

GAO

Report to the Chairman, Committee on
Governmental Affairs, U.S. Senate

August 1991

NUCLEAR WASTE

Hanford Single-Shell Tank Leaks Greater Than Estimated



144831

RESTRICTED — Not to be released outside the
General Accounting Office unless specifically
approved by the Office of Congressional
Relations. **RELEASED**



United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-235391

August 5, 1991

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

Dear Mr. Chairman:

In our 1989 report on the Department of Energy's (DOE) management of the single-shell tanks at its Hanford Site in Washington, we reported that, based on estimates by DOE contractor staff, about 750,000 gallons of liquid waste had leaked from 66 single-shell tanks.¹ Subsequently, in September 1990 the Washington State Department of Ecology learned that the volume of liquid waste that had leaked from one Hanford single-shell tank (designated as 241-A-105, commonly known as 105-A) was substantially higher than the volume reported to us and included in our report.

In view of this new information, you asked us to determine whether DOE and/or Westinghouse Hanford Company—the Hanford Site contractor—had fully disclosed to us the volume of waste that had leaked from the Hanford Site's underground single-shell storage tanks. In subsequent discussions with your office, we were also asked to provide answers to seven questions about the development of Westinghouse's 1989 leak volume estimate. Appendix I provides specific answers to these seven questions.

Results in Brief

The 750,000-gallon leak volume estimate reported to us by DOE/Westinghouse, and included in our report, did not include the volume of cooling water that had been added to the tanks, some of which may have leaked to the ground. Although cooling water that has come in contact with hazardous waste must be classified as a hazardous waste unless it can be demonstrated otherwise, DOE/Westinghouse had historically not included cooling water that may have leaked from the tanks in its tank leak studies. To be consistent with the estimates contained in prior studies, DOE/Westinghouse did not include cooling water in the estimate provided to us. However, in reporting leak volumes to us, DOE/Westinghouse included a footnote to the tank 105-A tank leak estimate stating

¹Nuclear Waste: DOE's Management of Single-Shell Tanks at Hanford, Washington (GAO/RCED-89-157, July 10, 1989).

that cooling water was added to this tank and that some did leak to the ground, but did not provide any volume figures.

Specifically, Westinghouse's estimate provided to us showed that only 5,000 gallons of waste had leaked from tank 105-A, even though Westinghouse had indications at that time that perhaps more than 500,000 gallons of contaminated cooling water had leaked from this tank. However, it should be noted that a precise accounting of the volume of contaminated water that has leaked from tank 105-A was not available to DOE/Westinghouse in 1989 and, more importantly, such estimates are not available today. For example, DOE now estimates that the leakage of cooling water from tank 105-A ranges from 50,000 to 800,000 gallons.

In response to concerns over the uncertainty of the volume of wastes (including cooling water) that may have leaked from Hanford's single-shell tanks, DOE directed Westinghouse in October 1990 to examine past records to determine the amount of liquid waste that may have leaked from the 66 tanks classified as assumed leakers (including tank 105-A).² In January 1991 Westinghouse awarded a 2-year contract for this purpose.

Background

The Hanford Site, located on the Columbia River in southeastern Washington State, is operated by Westinghouse Hanford Company for DOE.³ Between 1943 and 1964, 149 single-shell storage tanks were constructed and placed in service at Hanford to contain the highly radioactive, heat-producing, and chemically toxic liquid wastes resulting from the reprocessing of spent reactor fuel in connection with the nuclear weapons program. These tanks, ranging in size from 55,000 gallons to 1,000,000 gallons, last had waste added in 1980.

²Tanks were previously classified as confirmed leakers, questionable integrity, or sound. DOE now labels the confirmed leaker and questionable integrity tanks "assumed leakers."

³Various contractors have operated the Hanford Site since it was established as part of the Manhattan Project during World War II. Westinghouse Hanford Company is the current contractor, taking over Hanford operations in 1987. The previous contractor was Rockwell International.

Because the single-shell tanks contain mixed waste,⁴ they are subject to regulation under the provisions of RCRA, as amended.⁵ EPA authorized the state of Washington to implement the RCRA hazardous waste program within the state on November 23, 1987. State regulations implementing the RCRA program had been issued by the Washington State Department of Ecology—the designated state regulatory agency—in June 1987. The regulations provide that dangerous waste shall include run-off from a dangerous waste site unless it can be demonstrated that the run-off has not been contaminated by the waste. According to an attorney with the Washington State Attorney General's Office, the leakage of cooling water is considered a hazardous waste release under the state's regulations.

