

Title: WATTS BAR NUCLEAR PLANT

ALLEGED FALSIFICATION OF TEST DATA REGARDING ICE CONDENSER  
SCREWS

Licensee:

Case No.: 2-1998-023

Tennessee Valley Authority  
400 West Summit Drive  
Knoxville, Tennessee 37902-1499

Report Date: November 19, 1999


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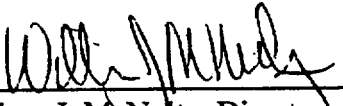
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## SYNOPSIS

This investigation was initiated by the U.S. Nuclear Regulatory Commission, Office of Investigations, Region II, on November 4, 1998, to determine whether employees of the Tennessee Valley Authority (TVA) withheld or assisted in concealing information regarding new defective screws from 1995 to 1998.

Based on evidence developed during this investigation, it is concluded that in 1995, the lead civil engineer at Watts Bar Nuclear Plant became aware of a condition adverse to quality but willfully provided inaccurate information on a corrective action report to conceal the condition. It is also concluded that a [REDACTED] willfully withheld information in 1995, 1997, and 1998 that would have identified the same condition adverse to quality. It is further concluded that in 1998, [REDACTED] willfully provided inaccurate information which concealed the actions of the Central Laboratory Services supervisor.

7C

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## LIST OF INTERVIEWEES

### EXHIBIT(S)

ADAIR, James G., Lead Civil Engineer, Watts Bar Nuclear Plant (WBN) .....	10
BRIGGS, Robert D., Metallurgical Engineering Supervisor, WBN .....	20
CASNER, Teresa C., Metallurgy Engineer, WBN .....	15
FRAZIER, Delsa L., Metallurgical Engineer, WBN .....	21 & 22
GUTHRIE, Paul V., Materials and Welding Manager, TVA (retired) .....	16
KATCHAM, Larry A., Structural Engineer Supervisor, TVA (former) .....	32
LEWELLYN, William W., Compliance Liaison Officer, TVA (retired) .....	18
McCOLLUM, Ralph T., Mechanical Engineer, S&W (former) .....	33
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OVERALL, Curtis O., System Engineer, WBN (former) .....	2
PHILLIPS, Robert L., Metallurgy and Materials Manager, TVA .....	17
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## DETAILS OF INVESTIGATION

### Applicable Regulation

Allegation: Alleged Falsification of Test Data Regarding Ice Condenser Screws

10 CFR 50.9: Completeness and accuracy of information

10 CFR 50.5: Deliberate misconduct

### Purpose of Investigation

This investigation was initiated by the U.S. Nuclear Regulatory Commission (NRC), Office of Investigations (OI), Region II (RII), on November 4, 1998, to determine whether employees of the Tennessee Valley Authority (TVA) Watts Bar Nuclear Plant (WBN) withheld or assisted in concealing information regarding defective screws from 1995 to 1998 (Exhibit 1).

### Background

In April 1995, Curtis C. OVERALL, WBN Ice Condenser System Engineer, discovered approximately 170 whole and broken pieces of ice condenser basket screws in the melt tank of the WBN ice condenser. OVERALL completed a problem evaluation report (PER), identified as WBP950246 (PER 246). PER 246 contained corrective actions which included having the screws analyzed by TVA Central Laboratory Services (CLS) and then having the CLS report evaluated by Westinghouse Electric Company (WEC), the plant's designer.

In May 1995, the screws were provided to CLS in order to determine the cause of failure. CLS was also asked to analyze a representative number of new, unused ice condenser basket screws taken from the WBN warehouse. CLS conducted the metallurgy tests and submitted four copies of a report dated June 2, 1995, to WBN personnel, including Lead Civil Engineer, James G. ADAIR. One of the findings (conclusion no. 6) by CLS concluded that quench cracks were present in the screws upon receipt from the manufacturer. An enlarged photograph of one of the cracked screws was attached to the report as figure 7 (Exhibit 6).

After reviewing the report, ADAIR contacted Terry R. WOODS, TVA Chief Metallurgical Engineer, because he (ADAIR) was concerned that some of the statements in the June 2 report were not scientifically objective. After reviewing the report, WOODS met with CLS personnel to determine the basis for certain statements. Subsequent to the meeting, CLS personnel agreed that the report should be revised.

On or about June 14, 1995, OVERALL learned that there was to be a meeting at WBN concerning the June 2 report, and that the original copies of that report were to be returned to CLS. OVERALL

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had already faxed a copy of the June 2 report to WEC for an opinion of the metallurgical analysis. OVERALL alleged that [REDACTED] used the June 14 meeting to downplay the findings of the CLS and to assure the attendees that there was no safety significance involved with the ice condenser basket screws. 7C

On June 19, 1995, [REDACTED] 7C

Even though the corrective action steps in PER 246 called for WEC to evaluate the CLS metallurgical report, WEC was not asked by TVA to perform such a review. On June 22, 1995, WEC provided a report to TVA which gave an evaluation of the number of screws that could be missing from any given ice condenser basket and still allow the system to meet its design requirements.

On July 28, 1995, [REDACTED] ADAIR each initialed documents in the closure package for PER 246, indicating that the documents and actions required by the corrective action report had been reviewed and verified in order to provide satisfactory completion of corrective actions. In fact, step 3 of the corrective action report, calling for an evaluation of the CLS metallurgical report, was not carried out. 7C

In 1997, TVA discovered that there were two separate CLS reports regarding the same subject matter and bearing the same report number. As part of the inquiry into the two reports, TVA requested that CLS compare the differences between the June 2 report and the June 19 report. [REDACTED] C

During the conduct of the TVA inquiry, the NRC learned that conclusion no. 6, regarding the Set B screws, had been omitted from the June 19 report, possibly to avoid a time consuming evaluation of the defective screws. At NRC's request, TVA expanded the inquiry into a supplement of PER 246 in order to reconcile the difference between the two CLS reports.

[REDACTED] 7C

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[REDACTED] which was made a part of the supplemental PER 246 [REDACTED] as giving an explanation for the omission of conclusion No. 6 from the June 19 report (Exhibit 34, p. 4).

As a result of information provided by OVERALL and RII inspection efforts, evidence of wrongdoing surfaced. Accordingly, OI initiated this investigation. 7c

#### Interview of Alleger (Exhibit 2)

On February 11, 1999, OVERALL was interviewed by OI:RII regarding this and other matters which he had brought before the NRC. OVERALL has been employed by TVA since 1979 and was the system engineer for the WBN ice condenser system from 1984 until 1995.

