Advanced Medical Systems, Inc.
[illegible] London Rd
Cleveland, Ohio 44110
216-692-3270

June 25, 1996

Mr. Geoffrey Wright
United States Nuclear Regulatory Commission
801 Warrenville Road
Lisle, Illinois 60523-4351

Re: USNRC License No. 34-19089-01

Dear Mr. Wright:

On March 1, 1995 and March 20, 1995, Advanced Medical Systems, Inc. (AMS) submitted applications to amend the referenced license to permit release of ground surface water that collects in the *remediated* foundation drainage system of the London Road facility. As of the date of this letter, USNRC authorization to proceed on this request has not yet been received.

Since the date of those applications, AMS has faced a series of extenuating circumstances that have increased the urgency for action. However, we recognize that considerable time has passed since then, and that some of the original descriptions and specifications contained in the 1995 applications are no longer applicable. The purpose of this letter is to reiterate our request to amend the referenced license to permit free discharge of water pumped from the foundation drainage system. Attached is a brief description of the regulatory action on this issue to date, a discussion of the reason for our request and its justification, and a description of the procedure we intend to follow when USNRC authorization to proceed is given.

Please call me at (216) 692-3270 if you have any questions or if I can assist you in any way in expediting your review. We are asking for prompt USNRC action on this important issue.

Sincerely,

Robert Meschter, RSO

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

REQUEST TO DISCHARGE GROUND/SURFACE WATER FROM THE REMEDIATED FOUNDATION DRAINAGE SYSTEM

Purpose

As a result of technically-indefensible legal action taken by the Northeast Ohio Regional Sewer District (NEORSD), the Advanced Medical Systems, Inc. (AMS) facility on London Road does not have a direct connection between the building and the regional sewer system for the discharge of sanitary waste, rain water from the building's roof drains or the storm water that surrounds the building. Even after completion of an extensive sewer remediation project that involved installation of a new foundation drainage system and a new manhole, the free-flow of water away from the building is still not possible for a variety of legal and regulatory reasons.

As of the date of this letter, AMS is bound by court order and USNRC license requirements to pump water from the foundation drainage system into hold-up tanks, sample the tanks for the presence of radioactivity, notify the NEORSD of pending discharge of each tank, and await the results of a NEORSD confirmatory sampling effort prior to discharge. As a result, a major portion of the daily activities performed by the AMS staff at the London Road facility involves water management.

Because of the delay associated with discharge of each tank (e.g., typically four days), coupled with the increased precipitation AMS experiences during the spring, early summer and fall months, temporary limitations in tank storage capacity may occur. If a spring or summer storm should cause our tank or pumping capacity to be exceeded, AMS has one of two options: (1) it must discharge the pumped water without sampling and in violation of the court order, or (2) it must cease pumping the water out of the manhole. If pumping ceases, (e.g., if the foundation drainage system is rendered non-functional), the storm water that accumulates around the building is likely to enter the building basement, come into contact with the contents of the WHUT Room and the stored waste, and become contaminated. This water cannot be discharged until the radioactivity has been removed.

The financial and radiological impacts associated with foundation drain failure or impaired tank capacity would be similar to those suffered during the financially-devastating flood of 1995. This occurrence forced AMS to implement an expensive water treatment and sewer remediation program that cost in excess of $1M[1]. It also drained the corporation of almost all of its cash reserves, rendering it unable to bear the cost of another water clean-up project if such an event should be required.

The 1995 basement flood also raised questions in regard to the structural integrity of the building. In subsequent inspections by the USNRC and a registered Professional Engineer working under contract to AMS, it was determined that this event caused no apparent damage to the building or its ability to contain its inventory of licensed radioactive materials. However, there is no guarantee that a future flood event will have a similar outcome. Thus it is imperative that AMS receive USNRC authorization to freely discharge the water from the foundation drainage system, without lengthy and costly hold-up sampling steps, so that

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[1] As of the date of this letter, the treated water from the 1995 project continues to be stored in the AMS warehouse in collapsible storage tanks.

a permanent (functional) drainage system can be installed. Only then will the potential for water ingress into the basement be minimized.