On July 26, 1988, in conjunction with performing our prior review of DOE's management of the Hanford single-shell tanks, we requested in writing that DOE provide an estimate of the total amount of liquid waste that had leaked from the single-shell tanks. To estimate the leak volumes, Westinghouse used a variety of approaches, depending on what was known about possible tank leaks. For 39 of the 66 tanks known or assumed to have leaked, including tank 105-A, Westinghouse used previously published estimates reported in six separate studies. For eight tanks, Westinghouse used changes in the liquid level to estimate the leakage. For the remaining 19 tanks, Westinghouse did not have reliable liquid level data; it therefore estimated the leakage by assuming that the possible leaks in these 19 tanks would be similar to leaks observed in other single-shell tanks of similar size.

The Westinghouse leak volume estimate for the single-shell tanks was reported in a May 17, 1989, letter to the DOE Richland Operations Office (DOE Richland). This letter, which was given to us by DOE Richland, estimated that approximately 750,000 gallons of liquid waste had leaked from the single-shell tanks. This estimate was included in our July 1989 report.

⁴Mixed waste contains both radioactive and hazardous components, as defined by the Atomic Energy Act of 1954, as amended, and the Resource Conservation and Recovery Act of 1976 (RCRA), as amended, respectively.

⁵On July 3, 1986, the Environmental Protection Agency (EPA) published a notice (51 FR 24504) of its determination that radioactive mixed wastes would be subject to regulation under RCRA. This determination was confirmed on May 1, 1987 (52 FR 15937), by a DOE-published final byproduct material interpretive rule. Consequently, DOE-generated radioactive wastes that qualify as hazardous waste under RCRA are subject to dual regulation under RCRA and the Atomic Energy Act of 1954, as amended.

Single-Shell Tank Leak Estimates Did Not Include Cooling Water Volumes

In the May 17, 1989, letter, Westinghouse estimated that a total of about 750,000 gallons of liquid waste had leaked from the 66 single-shell tanks known or suspected of leaking. An attachment to the letter contained a table summarizing the estimated leakage from each of the 47 single-shell tanks for which Westinghouse had previously made estimates. The estimate for tank 105-A was 5,000 gallons, but it contained the following footnote:

Cooling water was added to 241-A-105 after the tank was declared a leaker to aid evaporative cooling. It is believed some of this liquid did go to ground. The past practice was to not include cooling water in the leak volume estimate. The scope of this letter did not include a review of the methods used previously to estimate leak volumes.

During our previous review, DOE gave us a four-volume report prepared by Rockwell (the former site contractor), last updated in 1986. This report summarized leak detection and liquid level data on each tank from June 15, 1973, to January 1986. It also included a brief summary on each tank. For tank 105-A the report chronicled cooling water additions by sprinkling but never mentioned the quantity. The tank summary for 105-A, however, noted "the possibility of some leakage is suggested."

Finally, Westinghouse's Tank Farm Surveillance and Waste Status Summary Report, distributed monthly to DOE Richland, did not include data on tank leaks until the May 1989 report. This report, published in July 1989, reflected the new 750,000-gallon leak volume estimate reported to us by Westinghouse. The report also added a footnote to the tank 105-A estimate similar to the footnote quoted above from the May 17, 1989, letter.

Westinghouse Knew About Cooling Water Additions in 1989

On September 27, 1990, the Washington State Department of Ecology learned that, according to a DOE memorandum dated September 26, 1990, tank 105-A may have leaked more than one million gallons of contaminated water over a 10-year period ending in 1978. Documents we obtained from Westinghouse show that a Westinghouse reviewer had raised the issue of cooling water additions when Westinghouse was developing its 1989 leak volume estimate.