OVERALL said that after the 1994-1995 WBN ice loading process was complete he inspected the melt tank and discovered a number of screws which apparently had been vacuumed up with the ice. Recognizing the importance of the screws, OVERALL initiated PER 246 (Exhibit 5, p. 22), as well as bringing up the issue to his Supervisor, Landy L. McCORMICK (Exhibit 2, p. 41). He explained that ice condenser basket screws are used to attach the steel mesh basket material to a ring, or coupling, every 12 feet for a total length of 48 feet. OVERALL said that the screws are unique and would not have come from any source other than the ice baskets. He said that all of the screws and pieces of screws which he found in the melt tank were ice condenser basket screws (Exhibit 2, pp. 36-39).

OVERALL prepared an extent of condition report after completing the PER. He said this document sets forth a best guess estimate of what caused the condition noted on the PER. OVERALL suggested from his observation of the broken screws and reviewing the installation procedures, that over-torquing was a factor. He added that temperature variations would have caused expansion of the screws, possibly leading to fractures as a result of the added stress caused by lifting the baskets during weighing (Exhibit 2, pp. 44-45).

As a result of these observations, OVERALL proposed a metallurgical evaluation of the screws. However, responsibility for completion of PER 246 was transferred from Technical Services (OVERALL's group), to Nuclear Engineering (ADAIR's group) (Exhibit 2, p. 47).

OVERALL provided Vonda L. Sisson, WBN Site Metallurgist, with some of the broken screws he had found. OVERALL also removed a sample number of in-service screws from ice condenser baskets as well as several new, unused screws from the WBN warehouse. OVERALL said Sisson transported the screws to the TVA CLS with a request from OVERALL to determine the mode of failure (Exhibit 26, p. 48). OVERALL said CLS returned a report with several modes of failure listed for the screws, including thermal cycling and over-torquing. OVERALL recalled the CLS report also referred to corrosion, microfractures, quench cracks, and stress overload (Exhibit 2, p. 51). OVERALL said CLS provided the answers that "validated" his interest in the screws and the "possible cause of failure."

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OVERALL said the report, dated June 2, 1995, also included magnified photographs of the screws and that the different sets of screws (i.e., new, broken, whole) were identified by alpha characters. He said that a subsequent, revised analysis of the screws by CLS appeared to play down the severity of the first report and that the photo of the cracked new screw was removed. He added that the second report (dated June 19, 1995) bore the same file number (Exhibit 2, p. 52, Exhibit 6, p. 1, and Exhibit 7, p. 1).

OVERALL said Sisson requested that he return the June 2 report which had been issued by CLS in order to replace it (the June 2 report) with the revised June 19 report. OVERALL said it was his understanding that the June 2 report was never entered into the TVA documentation system. OVERALL testified that he returned his June 2 report to Sisson, and reported to her that he had already faxed a copy to Charles M. SCRABIS, Materials Engineer, WEC. OVERALL believes he returned the June 2 report to Sisson during a June 14 meeting. Later, he received a copy of the June 19 report (Exhibit 2, p. 54).

Upon receiving the June 19 report, OVERALL said he compared it, line-by-line to the June 2 report. He said it was apparent that the tone of the June 19 report was diluted, or downplayed, from that of the June 2 report. He said [REDACTED]

[REDACTED] OVERALL recalled that WOODS stressed that the matter of ice condenser basket screws needed to be rectified by WEC as soon as possible. 7C  
[REDACTED]

OVERALL said he only got to see the closure of PER 246 after he had left TVA and he learned TVA did not perform any corrective actions at all. OVERALL said it appears that TVA closed out PER 246 while he was still employed there, but that he didn't know anything about it nor did TVA consult with him in any way (Exhibit 2, p. 65). OVERALL described how TVA closed out PER 246 based on the WEC report. The WEC report, according to OVERALL, basically leaves the decision up to the licensee (TVA) as to whether the ice condenser baskets are safe with missing screws. OVERALL believes the missing screws from the ice condenser baskets create an unsafe condition that would allow the baskets, or portions of the baskets, to eject during an accident. According to OVERALL, WEC did not quantify the damage or specify what type damage could occur (Exhibit 2, p. 64).

OVERALL said he telephoned SCRABIS at WEC to discuss the PER 246 issue and that SCRABIS expressed concern because the ice condenser basket screws are used in nuclear plants all over the world. OVERALL also related the find to Vernon P. LAW, who, at the time was his (OVERALL's) engineering backup. OVERALL stated that LAW didn't get "bent out of shape" by the news, but appeared a little bewildered (Exhibit 2, p. 67).

OVERALL's concern was not so much that the screws were missing, as much as it was how they came about to be missing. He stressed that the fractures were the real issue, and whether it was an inherent fracture that was causing screws to fall out or break. OVERALL contended that he was

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laid off at TVA in 1995 because he wrote PER 246. He added that the PER came at a bad time for TVA because they (TVA) didn't want the NRC to know about the possible defects in the screws just prior to WBN startup (Exhibit 2, pp. 83-84).

AGENT'S NOTE: OVERALL's allegation of retaliation for reporting the defective screws is the subject of OI's investigation regarding Case No. 2-1997-006. That investigation did not substantiate OVERALL's allegation.

#### Coordination with Regional Counsel

Carolyn F. EVANS, NRC RII Counsel, was briefed on a regular basis regarding the developments of this investigation as it proceeded and she was provided with copies of pertinent transcribed witness interviews. On October 7, 1999, EVANS advised that [REDACTED] 5

#### Evidence

The following individuals were interviewed. The entire transcript/report of interview can be located in the Exhibit section of this report.

#### Interview of McCORMICK (Exhibit 8)

McCORMICK said he was OVERALL's supervisor in the Nuclear Steam Supply System (NSSS), Technical Support section at WBN when OVERALL found some screws in the WBN ice condenser melt tank. McCORMICK said OVERALL brought the screws to him and they agreed that the screws came from the ice condenser baskets. Since some of the screws were broken, McCORMICK said he felt the screws should be evaluated by the TVA CLS to determine why they broke (Exhibit 8, pp. 8-10).

McCORMICK said that OVERALL initiated PER 246 and that in order to properly close out a PER, the cause of the problem must be identified. McCORMICK explained that the metallurgical analysis would allow the identification of the cause as well as the recurrence control. McCORMICK recalled that the metallurgical report was not forthcoming in time to meet the PER 246 deadline and that he extended the corrective action deadline.