Regulatory Action to Date

On March 1, 1995, AMS submitted an application to amend USNRC License No. 34-19089-01 to permit water treatment and sewer remediation to proceed at the London Road facility.[1] Included in that application was a proposed methodology for evaluating contaminant levels in the ground surface water after the work was complete so that water could be freely discharged. In response, Amendment No. 32 to the license was issued. However, re-connection of the remediated foundation drainage system to a new manhole and installation of a methodology for evaluating contaminant levels were specifically excluded.

On March 20, 1995, AMS requested another amendment to License No. 34-19089 wherein re-connection of the remediated foundation drainage system to a new manhole, installation of a sampling device, and authorization to discharge through the new lateral ground surface water that meets the release criteria were specifically requested.[2] In a June 14, 1995 communication, the USNRC solicited additional information in regard to AMS's request. AMS provided that information on June 16, 1996, and on June 21, 1996, the USNRC responded as follows:

> "...we have received your June 16, 1995 response to our June 14, 1995 deficiency letter and will make every effort to review your response in an expeditious manner. We will notify you if we have additional questions. Again, please note that we have only approved the installation of a new manhole and lateral and its re-connection to the existing under drain system. We will need to evaluate all of the other issues regarding cobalt-60 contamination within the existing underdrain system and soils both under the building and in the vicinity of the underdrain system prior to discharge of collected water."

On June 27, 1995, AMS received Amendment No. 37 to the referenced license, wherein the water discharge issue was again excluded. However, in the transmittal letter, the USNRC stated the following in regard to how effective the sewer remediation might be:

> "Note that we are still in the process of reviewing information you submitted relative to installation of a sampling device on the new lateral connection (reference Item 2 of your 3/22/95 letter, and letter dated June 16, 1995). Also regarding your June 16 letter, we are reviewing Item II.C. which describes your proposed soil sampling program to evaluate the radiological conditions of the soil under the building and in the vicinity of the under drain system. We anticipate that we will have additional questions on both of these issues and will forward them to you as soon as possible."

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[1] AMS recognizes that it is barred by court order from freely releasing the ground surface water collected from the underdrain system. However, USNRC authorization to free-release the water is a necessary part of a permanent legal solution.

[2] The March 1, 1996 amendment application was supplemented in a March 8, 1995 communication.

On July 17, 1995, AMS received Amendment No. 18 to the referenced license. Again, the water discharge issue was excluded. However, the following statement in regard to the effectiveness issue and subsequent free-release of water was in the transmittal letter:

> "Note that we are still in the process of reviewing Item II.3 in your June 16, 1995 letter, regarding your proposed soil sampling program, and the grouting remediation project. We anticipate that we will have additional questions on these issues and will forward them to you as soon as possible".

As of the date of this letter, no additional regulatory action on our requests to freely discharge ground surface water from the remediated foundation drainage system has been taken.

Effectiveness of the Sewer Remediation

In its June 27, 1995 and July 17, 1995 communications, the USNRC expressed concern over the effectiveness of the sewer remediation project, and implied that this was the reason for delayed action on issuing a license provision to discharge water from the foundation drainage system. AMS maintains that the sewer remediation project was completely effective in removing or isolating all residual radioactivity outside of the London Road building, and that the only residual contamination remaining outside of the building after the remediation (e.g., that in the abandoned footer drain in the immediate vicinity of the Source Garden and the abandoned lateral connection between the old manhole and the London Road interceptor) is hydraulically isolated from ground surface water paths to the foundation drainage system. AMS also 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 and thus cannot contribute to future contaminant migration. The following are the reasons why these positions are justified:

> (1) Throughout the period of time that the basement of the London Road facility was flooded due to the regional sewer district'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.[4] This was evidenced in USNRC Inspection Report No. 030-16055/95006(DNMS) wherein it was 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 WIUT 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". This finding was confirmed during an independent evaluation performed by a registered Professional Engineer under contract to AMS.[5] Thus the structural evidence supports our position that pressure gradients sufficient to jeopardize the integrity of the slab did not occur.

