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POLICY ISSUE

November 13, 1990

(NEGATIVE CONSENT)

SECY-90-382

For: The Commissioners

From: James M. Taylor
Executive Director
for Operations

Subject: LONG-TERM USE OF WASTE ENCAPSULATION AND STORAGE FACILITY
(WESF) SOURCES AT COMMERCIAL IRRADIATORS

Purpose: To inform the Commissioners of the staff's recommendation about long-term use of WESF sources and to provide a response to a section of the Staff Requirements Memorandum (SRM) dated September 14, 1990, on SECY-90-211.

Background: In June 1988, a WESF source failed at a commercial irradiator operated by Radiation Sterilizers, Inc. (RSI) in Decatur, Georgia. Since that time, the Department of Energy (DOE), from which the WESF sources are leased, has sought to identify, remove, and examine leaking and suspect sources (i.e., Capsules 1502 and 1504, respectively) from the RSI, Decatur facility. In addition, DOE has been conducting investigations to determine:

- 0 cause of failure,
- 0 all factors contributing to cause of failure, and
- 0 whether other sources might fail.

In SECY-90-066 and SECY-90-093, the staff provided information on the use of WESF sources in commercial irradiators in the United States. WESF sources are being used at two commercial facilities; namely, Applied Radiant Energy Corporation (ARECO), in Lynchburg, Virginia, which is licensed by the Nuclear Regulatory Commission (NRC), and Iotech, in Northglenn, Colorado, which is licensed by the Agreement State of Colorado. (WESF sources at RSI's NRC-licensed facility in Westerville, Ohio, are being stored, pending shipment to a DOE facility.)

Until recently, the staff has believed that ARECO and Iotech could continue to use WESF sources, until DOE

Contact:
Patricia Vacca, NMSS
X20615

NOTE: TO BE MADE PUBLICLY AVAILABLE
WHEN THE FINAL SRM IS MADE
AVAILABLE

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completed its investigation into cause of failure. The staff's belief was based on the following considerations: the modes of operation of these two facilities are quite different from RSI's; both facilities have increased surveillance to provide for early detection if a failure should occur; WESF sources at ARECO successfully passed integrity tests in February 1990; and the staff believed that DOE would soon complete its investigation.

The staff has long had a number of concerns about long-term use of WESF sources. These concerns crystallized after reading an advance copy of the Interim Report of the DOE Type B Investigation Board (Interim Report). In the same time period, the SRM dated September 14, 1990, directed the staff: to obtain the Interim Report and any records of the WESF source testing performed to date; to establish a panel of experts, with appropriate expertise, who were not directly involved in the decisions to license WESF sources; and to have the panel review DOE's findings and report on an assessment of the findings and recommendations regarding continued commercial use of WESF sources.

Discussion:

Staff Recommendation and its Basis: As of October 1990, although DOE and its contractors have removed Capsules 1502 and 1504 from the RSI, Decatur facility and subjected them to non-destructive testing, they have still not identified the causes of failure. This work has been delayed many times and continues to be delayed. DOE now expects to complete destructive testing of Capsules 1502 and 1504, as well as other WESF sources, by the first quarter of 1991, and to have a written report by August 1991. The DOE Type B Investigation Board has completed an Interim Report on its evaluation of factors that might contribute to cause of failure (e.g., the design, testing, and manufacture of the sources; the licensing process; the operations at the RSI, Decatur facility).

Based on reading an advance copy of the Interim Report and on the data provided by DOE and its contractors at periodic meetings over the past two years, it appears that there are numerous uncertainties related to the manufacture, quality control, and quality assurance of the WESF sources. In addition, it appears that DOE's planned investigation of the cause of failure of Capsule 1502 will not, in itself, provide adequate assurance that all WESF sources will retain their integrity during long-term use in commercial facilities.