According to McCORMICK, PER 246 was transferred from his oversight to Nuclear Engineering, at about the same time the June 2 CLS report was received. McCORMICK said the CLS report had "causes" listed for the screw failure which would provide a starting point for determining the actual cause of screw failure. McCORMICK said he had told OVERALL to contact CLS and make sure the metallurgists knew that NSSS needed some causes of why the screws broke. McCORMICK

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said he only found out several years later that OVERALL actually provided the reasons, or potential causes that were listed by CLS in the technical report (Exhibit 8, p. 12).

Shortly after the June 2 report was issued, McCORMICK said OVERALL came into his office and told him that the report was going to be called back and a second report issued. McCORMICK recalled that OVERALL also told him that they (CLS) were going to change the report but assign the same report number because WOODS didn't agree with the first report (Exhibit 8, p. 13).

McCORMICK said he did not attend a meeting at WBN on June 14 which was led by WOODS, although he was aware that such a meeting was held. He said he was part of a telephone conference which he believes took place the following day which included WEC personnel as well as [REDACTED] 7c  
McCORMICK recalls that the conference involved the structural integrity of the ice condenser baskets and the potential damage which would result from an accident. McCORMICK said he and OVERALL were frustrated because [REDACTED] seemed to dominate the call and the direction of the corrective actions seemed to be headed more toward a probability study of the maximum allowable number of missing screws (Exhibit 8, p. 22).

McCORMICK said it was during this teleconference that he first learned of the extent of WEC's involvement in evaluating the structural aspects of the ice condenser baskets as opposed to the component screws (Exhibit 8, pp. 24-25).

McCORMICK said a second report (June 19 report) was issued several weeks later and he was "deflated" because the June 19 report did not list the causes of failure which would allow the completion of an action plan (Exhibit 8, p. 13).

During the time period when PER 246 was still assigned to McCORMICK's NSSS section, work was simultaneously being conducting on it by Nuclear Engineering. McCORMICK said discussions were being carried out by Nuclear Engineering regarding structural aspects of the ice condenser baskets and what the effects would be in the event of an accident. McCORMICK said he consulted with his supervisor and suggested that PER 246 be transferred to Nuclear Engineering, since it was more of an engineering issue which was not McCORMICK's area of expertise. McCORMICK said responsibility for PER 246 was, in fact, transferred to Nuclear Engineering. He added that he saw the June 19 report but doesn't recall actually reading it. He said OVERALL briefed him on the findings of the June 19 report and told him that the causes of screw failure had been removed (Exhibit 8, pp. 7-18).

McCORMICK stated he apparently did not realize from his reading of the report, nor was he made aware that information regarding the "warehouse" (Set B) screws had been deleted from the June 19 report. McCORMICK said if he had been aware of the information regarding possible manufacturing defects, he certainly would have pursued it as a possible part 21 issue (Exhibit 8, p. 29).

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### Interview of SISSON (Exhibit 9)

SISSON was the site metallurgical engineer at WBN in 1995 when OVERALL found the broken ice condenser basket screws in the bottom of the WBN ice condenser. SISSON said OVERALL brought the screws to her for her opinion as to why they were broken and they agreed that a metallurgical evaluation was in order. SISSON said she selected a representative number of screws and forwarded them to the CLS, returning the remainder of the screws to OVERALL. SISSON said she subsequently received a metallurgical evaluation of the screws by CLS Metallurgist, Daryl A. SMITH (Exhibit 9, pp. 8-9).

SISSON said she distributed copies of the laboratory report, dated June 2, 1995, but that she doesn't recall all of the recipients. A short time later, SISSON said she was contacted by FRAZIER who requested that SISSON retrieve the June 2 report. SISSON recalled that there were four copies, but that OVERALL had sent one of the copies to Duke Engineering (sic). SISSON said she retrieved the reports as requested and told FRAZIER that she was unable to retrieve one of the reports. According to SISSON, she met with other WBN and CLS employees at CLS to discuss the revised report (Exhibit 9, pp. 23-27).

SISSON said WOODS advised them of the purpose of the meeting and they proceeded to go over the June 2 report "line by line" to discuss what areas could be verified. She recalled that there was no discussion about the Set B screws or figure 7 in the report. She stated that references to the cracked new screws were carried over to the revised report (June 19). However, SISSON was given the opportunity to review the June 19 report and she then stated she was mistaken, because no such statement appeared in the June 19 report (Exhibit 9, pp. 27-28 and 36).

SISSON denied knowing why the Set B information was removed from the June 2 report. She said the Set B information should have been documented. She was asked a second time whether such information (cracked new screw) was significant, and she replied, "I think it was information that needed to be there." (Exhibit 9, pp. 38-39). SISSON again said that the June 2 report was reviewed line-by-line during the meeting at CLS and that she "does not recall" a statement being made that the Set B information should be omitted. She then added that maybe the omission wasn't inadvertently left out (Exhibit 9, pp. 50-51).

### Interview of ADAIR (Exhibit 10)

ADAIR has been the lead civil engineer at WBN, Nuclear Engineering since 1994. ADAIR said Nuclear Engineering was asked by McCORMICK's section, NSSS, to provide structural evaluation of PER 246 as part of the corrective action plan for the PER. ADAIR said the preliminary actions called for a metallurgical evaluation of the ice condenser basket screws by the CLS. ADAIR stated that the corrective action plan called for WEC to review the CLS report (Exhibit 10, pp. 9-10 and Exhibit 5, p. 18).

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ADAIR said he received a copy of the CLS technical report dated June 2, 1995 (Exhibit 6), which he reviewed for completeness. ADAIR said he knew that WEC had a copy of the report and that they (WEC) had been requested to provide a structural evaluation to be used in the PER 246 closure process (Exhibit 10, p. 13). ADAIR said, "we knew" that WEC had received a copy of the June 2 report because he had been told that by OVERALL. ADAIR immediately corrected himself and said he didn't know whether it was OVERALL or someone else, but that he had been apprised of the fact that the June 2 report was in WEC's possession (Exhibit 10, p. 23).

ADAIR said he found that CLS personnel had made several conclusions in the evaluation and he questioned the basis of the statements made in the report. As a result, he contacted WOODS, TVA's chief metallurgy and materials engineer. Although WOODS has no supervisory responsibility over CLS, ADAIR stated that he normally contacts WOODS when he (ADAIR), has a question about CLS. ADAIR said that in this instance he does not recall whether WOODS responded to ADAIR's request. ADAIR further stated that he did not know whether WOODS had previously seen a copy of the June 2 report (Exhibit 10, pp. 13-15).

