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Report to Congressional Requesters

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NUCLEAR HEALTH AND SAFETY

Savannah River's Unusual Occurrence Reporting Program Has Been Ineffective

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Resources, Community, and
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December 20, 1989

The Honorable John Glenn
Chairman, Committee on
Governmental Affairs
United States Senate

The Honorable Mike Synar
Chairman, Environment,
Energy and Natural
Resources Subcommittee
Committee on Government Operations
House of Representatives

On the basis of your November 16, 1988, request and subsequent meetings with your offices, we agreed to determine whether reactor-related events occurring at the Department of Energy's (DOE) Savannah River Site in South Carolina were reported to DOE headquarters. Specifically, our work focused on DOE's Unusual Occurrence Reporting (UOR) program at the Savannah River Site. The existing DOE UOR program began in August 1981 to document, analyze, and disseminate information on unusual or unplanned events at all DOE nuclear sites. This program can be an important management tool in evaluating problems occurring at DOE sites that could lead to serious accidents.

Results in Brief

Since its beginning in 1981, DOE's UOR program has not provided a complete picture of unusual reactor-related events at the Savannah River Site. A problem with underreporting has persisted even though DOE headquarters was aware of it. Many reactor-related events viewed as having "significant consequence or hazard potential" by the Savannah River Site contractor have not been reported to DOE headquarters. These events include such things as reactor operations personnel not following proper procedures during reactor operations and equipment failures.

Between 1982 and 1987 a total of only 39 percent of the events identified by the contractor as having "significant consequence or hazard potential" were reported to DOE as unusual occurrences.[1] Based on our comparison of those events not reported against DOE's criteria for UORs, we believe most of the events not reported should have been reported to

[1] 1982 was the first year the Savannah River Site contractor prepared UORs under DOE's program. The reactors were shutdown in 1988 and have not been restarted.

DOE headquarters as UORs. The underreporting problem, which has existed since DOE's UOR program began, is primarily the result of inadequate oversight of contractor operations by the Savannah River Operations Office. Oversight is an important element of internal control necessary to provide reasonable assurance that program objectives will be accomplished.[2] In addition, we believe that the amount of discretion inherent in some of DOE's UOR criteria has contributed to the underreporting problem at the Savannah River Site.

DOE's Savannah River Operations Office is acting to improve oversight of contractor operations. For example, DOE's Savannah River Operations Office is now reviewing internal contractor reports to identify events that should have been reported as UORs but were not, and requesting the contractor to prepare reports for those events that it believes meet DOE's UOR criteria. However, we believe that the Operations Office can do more to ensure that all significant unusual occurrences are reported by the contractor through better oversight of contractor operations. Likewise, we believe that DOE headquarters can do more to clarify its UOR criteria for identifying reactor-related events that should be UORs. For example, DOE should consider requiring the reporting of events that are listed in an attachment to the DOE UOR order. This attachment is currently provided only as guidance. Many of these events specifically relate to equipment failures.

Unusual Occurrence Reporting Systems at the Savannah River Site

There are two systems for reporting unusual reactor-related events at the Savannah River Site. One is the agency-wide UOR program and the other is an internal system developed and used by the previous Savannah River Site contractor—E.I. du Pont de Nemours and Company.[3]

DOE's UOR Program

The existing DOE UOR program was implemented agency-wide in August 1981. The overall goal of the UOR program is to document, analyze, and disseminate information on unusual or unplanned events throughout

[2]Internal controls that federal agencies are required to follow are set forth in GAO's Standards for Internal Controls in the Federal Government, published in 1983 pursuant to the Federal Manager's Financial Integrity Act of 1982.

[3]Near the end of our audit, in April 1989, a new contractor—Westinghouse Electric Company—began managing the Savannah River Site. The internal reporting system described in this report was still in use at that time.

DOE that are of programmatic significance. DOE defines an unusual occurrence as any unusual or unplanned event having programmatic significance such that it adversely affects the performance, reliability, or safety of nuclear facilities.

