



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 AND 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT EN 230.1 (B)
"HVAC DESIGN-FIRE DAMPER LATCHING TEST"

1.0 INTRODUCTION

A concern was raised at Watts Bar Nuclear Plant involving curtain type fire dampers which would not close and latch, as required when tested under actual system operating conditions. These fire dampers were manufactured by Ruskin Manufacturing Company. This problem is generic to all Ruskin fire dampers and is applicable at Sequoyah since Ruskin dampers were also installed at Sequoyah.

2.0 EVALUATION

Category: Engineering (23000)
Subcategory: Fire Protection (23001)
Element: HVAC Design-Fire Damper Latching Test (230.1 (B))
Employee Concern: EX-85-027-001

The basis for Element Report EN230.01 (B) - SQN, Rev. 2, dated January 27, 1987, is Sequoyah Employee Concern EX-85-027-001 which states:

"HVAC dampers in the auxiliary and control buildings (one location given west end of control building - Elev. 713' (?) were tested under actual operating conditions (use of fuse link to release dampers), and the dampers would not latch. Manufacturer (Ruskin) was contacted, and recommended changing of test to use a hand release of dampers, which was done, and damper latched. CI is concerned that original intent of test (to demonstrate operability under actual conditions) was not met."

TVA reviewed the design, procurement, installation and testing documents and manufacturer's installation criteria for the Ruskin fire dampers. This review verified that Ruskin dampers were installed at Sequoyah and that the installation concerns which related to the failure of the fire dampers to be released by the melting of a fusible link and the failure of the fire dampers to close and latch as required by the manufacturer during full air flow conditions from the ventilation system was partially true.

Fire dampers are normally released by the melting of a fusible link device which holds the damper in the open position. Industry records have not

reported any generic fusible link failures on the Ruskin fire dampers. A few failures were identified which were attributed to installation problems such as mechanical interference or binding of cables and due to corrosion. TVA's Division of Construction Quality Control group verified that the fire dampers at Sequoyah were installed to meet the required installation criteria and did not contain any of the installation problems known to cause the fusible link not to function. Therefore, the fusible link concern was not considered a problem at Sequoyah. Following the pre-operational test program at Watts Bar which discovered that curtain type gravity operated fire dampers from Ruskin would not close completely against air flow, a nonconformance report (NCR) was issued. This NCR resulted in modifications to the Ruskin dampers which consisted of the installation of new negator springs and positive blade latching mechanism to 100 fire dampers and replacement of 15 dampers at Sequoyah. However, the modification for one of the 15 dampers has not been completed. This fire damper O-31c-1744, is required in a penetration through barriers. During the telephone conversation between G. R. McNutt, TVA and W. H. Miller, Jr., NRC Region II on April 22, 1987, TVA indicated that the limiting conditions for operations of the Technical Specifications which consists of the verification of the fire detection system operability and provision of a one hour fire watch patrol, for the areas adjacent to the fire damper had been implemented and will be maintained until a new fire damper is installed in this penetration. This damper is to be installed during the next Unit 2 refueling outage.

After completion of the Sequoyah fire damper modifications, the dampers were tested under full system air flow. A total of 12 dampers failed the full flow drop test or were untested but based on previous tests were expected to fail. Procedure AOI-31 was revised to require the air flow in the ventilation systems containing nine of these dampers to be interrupted in the event of fire to assure that the dampers will properly close and latch. The remaining three dampers are in systems operating less than 1,000 hours per year or in non-fire-rated walls. No additional corrective action is proposed on these dampers. This is considered acceptable. Instructions for either shutdown of HVAC fans or isolation of the ventilation systems to permit the fire dampers to close are presently included in system Operating Instruction, "Fire Interaction Manual". This information is included in procedure AOI-31 and is considered a procedure enhancement.

3.0 CONCLUSION

The concern that the fire dampers at Sequoyah would not latch if actuated under normal full air flow operating condition was true. However, all dampers have been upgraded or modified to close under HVAC system air flow, except for damper O-31c-1744 which is to be modified at the next refueling outage and 12 dampers which will not close due to the damper size and/or installation configuration. Nine of these dampers are included in plant procedures which require interruption of the ventilation system air flow in the event of fire to permit the dampers to close. Three dampers are located in non-fire-rated walls or in ventilation systems which are used infrequently. This is acceptable. Procedure AOI-31 was revised to indicate the appropriate actions to be taken by plant operators in the event of a fire to interrupt the ventilation system air

flow as necessary, and assure that the fire dampers will properly close and latch. The NRC staff concludes that TVA's investigation and resolution of the concerns described in Element Report EN 230.1(b) were adequate. No further NRC review is required.