AGENT'S NOTE: It was learned later in this investigation that ADAIR had provided conflicting information to the NRC Office of the Inspector General (IG), during an interview dated February 12, 1998 (Exhibit 11). During that interview, ADAIR said he recalled seeing the CLS report dated June 19, 1995, but wasn't aware of the earlier report dated June 2. ADAIR further told the IG that he did not recall discussing the June 2 report with WOODS. Contrary to what he told the IG, ADAIR told OI that he reviewed the June 2 report and discussed its conclusions with WOODS. When confronted with the conflicting information, ADAIR said he must have "mis-spoke" concerning the matter. In addition, ADAIR told the IG that he saw no difference in the analysis of new unused screws between the first and the second reports. As noted earlier in this report, there was no reference to new, unused screws in the second (June 19) report.

ADAIR acknowledged that a subsequent report was produced by CLS dated June 19, 1995, but he said the second report was not produced as a result of his request. ADAIR further acknowledged that he used the June 19 report as part of the corrective action plan (Exhibit 5, p. 26) but could not recall if he read the June 19 report at the time it was distributed (Exhibit 10, p. 15).

ADAIR said he did not provide any additional information to WEC nor did he meet with CLS or WBN site personnel regarding the metallurgical examination or its results. ADAIR was shown a sheet of paper which purportedly was a sign-in sheet for a meeting at WBN on June 14, 1995, to discuss the ice condenser basket screw issue (Exhibit 3). ADAIR acknowledged his signature but said he does not recall the meeting (Exhibit 10, pp. 17-18). ADAIR further stated that he did not recall having any meetings regarding the new, unused (Set B) screws after he brought the June 2 report to WOODS' attention (Exhibit 10, p. 19).

ADAIR asserted that he received a structural evaluation from WEC (Exhibit 4) which concluded that no action was required and that the condition (of the ice condenser baskets) was acceptable as

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is. ADAIR said he used the letter from WEC to verify completion of the corrective action steps. However, ADAIR acknowledged that the WEC evaluation was a structural assessment of the ice condenser baskets and made no mention of either of the CLS metallurgical technical reports. ADAIR said he did not know that it was or was not significant that the WEC evaluation did not refer to the CLS report. ADAIR said he may have missed the reference to the Set B screws in the June 2 report but relied on the structural evaluation provided by WEC (Exhibit 10, pp. 27-28).

ADAIR agreed that the WEC evaluation did not reference the CLS report, but he alleged that WBN did the right thing by getting the CLS report to WEC. He questioned whether the report got to the right person, but nonetheless, he said WEC's structural engineers did make an evaluation. ADAIR responded that he did not recall whether he talked to anyone at WEC regarding the June 2 report nor did he recall whether the June 19 report was even sent to WEC (Exhibit 10, p. 29).

ADAIR said that when questions arose about the differences between the June 2 report and the June 19 report, Nuclear Engineering asked [REDACTED] to explain the disparity. It was pointed out to ADAIR that the explanation in the reconciliation report as to why conclusion no. 6 was missing from the June 19 report did not apply to conclusion no. 6 at all, but referred to figure 7. ADAIR responded that he could only suppose that from a metallurgical standpoint, that there was a crack in Set H (used screw) and in Set B (new screw) and they (CLS) substituted Set H for Set B (Exhibit 10, p. 33). 7C

AGENT'S NOTE: ADAIR only repeated what was written in [REDACTED] 7C  
[REDACTED] ADAIR's response did not address why conclusion no. 6 was missing from the June 19 report.

ADAIR eventually admitted that he would have to do an evaluation if he received information regarding a manufacturing defect in new screws. He acknowledged that such information reached him by way of the June 2 report, but that there was never any evaluation of the condition (Exhibit 10, p. 34).

AGENT'S NOTE: ADAIR became argumentative and evasive during a line of questions designed to elicit the significance of the cracks in the Set B screws (Exhibit 10, pp. 33-36).

ADAIR stated that he did not know why the Set B information had been removed from the June 19 report and that he had not asked anyone to remove it.

#### Interview of WOODS (Exhibit 12)

WOODS is the TVA-Nuclear, Chief Metallurgical Engineer. WOODS said he received a telephone call from ADAIR who voiced concerns regarding conclusions listed in the CLS technical report, dated June 2, 1995. WOODS said ADAIR asked him to evaluate the CLS report because ADAIR did not see how a metallurgical evaluation could produce such findings. WOODS said he had some concerns of his own once he read the report (Exhibit 12, pp. 6-8).

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WOODS said he specifically recalls two of the conclusions, No. 2 and No. 7, which concerned him and he thereafter met with CLS personnel regarding the June 2 report. WOODS said the matter was discussed in great detail and that he questioned the CLS personnel regarding the basis for their conclusions. He said there was general agreement that laboratory testing could not produce the conclusions seen in the June 2 report. WOODS learned that some of the conclusions had been provided to CLS by the cognizant engineer at WBN, and that those conclusions had been incorporated into the CLS report (Exhibit 12, pp. 8-10).

WOODS related that there was agreement among the CLS personnel at the meeting that a metallurgical analysis should produce an independent document capable of standing on its own, based upon observable facts. He said that it was further agreed that a second report would be issued to provide clarity. WOODS confirmed that a second report (June 19 report) was issued, although he said he did not read it until several years later (Exhibit 12, pp. 12-13).

AGENT'S NOTE

[REDACTED]

7C

WOODS recalled that he did not discuss the Set B screws with ADAIR during this time frame. WOODS said he "focused on the conclusions" and didn't get involved in "this stuff about new screws, old screws." WOODS confirmed that conclusion no. 6 of the June 2 report involved quench cracks that were observed in new screws. He said he interpreted the term "quench crack" to mean a manufacturing defect. He said conclusion no. 6 regarding quench cracks was a technical attribute that could properly be addressed by CLS and that he had no problem with its inclusion in the June 2 report (Exhibit 12, pp. 13-14).

WOODS explained that the revised report should have gone back to WBN for evaluation and he would have been contacted only if the site needed additional assistance. He added that it was significant that the information regarding quench cracks (conclusion no. 6) was left out of the June 19 report (Exhibit 12, p. 15).

WOODS stated that the question of new, unused screws which exhibited cracks, did not come to light for him until September 1998 during a meeting of TVA management and inspectors. WOODS said they discussed what information had been included and excluded from the June 19 report and it was at that time that he learned that a new screw identified in the June 2 report had a crack. WOODS said he was assigned to assess what information had been omitted, and to then determine the impact of that omission (Exhibit 12, pp. 16-17).