In view of these uncertainties, the likelihood of continued delays in completion of DOE's cause-of-failure analysis, and the lack of adequate confidence in the long-term integrity of these sources, the staff has concluded that it is a prudent safety measure to have all WESF sources, currently in commercial use in the United States, returned to DOE well before the end of their respective leases in an expeditious, orderly manner, and to institute a testing program to enhance monitoring of source integrity in the interim.

The staff believes that the return of the WESF sources need not occur immediately in light of: practical considerations (e.g., cask availability); preliminary results of DOE's cause-of-failure analyses that, to date, do not suggest immediate concerns for the sources at ARECO and Iotech; the results of visual examination and "clunk" tests of WESF sources at ARECO in February 1990; and the previous commitments of both licensees regarding increased surveillance to provide early indication of source failure.

On September 25, 1990, NRC representatives of both Region II and the Office of Nuclear Material Safety and Safeguards met with representatives of ARECO to discuss these matters and suggested that WESF sources be returned to DOE by December 31, 1991. This date was chosen to allow for completion of the on-going RSI shipping campaign and for orderly withdrawal of the WESF sources from ARECO and Iotech. Enclosure 1 documents the September 25 meeting, requests certain information, and provides ARECO with the opportunity to propose an alternative schedule or to justify why its WESF sources should not be returned to DOE well before the end of its lease.

Although not reflected in Enclosure 1, the staff anticipates that ARECO will request that its return of WESF sources coincide with its move to a new facility, and that it will propose a date in late 1992. The staff will evaluate ARECO's complete response to Enclosure 1, and if it is satisfied, the staff will approve a delay in returning ARECO's 25 WESF sources.

The Office of Governmental and Public Affairs (GPA) will notify the State of Colorado of NRC's action with respect

to ARECO and will recommend that Colorado take similar action with regard to its licensee, Iotech (Enclosure 2).*

The staff will also notify DOE of its action and request the cooperation of DOE and its contractors in the orderly withdrawal of WESF sources from ARECO and Iotech (Enclosure 3).

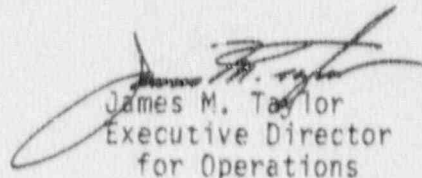
DOE Documents and Review by a Panel of Experts: Although DOE has not officially provided NRC with a copy of the Interim Report, a DOE staff member gave Enclosure 4 to the NRC staff; this document summarizes the Interim Report and was used in a DOE meeting on the report. As indicated above, the staff has read an advance copy of the Interim Report.

Since the staff's objective is to get WESF sources returned to DOE as soon as is practicable and the staff does not envision issuing any other licenses for commercial use of WESF sources, the staff believes that it is not necessary to establish a panel of experts now to review the Interim Report and make recommendations about continued, commercial use of these sources. In the unlikely event that, in the future, the staff were to receive a credible application for commercial use of WESF sources, then the staff would: establish a panel of experts; ensure that, as appropriate, it establishes the panel in accordance with the requirements of the Federal Advisory Committee Management Act; and obtain the panel's recommendations, before reaching a decision on the requested license. GPA will request that the Agreement States seek NRC's advice in similar situations, so that a similar procedure can be followed. Please note that the staff does not plan to establish a review panel with regard to any licensing action associated with the orderly return of WESF sources to DOE from any of the four commercial facilities that currently possess WESF sources (i.e., RSI, Decatur, Georgia; RSI, Westerville, Ohio; ARECO; and Iotech). Return of WESF sources from the two RSI facilities is continuing.

* Based on the failure of a WESF source at the RSI, Decatur facility, both RSI and Iotech have filed multimillion dollar claims against DOE under the Federal Tort Claims Act. As of the writing of this paper, ARECO has not filed a similar claim against DOE. On October 15, 1990, the staff received documents related to Iotech's claim and returned the documents on October 19, 1990, because they were not needed for any regulatory action and NRC is not involved in Iotech's claim.