DOE has established criteria in its orders for determining which unusual occurrences or events are reportable under the UOR program. These criteria include (1) violations of approved technical specifications, operating safety requirements or other safety limits prescribed by DOE; (2) a series of related events that collectively are considered significant enough to warrant reporting; and (3) a near miss, defined as an event that when coupled with another credible event or condition could result in an accident. In addition to the criteria, the DOE UOR order provides guidance on the type of events which should be considered for reporting by attaching a list of examples.

Some of the criteria are explicit, while others rely on the operator's judgment to determine significance. Identifying violations of technical specifications, operating safety requirements, or other safety limits depends on professional expertise. However, determining the significance of a series of related events that are by themselves not considered significant requires judgment by the operator. Operator judgment is also inherent in other criteria such as identifying a near miss. These criteria require the operator to use judgment to evaluate the significance of hypothetical situations that have not been formally analyzed.

The UOR program has several objectives that facilitate its use as a management tool. These objectives include

- sharing of information and experience (lessons learned) throughout DOE for the purpose of avoiding similar occurrences,
- enhancing management awareness of significant technical and operational problems,
- providing a basis for corrective action and operational improvements, and
- developing data to track trends and identify relationships that might otherwise not be readily apparent in order to provide for the early recognition of problems.

DOE requires that each operations office establish a UOR program for its facilities and contractors. Further, the operations offices are responsible for ensuring that the contractor's internal reporting system is compatible with DOE's UOR program.

Internal Reporting at the Savannah River Site

The Savannah River Site contractor has its own internal reporting system for reporting unusual reactor-related events. This system is designed to document events that constitute a deviation from the accepted normal operation of the reactors and related equipment. Also, the system is intended to call attention to the event so that contractor organizations and management are promptly informed. Reportable events are determined by contractor personnel in an oversight role based on criteria established by the contractor to identify variations from expected performance. While these criteria are similar in some respects to the criteria used in the DOE UOR program, there is no formal linkage between the two reporting systems. As a result, reactor-related events reported in one system may not be reported in the other.

The contractor's internal system for reporting reactor-related events is more extensive than DOE's UOR program with regard to reactor-related events because the contractor has established a lower threshold for reporting events. In other words, the contractor's system includes reactor-related events that would not be considered significant enough to be reported as UORs. A far greater number of events have been reported in the contractor's internal reporting system than have been reported under DOE's UOR program.

Under the internal system, the contractor has established various levels of significance for categorizing reactor-related events. Although these levels of significance do not directly correspond to DOE's UOR criteria, they do highlight events that the contractor considers to be significant. Events occurring from 1982 through 1987 have been categorized in one of five levels of significance ranging from A to E. Category A events, the most significant, are "incidents with serious consequences," and category B events are "incidents with significant consequences or hazard potential." The other categories include those events that have only "remote hazard potential" (category C events), are "conditionally significant" (category D events), or have "no significant potential" (category E events). Beginning in 1988 the system was modified to, among other things, expand the categories for reporting events from five to seven in order to more precisely define events within each category.

All Significant Reactor-Related Events Have Not Been Reported as Unusual Occurrences

Since DOE's UOR program began, many reactor-related events viewed by the contractor as having "significant consequences or hazard potential" have not been reported to DOE headquarters. Our comparison, based on DOE's UOR criteria, indicated that most of these events should have been reported to DOE headquarters as UORs.

Reactor-related events considered by the Savannah River Site contractor to have "significant consequences or hazard potential" include such events as a radiation release in excess of plant guidelines, a production loss of 10 days, reactor core damage, or those events that could cause a serious consequence (e.g., a nuclear-related death) if another event were to occur. There were over 1,300 reactor-related events reported in the contractor's internal reporting system from 1982 through 1987. Of these, 71 events were categorized by the contractor as "having significant consequence or hazard potential."[4]

In general, these 71 events related to equipment failures and/or operator error. Equipment failures involved such things as malfunctions in pumps, valves, and electrical equipment. Operator errors primarily involved personnel not following prescribed procedures. For example, in one instance, reactor operations personnel mistakenly loaded an assembly into the reactor. Handling of unknown assemblies could result in their being dropped causing a nuclear criticality accident, personal injury, or a process water leak from reactor damage and subsequent radiation release.

