



Commonwealth Edison
Quad-Cities Generating Station
Post Office Box 216
Cordova, Illinois 61242
Telephone 309/654-2241



NJK-74-42

April 25, 1974

Mr. John F. O'Leary, Director
Directorate of Licensing
Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Reference: Quad-Cities Nuclear Power Station, Unit 1
Docket No. 50-254, DPR-29, Appendix A
Sections 1.0.A.4, 6.6.B.1.a

Dear Mr. O'Leary:

The purpose of this letter is to inform you of the details of the findings from jet pump inspections performed on Quad-Cities Unit 1. Initial inspections were completed on April 15, 1974. The initial findings were discussed with Region III Regulatory Operations personnel on April 16, 1974 and were reported to you and to the Region III Directorate of Regulatory Operations by telegram that same day. On April 24, 1974 the findings and plans to date were discussed with Commission personnel at the station.

PROBLEM AND INVESTIGATION

INITIAL INSPECTION

With Unit 1 in the cold shutdown mode during refueling operations, a scheduled jet pump inspection was performed. This inspection was carried out with the aid of an underwater television camera and video tape unit. The details of the inspection are listed below. Refer to Figures 1 and 2 for location of the components.

- 1) Inspection of the tack welds on the jet pump beam bolt keepers and a check of beam pocket fits.
- 2) Observation of the beam bolt assembly while applying 200 ft-lbs. of torque to the beam bolt in both the clockwise and counterclockwise directions, respectively.

8305200316 740712
PDR ADOCK 05000254
S PDR

COPY SENT REGION III

3800

April 25, 1974

- 3) Inspection of the restrainer gate and wedge positions and restrainer bolt tack welds.

Upon completion of the above inspections on all twenty jet pumps, the following discrepancies were noted:

- 1) While applying up to 200 ft-lbs. of torque to the beam bolts, movement was detected on three bolt assemblies, namely numbers 10, 13, and 16. They thus failed the test.
- 2) Three restrainer gate bolts and keepers were found to be completely sheared and missing. Two of these were from jet pump 5; one was from jet pump 6.
- 3) Thirty of thirty-seven remaining restrainer bolt keeper welds were found to be either missing or cracked.
- 4) The restrainer gate wedge on jet pump 5 was missing.
- 5) The restrainer gate on jet pump 18 showed signs of wear in the vicinity of the wedge indicating possible vertical movement of the wedge prior to the inspection.

SUBSEQUENT INSPECTION

A subsequent inspection was made of the jet pump inlet riser braces for jet pumps 5 and 6. This inspection showed the brace to vessel welds to be intact.

RECOVERY OF MISSING PARTS

From the above inspections, the following parts were determined to be missing:

- 1) Three restrainer gate bolt heads.
- 2) Three restrainer gate bolt head keepers.
- 3) One wedge.
- 4) One wedge spring.

Attempts to locate and retrieve the missing parts produced the following results:

- 1) One restrainer gate bolt head was retrieved.
- 2) Two restrainer gate bolt head keepers were retrieved.

April 25, 1974

- 3) One wedge was retrieved in three pieces; the wedge, the wedge bale, and the wedge spring.
- 4) One additional wedge bale was retrieved.

EVALUATIONS AND CORRECTIVE ACTIONS

An extensive plan has been developed by the station and the General Electric Company to repair the discrepancies noted above. Details of this plan are described below.

Beam Bolts

All beam bolts (20) for the twenty jet pumps will be completely detensioned and then retensioned. The procedure to be used will be one previously used at Quad-Cities Station for jet pump repairs but modified from the tensioning procedure used for the original installation. The modified procedure includes observing the beam bolt for rotation while being tensioned. The retensioned beam bolts will then be rewelded with two tacks per bolt.

Restrainer Gates

All restrainer gate assemblies (20) for the twenty jet pumps will be replaced with new assemblies. These new assemblies will be installed, properly tensioned and restrained, and the keepers welded with one tack per bolt. (Total of 40 bolts).

Riser Braces

The riser braces on all ten jet pump inlet risers (1 riser per 2 jet pumps) will be completely inspected by using the underwater television camera. This inspection will primarily check the brace to vessel wall welds for integrity.

Jet Pumps 5 and 6

Jet pumps 5 and 6 will be removed from their normal position and raised to a position for more complete viewing. A complete inspection of these jet pumps will be performed.

Recovery of Missing Parts

Attempts will be made to locate and retrieve the parts that are still missing. These include two restrainer gate bolt heads and one restrainer gate bolt head keeper. Additionally, an attempt will be made to determine the source of the extra wedge bale.

Metallurgical Inspection of Retrieved Parts

All parts retrieved from the vessel to date were sent to the General Electric Company on April 23, 1974. These parts will be examined at their Vallecitos Nuclear Center to determine the possible causes or reasons for the failures.

The above actions are scheduled to begin approximately April 30, 1974 and tentatively be accomplished by June 3, 1974.

SAFETY EVALUATION

The jet pumps are designed to withstand the combined loadings from differential pressure and temperature, dead weight, fluid movement, seismic acceleration and vibration without failure or loss of integrity. Even though there were significant failures of jet pump restraints and fasteners, there were no jet pump failures or loss of integrity. Particularly there were no failures of any jet pump hold-down components. There were thus no unsafe conditions existing during previous periods of reactor power operation.

