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Report to Congress on Abnormal Occurrences

July – September 1995

U.S. Nuclear Regulatory Commission

Office for Analysis and Evaluation of Operational Data

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ABSTRACT

Section 208 of the Energy Reorganization Act of 1974 identifies an abnormal occurrence (AO) as an unscheduled incident or event that the Nuclear Regulatory Commission determines to be significant from the standpoint of public health or safety and requires a quarterly report of such occurrences to be made to Congress. This report provides a description of those incidents and events that have been determined to be AOs during the period of July 1 through September 30, 1995.

This report addresses three AOs at NRC-licensed facilities. Two involved medical brachytherapy misadministrations and one involved ingestion of radioactive material by research workers. One AO submitted by the Agreement States is included. It involved importation into the United States of a package having excessive radiation. No updates of previously reported AOs are included in this report. No "Other Events of Interest" items are being reported.

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PREFACE

Introduction

The Nuclear Regulatory Commission (NRC) reports to Congress each quarter, under provisions of Section 208 of the Energy Reorganization Act of 1974, any abnormal occurrences (AOs) involving facilities and activities regulated by NRC. An AO is defined in Section 208 as an unscheduled incident or event that the Commission determines to be significant from the standpoint of public health or safety.

NRC identifies an AO for the purpose of this report using the criteria in Appendix A. The criteria were initially promulgated in an NRC policy statement that was published in the *Federal Register* on February 24, 1977 (Vol. 42, No. 37, pages 10950–10952).

This policy statement was published before medical licensees were required to report misadministrations to NRC and few of the examples in the policy statement were applicable to medical misadministrations. Therefore, in 1984, NRC adopted additional guidance for AO reporting of medical misadministrations. These guidelines augment the NRC policy statement examples and are summarized in Table A–1 in Appendix A.

On January 27, 1992, new medical misadministration requirements became effective. As directed by the Commission, the staff has developed a new policy statement for reporting incidents and events to Congress. The policy statement was published for public comment in the *Federal Register* on January 9, 1996 (Vol. 61, No. 6, pages 661–669).

In order to provide wide dissemination of information to the public, a *Federal Register* notice is issued on NRC licensee AOs. Copies of the notice are distributed to the NRC Public Document Room and all Local Public Document Rooms. At a minimum, each notice must contain the date and place of the occurrence and a description of its nature and probable consequences.

NRC has determined that, of the incidents and events reviewed for this reporting period, only those that are described in this report meet the criteria for reporting as AOs. This report covers the period from July 1 through September 30, 1995. Information reported on each AO includes date and place, nature and probable consequences, cause or causes, and actions taken to prevent recurrence.

Appendix B contains updated information on previously reported AOs.

Appendix C contains information on incidents that can be perceived as significant but do not involve a major reduction in the level of protection provided for public health and safety. These events are not reportable as AOs but are provided as "Other Events of Interest."

The Regulatory System

The system of licensing and regulation by which NRC carries out its responsibilities is implemented through the rules and regulations in Title 10 of the *Code of Federal Regulations*. This includes public participation as an element. To accomplish its objectives, NRC regularly conducts licensing proceedings, inspection and enforcement activities, evaluation of operating experience, and confirmatory research, while maintaining programs for establishing standards and issuing technical reviews and studies.

In licensing and regulating nuclear power plants and the uses of byproduct nuclear materials, NRC follows the philosophy that the health and safety of the public are best ensured by establishing multiple levels of protection. These levels can be achieved and maintained through regulations specifying requirements that will ensure the safe use of nuclear materials. The regulations include design and quality assurance criteria appropriate for the various activities licensed by NRC. An inspection and enforcement program helps ensure compliance with the regulations.

Reportable Occurrences

Operating experience is an essential input to the regulatory process for assuring that licensed activities are conducted safely. Licensees are required to report certain incidents or events to NRC. This reporting helps to identify deficiencies and to ensure that corrective actions are taken to prevent recurrence.