Of the 71 events categorized by the contractor as having "significant consequences or hazard potential," we found that only 28 were reported as UORs. Based on our comparison of the remaining 43 events not reported against DOE's UOR criteria, we determined that at least 29 should have been reported to DOE headquarters as UORs, including the example cited previously as well as various equipment failures. Many of the events not reported were violations of technical specifications, operating safety requirements, or other safety limits resulting from personnel errors, which clearly met DOE's UOR criteria.

We subsequently requested DOE headquarters and the Savannah River Operations Office to confirm our assessment of the events. Both agree that many reactor-related events not reported as UORs should have been reported as UORs. DOE headquarters told us that at least 36 of the 43

[4]Between 1982 and 1987, no events were categorized by the contractor as "having serious consequences."

events not reported met the UOR criteria and should have been reported as UORs. The Savannah River Operations Office told us that at least 20 of the 43 events met the UOR criteria and should have been reported as UORs. Both DOE organizations agreed that at least 17 events of the 43 events not reported met the UOR criteria and should have been reported as UORs. Thus, while there was not complete agreement on the exact number of events that should have been reported as UORs, both DOE headquarters and the Savannah River Operations Office confirmed our assessment that the Savannah River Site contractor has not been reporting all significant events as UORs.

There are two reasons reactor-related events were not reported. Contractor personnel told us that they did not believe it necessary to report events unless they met both the UOR criteria for significance and were thought to be of interest to other DOE sites. Because of the unique nature of operations at the Savannah River Site, most events were not considered applicable to other DOE sites. As a result they were not reported. In addition, both the Savannah River Operations Office and the contractor told us that some events were a matter of judgment as to whether they were significant enough to be reported as UORs. This was also reflected in both DOE headquarters and Operations Office assessments of the events the contractor did not report. While the assessments clearly identify significant events that should have been reported, they show that there is not always agreement as to whether a specific event should be reported. Thus, the assessments by both DOE organizations show that there is sometimes an element of judgment involved in applying DOE's UOR criteria to specific events.

Implementation of the UOR Program at Savannah River Site Has Not Been Effective

Since the inception of the UOR program there has been a problem at the Savannah River Site of underreporting reactor-related events. This problem, which has been raised in appraisals of the program by DOE headquarters, is primarily the result of inadequate oversight of contractor operations by the Savannah River Operations Office.

In September 1982, a year after the program began agency-wide, DOE headquarters' Office of Quality Assurance and Standards reviewed the Savannah River Operations Office draft implementation plan for the UOR program as part of an overall appraisal of Savannah River Site operations. This appraisal found that the threshold for reporting events as UORs under the plan was set at a level that would result in the reporting of few events. The plan was not specific regarding the reporting of events that the contractor considered unique to the Savannah River Site.

As a result, the contractor was only reporting events that it felt were significant and had applicability to other DOE sites.

In December 1983 the Operations Office issued a revised implementation plan, which provided additional guidance on making a UOR determination. The plan required that reports be submitted for events that either meet UOR criteria or have outside utility (i.e., that would be of interest to another DOE site). Further, it briefly outlined examples of events that were reportable as UORS. These events included violations of technical specifications, operating safety requirements, and other safety limits. Savannah River Operations Office officials believed these changes would correct the underreporting problem.

In November 1984, DOE headquarters attempted to clarify the agency-wide reporting requirements for UORS. The agency issued a revised UOR order that provided minimum criteria for determining whether an event should be reported as a UOR, such as violations of technical specifications, operating safety requirements, or other safety requirements prescribed by DOE. In March 1985, the Operations Office revised its implementation plan in response to the revised order.