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[4] Documentation to support this position is available for USNRC review.

[5] See June 7, 1996 letter from R. Meschter (AMS) to Mr. Geoffrey C. Wright (USNRC, Region III).

(2) During the 1995 sewer remediation project, AMS confirmed, through measurements and sampling, that the shale layer upon which the building is built and which formed the base of the existing foundation drainage system did not contain detectable radioactivity. In fact, no detectable activity was identified during the remediation other than that in the existing drain tile and the fill material upon which the drain tile rested. Thus the radiological data acquired during the remediation project support our position that the radiological conditions of the soil under the basement and the WTRT room are equivalent to their pre-flood conditions (e.g., when core samples taken through the basement in prior to the flood exhibited radiologically-benign conditions).

(3) In an April 12, 1996 communication to Mr. John Madera (USNRC, Region III), AMS attached a Registered Hydrogeologist's report wherein he concluded that the new foundation drainage system is hydraulically connected to the soils under the basement floor. In other words, if contamination migrated from the basement to these soils, it would appear in the water that is pumped out of the system.

(4) Between the 1995 completion date of the sewer remediation project and the date of this letter, over 140,000 gallons of water have been pumped from the foundation drainage system, confirmed to be "clean" through laboratory analyses, and discharged.[6] This is further proof that no mobile contamination is under the basement or in the new drainage system.

The findings of the USNRC Inspection Report, the hydraulic connection between the soils under the building and the foundation drainage system, and the fact that the water being pumped from the foundation drains has been and continues to be radiologically benign, provide an abundance of evidence to support our position that the new foundation drainage system is completely isolated from any sources of radioactivity.

Basis for Modifying the 1995 Discharge Procedure

In AMS's March 1, 1995 and March 20, 1995 license amendment requests to discharge ground surface water, it was anticipated that an immediate outcome of the sewer remediation project would be re-connection of the sanitary and storm sewers from the London Road facility to the NEORSD's interceptor. Therefore, in those applications AMS proposed a monitoring methodology designed to accomplish two purposes:

- *Confirming* that water that entered the sewer system was free of radioactivity;
- Demonstrating that the remediation efforts were, in fact, effective.

Because the water in the remediated underdrain system was intended to flow by gravity into the London Road interceptor, the proposed monitoring methodology involved installation of an in-line flow meter and composite sampler into a new lateral connection. The intent was to collect and analyze composite samples on a planned and periodic basis until such time as all parties were confident of the effectiveness of the sewer remediation effort.

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[6] Cobalt-60 was identified in two 3,000 gallon batch tanks and one 25,000 gallon frac tank. However, the source of this contamination was the tanks themselves, which were used as process tanks for the water treatment project. The residual ^{60}Co that remained in the batch tanks when they were first filled with water from the remediated underdrain system was removed by filtration. Sampling of subsequent batches of water held in these tanks has been negative for the presence of ^{60}Co. Remedial action for the frac tank is delayed pending resolution of a non-radiological issue.

Unfortunately, due to the on-going litigation between AMS and the regional sewer district, re-connection of the building foundation drainage system to the London Road interceptor is not likely in the foreseeable future. Therefore, an alternative methodology for meeting the intent of the March 1 and March 20, 1995 applications (e.g., one that does not require a gravity-fed discharge path, is necessary.

The water that enters the foundation drainage system is neither effluent from the London Road facility per 10 CFR 20.1302(b)(2)(i), nor is it discharged licensed materials into the sanitary sewer system per 10 CFR 20.2003(a). It is simply groundwater and storm water that collects within the "bathtub" of shale surrounding the building. Since this groundwater and storm water does not come in contact with any sources of ^{60}Co, continuous monitoring of the radionuclide content of this water as required in 10 CFR 20.1302(a) is not necessary.