WOODS said he prepared a reconciliation report (Exhibit 13) even though he was not involved with either the June 2 report or the June 19 report by CLS. WOODS alleged that he did not even read the June 19 report prior to it being issued and so he had no answer in terms of why the June 19 report did not contain information regarding Set B screws. WOODS said he posed the question to

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FRAZIER, which resulted in a memorandum from FRAZIER to WOODS dated September 3, 1998 (Exhibit 14). WOODS recalled that the memorandum explained why the photograph of Set B screws was replaced with a photograph of Set H screws. WOODS said he incorporated FRAZIER's memorandum into his reconciliation report and added a statement regarding the potential impact of omitting the Set B information out of the June 19 report (Exhibit 12, pp. 18-22 and Exhibit 3, p. 3).

WOODS stated he did not discuss the Set B screws with FRAZIER in the 1995 time frame, but focused primarily on the seven conclusions in the June 2 report. He added that he also did not discuss the initial metallurgical examination with D. SMITH, the author of the June 2 report, other than during the meeting at CLS (Exhibit 12, p. 39).

WOODS said he didn't discuss the screw issue with McCORMICK, OVERALL, or any WEC personnel

7C

[REDACTED]

7C (AGENT'S NOTE: [REDACTED])

#### Interview of Participants at WBN Conference

The names of the following interviewees appeared on the sign-in sheet for a meeting held at WBN on June 14, 1995, at which time WOODS allegedly discussed the ice basket screws. Following each name is a brief summary of their recollection of the meeting.

#### Interview of OVERALL (Exhibit 2)

7C [REDACTED] OVERALL recalled that WOODS stressed that the matter of ice condenser basket screws needed to be rectified by WEC as soon as possible (Exhibit 2, p. 60).

#### Interview of Teresa C. CASTNER (Exhibit 15)

CASTNER, Metallurgy Engineer, recalls attending the meeting for the purpose of discussing the ice condenser screws. She also recalls that WEC had a response regarding how many screws could be missing. She does not recall whether WOODS was present, nor does she know who led the meeting. CASTNER believes that ADAIR and WEC were involved in a discussion regarding how many screws could be missing (Exhibit 15, pp. 6 and 8).

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Interview of WOODS (Exhibit 12)

WOODS does not recall the meeting and denies taking any part in discussions of the ice basket screws (Exhibit 12, pp. 32-33).

Interview of Paul V. GUTHRIE (Exhibit 16)

GUTHRIE, Materials and Welding Manager, said he often accompanied WOODS to the WBN site for meetings, but does not recall the meeting in question (Exhibit 16, p. 7).

Interview of Robert L. PHILLIPS (Exhibit 17)

PHILLIPS, Metallurgy and Materials Manager, said he had just transferred to WBN from Browns Ferry Nuclear Plant at the time in question and was probably attending other meetings on the same day. He does not specifically recall attending the June 14 meeting regarding ice basket screws (Exhibit 17, p. 37).

Interview of William W. LEWELLYN (Exhibit 18)

LEWELLYN, Compliance Liaison Officer, vaguely remembered the meeting and that it involved other issues besides just the ice basket screws. LEWELLYN thinks the meeting also dealt with the ice condenser doors, but he could not remember further details. He also did not remember who was in charge of the meeting (Exhibit 18, pp. 5-6).

Interview of Phillip F. SMITH (Exhibit 19)

P. SMITH, Engineering Manager, NSSS, said he does not recall being at the meeting in question. However, he recalls being in meeting at which OVERALL was also present and ice screws were discussed. P. SMITH said he does not know whether these meetings were one and the same and he does not recall any further details about the subject matter (Exhibit 19, p. 11).

Interview of ADAIR (Exhibit 10)

ADAIIR said he did not meet with WEC or CLS personnel regarding the June 2 report. He stated he did not recall being a meeting at WBN on June 14, 1995 (Exhibit 9, p. 18).

Interview of Robert D. BRIGGS (Exhibit 20)

BRIGGS, Metallurgical Engineer Supervisor, vaguely recalls being at the June 14 meeting but doesn't recall any details nor did he take any notes. He believes that some of those in attendance, including himself, who had nothing to contribute, were excused from the meeting. BRIGGS said WOODS "probably" led the meeting, but that he doesn't specifically recall (Exhibit 20, pp. 15-16).

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Interview of SISSON (Exhibit 25)

SISSON avoided a direct response regarding her recollection of the June 14 meeting. She stated that "Everyone asks me about this particular meeting. We had a lot of meetings over this issue" adding that "they" were putting a lot of resources into it so as not to delay fuel loading. SISSON was provided additional details of the meeting and she again avoided the issue (Exhibit 9, p. 23). She said OVERALL brought parts of an ice basket into a meeting, but she doesn't recall whether or not it was the one which took place on June 14.

AGENT'S NOTE: None of those whose names appeared on the sign-in sheet for the June 14 meeting at WBN, other than OVERALL, recalled any substantive details of the meeting.

Interview of FRAZIER (Exhibit 21)

FRAZIER has been a metallurgical engineer at the TVA CLS for 17 years where she supervises 5 other employees and a secretary. FRAZIER said her responsibilities include scheduling, work flow and review of technical reports. FRAZIER said she received a work request from WBN metallurgist SISSON to determine the failure mode of screws that had been fractured. FRAZIER said she assigned the metallurgical evaluation to D. SMITH (Exhibit 21, pp. 6-7). FRAZIER said she does not recall whether she discussed the work request with SISSON or whether she (FRAZIER) had any subsequent questions about what information was required. FRAZIER said a CLS technical report (Exhibit 6) was produced by D. SMITH, which she approved and forwarded to SISSON. FRAZIER said she later received a request from WOODS to explain the report. She said WOODS came to the CLS, asked the laboratory personnel to look at the report and they "went over it." FRAZIER recalled that there were some references to thermal cycling that WOODS wanted to discuss (Exhibit 21, pp. 8-10).

FRAZIER said that a crack in a new screw should raise the suspicions of a metallurgists as it did in this case. She said that CLS looked further than the first (Set B) screw to a different screw to determine that the crack was the result of a manufacturing process. FRAZIER explained that the CLS is not to take any actions on such defects other than documenting the findings, which was done (Exhibit 21, pp. 16-17).

FRAZIER acknowledged that she had prepared a memorandum to WOODS, dated September 3, 1998 (Exhibit 14, pp. 19-21 ).

[REDACTED] 7C  
[REDACTED]  
[REDACTED] She related that during the 1995 time frame, figures were reproduced from Polaroid photos and that there was an inherent time delay of two to three days [REDACTED]  
[REDACTED]

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[REDACTED] 7C

[REDACTED]

She said CLS has a tendency to put a typical photograph in the report showing the condition for that screw if everything looks the same (Exhibit 21, p. 28).