SEQUOYAH NUCLEAR POWER PLANT, UNITS 1 & 2
SAFETY EVALUATION REPORT FOR EMPLOYEE CONCERNS
ELEMENT REPORT 230.5(B), HVAC DESIGN
AIRBORNE RADIOACTIVITY IN CDWE BUILDING

1. SUBJECT

Category: Engineering

Subcategory: HVAC design

Element: Airborne Radioactivity in CDWE Building (230.5(B))

Employee Concern: RII-85-A-0007

The basis for Element Report 230.5(B), dated December 29, 1986, is Sequoyah Employee Concern RII-85-A-0007 which states:

"An anonymous allegor stated that the vent condenser at the Condensate Demineralizer Building (CDWE) vents noncondensable gases to the duct in the CDWE building where it is discharged to the Auxiliary building (Aux. Bldg). During an Aux. Bldg isolation the exhaust dampers isolate the CDWE building from the Aux. Bldg and noncondensable gases can build up in the CDWE Bldg. At times, the iodine concentration in the CDWE Bldg are apparently somewhat [high, which renders the CDWEB] inaccessible and the [exhaust dampers] may go unnoticed in the closed position of long periods of time.

TVA should evaluate this situation and if in fact the problem currently exists, take immediate action to preclude the unnecessary exposure of personnel to airborne radioactivity. In addition, TVA should take actions to minimize the airborne problems in the CDWE Bldg. This may include such actions as providing additional filtered ventilation, better access and control of the dampers. The corrective actions should be documented and an expanded followup program performed to determine that the corrective actions solved the problem. The followup program should be documented.

This allegation is specific to Sequoyah; however, there are generic implications for other TVA nuclear plants such as Watts Bar."

This concern was evaluated by TVA, and was categorized as not requiring design change prior to restart. The TVA study, presently in progress will establish whether or not additional air monitors are required. The CDWE ventilation drawings required updating to reflect the "as-built" condition.

2. SUMMARY OF ISSUE

The problem defined by the concerned individual consists of the following issues:

- a. The vent gas cooler of the condensate demineralizer waste evaporator (CDWE) condenser in the CDWE building vents noncondensable gases into the duct leading to the auxiliary building.
- b. During auxiliary building isolation, noncondensable gases build up in the CDWE building and iodine concentrations may be unacceptable because isolation dampers could remain unnoticed in a closed position for long periods.
- c. TVA should take immediate corrective action to preclude unnecessary exposure of personnel to airborne radioactivity and minimize airborne radioactivity in the CDWE building.
- d. The corrective actions should be documented and a followup program performed and documented.

3. EVALUATION

The TVA evaluation of the employee concerns included the following actions:

- a. Traced the path of potential iodine and other noncondensibles from their origins to the condensate demineralizer waste evaporator building (CDWEB) atmosphere. Evaluated frequency of simultaneous occurrence of incidents leading to the condition of concern.
- b. Estimated radioactivity in noncondensibles from the CDWE vent gas cooler.
- c. Investigated protective measures for personnel in the CDWEB.

Because of the above licensee actions, it was found that:

- a. As a result of the previous modifications, the vent gas cooler and other CDWE package vent into the ventilation duct leading to the auxiliary building. The evaporator vendor drawings and TVA drawings have not been revised to reflect these changes.
- b. There is a remote potential for backup of radioactive contaminants in the vent duct during periods of auxiliary building isolation and simultaneous abnormal evaporator operation. The expected contaminant level is negligible during normal evaporator operation.
- c. Past history indicates the erroneous isolation of the auxiliary building and associated automatic closing of the isolation dampers in the ventilation ducts can be expected. The potential for radioactive exposure to personnel because of this is negligible since the CDWE Systems Operating Instructions (SOI) include references to a SOI for recovery

from auxiliary building isolation (ABI), which limits the time period of CDWE operation with concurrent ABI. Manual override switches are provided, allowing opening of the isolation dampers for exhausting CDWEB air.

- d. Since no immediate corrective actions are necessary, no documentation is required. If the current TVA review of the CDWE vent activity rates suggests adding an area or continuous air monitor to the CDWEB, it will be documented under the as-low-as-reasonably-achievable (ALARA) program.

Based on the above findings TVA initiated corrective actions, which included revision of applicable drawings to reflect "as-built" conditions, and a study of radioactive airborne potential in the auxiliary building as result of abnormal operating conditions.

4. CONCLUSION

The evaluation of the Sequoyah Employee Concern as stated in RII-85-A-0007 showed that the concern is not valid with respect to unacceptable iodine concentrations in the CDWE building. The estimated radionuclide discharge rates (including iodines) from the waste evaporator and auxiliary waste evaporator package, as documented in Table 11.2.2.2-2 of the SNP FSAR (App.A,5.a), are negligible under normal operation.

The employee concern that there is not continuous monitoring for airborne radioactivity in the CDWE building is valid. A clear need for such air monitoring was not established because of the negligible airborne radioactivity concentration normally expected. However, TVA initiated a further study evaluating the potential for backup of airborne radioactivity in the vent duct during auxiliary building isolation, and simultaneous abnormal evaporator operation. Should the study show that adding an air monitor is required, it will be documented under the ALARA program.

The Code of Federal Regulations, 10 CFR Part 20, App. B specifies maximum permissible exposure of individuals to concentrations of radioactive materials in air in restricted areas. Since personnel exposure limits were not exceeded and radiation protection measures taken by TVA are adequate, we conclude that this employee concern does not affect the restart of the Sequoyah plant.