On the other hand, 10 CFR 20.1501 and license condition 23.J of License No. 34-19089-01 require AMS to conduct a surveillance program in order to estimate doses to the public and to document that migration of radioactive materials from known locations does not occur. USNRC Regulatory Guide Reg Guide 8.37, "ALARA Levels for Effluents from Materials Facilities" indicates that Regulatory Guide 4.14, "Radiological Effluent and Environmental Monitoring at Uranium Mills" is a useful source of guidance for materials licensees in this regard.

Regulatory Guide 4.14 recommends that samples of water from "any surface water crossing the site boundary and offsite streams or rivers that may be subject to drainage from potentially contaminated areas or from a tailings impoundment failure" be collected at least monthly. Pursuant to this guidance, AMS intends to implement an even more aggressive sampling program for the surface water that enters the foundation drainage system in order to document that migration of radioactivity from potentially contaminated areas has not occurred. The following section describes the proposed sampling program.

Description of the Ground/Surface Water Sampling Program

Once USNRC and legal authority to freely discharge the storm ground water that collects in the foundation drainage system of the London Road building has been received, AMS will operate a temporary automatic pumping system to remove water that accumulates in the new manhole. This water will be discharged to a storm sewer catch basin on the west side of the building's west parking lot. AMS will then pursue the legal authority to re-institute a permanent (gravity-fed) discharge system.

Consistent with the Regulatory Guide 4.14 guidance, a one-liter sample of water will be collected from the manhole once per week and analyzed pursuant to Radiation Safety Procedure No. RSP-018, "Operation of the Gamma Spectrometer", and RSP-019, "Assessment of Radioactivity in Water Samples"[2]. All results will be documented and maintained as described in RSP-003, "Radiation Protection Records".

Regulatory Guide 4.14 recommends that the lower limits of detection for the sample analysis be 10% of the appropriate concentration limit listed in Table II of Appendix B to 10 CFR 20 (e.g., 300 pCi per liter for

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The Regulatory Guide also states that "operational samples should be collected upstream and downstream of the area of potential influence", and that "any unusual releases (such as surface seepage) that are not part of normal operations should be sampled."

[2] As recommended in Regulatory Guide 4.14, if the manhole is dry on a scheduled sampling collection date, that sample will be collected immediately after water starts to flow.

^{60}Co. However, the following release criteria that are specific to AMS (see ESP-01) and which demand a more stringent performance standard, are applicable:

- Water that contains greater than 100 pCi per liter of ^{60}Co in any form (e.g., "soluble" or "insoluble"), as determined from the sampling and analysis effort, shall not be discharged.

- Water that contains no detectable ^{60}Co activity by direct counting (e.g., analytical results that are below a nominal detection limit of 70 pCi per liter) may be discharged.

- Water that exhibits both of the following may be discharged:

  Less than 100 pCi per liter of ^{60}Co by direct counting and

  No detectable ^{60}Co activity (e.g., analytical results that are below a nominal detection limit of 15 pCi per liter) on a 0.45 micrometer filter after filtration.

Since AMS would consider any detectable ^{60}Co in samples collected from the manhole to be an "unusual release", such an occurrence would trigger re-instatement of "tanking" procedures (e.g., the water will be pumped to hold-up tanks, sampled, and confirmed to meet the release criteria prior to discharge) until the cause has been identified and corrective action instituted.

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

MEMORANDUM TO: [illegible]
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

ATTACHMENT 2

[illegible] somewhat [illegible] 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

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estimate that addressed the security/integrity retrofit. This is especially important since AMS was recently given a criteria amendment that allows AMS to significantly reduce their inventory.