FRAZIER returned to her explanation of the process of having photos prepared for inclusion in the CLS technical reports. She explained that the offset printing process is tedious and it would take anywhere from a few days to a few weeks to receive the printed product from TVA headquarters. 7C

[REDACTED]

[REDACTED]

FRAZIER said she knew of no reason why [REDACTED] would have omitted the information regarding the presence of cracks in the Set B screws (conclusion no. 6). 7C

[REDACTED]

#### Reinterview of FRAZIER (Exhibit 22)

FRAZIER was reinterviewed on May 15, 1999. FRAZIER said she and WOODS discussed the differences between the June 2 report and the June 19 report both before and after she wrote the September 3, 1998, memorandum to him. 7C

[REDACTED]

FRAZIER recalled that she requested the distributed copies of the June 2 report be returned to her when it was determined that a revision was to be made. 7C

[REDACTED]

FRAZIER alleged that she called for the return of the June 2 report and destroyed all copies prior to it being submitted to Records Information Management System (RIMS). FRAZIER alleged that she was not aware that one copy of the report had been faxed to WEC.

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AGENT'S NOTE: FRAZIER advised CLS Manager, Richard L. MORLEY, via memorandum dated July 31, 1997 (Exhibit 23 ), that she had destroyed the copies of the June 2 report before the report was submitted to RIMS.

[REDACTED] 7C

[REDACTED] 7C

Interview of D. SMITH (Exhibit 27)

(AGENT'S NOTE: [REDACTED] 7C

D. SMITH is a metallurgical engineer at TVA CLS and was the author of both the June 2 report and the June 19 report. D. SMITH said he received a work order from his supervisor, FRAZIER, to examine a number of screws from WBN, including 12 new screws.

D. SMITH said of the 12 new screws, 8 were examined for cracks and 1 of the 8 was found to have a crack. He said that he concluded that the crack in the one screw was present during the manufacturing process. D. SMITH said it was his understanding that if he observed a manufacturing defect, that he was to note that observation in his report. He said he felt the cracked screw was significant enough to be noted and that he did so by documenting his finding in the June 2 report. He said he did not discuss with FRAZIER or anyone else whether he should raise the issue of the cracked screw. D. SMITH said he compiled a report from the data he gathered during the examination of the screws and submitted the report to FRAZIER. [REDACTED] 7C

D. SMITH said he was later asked to revise the June 2 report which he did in conjunction with FRAZIER. D. SMITH said he believes the revision of the June 2 report was initiated by WOODS who voiced concerns about the report to FRAZIER. D. SMITH said he did not recall the setting where FRAZIER discussed the revision with him. D. SMITH said some of the revisions were technical and some were statements of conjecture. He said the conjectural statements involved the

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mechanical means by which the screws may have failed and that Sisson had suggested those means to him. D. SMITH said he did not recall why Sisson had given him the suggested means of failure (Exhibit 27, p. 14). D. SMITH said he was instructed by Frazier as to what areas of the June 2 report should be revised but that she did not instruct him in any way regarding the Set B screws (Exhibit 27, p. 23).

D. SMITH explained that the photograph of a Set B screw in figure 7 in the June 2 report was exchanged to show a Set H screw in the June 19 report. D. SMITH said additional evaluations were conducted on certain screws after the release of the June 2 report and that photographs (figures) of the subsequent evaluations were produced. D. SMITH said the latter figures (Set H) logically fell into place where the previous figure 7 was located (Exhibit 27, pp. 16 and 18). 7C

[REDACTED] 7C

D. SMITH provided a photocopy of a set of notes (Exhibit 28) that he said he made in order to document changes that he wanted to make in the June 2 report. D. SMITH initially said that he did not recall when he made the notes, but later said he believes the notes were made during a conversation with Frazier. D. SMITH said he thinks the notes were made after Frazier's conversation with Woods. [REDACTED] 7C

AGENT'S NOTE: A review of the notes (Exhibit 16) did not disclose any discernable reference to the elimination of information regarding Set B screws.

#### Interview of SCRABIS (Exhibit 29)

SCRABIS is a materials engineer for WEC who is responsible for design qualification for mechanical equipment specifically related to ice condenser containment systems of nuclear generating plants, including WBN. SCRABIS said he received a telephone call in 1995 from OVERALL who expressed a concern about broken ice condenser basket screws which OVERALL found in the WBN melt tank. SCRABIS said he did not recall whether OVERALL had specific questions but that OVERALL wanted him (SCRABIS) to take a look at a report that he was going to fax to WEC.

SCRABIS received the fax and then passed it on to a WEC metallurgist for further review. SCRABIS described the document as a partial report of an evaluation of screws which had been

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taken from the WBN ice condenser. SCRABIS said OVERALL probably discussed the reference in the report to possible manufacturing defects but that he doesn't specifically recall.

SCRABIS explained that the telephone call and fax amounted to a request for an opinion and was not a formal request for services. SCRABIS said he learned from WEC's Metallurgy Department that the screws had a slightly elevated hardness, but that the factor was still within the acceptable range. He said he also learned that some of the screws exhibited cracks induced during the manufacturing process.

SCRABIS said he was told by a WEC metallurgist that applicable technical literature indicated that the percentage of defective screws was acceptable. SCRABIS said his visual inspection suggested that all of the broken screws had been subject to over-torquing or intentional breaking. He explained that intentional breaking would typically take place when the screw was misapplied and would be chiseled out (broken) in order to remove it and then correctly insert a subsequent screw.

SCRABIS said he doesn't recall whether he responded to OVERALL's inquiry because WEC soon thereafter resolved the issue as a result of the formal request from TVA to evaluate the ice condenser baskets. SCRABIS explained that WBN never requested WEC to perform a metallurgical evaluation of the screws but rather asked WEC to evaluate how many screws could be missing and still allow the ice condenser system to remain operable.

SCRABIS provided an initial assessment to WEC management (Exhibit 30) regarding the number of screws needed to maintain operability in the ice condenser system. SCRABIS said WEC then performed more exacting calculations which formed the basis for WEC's report to WBN dated June 22, 1995 (Exhibit 4).

SCRABIS stated WEC was not bound to provide an evaluation of the CLS metallurgical report just because the corrective action plan listed such a step. He added that WEC only performs work that is specifically requested by TVA and which is supported by a contract.