As part of Westinghouse's review procedures, the staff responsible for preparing the written response to our request submitted a draft letter to the Westinghouse Defense Waste Storage Safety group for internal

review prior to release.⁶ One member of the safety group raised concerns about the 750,000-gallon estimate being reported. As part of her review of the methodology, the reviewer selected several tanks and checked the underlying files. During this review she found records indicating that over 570,000 gallons of cooling water that had been added to tank 105-A might have leaked from the tank.⁷

Faced with a deadline to respond, Westinghouse officials decided to address the reviewer's comment related to tank 105-A by (1) using the previously reported leak estimate for tank 105-A of 5,000 gallons and (2) adding a footnote (quoted previously) to the letter that stated that cooling water was added to tank 105-A and that some may have leaked to the ground.

In discussing tank 105-A during this review, Westinghouse and DOE Richland officials said that, because clean water was added, leakage of this water was not considered waste in previous tank leak studies; therefore, to be consistent with the numerous prior estimates, cooling water was not included in the estimate they supplied us. In addition, they said that, at the time, they thought the leakage was probably small and that water leaks were not as severe a problem as leaks of highly radioactive waste.

As discussed earlier, state of Washington regulations provide that dangerous waste shall include run-off from a dangerous waste site unless it can be demonstrated that the run-off has not been contaminated. Furthermore, an attorney from the Washington State Attorney General's Office told us that specific written notice of a hazardous waste leak is required by the Washington Administrative Code.⁸ In his view, disclosure of a leak through a footnote to a report, which may or may not be read, is not adequate notice. The DOE Richland Acting Branch Chief responsible for tank farms also believes it is clear that, under Washington State law, cooling water is waste when it leaks out of a tank and that Westinghouse should have reported such leaks.

⁶The Defense Waste Storage Safety Group (now known as Waste Tank Safety Assurance) was a group within Westinghouse that had responsibility for, among other things, providing an independent review of all studies related to the tank farms that were intended for delivery to DOE.

⁷Since the member of the safety review group made her comment, DOE and Westinghouse have reviewed additional records and now estimate that between 50,000 and 800,000 gallons may have leaked from tank 105-A.

⁸Washington Administrative Code 173-303-145(1).

Current and Future Leak Estimate

As of February 1991 Westinghouse estimated that between 50,000 gallons and 800,000 gallons of the one million gallons of cooling water added to tank 105-A between February 1971 and December 1978 may have leaked. The Manager, Single-Shell Tanks, also stated that this water may have leached some of the waste from the tank. A DOE Richland official agreed that water in a leaking tank acts to move waste out of the tank and through the soil. Westinghouse also acknowledged that the current tank leak estimates do not include other possible additional leaks, such as continued seepage from leaking tanks and rainwater that may have gotten into the tanks and subsequently leaked out.

Current monthly reports on the tank farms, however, still list 105-A as having leaked 5,000 gallons of contaminated waste with a footnote explaining the cooling water additions. Specifically, beginning with the November 1990 report, published in January 1991, the footnote stated that:

Perhaps as much as one million gallons of clean cooling water was sprayed into single-shell tank 241-A-105 in the 1970s to aid in evaporative cooling. It is likely that much of this water (50,000 to 800,000 gallons) did not evaporate and therefore, may have leached some of the sludge and added to the waste released from this tank. Past practice was to exclude the cooling water from the leak volume estimate.

In October 1990 DOE directed Westinghouse to examine past records, on a tank-by-tank basis, to determine the amount of liquid waste that may have leaked from the 66 single-shell tanks assumed to be leakers, including tank 105-A. Westinghouse awarded a contract to EBASCO Services Incorporated in January 1991 to begin this review. This \$1.7-million contract calls for re-estimating leakage within 2 years. Westinghouse has directed the contractor to begin the reassessment with tank 105-A. This review should help clarify tank history.

Conclusions

The actual volume of waste that may have leaked from Hanford's single-shell tanks is not known. The DOE/Westinghouse leakage estimate of 750,000 gallons included in our 1989 report did not include the volume of water added to the tanks to cool the waste and that may have eventually leaked to the soil. Although DOE currently estimates that 50,000 to 800,000 gallons of this water may have leaked from tank 105-A alone, the total leak volume for all tanks will not be available until Westinghouse completes its ongoing review of historical tank records.

Recommendations

We recommend that the Secretary of Energy direct the Manager of the DOE's Richland Operations Office to (1) incorporate the best current estimates of cooling water leaks into its estimate of total tank leaks and (2) revise that estimate as additional information becomes available through the tank-by-tank analysis currently being developed.