For nuclear power plants, dedicated groups have been formed, both by NRC and the nuclear power industry, for the detailed review of operating experience to help identify safety concerns early; to improve dissemination of such information; and to feedback the experience into licensing, regulations, and operations. In addition, NRC and the nuclear power industry have ongoing efforts to improve the operational data systems, which include not only the type and quality of reports required to be submitted, but also the methods used to analyze data. In order to more effectively collect, collate, store, retrieve, and evaluate operational data, the information is maintained in computer-based data files.

Three primary sources of operational data are Licensee Event Reports (LERs) submitted pursuant to 10 CFR 50.73, immediate notifications submitted pursuant to 10 CFR 50.72, and medical misadministration reports submitted pursuant to 10 CFR 35.33.

Except for records exempt from public disclosure by statute and/or regulation, information concerning reportable occurrences at facilities licensed or otherwise regulated by NRC is routinely disseminated by NRC to the nuclear industry, the public, and other interested groups as these events occur.

Dissemination includes special notifications to licensees and other affected or interested groups, and public announcements. In addition, information on reportable events is routinely sent to the NRC's Local Public Document Rooms throughout the United States and to the NRC Public Document Room in Washington, D.C. Congress is routinely kept informed of reportable events occurring in licensed facilities.

Agreement States

Section 274 of the Atomic Energy Act, as amended, authorizes the Commission to enter into agreements with States whereby the Commission relinquishes and the States assume regulatory authority over byproduct, source, and special nuclear materials (in quantities not capable of sustaining a chain reaction). Agreement State programs must be comparable to and compatible with the Commission's program for such material.

Presently, information on reportable occurrences for Agreement State licensed activities is publicly available at the State level. For the purpose of developing a nationwide database, Agreement States are encouraged to provide information to NRC on reportable events.

In early 1977, the Commission determined that AOs happening at Agreement State licensed facilities should be included in the quarterly reports to Congress. The AO criteria included in Appendix A are applied uniformly to incidents and events that occur at NRC and Agreement State licensed facilities. Procedures have been developed and implemented, and AOs reported by the Agreement States to NRC are included in the quarterly reports to Congress.

Foreign Information

NRC participates in an exchange of information with various foreign governments that have nuclear facilities. This foreign information is reviewed and considered in the NRC's assessment of operating experience and in its research and regulatory activities. Reference to foreign information may occasionally be made in these quarterly AO reports to Congress; however, only domestic AOs are reported.

Reopening of Closed Abnormal Occurrences

NRC reopens previously closed AOs if significant new information becomes available. Similarly, previously reported "Other Events of Interest" are updated if significant new information becomes available.

REPORT TO CONGRESS ON ABNORMAL OCCURRENCES JULY-SEPTEMBER 1995

NUCLEAR POWER PLANTS

NRC has reviewed all incident and event reports received from licensees for operating nuclear power plants in the United States (U.S.) through the third quarter of 1995. Using the criteria and guidelines in Appendix A of this report, none of the occurrences reviewed for this reporting period was determined to be significant enough to be reported as an AO.

FUEL CYCLE FACILITIES (Other than Nuclear Power Plants)

NRC has reviewed all incident and event reports received from licensees for the milling, processing, and fabrication of nuclear fuel in the U.S. through the third quarter of 1995. Using the criteria and guidelines in Appendix A of this report, none of the occurrences reviewed for this reporting period was determined to be significant enough to be reported as an AO.

OTHER NRC LICENSEES (Industrial Radiographers, Medical Institutions, Industrial Users, etc.)

There are approximately 22,000 active material licenses for the use of byproduct materials in industrial, medical, and academic applications in the U.S. Twenty-nine States, known as Agreement States, have entered into agreements with NRC to assume regulatory authority for approximately 15,000 of these licensees within their States. NRC is responsible for regulating approximately 7000 licensees located in the remaining 21 States, the District of Columbia, and all U.S. territories. NRC has reviewed all incident and event reports received from NRC licensees through the third quarter of 1995. Using the criteria and guidelines in Appendix A of this report, the following occurrences were determined to be significant enough to be reported as AOs.

95-7 Medical Brachytherapy Misadministration at Marshfield Clinic in Marshfield, Wisconsin

The following information pertaining to this event is also being reported concurrently in the *Federal Register*. Appendix A (see Event Type 5[a] in Table A-1) of this report notes that administering a therapeutic dose from a sealed source such that the calculated total treatment dose differs from the prescribed total treatment dose by more than 10 percent and the actual dose is greater than 1.5 times the prescribed dose can be considered an AO.