AGENT'S NOTE: Neither TVA nor WEC could locate the contract in this matter which would have established what services TVA requested. However, WEC's report to WBN (Exhibit 4, p. 1) states that the intent of the assessment was to ensure the structural adequacy of the ice condenser system based upon configuration parameter described in the WEC report.

#### Interview of Sammy R. WALKER (Exhibit 24)

WALKER is the Quality Assurance (QA) manager at the CLS and is responsible for ensuring the QA Program, especially in relation to nuclear regulatory requirements. WALKER said his office received a request from a person (can't recall name) at WBN in 1997 to provide copies of the metallurgical report dated June 2, 1995, as well as the revision of that report dated June 19, 1995. WALKER learned that WBN could not locate the June 19 report and forwarded the request to

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WALKER's group. WALKER remembered that his office searched for the report through the official TVA document system (RIMS) and, like WBN, could not locate the June 19 report. WALKER related that a nonconformance report was initiated to document the missing laboratory report. Subsequently, inquiry was made at the CLS metallurgy laboratory where the report was located (Exhibit 24, p. 8).

WALKER said an informal inquiry was made in the metallurgical unit regarding why the June 19 report was not in RIMS, and no one could provide an answer. WALKER explained that the reports which are produced by CLS are transported to TVA headquarters where they are microfiched. A verification that the document has been entered into RIMS is then returned to the contributor, which in this case was CLS. WALKER confirmed that the June 19 report did not exist in RIMS at the time he searched for it in 1997 (Exhibit 24, pp. 9-12).

WALKER said his department instituted a nonconformance report (Exhibit 31) regarding the two reports when it was determined that this matter involved more than just trying to locate a report. WALKER said CLS QA realized that TVA was looking for an explanation for the existence of two reports and he therefore began an inquiry to try to answer that question (Exhibit 24, p. 21). WALKER talked with CLS personnel and had them write a memorandum as to what they understood at the time.

AGENT'S NOTE: CLS personnel FRAZIER, D. SMITH, and Leslie BLANKENSHIP wrote memoranda in response to the QA corrective action report wherein they each reported that the June 2 report had not been submitted to RIMS prior to issuance of the June 19 report. In her memorandum, FRAZIER claimed that all of the June 2 reports had been returned to her and that she had destroyed them (Exhibit 31, pp. 8-10). [REDACTED] 7C

WALKER implicated that he relied on the statements of the CLS personnel that they believed the June 2 report had not been submitted to RIMS.

WALKER said he discussed with both FRAZIER and D. SMITH the nature of the major changes and how they went about making the changes between the first and second report. WALKER explained that due to the technical nature of the matter, he wanted to be sure he understood the differences and why those differences were made. However, [REDACTED] 7C

WALKER then proceeded to provide the same information as other witnesses and repeated the explanation for the exchange of the photograph in figure 7 (Exhibit 24, pp. 28-29).

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7C  
AGENT'S NOTE: [REDACTED]

7C  
WALKER said the Set B information concerning cracks in new screws was significant [REDACTED]

Interview of KATCHAM (Exhibit 32)

KATCHAM was formerly the structural engineer supervisor at WBN, working under the supervision of ADAIR. KATCHAM said he was assigned to determine the corrective action steps for PER 246 which would then be reviewed for comments. KATCHAM said he and ADAIR discussed the proposed corrective actions for PER 246 and thought the issue called for immediate attention and needed to be resolved (Exhibit 32, pp. 10-11).

KATCHAM said the corrective action report authorized WBN to use the ice condenser basket screws "as is." He stated that the authorization to use the screws required a Nuclear Engineering technical evaluation. The corrective action report references WEC report WAT-D-10048 dated June 22, 1995 (Exhibit 4), as the required engineering evaluation. KATCHAM said it was his responsibility to evaluate WAT-D-10048 and make a determination whether it was adequate for closure of the PER 246 (Exhibit 32, pp. 26-27).

KATCHAM said he clearly remembers asking WEC personnel to evaluate whether the screws would affect the safety-related equipment and whether the baskets would actually eject from the ice bed. KATCHAM recalled that he telephoned WEC Project Manager, John IRONS, the following day and was told by IRONS that WEC's priorities are not set by WBN and that he (IRONS) was still working on the request (Exhibit 32, p. 27).

KATCHAM said step no. 3 of the corrective action report called for WEC to evaluate the TVA metallurgical laboratory examination of the screws [REDACTED] 7C

[REDACTED] KATCHAM said he does not know why WEC didn't address the metallurgical issue. KATCHAM said he could only suppose that it "didn't matter" since WEC demonstrated that the structure would stay in place in the event of screw failure. KATCHAM said his concern in this matter was that the ice condenser system would operate as designed, even in the worst case scenario. He added that the WEC analysis answered that to his satisfaction and that the metallurgical aspects of the issue were never discussed (Exhibit 32, pp. 29-32).

KATCHAM said the resolution of the PER 246 showed that the ice condenser was able to function in the worst scenario of missing screws. KATCHAM said he didn't recall anyone suggesting that WBN go back to WEC to request additional information (regarding the evaluation of the CLS examination) [REDACTED] 7C

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[REDACTED] 7C

KATCHAM said everyone was aware that if the ice condenser screws were defective, they would all have to be replaced. He said the issue was probably discussed and that he (KATCHAM) had probably mentioned it. He added that he was aware of the magnitude of the issue, and he was sure it had been discussed among people. KATCHAM asserted that there was no pressure to resolve it (the screw issue) one way or the other, but that the goal was to make the ice condenser safe in the event of a loss of coolant (Exhibit 32, p. 39).

KATCHAM said the corrective action report would have been provided to McCOLLUM for his review once the package was ready for closure. KATCHAM identified McCOLLUM as a reviewer who made sure that all necessary documentation was in place. KATCHAM said he had no discussions with McCOLLUM regarding the corrective action step that called for WEC to evaluate the CLS metallurgical report. KATCHAM said McCOLLUM reviewed the documentation, found it acceptable, and signed off on it (Exhibit 32, pp. 40-41).

#### Interview of McCOLLUM (Exhibit 33)

McCOLLUM was formerly employed at WBN by Stone and Webster Engineering Company. During the 1995 time frame, McCOLLUM was responsible for performing QA reviews on PERs at WBN, and he said he vaguely remembers working on the closure of the corrective action report for PER 246. McCOLLUM explained that his job was to review such PERs and ensure that all of the corrective actions had been taken. McCOLLUM said he worked with ADAIR but does not recall discussing PER 246 with him.