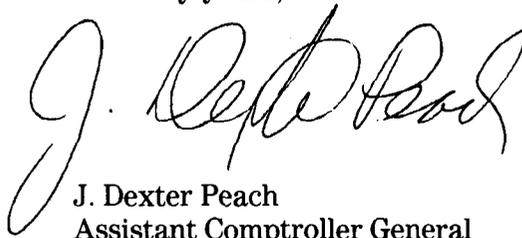
As requested by your office, we did not obtain official DOE comments on this report. However, we discussed the facts presented in this report with DOE's Richland Operations Office and Westinghouse Hanford Company officials and incorporated their comments where appropriate.

We performed our review between November 1990 and May 1991 in accordance with generally accepted government auditing standards. To obtain the information needed, we reviewed Westinghouse and DOE Richland files, interviewed appropriate Westinghouse and DOE staff, discussed regulatory requirements with Washington State and EPA officials, and reviewed various studies prepared by the current and previous contractors. In addition, we reviewed the investigative files of the DOE Office of Inspector General and discussed its investigation with Inspector General investigators. Our objectives, scope, and methodology are discussed in appendix II.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time we will provide copies to DOE and to other interested parties upon request.

This report was prepared under the direction of Victor S. Rezendes, Director of Energy Issues, who may be reached at (202) 275-1441. Other major contributors to this report are listed in appendix III.

Sincerely yours,



J. Dexter Peach
Assistant Comptroller General

Contents

Letter	1
Appendix I Responses to Questions Concerning the Events Surrounding the DOE/ Westinghouse 1989 Leakage Estimate	10
Appendix II Objectives, Scope, and Methodology	18
Appendix III Major Contributors to This Report	20

Abbreviations

DOE	Department of Energy
EPA	Environmental Protection Agency
GAO	General Accounting Office
RCRA	Resource Conservation and Recovery Act

Responses to Questions Concerning the Events Surrounding the DOE/Westinghouse 1989 Leakage Estimate

On the basis of documents it had, the Senate Committee on Governmental Affairs became aware of inaccurate information in a 1989 DOE/Westinghouse estimate of the Hanford single-shell tank leaks, which we had incorporated in our July 1989 report on the single-shell tanks. The Committee asked us to answer seven questions related to the preparation and release of this estimate.

1. Why did the contractor not fully disclose the amount of cooling water which leaked to DOE and thus to GAO?

According to Westinghouse, while DOE Richland had requested Westinghouse to develop overall leak volume estimates for the 66 single-shell tanks currently classified as assumed leakers, the focus of its effort was on estimating how much had leaked from the 27 for which no estimate had ever been published.

Westinghouse said that past practice had excluded cooling water additions from leak estimates; therefore, to be consistent with this past practice, cooling water was also excluded from its estimates. Westinghouse said that cooling water has been historically excluded because it was considered clean water rather than waste water. With respect to tank 105-A, Westinghouse said that the tank waste had been flushed with an acidic solution and then the liquid and dissolved material pumped from the tank. At the time Westinghouse believed that no waste would be carried out with the clean water. Subsequently, Westinghouse has determined that additional waste had probably been transported by the cooling water.

Prior studies of tank 105-A had estimated that up to 5,000 gallons of liquid waste had leaked and therefore this figure was used in Westinghouse's response. Westinghouse kept DOE fully aware of the approach it used to estimate the leak volumes. DOE Richland officials attended meetings, reviewed the method Westinghouse used to estimate the leak volumes for the tanks, and reviewed draft copies of the Westinghouse response letter. However, DOE officials said that they were not aware of the specific concerns that had been raised during the review by one of the staff of the Defense Waste Storage Safety Group until October 1990—after the cooling water additions had been reported to the state. (See question 3 for a full discussion of the safety group review.)

2. Did DOE know about the cooling water additions and, if so, why did DOE not report them to GAO?

DOE Richland officials knew that cooling water had been added to the single-shell tank known as tank 105-A. The Director, Tank Farms Project Office, to whom the Westinghouse letter was addressed had been the branch chief for DOE who worked with the contractor in 1978 to stop cooling water additions to 105-A. The DOE Richland engineer responsible for coordinating Westinghouse's response said that he also was aware that cooling water had, in the past, been added to 105-A. He reviewed Westinghouse drafts and provided comments. We found in Westinghouse files a copy of a draft response revised by the DOE engineer.

