D. L. Caphton

October 9, 1973

E. G. Greenman

Telephone Report - The Permanent Fix on the Diesel Generators at Oyster Creek

The permanent fix at Oyster Creek (OC) involved the installation of two relays and a jumper wire. The jumper wire goes around a relay contact -- the DLU contact. In essence, this permits the fast-start relay and the two new additional relays to be energized even if there is an engine fault present. The jumper enables the fast start relay, the FSR relay, to pick up the two new relays at the same time that the fast-start relay is energized -- so all three of these relays are essentially energized at the same time. Now each of the two new relays has a contact that goes around the manual reset button -- one contact on the relay that is deenergized is open and the other contact is closed. When you energize these two relays, the contact that is open closes, and the contact that was already closed opens after a 5-second time delay, so that essentially, what you are doing, is pushing that reset button through the circuitry, with no more than a 5-second delay. The plant ran a valid test, a fast-start sequence, against an engine fault and they were able to get a fast-start, and this does represent the permanent fix -- this was installed the 1st of October and it was reviewed by PORC.

OPS
Greenman/her
10/9/73

B1115

Jersey Central Power & Light Company

MADISON AVENUE AT PUNCH BOWL ROAD • MORRISTOWN, N.J. 07960 • 539-6111

October 8, 1973

Mr. Robert J. Schemel, Chief
Operating Reactors Branch #1
Directorate of Licensing
Office of Regulation
U.S. Atomic Energy Commission
Washington, DC 20545

Dear Mr. Schemel:

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION
DOCKET NO. 50-219
INFORMATION REGARDING THE DRYWELL
VACUUM BREAKER VALVES

Upon receipt of your January 22, 1973 letter, the position of the subject valves was checked and verified to be closed. Consequently, no remedial action was necessary.

Subsequent to that time, we contacted General Electric and have employed their services to prepare the analytical data requested in your letter. The information is not yet available. General Electric cannot specify a completion date at this time, but we will inform you by November 15, 1973 of the status of this request. Upon receipt of this information, the answers to your questions 8 through 13 will be submitted. The responses to questions 1 through 7 are attached. Illustrative diagrams, which are to be considered proprietary, are being submitted under separate cover.

During the spring 1973 refueling outage, a leak rate test was conducted to determine the bypass area from the drywell to the torus. The results indicated a leakage area which was significantly less (1-2%) than the bypass area which G.E. has determined to be limiting for several of its other plants.

The details of this test and other related tests were reported in semi-annual report #8. However, the allowable bypass area was in error and a correction to the report will be made.

Very truly yours,

D. A. Ross
Manager
Nuclear Generating Stations

DAR/NGT/ab
Attachment

8304050019 5pp.

Question No. 1: Manufacturer, model number, ratings, and modifications, if any, of the vacuum breakers.

Answer: The torus to drywell vacuum breakers were built by Atwood & Morrill Company of Salem, Massachusetts. The following information is pertinent to the valves:

Atwood & Morrill Drawing No. 20464-H-ALT.1
Size: 18 inches
Rating: 150# ASA Standard

Question No. 2: Installed assembly drawing, including testing equipment.

Answer: This drawing is considered proprietory information by the Atwood & Morrill Company and may not be released to the public without their written consent. The only difference between the drawing and the installed valves is that the cast iron weights, Part #5, have been removed, as they were not required for proper valve operation.

Question No. 3: Materials used in the vacuum breakers, including seals, seats, bearings, lubricant, body and operating parts.

Answer: The list of materials is shown on the proprietory drawing referred to in No. 2 above.

Question No. 4: Capability of parts and their design life in the most severe suppression chamber operational transient and accident environments. Discuss possible deleterious effects of chemicals present during the surface preparation and application of the suppression chamber coating and of nitrogen on vacuum breaker system materials. Advise what tests have been performed on the vacuum breakers and their position indication system in a simulated accident environment.

Answer: All parts of the valves are designed for sustained operation at temperatures in excess of 300° F. The maximum temperature expected during the design basis accident is 275° F. at 33 psig which is well below the capabilities of the valve. During construction of the suppression chamber, no chemicals were used to prepare the surface prior to painting. The inside surfaces were merely sandblasted. Furthermore, because the vacuum breakers and their associated piping are located outside the suppression chamber, it is unlikely that the valves' internals were exposed to an unfavorable environment at that time.

Discussions with the valve manufacturer have indicated that the inert nitrogen atmosphere to which the valves' internals are exposed during operation should have no adverse effects. No tests have been performed with these valves in a simulated accident environment.