Date and Place—June 8, 1995; Marshfield Clinic; Marshfield, Wisconsin.

Nature and Probable Consequences—A patient was prescribed a dose of 1640 centigray (cGy) (1640 rad) for a low dose rate brachytherapy treatment of the cervix using cesium-137 sources.

After the sources were implanted, but prior to completion of the treatment, the physician entered the wrong date for removal of the sources into the final treatment plan. Because of this error the treatment was extended for an additional day. As a result, the calculated administered dose was 2440 cGy (2440 rad) which was approximately 50 percent greater than the prescribed dose.

The physician informed the patient of the misadministration both verbally and in writing. The licensee evaluated the consequences of the misadministration and determined that there would be no adverse health effects.

An NRC medical consultant evaluated the consequences of the misadministration and agreed with the licensee's conclusion.

Cause or Causes—The licensee failed to notice that the planned explant time documented in the final treatment plan did not represent the prescribed treatment time documented in the written directive. Also, the licensee's written directive/low dose rate brachytherapy log form, used to record events occurring during low dose rate brachytherapy treatments, did not contain a location to document the prescribed time for source removal.

Actions Taken To Prevent Recurrence

Licensee—The licensee revised its written directive/low dose rate brachytherapy log form to include documentation of the actual implantation time, and the time for the prescribed and actual removal of sources. Additionally, the revised form will include verification of such times by a licensee staff member.

NRC—NRC conducted an inspection and reviewed the circumstances surrounding the misadministration. NRC also retained a medical consultant to review the case. A Confirmatory Action Letter was issued which confirms that the licensee will verify that its authorized users meet training and experience requirements. A Notice of Violation was issued with five Severity Level IV violations.

This event is considered closed for the purpose of this report.

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95-8 Medical Brachytherapy Misadministration at Providence Hospital in Southfield, Michigan

The following information pertaining to this event is also being reported concurrently in the *Federal Register*. Appendix A (see Event Type 3 in Table A-1) of this report notes that a therapeutic exposure to any part of the body not scheduled to receive radiation can be considered an AO.

Date and Place—July 25, 1995; Providence Hospital; Southfield, Michigan.

Nature and Probable Consequences—A patient was prescribed a dose of 1230 centigray (cGy) (1230 rad) for a palliative manual brachytherapy treatment of the brain using an iridium-192 seed.

After implantation, confirmatory x-rays were taken but could not confirm the location of the seed and the treatment was terminated about 31 hours after implantation. The licensee determined that the seed was implanted about 4 centimeters (1.57 inches) from the intended treatment site of the brain. Consequently, the wrong treatment site received an unintended radiation dose of about 739 cGy (739 rad) and the tumor received only about 72 cGy (72 rad).

The licensee determined that no adverse health effects would result from the misadministration. An NRC medical consultant has reviewed the case but has not yet submitted a report to NRC. The licensee notified the referring physician and the patient about the misadministration.

Cause or Causes—The licensee said that the seed became detained at the elbow of the applicator during implantation and changed direction. The physician consequently encountered resistance while inserting the source and assumed that it reached the intended treatment site. A confirmatory x-ray taken at the time of insertion did not show the location of the source. (The licensee had used a fluoroscope [real time imaging] during simulation of the treatment, but a fluoroscope was not used to observe the actual seed implantation.)

Actions Taken To Prevent Recurrence

Licensee—The licensee reported that when using this type of applicator in the future, fluoroscopy will be used to assure proper implantation of radioactive material.

NRC—NRC conducted an investigation to review the circumstances surrounding the misadministration. The NRC staff is currently reviewing the inspection results for possible violations, and enforcement action is pending.

This event is considered closed for the purpose of this report.

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95-9 Ingestion of Radioactive Material by Research Workers at the National Institutes of Health in Bethesda, Maryland

The following information pertaining to this event is also being reported concurrently in the *Federal Register*. Appendix A (see General Criterion 1) of this report notes that a moderate exposure to, or release of, radioactive material licensed by or otherwise regulated by the Commission can be an abnormal occurrence.

