



DR Central

UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

TELEPHONE
(312) 858-2660

April 27, 1973

Commonwealth Edison Company
ATTN: Mr. Byron Lee, Jr.
Assistant to the President
P. O. Box 767
Chicago, Illinois 60690

Docket No. 50-237

Gentlemen:

This refers to the inspection conducted by Messrs. Fishbaugher and Fisher on March 28 and 29, 1973, of operations at Dresden Unit 2 authorized by License No. DPR-19, and to the discussion of our findings held by the inspectors with Mr. W. Worden, Plant Superintendent, and members of his staff at the conclusion of the inspection. A copy of our report of this inspection is enclosed.

Areas examined during the inspection are described in the enclosed inspection report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with plant personnel, and observations by the inspectors.

No items of noncompliance with AEC requirements were identified within the scope of this inspection.

In accordance with Section 2.790 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the AEC's Public Document Room. If this report contains any information that you (or your contractors) believe to be proprietary, it is necessary that you make a written application within 20 days to this office to withhold such information from public disclosure. If such an application is submitted, it must identify the basis for which information is claimed to be proprietary. The application should be prepared so that proprietary information identified is contained in a separate part of the document, since the application will also be placed in the Public Document Room. If we do not receive an application to withhold information, or are not otherwise contacted within the specified period, the report will be placed in the Public Document Room with a copy of this letter.

1088.2

April 27, 1973

Unless you wish to make application to withhold information, no reply to this letter is necessary; however, should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely yours,

Boyce H. Grier
Regional Director

Enclosure:

RO Inspection Rpt No. 050-237/73-02

bcc: RO Chief, OB
RO:HQ (4)
Licensing (4)
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U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

RO Inspection Report No. 050-237/73-02

Licensee: Commonwealth Edison Company
P. O. Box 767
Chicago, Illinois 60690

Dresden Nuclear Power Station, Unit 2
Morris, Illinois

License No. DPR-19
Category: C

Type of Licensee: BWR, 809 Mwe

Type of Inspection: Special, Unannounced

Dates of Inspection: March 28 - 29, 1973

Dates of Previous Inspection: February 7 - 9, 13 - 16, and 21, 1973

Principal Inspector: *J. R. Fishbaugh*
J. R. Fishbaugh

4/26/73
(Date)

Accompanying Inspector: W. L. Fisher

Other Accompanying Personnel: None

Reviewed By: *H. C. Dance*
H. C. Dance, Senior Reactor Inspector
BWR Operations

4/26/73
(Date)

1088.4

SUMMARY OF FINDINGS

Enforcement Action: None

Licensee Action on Previously Identified Enforcement Matters: Not inspected

Unusual Occurrences

A hydrogen explosion occurred in the Unit 2 off-gas line on March 27, 1973. The line was being purged (reactor shutdown) for a modification tie-in. Leaking off-gas was ignited by welding activity. Two construction workers were injured.

Other Significant Findings: None

Management Interview

Following the inspection, the inspector's findings were discussed with Mr. W. Worden, Plant Superintendent; Mr. F. Morris, Assistant Plant Superintendent; and Mr. J. Diederich, Supervisor, Technical Staff. The inspectors explained that the purpose of the visit was a special inspection of the hydrogen explosion.

- A. The inspectors indicated concurrence with the licensee's conclusion that the explosion was caused by a combination of leaking off-gas and welding activity. The inspectors noted that the special procedure for the off-gas purging should have recognized the explosion hazard, and should have provided suitable controls such as exclusion of other activity in the vicinity of the purge route. The licensee did not disagree. The inspectors noted that the injuries of personnel in the near vicinity of the explosion did not appear to be serious, although the potential did exist.
- B. The licensee intends to perform further inspections to verify that plant equipment was undamaged prior to resuming plant operation. (Paragraph 3)
- C. The licensee plans to estimate the amount of particulate radionuclides released by the explosion. (Paragraph 7)
- D. The licensee plans that the explosion event would be reported as an unusual occurrence. (Subsequently, the unusual occurrence report was completed by the licensee.^{1/})

^{1/} Letter, CE to Directorate of Licensing, dtd 4/5/73.

REPORT DETAILS

Section I - Prepared by J. R. Fishbaugher

1. Persons Contacted

Commonwealth Edison Company

W. Worden, Plant Superintendent
F. Morris, Assistant Plant Superintendent
J. Diederich, Supervisor, Technical Staff
R. Pavlick, Supervisor, Radiation Protection
J. Marshall, Engineer, Technical Staff

Phillips-Getschow Company

Two persons injured by the explosion

2. Description of the Event

The following description of the off-gas explosion was developed from interviews with plant personnel, from plant records, and from inspection within the facility.

a. Events Leading to the Explosion

Unit 2 was shut down at the end of the day on March 24, 1973, for an off-gas modification tie-in. Unit 3 had been shut down since March 4, 1973, for refueling. The corresponding tie-in for Unit 3 was also being performed.

A special procedure for the off-gas tie-in was prepared and approved (SRB meeting of March 21, 1973). The first step was a fresh air purge of the off-gas line. Purpose of the purge was to reduce the levels of radioactivity and combustible gases prior to cutting the off-gas line.