Recommendation: Unless the Commission directs otherwise, the staff plans to transmit Enclosures 1 through 3, two weeks from the date of this paper. With respect to the September 14, 1990, SRM requesting the staff to form a panel of experts to assess use of WESF sources, such a panel should be formed only if there is a credible proposal to use WESF sources in the future.

Coordination: The Office of the General Counsel has reviewed this paper and has no legal objection. GPA concurs in this paper.


James M. Taylor
Executive Director
for Operations

Enclosures:

1. Draft ltr to ARECO
2. Draft ltr to Colorado
3. Draft ltr to WYoung, DOE
4. Summary of Interim Report
of DOE's Type B
Investigation Board

SECY NOTE: In the absence of instructions to the contrary, SECY will notify the staff on Tuesday, November 27, 1990, that the Commission, by negative consent, assents to action proposed in this paper.

DISTRIBUTION:

Commissioners
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REGION II
EDO
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The Applied Radiant Energy Corporation.
ATTN: James J. Myron, Ph. D.
Vice-President of Safety and
Regulatory Compliance
2432 Lakeside Drive
Lynchburg, Virginia 24501

Gentlemen:

This is in reference to: (1) your January 21, 1988, application to renew License No. 45-11496-01 that includes, among other things, a request to continue using Waste Encapsulation and Storage Facility (WESF) sources that contain cesium-137; (2) the Nuclear Regulatory Commission's (NRC's) conclusion on the acceptability of continued, long-term use of WESF sources; and (3) the September 25, 1990, meeting between you and other representatives of Applied Radiant Energy Corporation (ARECO) and Glen Sjoblom, William Cline, and Patricia Vacca of the NRC staff.

During the September 25, 1990, meeting, NRC representatives explained NRC's concerns about long-term use of WESF sources in commercial irradiator facilities. NRC is concerned about numerous uncertainties related to the manufacture, quality assurance, and quality control of WESF sources; the continued delays in the Department of Energy's (DOE's) determination of cause of failure of a WESF source at the Radiation Sterilizers, Inc. (RSI) facility in Decatur, Georgia; and the apparent difficulties in extrapolating information about a single WESF source (e.g., cause of failure) to all WESF sources. Thus, NRC lacks confidence that all WESF sources will retain their integrity during long-term use in commercial facilities.

Accordingly, in the September 25 meeting, NRC representatives informed you of our conclusion that it is a prudent safety measure to have all WESF sources returned to DOE well before the end of the lease, in an expeditious but orderly manner. We believe that this action is prudent, even though we recognize that your WESF sources are in a relatively benign environment, where the risk of source failure is less than at RSI. The staff also indicated to you in the September 25 meeting that it would recommend that the Agreement State of Colorado take similar action with regard to Iotech, the other commercial irradiator that is located in Colorado and is still using WESF sources.

The return of the WESF sources need not occur immediately, in light of practical considerations (e.g., cask availability); preliminary results of DOE's cause of failure analyses that, to date, do not suggest immediate concerns about your sources or those at the other licensed commercial facility (i.e., Iotech in Colorado); the February 1990 results of visual examination

Enclosure 1

and "clunk" testing of your sources; and your commitments and capabilities for early detection and isolation of a failed source. The NRL representatives suggested that all WESF sources be returned to DOE by December 31, 1991, a date that should allow completion of the on-going RSI shipping campaign and orderly withdrawal of WESF sources from both your facility and Iotech.

In the interim, however, because of the concerns noted above, we believe that it is also prudent to enhance surveillance of the sources to detect source degradation before leakage.