DOE Richland officials said that we were told during interviews that cooling water had been added to tank 105-A. Also, they said that we were given a four-volume 1986 study that specifically mentioned the cooling water additions. Although the 1986 study reported that cooling water had been added to the tank, it did not indicate how much water had been added or give an estimate of the amount of water that may have leaked. The study does indicate that some leakage might have occurred. GAO staff who performed the earlier study agree that DOE had mentioned that cooling water had been added to some tanks, but no specific tanks were mentioned. Further, DOE did not indicate the potential magnitude of the leak quantities.

3. Why was the Westinghouse Hanford Company's Defense Waste Storage Safety Group bypassed in sending the response letter on tank leaks to GAO?

The Westinghouse Defense Storage Safety Group was not bypassed. However, standard procedures for disposing of review comments were not followed.

DOE procedures require a review of all significant safety-related programs by the appropriate group within the contractor organization. Westinghouse officials said this requirement means that Safety and Security should review any reports being prepared for issuance to DOE or other parties outside of Westinghouse. For issues related to tank farms, the Defense Waste Storage Safety Group (safety group) performed that function.¹

The safety group was organized by area. For example, one reviewer was responsible for matters related to single-shell tanks while another reviewer looked at material related to double-shell tanks. When a report

¹The group is now known as Waste Tank Safety Assurance.

came in for review, the group manager determined a deadline and scope of review and assigned it to the appropriate engineer for review. The assigned engineer reviewed the report and any related materials that the engineer believed needed to be examined. If the engineer had significant comments on the report, the engineer would prepare a form called a Review Comment Record. The Review Comment Record and the marked-up report were returned to the group preparing the report, which responded to the Review Comment Record and revised the report. If necessary, the group would meet with the safety engineer to resolve any issues. The revised draft and the Review Comment Record—annotated to show how comments were addressed—was then returned to the safety engineer, who had to indicate agreement by signing the form. If the engineer did not agree and regarded the issue as significant, the engineer could hold up the report until the issue was resolved.

The safety group reviewed the leak volume estimate report at least three times. The engineer responsible for preparing the Westinghouse response on leak volumes completed an initial draft on January 18, 1989. This draft response was revised on February 1, 1989, and again at an unspecified later date in response to internal review comments. This draft was submitted to the Westinghouse Defense Waste Storage Safety Group for its first review sometime before March 1, 1989, and was assigned to the safety engineer responsible for single-shell tanks. The safety engineer made no comments on the previously reported leak volumes on his Review Comment Record, dated March 1, 1989, but proposed some changes to the response and revised the routings on the cover sheet to include the Manager of the Defense Waste Storage Safety Group.

Comments from the March 1, 1989, review and other changes were made in the response, and another draft was submitted to the safety group. The safety group assigned this draft to the original reviewer and directed that a second safety reviewer also review the draft by March 31, 1989. We were unable to determine why the second reviewer was asked to review the draft response.

The second reviewer pulled several files and found some letters and other reports that questioned the leak volumes reported on six of the tanks. She raised objections to the draft as indicated in a note which stated:

Don't sign. As of 1978 over 500,000 gal[lons] from 105-A had gone to soils. We have accounted for 5,000 gal[lons] only. There are probably other discrep[ancies].

This reviewer's concerns were recorded in a second Review Comment Record, dated April 7, 1989.

The response was revised to address these comments. The April 7, 1989, Review Comment Record was answered on May 15, 1989, by the Manager, Westinghouse Single-Shell Tanks, and noted that challenging older estimates of leakage from particular tanks was outside the scope of the work. A footnote was also added to the list of tank leak estimates to report cooling water additions to 105-A. The disposition of this and other comments was discussed with the second reviewer who raised the concerns. The engineer who prepared the report and his manager told us that they thought they had satisfied the second safety reviewer's concerns. The second safety reviewer told us that she does not know now if she was satisfied with the disposition of her comments. She did not sign the Review Comment Record. The original safety reviewer, rather than the second reviewer who made the comments, signed off on the Review Comment Record on May 15, 1989, in the third safety review.