McCOLLUM explained that TVA would review the PERs, and when the responsible TVA employee was satisfied that the PER was complete, it would be forwarded to McCOLLUM's group for final oversight. McCOLLUM said he would typically review the TVA product very meticulously (Exhibit 33, pp. 10-11).

[REDACTED] He said from reading the corrective action verification submitted by TVA, there was reference to a test performed by WEC [REDACTED] 7C

[REDACTED] He said he never questioned ADAIR or any other TVA employee as to how corrective action step no. 3 was completed, or whether, in fact, it was completed. McCOLLUM said he saw the cover letter for the WEC report (Exhibit 4), but states he does not recall seeing the report (Exhibit 33, pp. 12-13).

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Agent's Analysis

Two separate references regarding defective screws were affirmatively removed from the June 2 CLS report.

The combined actions of ADAIR [REDACTED] over a period of three years served to conceal the existence of defective screws. Their actions further served to cover up the steps they took to conceal the information.

ADAIR arranged [REDACTED] to have information removed [REDACTED] from the June 2 CLS report regarding manufacturing defects in screws. ADAIR later verified on the closure of the corrective action report that a CLS report had been evaluated by WEC, when he knew that it had not.

[REDACTED] The reconciliation report was made a part of the supplementary PER 246 which had been requested by the NRC.

1. Motive for concealing manufacturing defects

If screws containing manufacturing defects had been brought to light, the time required for evaluation and testing would have adversely and significantly impacted the scheduled startup date for WBN.

2. Knowledge of manufacturing defects

ADAIR acknowledged that he read the June 2 report and apparently read it very critically since he was responsible for its revision by CLS.

3. [REDACTED]

FRAZIER told CLS management and the NRC that she recalled the June 2 report from those who had received it and that she then destroyed it in order that she might issue the June 19 report.

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7C  
The June 19 report had been assigned a RIMS number by CLS [REDACTED]

[REDACTED] As stated by ADAIR,  
the corrective action steps were not taken.

In 1997 FRAZIER was directed by CLS QA to analyze the June 2 and the June 19 report, side-by-side, and to list the differences between the two. FRAZIER compiled a list of 17 differences [REDACTED]

[REDACTED] listing the differences  
between [REDACTED] prepared a  
memorandum [REDACTED] photograph of a used  
screw in [REDACTED] not mention the  
omission [REDACTED]

In his reconciliation report, WOODS notes the significance of the omission of conclusion no. 6 from the June 19 report [REDACTED]

The conclusions of this investigation have been arrived at in view of the following:

ADAIR admittedly reviewed the June 2 report, especially the conclusions, which he discussed with WOODS.

ADAIR was aware of the statement in the June 2 report regarding manufacturing defects in ice condenser basket screws and admitted he took no action to evaluate the information.

FRAZIER approved the revision of the June 2 report [REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

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[REDACTED]

FRAZIER compiled a report in 1997 intended to provide TVA with a list of differences between the reports of June 2 and June 19. [REDACTED]

WOODS directed FRAZIER in 1998 to write a memorandum (September 3, 1998) as to why certain information was missing from the June 19 report. [REDACTED]

[REDACTED]

ADAIR used the June 19 report to close out the corrective action report, knowing that it made no mention of the manufacturing defects which had appeared in the June 2 report.

ADAIR verified closure of the corrective action report, knowing that WEC did not evaluate the metallurgical report as called for in step no. 3 of the corrective action report.

#### Conclusion

Based on evidence developed during this investigation, it is concluded that in 1995 ADAIR became aware of a condition adverse to quality but willfully provided inaccurate information on a corrective action report to conceal the condition. [REDACTED]

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## SUPPLEMENTAL INFORMATION

On October 26, 1999, William P. SELLERS, Senior Legal Advisor for Regulatory Enforcement, General Litigation and Legal Advice Section, Criminal Division, U.S. Department of Justice, Washington D.C., was apprised of the facts and conclusion of this investigation. SELLERS declined prosecution in this matter in lieu of other civil administrative remedies available to the NRC.

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## LIST OF EXHIBITS

<u>Exhibit No.</u>	<u>Description</u>
1	Investigation Status Record, dated November 4, 1998.
2	Transcript of Interview with OVERALL, dated February 11, 1999.
3	Sign-in Sheet for Attendees at June 14, 1995, Meeting at WBN.
4	WEC Report to TVA Regarding Broken Ice Basket Sheet Metal Screws.
5	Corrective action report for WBPER950246, dated July 25, 1995.
6	CLS Technical Report 95-1021, dated June 2, 1995.
7	CLS Technical Report 95-1021 (no revision number), dated June 19, 1995.
8	Transcribed Interview of McCORMICK, dated March 22, 1999.
9	Transcribed Interview of SISSON, dated March 23, 1999.
10	Transcribed Interview of ADAIR, dated March 22, 1999.
11	IG Report of Interview with [REDACTED] dated February 12, 1998. 1C
12	Transcribed Interview of WOODS, dated March 10, 1999.
13	TVA Reconciliation Report, dated October 20, 1998.
14	FRAZIER Memorandum to WOODS, dated September 3, 1998.
15	Transcribed Interview of CASNER, dated May 12, 1999.
16	Transcribed Interview of GUTHRIE, dated May 12, 1999.
17	Transcribed Interview of PHILLIPS, dated May 12, 1999.
18	Transcribed Interview of LEWELLYN, dated May 12, 1999.

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<u>Exhibit No.</u>	<u>Description</u>
19	Transcribed Interview of P. SMITH, dated May 12, 1999.
20	Transcribed Interview of BRIGGS, dated May 12, 1999.
21	Transcribed Interview of FRAZIER, dated March 10, 1999.
22	Reinterview of FRAZIER, dated May 15, 1999.
23	FRAZIER Memorandum to MORLEY, dated July 31, 1997.
24	Transcribed Interview of WALKER, dated August 19, 1999.
25	TVA Certification of Authenticity for CLS Report, dated June 2.
26	CLS Endorsement to Technical Report 95-1021, dated June 2, 1995.
27	Transcribed Interview of D. SMITH, dated March 10, 1999.
28	Handwritten Notes of D. SMITH, dated June 8, 1995.
29	Report of Interview with SCRABIS, dated September 27, 1999.
30	SCRABIS Memorandum Regarding Ice Basket Screws, unknown date
31	CLS Nonconformance Report 97099, dated June 23, 1997.
32	Transcribed Interview of KATCHAM, dated September 2, 1999.
33	Report of Interview with McCOLLUM, dated September 10, 1999.
34	Supplemental Information to PER 246, dated October 26, 1998.

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