In light of NRC's conclusion on this matter, we request the following information from you. Please submit:

1. A schedule for return of all WESF sources to DOE as soon as is practicable, but not later than December 31, 1991. If you propose a date later than December 31, 1991, or you do not agree to return the WESF sources to DOE well before the end of your lease, explain your rationale, and justify your request or decision.
2. A program for ongoing, periodic testing of the WESF sources at your facility, preferably by an independent organization. As a minimum, your program should specify:
 - 0 the testing procedure that will indicate potential source degradation (e.g., gauging tests, "clunk" tests, or gamma scans using portable equipment designed by Westinghouse Hanford Corporation [WHC] would be acceptable; other test procedures would be considered on a case-by-case basis) and who will conduct the testing. It would be desirable for the tests to be conducted by WHC, because its staff has the necessary skills and experience. If you or another organization plan to conduct the tests, it will also be necessary to submit the details of the proposed test procedures.
 - 0 frequency of testing (e.g., at intervals not to exceed twelve months) and when the first test will be performed; if tests are to be conducted in conjunction with preparation for shipment by December 31, 1991, they do not need to be conducted separately;
 - 0 actions to be taken if tests results indicate changes have occurred in the sources (e.g., sources are swollen or leaking; sources do not "clunk").

We would like to incorporate the above-requested information into your license. This could be accomplished most easily if your response to this letter is in the form of an addendum to your renewal application. No fee need accompany your response to this letter, because we would consider any licensing action we take to be either an interim step toward renewing your license or final action on your renewal request.

Please submit the information requested above by (INSERT DATE CERTAIN) to: Regional Administrator, U. S. Nuclear Regulatory Commission, Region II, 101 Marietta Street, Suite 2900, Atlanta, Georgia 30323.

Please note that, depending on your circumstances, other licensing actions may be needed before you can convert your irradiation operations to the use of cobalt-60. Please review your license carefully and submit requests for any other needed licensing actions as soon as possible to ensure timely authorization for the transition to the use of cobalt-60 in your operations.

We appreciate the opportunity to meet with you, to tour your facility, and to discuss our concerns. If you have any questions about this letter or would like to arrange a meeting with the NRC staff, please contact (FILL IN NAME AND PHONE NUMBER OF CONTACT PERSON ON THE NRC STAFF).

Sincerely,

Use signature block of appropriate individual in Region II

Robert Quillin, Director
Radiation Control Division
Department of Health
4210 East 11th Avenue
Denver, CO 80220

Dear Mr. Quillin:

I am writing to inform you that the Nuclear Regulatory Commission (NRC) has concluded that long-term use of Waste Encapsulation and Storage Facility (WESF) sources is unacceptable in commercial facilities licensed by NRC.

As indicated in the enclosed letter to Applied Radiant Energy Corporation (ARECO), we have reached this conclusion because of our lack of confidence in the long-term integrity of these sources. Our lack of confidence stems from our concerns about: (1) the uncertainties related to the manufacture, quality control, and quality assurance of the WESF sources; (2) the continued delays associated with completion of the Department of Energy's (DOE) investigation into the cause of failure; and (3) the apparent difficulties in extrapolating information about a single source (e.g., cause of failure) to all WESF sources.

The NRC staff has requested that the WESF sources be returned to DOE by December 31, 1991. We recommend that Colorado inform its licensee, Iotech, that it is a prudent safety measure to have all WESF sources returned to DOE in an expeditious but orderly manner. As noted in the enclosed letter, the timing of the return will be subject to practical considerations (e.g., cask availability). NRC staff will be glad to work with Colorado to coordinate a plan for the timely return of the WESF sources from Iotech to DOE including, as appropriate, interim measures to enhance surveillance of the sources until they are removed from the facility.

Sincerely,

Carlton Kammerer, Director
State Programs
Office of Governmental and Public Affairs

Enclosure:
As stated

Enclosure 2

The Honorable William H. Young
Assistant Secretary for Nuclear Energy
Department of Energy
Washington, DC 20585

Dear Mr. Young:

I am writing to inform the Department of Energy (DOE) that we have concluded that long-term use of Waste Encapsulation and Storage Facility (WESF) sources that contain cesium-137 is unacceptable in commercial facilities licensed by the Nuclear Regulatory Commission (NRC).