While safety group managers said that they prefer to have the reviewer who makes the comments sign off on his or her disposition, it does happen that other reviewers may sign off to avoid delaying a product when the original reviewer is not available. We were unable to determine why the revised draft was not returned to the second reviewer for signature.

4. Were key documents related to the leak volume estimates removed or destroyed from Westinghouse files?

One file and other miscellaneous documents were removed from Westinghouse files in 1989 and have not been returned. We were unable to determine exactly what was removed or why they were removed. However, we found no evidence that the disappearance was an attempt to cover up the amount of leakage from the single-shell tanks.

Material from two locations—the Tank Farms Surveillance Analysis Support Section and the single-shell tank farms Process Engineering Section—disappeared sometime after the second Defense Waste Storage Safety Group review of the Westinghouse response on tank leaks in March 1989. A Surveillance Section file, which was maintained in the desk drawer of the engineer, was not discovered to be missing until October 1989. This file, which had been maintained by this engineer's predecessor, consisted of material the former employee developed or saved that had not been incorporated into any reports. The missing

material was the contents of one hanging file that was related to tank 105-A. The retired former employee did not maintain a list of the files. Furthermore, he doubted that his files would mean much to anyone else.

According to the technician who now maintains the files, the missing material was probably simply mislaid after being borrowed, and not stolen. The technician reconstructed the missing Surveillance Section material by copying documents previously copied by the second safety reviewer.

When we reviewed the reconstructed files, we found that most of the information in them was also located in other files. For example, the documents that described the leaks and cooling water additions have been provided to the state in response to its request. The engineer who responded to the request said that in identifying documents to provide to the state, he had not reviewed the files the technician maintained. He had located these materials in other sets of files he reviewed.

Some material in the Process Engineering Section, according to the safety reviewer who had used the material, also disappeared. The engineer responsible for the files said that he does not know what material had been removed or what happened to it. This engineer was responsible for records retention activities in the group. He said that these files were maintained for the engineers to reference. Therefore, they were not purged in the records management campaign in 1989.²

Because of concerns about the files' disappearance, Westinghouse's Office of General Counsel requested the Westinghouse Safeguards and Security Internal Investigation Group to review the disappearance. In an April 1990 report, the group concluded that the evidence did not support the allegations that files were suspiciously removed.

In response to the concerns raised by the second safety reviewer about the missing files, the Manager of Single-Shell Tanks, in an October 24, 1989, memorandum, directed his staff to maintain all records on single-shell tanks. Previously, some of the records had been destroyed under DOE orders on records management that provide for periodic review and shipment to storage of records maintained on single-shell tanks. As part

²Determining how long records should be retained at Hanford is controlled by DOE orders which specify how long various types of records must be maintained. The DOE orders require that some records be retained permanently and others for periods of from 3 months to 100 years. Records related to spills or leaks are permanent records. Westinghouse has established a program (Records Inventory and Disposition Schedules) to implement the DOE orders.

of DOE's effort to develop information about tank leaks and contents, Westinghouse has begun a program to retrieve and catalog various tank farm records from files within the contractor facilities and from storage.

5. Were leaks in single-shell tanks, other than tank 105-A, also not accurately disclosed?

Because Westinghouse focused its effort on developing estimates for tanks that had not previously had a leak volume reported, information questioning the estimates on other tanks was not evaluated. Records that we reviewed show that the leak estimates reported by Westinghouse in the May 1989 letter to DOE were not complete according to information available at the time. Although other tanks were involved, how many tanks and how much liquid were involved is not clear.

The second Defense Waste Storage Safety Group reviewer who raised concerns about the cooling water additions also raised questions about the estimates for five additional tanks on the basis of information she reviewed. When DOE became aware of the second safety reviewer's comments in October 1990, it directed Westinghouse to review the concerns she had raised.

In its response Westinghouse confirmed the information she had quoted but concluded that the information had probably been available to the groups that prepared previous studies Westinghouse had relied on. The previous studies had not accepted these new leak volumes, and Westinghouse said that it would not revise the estimates now. On the basis of our analysis of the Westinghouse response, we were unable to determine whether the estimates the second safety reviewer identified were more accurate than the current estimates.