Attachments: As stated

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

August 14, 1996

MEMORANDUM TO: John Madera, Chief
Materials Licensing Branch
Division of Nuclear Materials Safety, RIII

FROM: Josephine Piccone, Acting Chief
Operations Branch
Division of Industrial and
Medical Nuclear Safety, NMSS

SUBJECT: REVIEW OF THE PROPOSED WATER ANALYSIS PROCEDURES RECENTLY SUBMITTED BY ADVANCED MEDICAL SYSTEMS (AMS)

We have reviewed the water analysis procedures recently developed by AMS and sent to region III on June 11, 1996. These procedures included RSP-018, Operation of the Gamma Spectrometer, and RSP-019, Assessment of Radioactivity in Water Samples. Both procedures were dated June 11, 1996. Our major concerns with the procedures are discussed below. More detailed comments are provided in the attachment to this memorandum.

1. The bases for the proposed maximum detectable activity (MDA) of 70 pCi/l for water samples and 15 pCi/l for filters are not well developed and justified in the technical basis section of Procedure RSP-019. We suggest that AMS provide a more defensible basis for their choice of MDA. In our letter to them dated May 31, 1996, we suggested that the MDA be based on the capability of a detection system that is state of the art for the application but not necessarily extraordinarily specialized or sophisticated. We recommend that AMS expand their technical basis section to include a detailed description of their measurement systems and their testing of these systems to evaluate their measurement capabilities.

2. The procedures make only brief mention of the quality assurance program to be used for their measuring systems. We suggest that AMS develop a better quality assurance program, and provide a detailed description of that program in the technical basis section. The quality assurance program should extend to any outside analytical laboratories that AMS may use to confirm their results.

Contact: Sami Sherbini
(301) 415-7902

9702060379

ATTACHMENT 3

3. The procedures do not fully develop the bases for determining whether a sample does or does not show activity. They are still using the MDA as a criterion for this purpose, which is incorrect. They need to develop decision levels, independently of the MDA, to allow this determination to be made. The development of this decision level should be described in detail in the technical basis section.

4. AMS has not resolved the discrepancies that appeared several times between their water analyses and those performed by The Northeast Ohio Regional Sewer District (NEORSD). These discrepancies appear to have been due to differences in sampling protocols.

5. The procedures contain several errors in the manipulation of the data, most notably the error of using the MDA for making field decisions, and the incorrect equations provided in the procedures for calculating the MDA.

Attachment: As stated

ATTACHMENT

COMMENTS ON AMS PROCEDURES

Procedure RSP-018: Operation of the Gamma Spectrometer

Page 2, 5.1.3:

It is not clear what is meant by "so that the two primary peaks fall in channels 155 and 176." Confirm that the maxima of the Co-60 peaks occur at these channel numbers?

Procedure RSP-019: Assessment of Radioactivity in Water

1. Page 3, 5.1.2: It is not clear whether the analysis is to be performed in-house or by a commercial laboratory. It should be clear that the laboratory performing the analyses must participate in a quality assurance/quality control program that is approved by AMS and periodically audited by a recognized group or organization outside the organization that operates the laboratory. Pre-qualification of the laboratory is only part of this ongoing program. A later section (5.4.3) states that samples may be forwarded to a commercial analytical laboratory for confirmatory analysis. Some indication should be provided as to when such an action may be necessary.

2. Page 3, 5.2.1: Sampling these tanks has a history that indicates that different results are obtained from samples taken from various locations within the tank. The differences in the results have not been explained, giving the impression that the mixing used by AMS to date has not been effective, and that there remained stratification of the Co-60 even after prolonged mixing. It is therefore necessary for AMS to do one of two things: either explain the differences in the results obtained in the past, or conduct tests to demonstrate that their proposed method does indeed produce representative samples. Without such data, the results will remain suspect because of unexplained past anomalies.

3. Page 3, 5.2.3: In the note, it is stated that samples may be collected from any location in the tank. In the interest of consistency, we suggest specifying a sampling method at this point.