The Savannah River Site's UOR program was again evaluated by DOE headquarters in March 1986 as part of an overall appraisal of site management and the nuclear safety program. This appraisal found that the problem of underreporting cited in the September 1982 appraisal was still open. Specifically, the appraisal found that the Savannah River contractor was still only reporting events it believed were of interest to other DOE sites. The appraisal recommended that the Operations Office should ensure that the contractor report events consistent with the DOE order.

In September 1987 the Savannah River Operations Office issued a supplemental order to address the problems cited by the appraisal. The order states that the objectives of the UOR program are to enhance Operations Office and contractor management awareness of significant on-site problems and provide input to the agency-wide UOR program. The order requires the contractor to maintain a system that reports events in accordance with DOE's UOR criteria. In addition, the order commits the Savannah River Operations Office to monitoring site events and contractor internal reports for the purpose of identifying events that meet DOE's UOR criteria but were not reported as UORS.

However, the Savannah River Operations Office supplemental order stops short of requiring the Operations Office to develop formal written procedures to help ensure adequate review and analysis of the contractor's internal reports, the timely resolution of comments, and follow-up so that appropriate corrective action is taken. All of these functions are necessary for effective oversight of contractor operations and should be a part of the Operations Office's system of internal controls.

Likewise, although this supplemental order requires the Savannah River Operations Office to perform appraisals to verify the effectiveness of the UOR program at the Savannah River Site, it does not require the Operations Office to develop formal written procedures for evaluating the contractor's internal reporting system to ensure that it is compatible with DOE's UOR program. Formal written procedures for the conduct of appraisals of the UOR program by the Savannah River Operations Office are needed to ensure that these appraisals are comprehensive and that the reporting system through which most unusual occurrences are initially identified is compatible with the objectives of DOE's UOR program. This, too, should be a part of the Savannah River Operations Office's system of internal controls.

In 1988, the Savannah River Operations Office initiated efforts to improve their oversight of the UOR program. Specifically, in July 1988 the Operations Office began monitoring the contractor's internal reports and reviewing the reports against DOE's UOR criteria to identify events that should be reported. The Operations Office is currently requesting the contractor to prepare UORs for those events the Operations Office believes meet the criteria but which were not reported. Finally, in December 1988 and January 1989, the Operations Office reviewed, for the first time, the contractor's implementation of the UOR program. These functions are necessary elements of oversight, which should have been a part of the UOR program since it began.

Conclusions

Responsibility for ensuring the complete, accurate, and timely reporting of significant events as unusual occurrences is shared by all levels of management. Since the UOR program began, the Savannah River Site contractor has not been reporting all events that should have been reported. As a result, the UOR program has not provided DOE with a complete picture of unusual reactor-related events occurring at the Savannah River Site.

Underreporting has been brought up in headquarters' appraisals of the UOR program. However, the problem has persisted. Recent corrective actions taken by the Savannah River Operations Office, especially the review of the contractor's internal reports against DOE's UOR criteria and the appraisal of the UOR program, are steps in the right direction. However, considering the longstanding nature of the underreporting problem, we believe that the Savannah River Operations Office should do more to strengthen its oversight of contractor operations. The Operations Office needs to establish formal written procedures for the review and analysis of the contractor's internal reports to provide reasonable assurance that all significant events are reported as UORs. Currently, the Operations Office is only required to monitor the contractor's internal reports. Formal written procedures will emphasize the Savannah River Operations Office commitment to providing continuous oversight of contractor operations. Further, the Savannah River Operations Office needs to establish formal written procedures for the evaluation of the contractor's internal reporting system to ensure that it is compatible with the objectives of the UOR program.

Finally, both DOE headquarters and the Savannah River Operations Office assessed the 43 events considered by the contractor to have "significant consequences or hazard potential" but that were not reported as UORs. Although both assessments confirmed that many of these events should have been reported as UORs, they differed on the number of events that should have been reported. Headquarters thought that at least 36 of the events should have been reported as UORs, while the Operations Office thought that at least 20 of the events should have been reported. In our view, much of the difference is attributable to the judgment inherent in determining whether an event meets the threshold for significance to qualify as a UOR. We believe that DOE headquarters can minimize the discretion associated with determining which events are reportable by further clarifying its order to more clearly specify which events should be reported as UORs. Many of these events specifically relate to equipment failures.