The purge route consisted of drawing air into the off-gas line via an open off-gas filter housing, backwards through the off-gas line, through the off-gas rupture disc flange (disc removed), through a temporary ductwork and filter arrangement to the suction of a gland steam exhaustor, and then to the chimney. The temporary filter was located at the floor level outside the "B" steam jet air ejector room. The connection points for the temporary ductwork were inside this room.

The purge route was established as described above and the exhauster was turned on at approximately 4:45 p.m. on March 27, 1973. The purge was halted about two minutes later because the temporary ductwork had deformed due to the suction which was being applied.

The cause of the excessive suction was found to be a plywood cover at the off-gas filter housing. Purpose of the cover was weather protection for the filter, and it had not been removed before starting the purge. Damage to the temporary ductwork was found to be minor, and two construction workers were sent to make repairs.

An unrelated job involving welding in the vicinity of the temporary filter had been approved previously. (Work Permit No. II-80, condensate line modification, authorized on March 23, 1973, to commence on March 26, 1973.) Welding activity was in progress at a point approximately eight feet above the temporary filter.

b. Explosion Event

The off-gas explosion occurred at approximately 5:45 p.m. Ignition was caused by the welding activity. The filter housing was ruptured by the explosion, and the temporary ductwork was blown off its connection points in the steam jet air ejector room. At the other end of the holdup line, the off-gas filter was blown out of its housing. The residue settled in the near vicinity.

The two men who were repairing the temporary ductwork were injured by the explosion.

c. Immediate Actions After the Explosion

The two injured men were checked for contamination (negative results) and taken to the hospital. Injuries were determined to be minor.

Both ends of the off-gas line were verified to have been isolated from equipment within the plant. Contamination control boundaries were established at both ends of the off-gas line. Preliminary damage assessment was made. Contamination surveys and air samples were taken. Emergency Plan, Condition E (for explosion) was activated.

3. Action by Licensee Following the Event

The preliminary evaluation of explosion consequences was completed. Damage was found to be minor and probably limited to the temporary filter and ductwork. No significant release of radioactivity was believed to have occurred, but an offsite sampling program was initiated as a precaution.

The Emergency Plan condition was secured at 10 p.m. Cleanup and decontamination work was begun.

Formal review of the event by the SRB occurred on March 28, 1973. The explosion was attributed to leakage of hydrogen from the temporary ductwork after the ductwork had been deformed by excessive suction. To assure that plant equipment was undamaged, further inspection was scheduled to include the gland seal exhaustor, the off-gas flow sensor, and the off-gas filter housing.

A brief notice to the local press was released during the morning of March 28, 1973.

4. Injuries

The inspectors talked with the two construction workers who were injured by the explosion. They had both returned to work on March 29, 1973. Their account of the event was in agreement with details given above.

5. Inspection Findings

Observations by the inspector were as follows:

- a. Cause of the explosion was identified correctly by the licensee.
- b. The special procedure for the off-gas tie-in did not include precautions for control of the explosion hazard.

REPORT DETAILS

Section II - Prepared by:

W. L. Fisher
W. L. Fisher

Reviewed by:

J. M. Allan
J. M. Allan

6. In-Plant Contamination Levels

Although some airborne radionuclides became dispersed throughout the Turbine Building, contamination resulting from the explosion was largely confined to the immediate vicinity of the ruptured filters. According to the licensee, contamination from the off-gas filter rupture was limited to the filter vault and proximity. The inspector observed that this contamination, consisting of pieces of off-gas filter media, was essentially cleaned up by the morning following the explosion. Contamination inside the Turbine Building was localized to the Steam Jet Air Ejector room (approximately 20,000 c/m per square foot) and proximity (approximately 1,000 c/m per square foot). The inspector observed that decontamination outside the Steam Jet Air Ejector room had nearly been completed by the morning following the explosion.

7. Release of Radioactivity to Unrestricted Areas

At the time of the inspection, the licensee had estimated that less than 1.8 curies of gaseous radionuclides, essentially all ^{133}Xe , had been released by the explosion. No estimate had been made of the iodine and particulate release, although the downwind particulate concentration has since been reported^{2/} to have been slightly (approximately 1×10^{-14} $\mu\text{Ci/ml}$) higher than upwind concentrations. Direct measurements of the activity released were not made, because the chimney sampler was out of service for maintenance when the explosion occurred. The explosion resulted in no release of radioactive liquids.

8. Environmental Measurements

Ionization chambers located at upwind and downwind environmental stations showed no detectable increase over background radiation

^{2/} Letter, CE to Directorate of Licensing, dtd 4/5/73.

levels. Vegetation and soil samples from upwind and downwind stations were obtained for isotopic analysis (^{89}Sr , ^{90}Sr , ^{137}Cs , and $^{140}\text{Ba-La}$). Analytical results have not yet been obtained.

9. Exposure of Personnel

According to the licensee, no personal contamination resulted from the explosion.

Film badges worn by the two injured contractor employees from March 25 to March 27 were processed following the incident. The film badges indicated exposures of about 10 mrem and 30 mrem for the two contractor employees.