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

Robert Meschter, R. S. O.

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

2-7-97

RESPONSE TO USNRC COMMENTS ON THE AMS CONCEPTUAL DECOMMISSIONING PLAN

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

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

Action Taken: No additional action required.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Action Taken: None required.

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

AMS Response: Concur.

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

ATTACHMENT 1

Quality
Environmental
Solutions, Inc.

April 11, 1996

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

Dear Carol:

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

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

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

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

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

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

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

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

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

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

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

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

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

Sincerely,

Donald E. Jones, P.G.
Registered Hydrogeologist

ATTACHMENT 2

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

Table 1

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

Table 2

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

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

Table 3

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

Table 4

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

Table 5

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

Table 6

Distance shipped			2525 (miles)		
Unit Cost for shipment			2.65 ($/mile/truckload)		
Additional Charges - Overweight			0 ($/mile)		
Additional Charges - Surcharge			0 ($/mile)		
Waste Type	**No. Of shipments**	**Unit Cost for shipping ($)**	**Distance Shipped (miles)**	**Surcharge ($)**	**Transportation Cost ($)**
LLW	1	2.654	700	0	1855
Asbestos	1	2.65	1825	0	4836
Total					6691

Table 7

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