Date and Place—June 28, 1995; National Institutes of Health (NIH); Bethesda, Maryland.

Nature and Probable Consequences—A pregnant research employee became internally contaminated with phosphorus-32 (P-32) and was sent to a local hospital for treatment.

NRC formed an Augmented Inspection Team (AIT), which included a medical consultant, to review the incident. The medical consultant stated, based on the licensee's initial report, that there would not be any adverse health consequences to the researcher or the fetus. Also, an NRC scientific consultant at the Oak Ridge Institute for Science and Education's Radiation Internal Dose Information Center was consulted. An independent assessment was also performed by Lawrence Livermore National Laboratories.

The licensee subsequently found that 26 individuals (in addition to the pregnant researcher) were also contaminated. The Federal Bureau of Investigation (FBI), the NRC's Office of Investigations (OI), and the NIH Police Department are currently investigating the event. The AIT has concluded its inspection efforts. OI continues to work with the FBI.

Cause or Causes—Because of the ongoing investigation, NRC has not reached a final conclusion as to the cause of the event.

Actions Taken to Prevent Recurrence

Licensee—The licensee continues to investigate the incident. The licensee performed bioassay sampling to identify the isotope, calculate preliminary estimates of intake, and determine the scope of the contamination. In addition, the licensee will take actions to enhance security for handling radioactive materials.

NRC—In addition to forming an AIT, NRC subsequently conducted a special inspection to determine the effectiveness of NIH security over radioactive materials.

NRC also issued two Confirmatory Action Letters. The first confirmed the actions that the licensee would take to reduce the possibility of further ingestion and to determine the extent of the contamination. The second confirmed the actions that the licensee would take in response to the special inspection that reviewed the NIH security policy for handling radioactive materials.

This event is closed for the purpose of this report.

AGREEMENT STATE LICENSEES

The 29 Agreement States have approximately 15,000 active material licenses for the use of byproduct materials in industrial, medical, and academic applications. Procedures have been developed for Agreement States to screen incidents and events using the same criteria and guidelines as NRC, and to report those occurrences that have been determined to be significant enough to be considered as AOs. Using the criteria and guidelines in Appendix A of this report, the following occurrence was determined to be significant enough to be reported as an AO.

AS 95-5 Importation of a Package Having Excessive External Radiation into the United States from the Republic of Korea

Appendix A (see For All Licensees, Example 11) of this report notes that serious deficiency in

management or procedural controls in major areas can be considered an AO.

Date and Place—December 20, 1994; Omnitron International, Inc.; Edgerly, Louisiana.

Nature and Probable Consequences—Omnitron International received a package of radioactive material with external radiation levels approximately 18 times higher than allowed by the U.S. Department of Transportation (DOT). The package was one of two packages received from a shipper in the Republic of Korea. Each package contained an iridium-192 source in the form of a wire that had an activity of approximately 16,650 megabecquerel (450 millicurie).

The high radiation levels were discovered during a routine survey of the packages upon receipt by Omnitron personnel. The package had radiation readings of 37 millisievert (mSv) (3700 millirem [mrem]) per hour at its surface and 1.4 mSv (140 mrem) per hour at 1 meter (39.37 inches). The maximum levels allowed by DOT, which regulates the transport of radioactive materials in the United States, are 2 mSv (200 mrem) per hour at the surface and 0.1 mSv (10 mrem) per hour at 1 meter (39.37 inches).

Omnitron notified the State of Louisiana's Radiation Protection Division of the event. Inspectors from the State agency found that the package had a narrow beam of radiation from its top surface of approximately 180 mSv (18 rem) per hour, and 22 to 37 mSv (2.2 to 3.7 rem) per hour at other surface locations. The radiation levels were approximately 4 times the levels measured at the surface of the container ("overpak") in which the package arrived.

During the ensuing investigation by State and Federal agencies, it was learned that the packages arrived in the United States at Los Angeles International Airport and were subsequently sent by truck to a Continental Freight facility in Houston, Texas, where they cleared Customs. After being placed in "overpaks" by a repackager, the packages were sent by Federal Express truck from Houston to Omnitron International in Edgerly, Louisiana. (It should be noted that at least eight companies [two brokers, two trucking companies, one repackager, and three freight forwarders] handled the packages in the United States before they left Houston.)