Question No. 5: For the tests performed on each vacuum breaker system, provide a brief description of acceptance criteria and test results including:

a) Preoperation and periodic surveillance tests.

b) Other tests and reasons for the tests.

Answer:

a) The following preoperational tests were conducted:

1. Measure the force to open the vacuum breakers and the force necessary to hold them open.

   a) This was performed by General Electric and was designed to insure the vacuum breakers would open at 0.5 psi across the valve. The test was done by means of a spring scale attached to the weight lever at a distance 30 inches from the shaft centerline, in order to verify that the valve would open with a pulling force less than 20 pounds. This is equivalent to a differential pressure of about .25 psi. The last step of this test was to insure the valve disc returned freely when the spring scale was released.

   b) All vacuum breakers successfully passed the preoperational test outlined above.

2. Each valve and associated piping was checked to assure that they were clear of foreign matter.

3. Checks were made to insure there was no restriction to valve lever movement.

4. A drywell leak rate test was conducted to insure that the valves seated.

5. Each valve was actually tested to insure it opened with 0.5 psi across it. This test was done by installing and inflatable seal on the torus side of the valve piping and pressurizing the piping between the seal and the valve.

b) The following surveillance tests are performed:

1. Each torus to drywell vacuum breaker is exercised during each refueling outage to insure proper operability.

2. Each refueling outage, the vacuum breakers are tested by means of the spring scale at the end of the weight lever. The force to open and hold open is measured and recorded. In the event the force to hold the valve open does not fall within the allowable range, corrective action is taken and the valve is retested.

Question No. 6: A description of corrective action taken to remedy any failure of the vacuum breakers, including a discussion of the cause of the failure.

Answer: The vacuum breaker valves have established a history of maintenance requirements. The valve bushings are manufactured of teflon which has a characteristic of "growing" and occasionally causes the vacuum breakers to fail the surveillance test. When discovered, the valve bushings have been repaired and the valves tested to insure that they pass the tests before startup. The "growing" characteristic has been experienced by several plants with teflon bushings. The mechanism by which this occurs is not fully understood at this time. It is suspected, however, that both radiation and moisture will cause teflon to grow. Because these valves are operated very infrequently, the bushings do not wear enough to compensate for the growth. In some cases, this causes the valves to operate sluggishly and fail a surveillance test.

As reported to the AEC by both telephone and letter dated January 17, 1973, the bushing problem has been recognized and discussed by the Plant Operations Review Committee (PORC). In this regard, the PORC has required that an investigation be conducted as to the suitability and long range applicability of the present packing material.

The bushing difficulty has been discussed with Atwood & Morrill Company and a long term solution is being investigated. The probable solution will be to replace the bushings with a material that is more suitable for the application. The material and bushing design is under study by the General Electric Company and Atwood & Morrill Company. As a continuing action, Jersey Central Power & Light Company's personnel will test the valves each refueling outage per the plant procedures, as well as insuring the valves are closed prior to startup after a refueling outage.

There have been no other maintenance problems experienced with the valves.

Question No. 7: A description of the station procedures or checks used to assure that the vacuum breakers:

a) function properly prior to startup

b) are closed after completion of pre-startup functional checks

c) are maintained properly.

Answer:

a) During each refueling outage, the vacuum breakers are tested to insure proper function in accordance with plant procedures as explained in reply 5.b.1, 2 and 3.

b) Prior to startup after a refueling outage, the vacuum breakers are verified to be in the closed position by actually checking the valve.

c) Each vacuum breaker valve is inspected and tested each refueling outage and in the event an abnormality is discovered, it is corrected prior to startup. Any abnormality is recorded and investigated or, when required, the manufacturer is contacted for further information and assistance.

MEMO ROUTE SLIP

Form AEC-93 (Rev. May 14, 1947) AECM

☐ See me about this. ☐ For concurrence. ☐ For action.
☐ Note and return. ☐ For signature. ☐ For information.

TO (Name and unit)	INITIALS	REMARKS
H. D. Thornburg, Chief, FS&EB	DATE	RO INSPECTION REPORT NO. 50-219/73-13 Licensee: Jersey Central Power & Light Company
TO (Name and unit) cc: OI:HQ 3 Central Files eg. Standards (3) Directorate of Licensing (13)	INITIALS DATE	REMARKS The subject inspection report is forwarded for your information. Distribution will be made by this office to the PDR, LPDR, NSIC, DTIE
TO (Name and unit) RO Regional Directors RO Files	INITIALS DATE	REMARKS and State representatives after review by the licensee for proprietary information.
FROM (Name and unit) R. T. Carlson, Chief Facility Operations Branch		REMARKS
PHONE NO.	DATE 10/4/73	

USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO : 1971 O - 445-469

10/11/73