4. Page 4, 5.4.2: It is not clear where the MDA of 70 pCi/l comes from. In our letter to AMS, we stated that AMS should establish a counting method that is considered typical of current and ordinary state of the art for such an

application. We have not seen any data to show that the licensee has done that. We therefore suggest that the licensee establish their well-shielded counting system, in a low background area, select a reasonably long counting time, and then establish the sensitivities achievable by such a system. We are confident that the MDA will be far lower than the proposed 70 pCi/l. Also, in the equation for MDA, if the time is to be in seconds, the procedure should clearly indicate that the count rate B_R must also be in counts per second.

The Note at the end of this section is not correct. The MDA will not ensure a 0.05 probability of a Type II error when comparing the sample result to the background result. Suggest removing or rewriting to more accurately reflect the technical meaning of the MDA.

The equation for MDA given in this section, and elsewhere in the procedure, is incorrect. The equation, in the form given, contains the implicit assumption that the sample (or gross) counting time and the background counting time are equal. This is not the case, however, because the background is counted for 8 hours, whereas the samples are counted for times less than 8 hours (See procedure RSP-018 for sample counting times). The equation in the form given will underestimate the MDA.

5. Page 4, 5.5.1: This step requires that all samples less than 100 pCi/l be drawn through a filter, even those that show no activity that is statistically different from background. The licensee should confirm that this is the intent.

Finally, information should be added to the section that indicates that proper procedures performed by trained individuals will be used to ensure that the sample will be drawn correctly through the filter.

6. Page 5, 5.5.3: Although the origin of the 15 pCi/l detection concentration level is mentioned in the technical basis section of the document, adequate techincal support for this number is not provided. This information should be provided.

This step, or the remainder of the procedure, does not describe what to do with the results of the analyses on the filter. What criteria are to be used to decide if the filter indicates insoluble activity?

7. Page 6, 5.7.4:

The condition given in 5.7.4.2 is not acceptable. The use of MDA as criterion for deciding if activity significantly different from background was detected is incorrect. The licensee must establish a decision level, independently of the MDA, that will be used to make this determination.

Technical Basis for Water Discharge Criteria

1. Page 7, Second point:

This point contradicts the first point. The first point stresses the regulatory requirement that no insoluble Co-60 may be discharged to the sewer. The second point tries to estimate the amount of insoluble Co-60 that may be discharged to the sewer without causing the ash to exceed 8 pCi/g. The analysis in the second point also neglects to consider the possibility that Co-60 discharged to the sewer as soluble cobalt may still end up in the ash because of a number of reasons, such as precipitation of the "soluble" cobalt during waste treatment, or settling of the "soluble" cobalt that is, in fact, not soluble but very finely dispersed insoluble material. We suggest re-assessment of the second point and possibly deleting.

2. Page 7, Third point:

The drinking water standard is not relevant in this case. It is suggested that it be removed because it does not contribute to the technical basis being developed.

3. Page 8, Second Point from the bottom:

This statement concerning Information Notice (IN) 94-07, that "the standard does not provide guidance on how much gross beta activity indicates an insoluble material," is incorrect. The standard states, on Page 4, that "activity in the suspended solids portion of the effluent greater than that found in similarly processed background water samples would indicate the presence of insoluble radioactive material." In other words, the IN states that any activity that is statistically distinguishable from background indicates the presence of insoluble material. Background in this case is the filter residue from water filtered in the same manner as the sample. The water used to produce the background filter is water obtained locally but that is not contaminated by the licensee's operation.

4. Page 9, First point:

This point is at variance with the data NRC has been getting from both commercial

laboratories that were used by AMS and NEORSD to analyze the water samples from the discharge tanks. The results from these laboratories were routinely reported as having been obtained using equipment capable of measuring 1-2 pCi/l using counting times as low as one to two hours. How can these values be reconciled with the values indicated in this point?

In this connection, AMS has not described the system it intends to use for sample analyses. We suggest including this in the technical basis section. It is necessary to know the system to be used, type and size of detector, counting times, background levels in the counting laboratory, location of laboratory within the AMS facility, shielding for the detector, methods of spectral analysis to be used, type of blank samples, and source of water to serve as the background, and the quality assurance program for the system.