DOE has directed Westinghouse to conduct a tank-by-tank analysis of the underground tanks. Westinghouse awarded a contract in January 1991 to begin this review. This \$1.7 million contract calls for completion of leak re-estimation within 2 years. Westinghouse has directed the contractor to begin the reassessment with tank 105-A. As a first step, Westinghouse has released several thousand pages of documents related to tank 105-A and developed an action plan to address problems in 105-A. The company is also retrieving, computerizing, and researching records previously sent to storage.

This reassessment may lead to changes in estimates. For example, we reviewed one 1974 memorandum that listed tank leak volumes for 23 of

**Appendix I
Responses to Questions Concerning the
Events Surrounding the DOE/Westinghouse
1989 Leakage Estimate**

the single-shell tanks. This document reported higher leak volumes for five of the tanks than reported to DOE in the May 1989 letter. Total leak volume for the five tanks was 82,000 gallons higher than currently reported by Westinghouse.

Westinghouse reported to DOE in November 1990 that

it appears that many sources of liquid additions (e.g. cooling water additions, intrusions, leak testing, continued use of the tanks) and associated continued or subsequent leakage may not have been included in previous leak volume estimates.³

The latest Westinghouse monthly report on the tanks also notes in its table on leak volumes that the volumes reported

do not include (with some exceptions), such things as: a) cooling/raw water leaks, b) intrusions (rain infiltration), and c) leaks not through the tank liner (surface leaks, pipeline leaks, etc.).⁴

In our limited review of available documents, we identified 36 tanks that had unusual increases in their liquid levels, including 8 tanks classed as assumed leakers.

While the proposed review of tank farm historical records and other documents should improve the accuracy of reported leak volumes, many of the leaks probably can never be accurately measured because all tanks do not have equipment that can measure drops in liquid levels. Also, the contents of some of the tanks prevent accurate measurement of leaks. Finally, limitations in many of the old records will prevent DOE from precisely determining the total leak volume.

6. Why was cooling water leakage routinely excluded from monthly Tank Farm Surveillance and Waste Status Summary Reports prior to July 1989?

According to the Westinghouse Manager, Single-Shell Tanks, and the DOE Director, Tank Farm Project Office, they were aware of the cooling water additions but did not consider them to be leaks because the added water was clean. A Washington State official said the water should be treated as waste. In support of his position, he cited provisions of the

³W. H. Hamilton, Jr., Single-Shell Tank Leak Volumes (9004655B R1, Nov. 5, 1990), p. 1.

⁴B. M. Hanlon, Tank Farm Surveillance and Waste Status Report for January 1991, Westinghouse Hanford Company, February 1991, p. G-4.

**Appendix I
Responses to Questions Concerning the
Events Surrounding the DOE/Westinghouse
1989 Leakage Estimate**

Washington Administrative Code which provide that any dangerous waste shall include

spill residue, . . . leachate, or precipitation run-off. Precipitation run-off will not be considered a dangerous waste if it can be shown that the run-off has not been contaminated with the dangerous waste.⁵

Westinghouse does not include the cooling water additions in its leak estimates because of the uncertainty about amounts involved. In its February 1991 monthly report, Westinghouse explained that cooling water was excluded because estimates of cooling water additions varied from 100,000 to 1.5 million gallons, there was no accurate estimate of cooling water leaks, and there was no reliable method to determine the additional waste released.

7. What did DOE's Inspector General do or know about the inaccurate reporting of the leaking tanks?

DOE's Inspector General's Office investigated the issue of inaccurate reporting of leak volumes as 1 of 14 issues that were brought to its attention in May 1989 by Westinghouse's Office of Security after the issues had been raised by an employee.

The Inspector General staff initially addressed some of the 14 issues that raised safety concerns. They began work on the issue of inaccurate tank leaks by conducting initial interviews related to this issue in the spring of 1990.

In March 1991 the Inspector General's Office did additional work related to this issue, including obtaining and reviewing many of the documents related to tank 105-A. The Office has focused its review on the specific tanks cited in the April 7, 1989, Review Comment Record whose reported leak volumes were questionable. As of the end of March 1991, the staff was continuing its work on this and some of the other issues and was beginning to draft its report.

The Inspector General did not originally investigate the disappearance of files related to the tank leaks because Westinghouse Security was investigating the issue. However, the Assistant Inspector General for Investigations said that the Office has now agreed to look at that issue as well.

