0	1855
Total					6691

Table 7

Burial Charges			340 (\$/ft <sup>3</sup> )		
Surcharges - Per container			0 (\$)		
Surcharges - Disposal			0 (\$/ft <sup>3</sup> )		
Waste Type	Burial Volume (ft <sup>3</sup> )	Unit Cost of Burial (\$/ft <sup>3</sup> )	Surcharge (\$)	Burial Cost (\$)	
Class A - LLW	200	340	0	68000	
Asbestos	21	150	0	3150	
Total					71150

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 Tech	Clerical	Total	
Outdoor release survey	4	15	15	1	40	6812
Building release survey	5	25	25	5	60	11180
Total	9	40	40	6	100	17992

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 (20 yr)	50	240	25	50	365	81120