As indicated in the enclosed letter to Applied Radiant Energy Corporation (ARECO), the only NRC-licensed facility still using WESF sources, we have reached this conclusion because of our lack of confidence in the long-term integrity of these sources. Our lack of confidence stems from our concerns about: (1) the uncertainties related to the manufacture, quality control, and quality assurance of the WESF sources; (2) the continued delays associated with completion of DOE's investigation into cause of failure; and (3) the apparent difficulties in extrapolating information about a single source (e.g., cause of failure) to all WESF sources.

Note that, in Enclosure 1, we have requested that the WESF sources be returned to DOE by December 31, 1991. In Enclosure 2, we have notified the Agreement State of Colorado of this conclusion and recommended that the State follow a similar course of action with respect to its licensee, Iotech, the other commercial facility still using WESF sources.

We would appreciate the cooperation of DOE and its contractors in making arrangements with these commercial facilities for orderly return of WESF sources. If DOE staff or contractors would like to discuss schedules, shipping priorities, or other issues related to return of WESF sources to DOE, please have them contact Patricia Vacca of my staff at (FTS) 492-0615.

Sincerely,

Robert M. Bernero, Director
Office of Nuclear Material Safety
and Safeguards

Enclosures:

1. NRC ltr to ARECO
2. NRC ltr to Colorado

Enclosure 3

Lee'd NRC/NMSS
9/7/90 PCW/aca

CESIUM-137 SOURCE LEAK

INVESTIGATION GROUP (APPOINTED JUNE 21,
1988)

- * RON HULTGREN, CHAIRMAN
- * ROGER JENSEN
- * MIKE JUGAN
- BOB LYNCH *(WILLIS DAVIS)
- JUDY PENRY

ADVISORS

GENE HOFFMAN (ED WRIGHT)
JIM FOUTCH (DON THRESS)
RICHARD CHITWOOD

- * PREPARED INTERIM REPORT WITH ANALYSIS
TECHNICAL EDITING (LEANN SMITH)

REVIEW OF FACTUAL DATA SECTIONS

- . DOE HEADQUARTERS - PROGRAM
- . INDUSTRIAL USERS - IOTECH
- ARECO
- . ORNL
- . RICHLAND OPERATIONS
- . PNL
- . WESTINGHOUSE HANFORD
- . LICENSING AGENCIES - NRC
- COLORADO
- GEORGIA
- . ORO STAFF - PROGRAM
- PROCUREMENT
- RESPONSE
MANAGEMENT

TOTAL REPORT REVIEW

- . ORO CHIEF COUNSEL

CONCLUSIONS - PRIMARY

- . DOE PROGRAM MANAGEMENT INADEQUATE

- . LICENSING PROCESS WEAK

- . RSI FACILITY DESIGN SAFETY IS SUSPECT

- . RSI OPERATION AND MANAGEMENT
 - RISK TAKING
 - MAXIMIZE PROFIT

- . CAPSULES WEREN'T DESIGNED OR
MANUFACTURED FOR USE IN IRRADIATION
FACILITY

CONCLUSIONS - SUBSIDIARY

- CAPSULE DESIGN BASIS ASSUMED LESS DEMANDING USE THAN ENCOUNTERED AT RSI
- CAPSULES MANUFACTURED WITH INADEQUATE QA/QC FOR COMMERCIAL USE
- CAPSULE TEST CONDITIONS AD HOC, LESS DEMANDING THAN USE AND DID NOT MATCH USE CONDITIONS IN IMPORTANT WAYS. BEHAVIOR OF WESF CESIUM CHLORIDE NOT WELL UNDERSTOOD
- LICENSING DISCOUNTED CAPSULE FAILURE TO THE EXTENT PUBLIC HEALTH AND SAFETY COULD HAVE BEEN COMPROMISED-- DOE "WALKED BY FAITH" WITH REGULATORY AGENCIES
- DOE LEASE INADEQUATELY REVIEWED, POORLY ACCOMMODATES GOVERNMENT RISK, DOES NOT ACCOUNT FOR LEASED PROPERTY AND OFFERS NO RESPONSE TO A FAILED CAPSULE