The investigation also determined that at least 32 people in the United States were probably exposed to the excessive radiation from the package. The estimated doses for the people who received maximum exposure are as follows: (1) Los Angeles International Airport to Houston, Texas, 5.82 mSv (582 mrem); (2) Houston, Texas, (freight companies, brokers and a repackager) 46.13 mSv (4613 mrem); and (3) Houston, Texas, to Edgerly, Louisiana, 0.84 mSv (84 mrem). The maximum estimated dose was received by an employee of a Texas repackaging firm because the packages were stored near the employee's workbench for a day or more while the "overpaks" were constructed.

Cause or Causes—The State of Louisiana's Radiation Protection Division concluded that the reason the one package had an excessive radiation profile was that the source wire was not secured in the safe or completely shielded position. This suggests an improper preparation for shipment and a failure to perform a proper radiation survey by the shipper in the Republic of Korea. There was no indication of damage to the package, or any evidence to suggest that the source changed position during transport. The source wire was properly secured in the shielded position for the second package.

The safe handling and transportation of radioactive materials imported into the United States are highly dependent on the actions taken by foreign shippers and their agents to properly prepare the packages for shipment. There are no DOT or NRC requirements for carriers or shipping agents to monitor or survey shipments during transit in the United States.

Actions Taken to Prevent Recurrence

Licensee—Omnitron International provides training on source exchange procedures to both its foreign and domestic customers. In this case, it supplied training to a Korean service company, which included training for a service manager and two service engineers. Its training procedures are being reviewed to emphasize the regulatory requirements for transportation in the United States.

DOT—DOT wrote two letters to the Competent Authority for Radioactive Materials Transportation in the Republic of Korea asking for information about the shipper and the procedures or requirements for shipping such packages. NRC does not know of any other actions that are being taken to prevent recurrence.

It should be noted that in response to a similar event which occurred in 1990 that involved an NRC licensee, NRC dispatched an Incident Investigation Team (IIT). The IIT's finding are documented in NUREG-1405, "Inadvertent Shipment of a Radioactive Source from Korea to Amersham Corporation, Burlington, Massachusetts."

This event is considered closed for the purpose of this report.

APPENDIX A

ABNORMAL OCCURRENCE CRITERIA[1]

The following criteria used to determine an abnormal occurrence (AO) were set forth in an NRC policy statement published in the *Federal Register* on February 24, 1977, (Vol. 42, No. 37, pages 10950–10952).

An event will be considered an AO if it involves a major reduction in the degree of protection of the public health or safety. Such an event would involve a moderate or more severe impact on the public health or safety and could include but need not be limited to:

1. Moderate exposure to, or release of, radioactive material licensed by or otherwise regulated by the Commission;
2. Major degradation of essential safety-related equipment; or
3. Major deficiencies in design, construction, use of, or management controls for licensed facilities or material.

Examples of the types of events that are evaluated in detail using these criteria are:

For All Licensees

1. Exposure of the whole body of any individual to 25 rem or more of radiation; exposure of the skin of the whole body of any individual to 150 rem or more of radiation; or exposure of the feet, ankles, hands or forearms of any individual to 375 rem or more of radiation [10 CFR 20.403(a)(1)], or equivalent exposures from internal sources.
2. An exposure to an individual in an unrestricted area such that the whole body dose received exceeds 0.5 rem in one calendar year [10 CFR 20.105(a)].
3. The release of radioactive material to an unrestricted area in concentrations which, if averaged over a period of 24 hours, exceed 500 times the regulatory limit of Appendix B, Table II, 10 CFR Part 20 [CFR 20.403(b)(2)].
4. Radiation or contamination levels in excess of design values on packages, or loss of confinement of radioactive material such as (a) a radiation dose rate of 1000 mrem per hour three feet from the surface of a package containing the radioactive material, or (b) release of radioactive material from a package in amounts greater than the regulatory limit.
5. Any loss of licensed material in such quantities and under such circumstances that substantial hazard may result to persons in unrestricted areas.
6. A substantiated case of actual or attempted theft or diversion of licensed material or sabotage of a facility.
7. Any substantiated loss of special nuclear material or any substantiated inventory discrepancy that is judged to be significant relative to normally expected performance and that is judged to be caused by theft or diversion or by substantial breakdown of the accountability system.
8. Any substantial breakdown of physical security or material control (i.e., access control, containment, or accountability systems) that significantly weakened the protection against theft, diversion, or sabotage.
9. An accident [illegible]ity [10 CFR 70.52(a)].
10. A major d[illegible]cy in design, construction, or operation h[illegible]g safety implications requiring in[illegible]ediate remedial action.
11. Serious deficiency in management or procedural controls in major areas.
12. Series of events (where individual events are not of major importance), recurring incidents,