⁵Washington Administrative Code 173-303-070 (2)(a)(ii).

Objectives, Scope, and Methodology

On October 31, 1990, the Senate Governmental Affairs Committee asked us for information about discrepancies between the amount of liquid which leaked from single-shell tanks that we had reported in July 1989 and the amount reported by the Washington press on September 30, 1990. In subsequent meetings with the Committee staff, it was agreed that we would also answer seven questions related to this disclosure:

1. Why did the contractor not fully disclose to DOE and thus to GAO the amount of cooling water which leaked?
2. Did DOE know about the cooling water additions and, if so, why did DOE not report them to GAO?
3. Why was the Westinghouse Hanford Company's Defense Waste Storage Safety Group bypassed in sending the response letter on tank leaks to GAO?
4. Were key documents related to the leak volume estimates removed or destroyed from Westinghouse files?
5. Were leaks in single-shell tanks, other than tank 105-A, also not accurately disclosed?
6. Why was cooling water leakage routinely excluded from monthly Tank Farm Surveillance and Waste Status Summary Reports prior to July 1989?
7. What did DOE's Inspector General do or know about the inaccurate reporting of the leaking tanks?

To address the Committee's questions, we reviewed DOE and Westinghouse files located in Richland, Washington, and at various facilities at the Hanford Site. Because Westinghouse does not maintain official tank-by-tank files, there is no readily accessible single repository for information related to the tank farms. Therefore, we reviewed various sets of informal files and correspondence files to identify and review materials related to 105-A and some other leaking tanks. Westinghouse, at our request, searched its tank farm automated data base established in October 1989 to identify related reports, which we then reviewed. From these records and the other files, we reviewed various studies prepared by the current and previous contractors that provided information on

tank farm leaks and operational procedures. We reviewed two major historical reports produced on the underground tanks—one published in 1979, the other initiated in 1973 and last updated in 1986.

We also interviewed the DOE staff responsible for the original request to Westinghouse and for current tank farm operations. In addition, we interviewed current and former Westinghouse staff to understand the process by which Westinghouse developed its response to us. We also reviewed files maintained by Westinghouse Defense Waste Storage Safety staff and interviewed various officials in the Safety and Security organization.

To determine whether Westinghouse followed procedures for safety review, we looked at DOE requirements. We also interviewed current and past staff from the Westinghouse Defense Waste Storage Safety Group. To determine if Westinghouse handled tank farm records properly, we reviewed DOE orders and Westinghouse instructions on records retention and destruction. We also reviewed Westinghouse's classification of various files into record and nonrecord categories as provided for under the applicable DOE orders and interviewed staff responsible for the records management program within the engineering staff. We also reviewed the report on the missing files prepared by Westinghouse Security staff.

To determine regulatory requirements for reporting single-shell tank leaks, we discussed regulatory roles with attorneys from DOE Richland and with staff of EPA and the state of Washington.

To address the final question, we interviewed investigators from DOE offices in Richland, Washington; Pittsburgh,¹ Pennsylvania; and Washington, D.C., to discuss their investigation. We also reviewed their files and other workpapers. We also re-interviewed a number of the staff that the investigators had interviewed to determine whether any relevant information had been overlooked. To obtain information on the status of the investigation, in March 1991 we interviewed the Assistant Inspector General for Investigations.

¹One of the investigators from Richland had transferred to DOE's Pittsburgh Office of the Inspector General prior to our review.

Major Contributors to This Report

**Resources,
Community, and
Economic
Development Division,
Washington, D.C.**

Judy A. England-Joseph, Associate Director
James Noel, Assistant Director
Edward E. Young, Jr., Assignment Manager

**Office of Special
Investigations**

Thomas N. Ciehanski, Criminal Investigator

Seattle Regional Office

Leonard L. Dowd, Regional Management Representative
Christopher R. Abraham, Evaluator-in-Charge

Ordering Information

The first five copies of each GAO report are free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

**U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20877**

Orders may also be placed by calling (202) 275-6241.

**United States
General Accounting Office
Washington, D.C. 20548**

**Official Business
Penalty for Private Use \$300**

**First-Class Mail
Postage & Fees Paid
GAO
Permit No. G100**