CONCLUSIONS - SUBSIDIARY (CONTINUED)

- . FACILITY OPERATIONS WERE WITHIN LICENSE CONSTRAINTS BUT DEMONSTRATED LACK OF CONCERN FOR PRODUCT, PERSONNEL AND ENVIRONMENTAL CONTAMINATION

- . FACILITY SAFETY SYSTEMS ALLOWED CAPSULE TO LEAK FOR UNDETERMINED TIME BEFORE A "LUCKY" EVENT SERIES LED TO DISCOVERY. NO RECOVERY SYSTEMS AVAILABLE.

RECOMMENDATIONS

- ESTABLISH STRONG PROGRAM OFFICE
 - ESTABLISH MANAGEMENT PLAN
 - DEAL WITH TECHNICAL, LEGAL AND LEASING RESPONSIBILITIES

- DETERMINE FAILURE MODE
 - FORMALLY REPORT ALL ORNL DATA
 - EVALUATE 1502 FAILED CAPSULE AND OTHER CAPSULES WITH A THOROUGH, PEER-REVIEWED TEST PLAN
 - UPDATE THERMAL ANALYSIS OF CAPSULES IN RSI RACK WITH SHROUDS

- PERFORM RISK/COST ANALYSIS OF CONTINUED OPERATION

IF RISK/COST ANALYSIS SHOWS CONTINUED LEASING IS THE DESIRED OPTION, THEN DOE SHOULD:

RECOMMENDATIONS (CONTINUED)

- EVALUATE OPERATIONS AT ARECO & IOTECH
 - TEST ALL CAPSULES
 - VERIFY RADIATION & CONTAMINATION MONITORING SYSTEMS
 - VERIFY LEAKING CAPSULE EQUIPMENT AND PROCEDURES ARE IN PLACE
 - PERFORM A RISK ANALYSIS ACCOUNTING FOR FAILURE DATA
 - DEFINE SAFE OPERATING ENVIRONMENT, INCLUDE IT IN LICENSE/LEASE AND VERIFY IT

- RENEGOTIATE LEASES
 - REGAIN PROPERTY CONTROL OF CAPSULES
 - PROVIDE DOE ROLE FOR TECHNICAL MONITORING AND OVERSIGHT
 - ACCOUNT FOR SPECIAL CONDITIONS FOR CONTINUING OPERATIONS
 - EXERCISE PERIODIC EVALUATION OF CAPSULE FROM EACH FACILITY

CAPSULE DESIGN AND DEVELOPMENT

PRIMARY CONCLUSIONS

- CAPSULES WEREN'T DESIGNED OR MANUFACTURED FOR USE IN IRRADIATION FACILITY
- DOE PROGRAM MANAGEMENT INADEQUATE

SUBSIDIARY CONCLUSIONS

- CAPSULE DESIGN BASIS ASSUMED LESS DEMANDING USE THAN ENCOUNTERED AT RSI

SUPPORTING FACTS

- CHLORIDE FORM OF CESIUM CHOSEN WITHOUT A SAFETY CRITERIA
- IRRADIATION USE DISCUSSED VERY EARLY BUT WESF INTERIM STORAGE WAS DESIGN BASIS
 - CAPSULE DESIGNER INFLUENCED WESF DESIGN
- DEVELOPMENT TESTING DURING DESIGN ASSUMED WESF STORAGE

CAPSULE MANUFACTURING

PRIMARY CONCLUSIONS:

- CAPSULES WEREN'T DESIGNED OR MANUFACTURED FOR USE IN IRRADIATION FACILITY

SUBSIDIARY CONCLUSIONS:

- CAPSULES MANUFACTURED WITH INADEQUATE QA/QC FOR COMMERCIAL USE

SUPPORTING FACTS:

- NO PILOT PROGRAM
- MINIMAL MATERIAL CONTROL
- ULTRASONIC INSPECTION WAS UNRELIABLE
- CESIUM CHLORIDE IMPURITIES WERE UNKNOWN/UNCONTROLLED
- OVER-FILLING OF SOME CAPSULES
- WELDING PROBLEMS

CAPSULE TESTING

PRIMARY CONCLUSION:

- DOE PROGRAM MANAGEMENT INADEQUATE

SUBSIDIARY CONCLUSIONS:

- CAPSULE TEST CONDITIONS AD HOC, LESS DEMANDING THAN USE AND DID NOT MATCH USE CONDITIONS IN IMPORTANT WAYS. BEHAVIOR OF WESF CESIUM CHLORIDE NOT WELL UNDERSTOOD.

SUPPORTING FACTS:

- LIMITED NUMBER OF TESTS
- "SUCCESSFUL" SEALED SOURCE HIGH TEMPERATURE TESTS RESULTED IN BULGING CAPSULES
- THERMAL CYCLE TESTS MISMATCHED RSI CONDITIONS

LICENSING

PRIMARY CONCLUSION:

- LICENSING PROCESS WEAK

SUBSIDIARY CONCLUSION:

- LICENSING DISCOUNTED CAPSULE FAILURE TO THE EXTENT PUBLIC HEALTH AND SAFETY COULD HAVE BEEN COMPROMISED-- DOE "WALKED BY FAITH" WITH REGULATORY AGENCIES

SUPPORTING FACTS:

- NO SYSTEMS ANALYSIS REQUIRED OR PERFORMED
- INCREASED RISK FROM WATER SOLUBLE CESIUM CHLORIDE NOT PROVIDED FOR
 - CONTINUOUS RADIATION MONITORING OF POOL WATER AND AIR NOT REQUIRED
 - HEPA FILTERS REMOVED
 - CONTAMINATION MONITORING OF PRODUCT AND PERSONNEL NOT REQUIRED

LICENSING (CONTINUED)

- . TEMPERATURE MONITORING WAIVED
DESPITE HIGHER HEAT LOAD
- . OPERATION NOT CLOSELY MONITORED
- . EMERGENCY PREPAREDNESS NOT VERIFIED

LEASES

PRIMARY CONCLUSION:

- DOE PROGRAM MANAGEMENT INADEQUATE

SUBSIDIARY CONCLUSION:

- DOE LEASE INADEQUATELY REVIEWED, POORLY ACCOMMODATES GOVERNMENT RISK, DOES NOT ACCOUNT FOR LEASED PROPERTY AND OFFERS NO RESPONSE TO A FAILED CAPSULE

SUPPORTING FACTS:

- CESIUM CAPSULES ARE NOT IDENTIFIED TO A SPECIFIC LEASE
- ES&H AND QA NEVER REVIEWED LEASES
- FRAGMENTED MANAGEMENT RESULTED IN INADEQUATE REVIEW OF LEASES - CHECKS AND BALANCES WERE MISSING
- OPERATING PARAMETERS AND CONSTRAINTS ARE NOT IDENTIFIED

LEASES (CONTINUED)

- . PLAN FOR IDENTIFICATION AND RECOVERY OF LEAKING CAPSULE WAS NOT INCLUDED AS PART OF THE LEASE
- . THE LEASES ARE VAGUE CONCERNING INDEMNIFICATION AND WHO PAYS FOR CLEANUP OF A LEAKING CAPSULE
- . THERE IS NO OVERSIGHT ROLE IDENTIFIED FOR DOE
- . DOE-HQ RETAINED CONTROL OF THE LEASING PROGRAM RESULTING IN A LACK OF OWNERSHIP AND RESPONSIBILITY WITHIN THE FIELD OFFICES