Recommendations

To better ensure the reporting of all significant events to DOE headquarters under DOE's UOR program, we recommend that the Secretary of Energy

- require the Savannah River Operations Office to establish formal written procedures for (1) reviewing and analyzing the contractor's internal reports and (2) evaluating the contractor's internal reporting system to

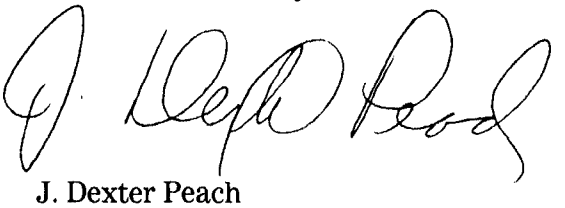
ensure that it is compatible with the objectives of DOE's UOR program; and

- revise DOE's UOR order to more clearly specify which reactor-related events should be reported to DOE headquarters as UORs.

We discussed the information in this report with DOE officials, who agreed that it was factually accurate. However, as agreed with your offices, we did not obtain official agency comments on a draft of this report. Our work was performed between March and July 1989 in accordance with generally accepted government auditing standards. (Appendix I provides a discussion of our objectives, scope, and methodology.)

Unless you publicly announce its contents earlier, we plan no further distribution of this report for 30 days from the date of this letter. At that time we will send copies to the appropriate congressional committees; the Secretary of Energy; and the Director, Office of Management and Budget. We will also make copies available to others upon request.

This work was performed under the direction of Keith O. Fultz, Director of Planning and Reporting, former Director of Energy Issues. Victor S. Rezendez, the current Director of Energy Issues, can be reached on (202) 275-1441. Other major contributors are listed in appendix II.



J. Dexter Peach
Assistant Comptroller General

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Abbreviations

DOE	Department of Energy
GAO	General Accounting Office
UOR	Unusual Occurrence Report

Objectives, Scope, and Methodology

Objectives

On November 16, 1988, the Chairman, Senate Committee on Governmental Affairs, and the Chairman, Subcommittee on Environment, Energy and Natural Resources, House Committee on Government Operations, requested that we investigate reactor-related events detailed in Savannah River Site contractor internal documents. These events were made public during congressional hearings held in September 1988. Specifically, we were requested to determine (1) the extent of reactor-related events in terms of numbers and severity; (2) whether the events were reported to the Atomic Energy Commission or the Department of Energy (DOE); and (3) for reactor-related events not reported, the reasons they were not reported. In addition, we were requested to describe DOE's program for reporting reactor-related events and evaluate its adequacy.

Subsequently, we learned that most of these events were reported to DOE in some manner and that most of the events occurred prior to the implementation of an agency-wide program for reporting these kinds of events, referred to as the Unusual Occurrence Reporting (UOR) program. In view of these findings, we agreed that our review would focus on the reporting of reactor-related events through DOE's UOR program as it has been implemented at the Savannah River Site.

Scope and Methodology

In order to determine the extent to which the Savannah River Site has reported reactor-related events we reviewed reactor-related events from 1982 through 1987 that had been identified by the contractor's internal reporting system as having "significant consequences or hazard potential" but which were not reported as UORs. We then compared these events with the criteria for reporting events given in the DOE UOR order to identify events that should have been reported but were not. We subsequently requested DOE headquarters and the Savannah River Operations Office to confirm our assessments.

We also reviewed agency records and interviewed agency officials and contractor personnel both at DOE headquarters and at the Savannah River Site to gain an understanding of how the program has operated since its inception. In addition, we discussed problems in implementation of the UOR program with both agency officials and contractor personnel.

Our work was performed between March and July 1989 in accordance with generally accepted government auditing standards.

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