[1]On January 1, 1994, changes to Title 10 of the *Code of Federal Regulatons* Part 20 were promulgated. At the Commission's directive, the staff has developed a policy statement revising criteria for various types of AOs. The changes pertinent to the 10 CFR 20 revision are included in that draft policy statement which was published for public comment in the Federal Register on January 9, 1996 (Vol. 61, No. 6, pages 661–669). Upon Commission's approval of the final policy statement, the appropriate changes to this Appendix will be published.

and incidents with implications for similar facilities (generic incidents) that create major safety concern.

For Commercial Nuclear Power Plants

1. Exceeding a safety limit of license Technical Specifications [10 CFR 50.36(c)].

2. Major degradation of fuel integrity, primary coolant pressure boundary, or primary containment boundary.

3. Loss of plant capability to perform essential safety functions such that a potential release of radioactivity in excess of 10 CFR Part 100 guidelines could result from a postulated transient or accident (e.g., loss of emergency core cooling system, loss of control rod system).

4. Discovery of a major condition not specifically considered in the Safety Analysis Report (SAR) or Technical Specifications that requires immediate remedial action.

5. Personnel error or procedural deficiencies that result in loss of plant capability to perform essential safety functions such that a potential release of radioactivity in excess of 10 CFR Part 100 guidelines could result from a postulated transient or accident (e.g., loss of emergency core cooling system, loss of control rod system).

For Fuel Cycle Licensees

1. A safety limit of license Technical Specifications is exceeded and a plant shutdown is required [10 CFR 50.36(c)].

2. A major condition not specifically considered in the safety analysis report or Technical Specifications that requires immediate remedial action.

3. An event that seriously compromised the ability of a confinement system to perform its designated function.

Medical Misadministrations

As discussed in the Preface to this report, the NRC policy statement on AOs was published before licensees were required to report medical misadministrations to the NRC. Therefore, during 1984, NRC developed guidelines for selecting such events for AO reporting. These guidelines, which are summarized in Table A-1, augment the NRC policy statement.

As noted in the Preface, revised guidelines are currently being developed because new medical misadministration definitions became effective on January 27, 1992.

Table A-1 NRC Guidelines for Selecting Medical Misadministration Events for Abnormal Occurrence (AO) Reporting

Event Type	AO Reporting Threshold	
	Diagnostic Exposure	Therapeutic Exposure
(1) Administering a radiopharmaceutical or radiation from a sealed source other than the one intended.	If the improper administration results in any part of the body receiving unscheduled radiation, an AO report should be proposed if: (a) the actual dose to the wrong body part is greater than five times the upper limit of the normal range of exposures prescribed for diagnostic procedures involving that body part, **or** (b) there are clinical indications of **any** adverse health effects to the wrong body part. If the parts of the body receiving radiation improperly would have received radiation anyway, had the proper administration been used, an AO report should be proposed if: (a) the actual dose is greater than five times that intended to the above described body parts, **or**, (b) the above described body parts show signs of adverse health effects greater than expected had the proper administration been used.	If the improper administration results in any part of the body receiving unscheduled radiation, an AO report should be proposed for any such event. If the parts of the body receiving radiation improperly would have received radiation anyway, had the proper administration been used, an AO report should be proposed if: (a) the actual dose is greater than 1.5 times that intended to the above described body parts, **or**, (b) the actual dose is less than 0.5 times that intended to the above described body parts, **or**, (c) the above described bodyparts show signs of adverse health effects greater than expected had the proper administration been used, **or** (d) the event (regardless of any health effects) affects two or more patients at the same facility.
(2) Administering a radiopharmaceutical or radiation to the wrong patient. or	An AO report should be proposed if: (a) the actual dose to the wrong patient exceeds five times the prescribed dose for the intended patient, **or** (b) the event results in **any** adverse health effects.	An AO report should be proposed for any such event.
(3) Administering a radiopharmaceutical or radiation by a	Same guidelines as for Event Type 1.	Same guidelines as for Event Type 1.