RSI OPERATIONS

PRIMARY CONCLUSION:

- . RSI OPERATION AND MANAGEMENT
 - RISK TAKING
 - MAXIMIZE PROFIT

SUBSIDIARY CONCLUSION:

- . FACILITY OPERATIONS WERE WITHIN LICENSE CONSTRAINTS BUT DEMONSTRATED LACK OF CONCERN FOR PRODUCT, PERSONNEL AND ENVIRONMENTAL CONTAMINATION

SUPPORTING FACTS:

- . CAPSULE HANDLING TOOL PERMITTED EXCESSIVE PRESSURE
- . CASK DESIGN MODIFIED FOR 5 CAPSULES
- . RESISTED CAPSULE TEMPERATURE MONITORING
- . PUSHED FOR CAPSULES IN UNMONITORED FACILITIES
- . USED EXCESSIVE NUMBER OF RADIATION SOURCES
- . ORDER-OF-MAGNITUDE MORE FREQUENT THERMAL CYCLES THAN FORECAST--NO NOTIFICATION

RSI OPERATIONS (CONTINUED)

- . HEPA FILTERS REMOVED
- . PROPRIETARY DESIGN AVOIDED
DISCLOSURE OF FACILITY DETAILS
- . NO CONTAMINATION CONTROL

THE INCIDENT

PRIMARY CONCLUSION:

- RSI FACILITY DESIGN SAFETY IS SUSPECT

SUBSIDIARY CONCLUSION:

- FACILITY SAFETY SYSTEMS ALLOWED CAPSULE TO LEAK FOR UNDETERMINED TIME BEFORE A "LUCKY" EVENT SERIES LED TO DISCOVERY. NO RECOVERY SYSTEMS AVAILABLE.

SUPPORTING FACTS:

- SAFETY SYSTEM BY-PASSED BY CIRCUIT BREAKERS
- CAPSULE LEAK DISCOVERED BY ACCIDENT
- EMERGENCY PROCEDURES INADEQUATE
- RECOVERY EQUIPMENT NONEXISTENT
- CONTAMINATED PRODUCT SHIPPED
- CONTAMINATION SPREAD

ROLES AND RESPONSIBILITIES

PRIMARY CONCLUSION:

- . DOE PROGRAM MANAGEMENT INADEQUATE

SUBSIDIARY CONCLUSION:

- . NONE

SUPPORTING FACTS:

- . THERE WAS NO WELL-DEFINED PROGRAM MANAGEMENT PLAN - ROLES AND RESPONSIBILITIES WERE NEVER FORMALLY DEFINED
- . DOE-HQ RETAINED CONTROL - A LACK OF OWNERSHIP BY FIELD OFFICES
- . CHECKS AND BALANCES FAILED DUE TO FRAGMENTED MANAGEMENT SYSTEM
- . PHYSICALLY SEPARATE ORGANIZATIONS ADDED TO THE NEED FOR BETTER CONTROL
- . SEVERAL FUNCTIONS WERE NEVER ADEQUATELY PERFORMED

ROLES & RESPONSIBILITIES (CONTINUED)

- RISK/COST ASSESSMENTS WERE NEVER DONE
- THE LICENSING AGENCIES AND RSI DID NOT PROVIDE MITIGATION FOR LOW PROBABILITY - HIGH CONSEQUENCE EVENTS AS DID THE OTHER IRRADIATORS

FAILED CAPSULE EVALUATION

PRIMARY CONCLUSIONS

- NONE -

SUBSIDIARY CONCLUSIONS

- NONE -

SUPPORTING FACTS

- . APPROVED TEST PLANS WERE FOLLOWED WITH GOOD QA/QC PROCEDURES
- . AREA OF LEAK IS IN OUTER CYLINDER
- . FAILURE CAUSED BY CESIUM CHLORIDE BULGING LOWER END OF INNER AND OUTER CAPSULES
- . FAILURE IS TEMPERATURE DEPENDENT