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MEMORANDUM FOR: E. Volgenau, Director  
Office of Inspection and Enforcement

FROM: Harold D. Thornburg, Director  
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Leo B. Higginbotham, Acting Director  
Division of Fuel Facilities and Materials  
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SUBJECT: RESULTS OF FORT ST. VRAIN INVESTIGATION

A two phase investigation of an event that occurred at the Fort St. Vrain facility on January 23, 1978, was conducted by the NRC Region IV (Dallas) office. The first phase of the investigation (January 23-26, 1978) dealt with identification of the cause of the event, the consequences of the event, licensee response to the event, and response by federal, state and local authorities (IE Investigation Report No. 50-267/78-03). The second phase of the investigation (February 6-10, 1978) dealt with an allegation that the event was intentionally caused by a person or persons tampering with certain controls and instrumentation (IE Investigation Report No. 50-267/78-04).

REASON FOR NRC INVESTIGATION

Though the consequences of the event were minimal, conduct of an in-depth investigation was deemed appropriate for the following reasons:

1. The NRC Incident Response Center was activated in response to licensee notification that a significant off-site radioactive release had occurred. Consistent with the long standing NRC policy of conducting prompt on-site followup subsequent to significant events, it was determined that an investigation should be conducted to determine the cause of the release and assess the personnel and plant safety status.
2. Site evacuation calling for coordination of licensee, federal, state and local government response was effected. It was decided that the effectiveness of such an evacuation should be evaluated so that weaknesses, if any, could be delineated and subsequently corrected.

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3. There was an allegation that the event was intentionally caused by plant personnel.
4. There was considerable public interest in the event.

SUMMARY

The initiating cause of the January 23 event was determined to be a malfunction of the water level controller for the Loop 2 Bearing Water Surge Tank. This malfunction initiated a series of equipment interactions leading to the release of a small quantity (four curies) of fission products contained in the primary coolant (helium). The consequences of the release were minimal. The licensee implemented its emergency plan. Although the objectives of the emergency plan were achieved, some minor problems were identified. The NRC has taken action to assure that power operation will not resume at Fort St. Vrain until identified problems have been corrected. The investigation established that the event was not intentionally caused.

DETAILS

Cause of Event

Failure of the primary water level controller for the Loop 2 Bearing Water Surge Tank was identified as the initiating cause of the event. An investigation of allegations that the event might have been the result of tampering by a person or persons established that the event was not intentionally caused by such tampering. This conclusion is based on the following facts:

1. Examination of the controller by NRC inspectors and the licensee disclosed no evidence of tampering.
2. Design review of the controller by NRC personnel revealed that a covert means of causing delayed failure of the level controller was not probable. IE:HQ specialists and highly competent field inspectors considered the matter at length, and concluded that if tampering with the controller had occurred, the effects would have been observed within a matter of seconds following the tampering.
3. NRC interviews of two mechanical craftsmen working near the controller revealed that:

a. They observed no one tampering with the controller before or during the event.

b. They did not disturb or tamper with the controller.

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- c. The two workers were employed by contractor and did not have the background and familiarity with instrumentation to have intentionally initiated the resulting sequence of events.
- 4. The alleged did not have evidence that intentional tampering had occurred. During discussions with the investigators, the alleged stated that he was concerned that the possibility of sabotage would be overlooked by the NRC during its review of the event. He did not mean to imply that he had proof the event was an act of sabotage.

Impact on the Public

The radiological consequences of the event with respect to the impact on the public and the environs was negligible. Approximately 4 curies of noble gases and 5 microcuries of <sup>131</sup>I were released during the event. This amount of radioactivity would have caused approximately .1 millirem (3-4 times that from natural background radiation level in Colorado) whole body exposure to a person located at the site boundary during the course of the event.

Impact on Plant Personnel

Exposure of plant personnel as determined by personnel dosimeters was limited to approximately 10 mrem. Whole body counts, urine samples and thyroid surveys of representative plant personnel revealed that no internal contamination resulted from the event.

Response by the Licensee

When confronted by an indicated elevated release of radio-iodine, licensee management at the site activated the facility emergency plan. Given the existing circumstances, the licensee's response to the event was conservative. The licensee apparently predicated his actions on the readout from the iodine monitor in the plant stack. Since the iodine monitor was actually detecting energy from radionuclides other than iodine, its reading resulted in the high initial estimate of radioactive release.

Criticism of the licensee in this regard must be aimed only at his need for better evaluation of available technical data. Such criticism should not in any way detract from the NRC desire that licensees respond to protect the public in similar situations.

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Implementation of the emergency plan was found to be essentially as designed. Evacuation of non-essential plant personnel to the primary assembly point (Visitor's Center) was abandoned because of wind direction. Evacuees moved to the secondary assembly point where facilities were more crowded and communications equipment was limited. This relocation caused some confusion but it did not significantly impact overall emergency response. The licensee was late with some of his notifications and initially did not supply sufficient information (category of incident and areas affected). It does not appear that these lapses were intentional; however, it did impact on the response of state and local agencies.

Responses by Government Agencies

While there were some minor difficulties in coordination of the response activities of the federal, state and local authorities, each performed its intended function in a timely fashion and the objectives of their respective emergency plans were achieved.

Enforcement Action

The investigation revealed that the licensee was in noncompliance (infractions) with license requirements in the following areas:

1. Provisions of the emergency plan regarding timing and content of notifications.
2. The radioactivity release rate during the event exceeded the allowable release rate by a factor of approximately 3.7.
3. The surveillance program associated with the Helium Circulator Auxiliary System was not fully implemented.

Regional Office Notices of Violation have been issued to the licensee on these matters.

Technical Matters Requiring Corrective Action

The investigation disclosed some specific technical matters which have been identified for action by the licensee prior to resumption of power operations.

1. The event could probably have been terminated prior to release of fission products if the helium dryers could have been isolated from the control room. Provision for such isolation from the control room will be made.

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A need for an improved failure mode and effects analysis for the helium circulator auxiliaries was identified and will be completed by the licensee.

- 3. Inadequacies in the surveillance program for the Helium Circulator Auxiliary System were identified. The surveillance program will be revised by the licensee and reviewed by the NRC staff.
- 4. The surge tank level controller that failed has been replaced. All four surge tank level controllers have been functionally tested.
- 5. All damage resulting from the event has been repaired.

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Enclosures:

- (1) Investigation Report 50-267/78-03
- (2) Investigation Report 50-257/78-04

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