Table A-1 (Continued)

Event Type	AO Reporting Threshold	
	Diagnostic Exposure	**Therapeutic Exposure**
route of administration other than that intended by the prescribing physician.		
(4) Administering a diagnostic dose of a radiopharmaceutical differing from the prescribed dose by more than 50 percent.	An AO report should be proposed if: (a) the actual dose is greater than five times the prescribed dose, **or**, (b) the event results in adverse health effects worse than expected for the normal range of exposures prescribed for the diagnostic procedure.	Not applicable.
(5) Administering a therapeutic dose of a radiopharmaceutical differing from the prescribed dose by more than 10 percent; or administering a therapeutic radiation dose from a sealed source such that errors in the source calibration, time of exposure, and treatment geometry result in a calculated total treatment dose from the final prescribed total treatment dose by more than 10 percent.	Not applicable.	An AO report should be proposed if: (a) the actual dose is greater than 1.5 times the prescribed dose, **or**, (b) the actual dose is less than 0.5 times the prescribed dose, **or** (c) the event results in adverse health effects worse than would be expected for the normal range of exposures prescribed for the therapeutic procedure, **or**, (d) the event (regardless of any health effects) affects two or more patients at the same facility.
(6) Recurring or series of events (regardless of the number of patients or facilities involved).	For either diagnostic or therapeutic exposures, an AO report should be proposed for recurring events or a series of events (in which each individual misadministration is not of major importance) that create a significant public health or safety concern.	
(7) Generic events.	For either diagnostic or therapeutic exposures, an AO report should be proposed for misadministrations with generic implications that create a significant public health or safety concern.	

APPENDIX B

UPDATE OF PREVIOUSLY REPORTED ABNORMAL OCCURRENCES

During July through September 1995, NRC licensees, Agreement States, Agreement State licensees, and other involved parties, such as reactor vendors and architect-engineering firms, continued with the implementation of actions necessary to prevent recurrence of previously reported abnormal occurrences (AOs). During the period from July 1 through September 30, 1995, no updates of previously reported AOs were received. Those updated events which still require additional information will be discussed in future reports.

APPENDIX C

OTHER EVENTS OF INTEREST

"Other Events of Interest" are reported because they can be perceived as being significant but have been determined not to involve a major reduction in the level of protection provided for public health or safety; therefore they are not reportable as abnormal occurrences. During the period from July 1 through September 30, 1995, no "Other Events of Interest" items were reported.

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July-September 1995

8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)

Office for Analysis and Evaluation of Operational Data
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above"; if contractor, provide NRC Division, Office or Region, U.S. Nuclear Regulatory Commission, and mailing address.)

Same as 8., above

10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

Section 208 of the Energy Reorganization Act of 1974 identifies an abnormal occurrence (AO) as an unscheduled incident or event that the Nuclear Regulatory Commission determines to be significant from the standpoint of public health or safety and requires a quarterly report of such occurrences to be made to Congress. This report provides a description of those incidents and events that have been determined to be AOs during the period of July 1 through September 30, 1995. This report addresses three AOs at NRC-licensed facilities. Two involved medical brachytherapy misadministrations and one involved ingestion of radioactive material by research workers. One AO submitted by the Agreement States is included. It involved importation into the United States of a package having excessive radiation. No updates of previously reported AOs are included in this report. No "Other Events of Interest" items are being reported.

12. KEY WORDS/DESCRIPTORS (List words or phrases that will assist researchers in locating the report.)

Medical Brachytherapy Misadministration; Ingestion of Radioactive Material; Package Having Excessive External Radiation

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