CAUSES

The cause of the failed restrainer gate bolt keeper tack welds and the apparent lack of preload on the beam bolts is presently being attributed to construction and installation deficiencies. The apparent cause of the failed restrainer bolts and the missing and possibly moved restrainer gate wedge is probably excessive vibration as a result of the deficient installation.

CUMULATIVE EXPERIENCE

The problems discovered on this inspection of Unit 1 are similar to those discovered during inspections related to a jet pump failure on Quad-Cities Unit 2 in August 1972. At that time a jet pump assembly had become dislodged from its normal position and rotated in the vessel. At that time extensive inspections and repairs were performed on all Unit 2 jet pumps and they have since operated satisfactorily. The details of that occurrence were reported to A. Giambusso by F. Palmer's letter of August 30, 1972. We are confident that the planned repairs to the Unit 1 jet pumps will be as successful as the repairs made on Unit 2.

We note that a previously reported failure of flow instrumentation for jet pump number seven on Unit 1 now appears to have a reasonable explanation and could be related to these current failures. That failure was reported to A. Giambusso by B. Stephenson's letter of December 4, 1972. That failure

Mr. J. F. O'Leary

-5-

April 25, 1974

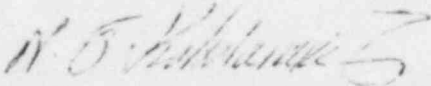
has now been located as a severed instrument line at the point where the line is attached for support to jet pump number six. It appears that this failure could have been caused by excessive vibration of jet pump six due to the failed restraints.

It appears that all jet pump problems that have been experienced at Quad-Cities Station can probably be traced to faulty craft installation and workmanship during the initial installation of both units.

The station and General Electric Company are still involved in discussions and planning to resolve all the deficiencies related to this abnormal occurrence. The results of the future inspections and planned repairs will be reported to you in a timely manner.

Very truly yours,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

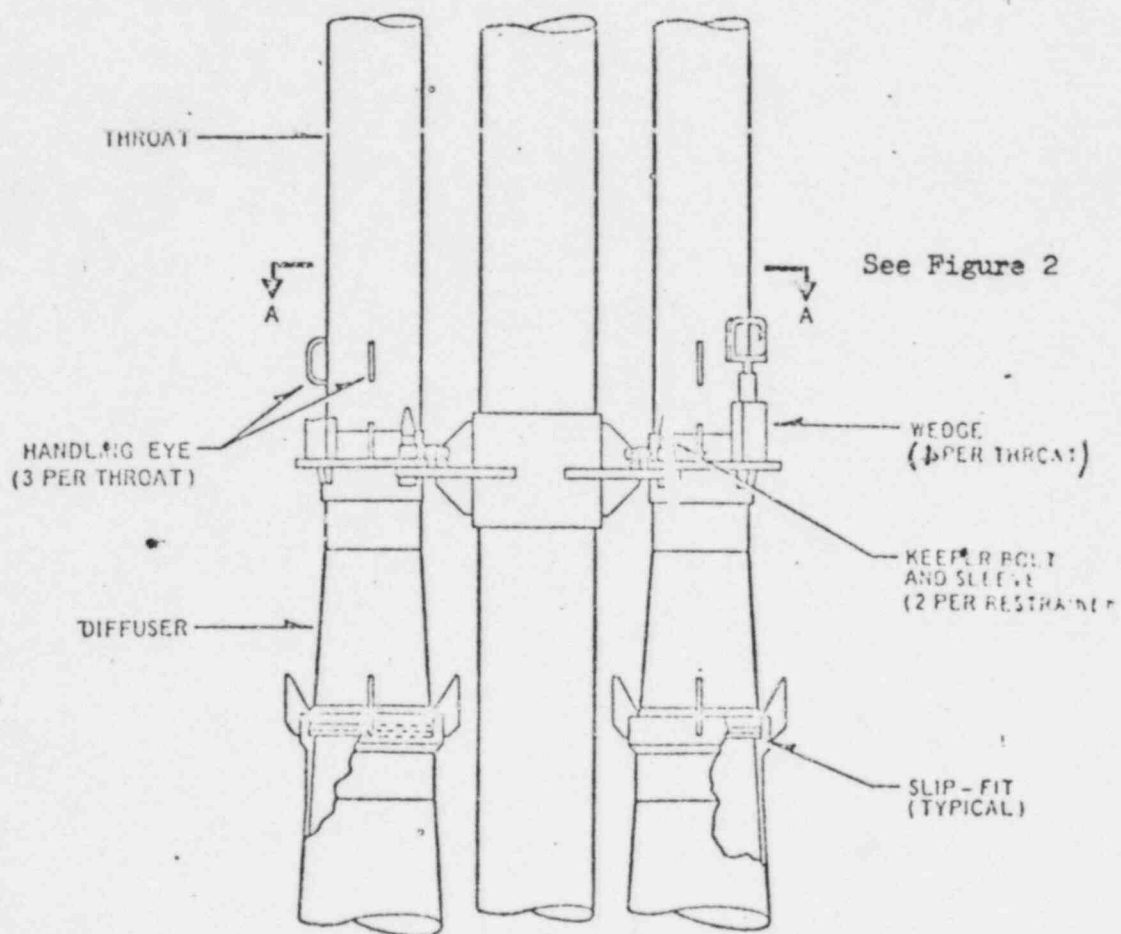

N. J. Kalivianakis
Station Superintendent

NJK/REQ/lk

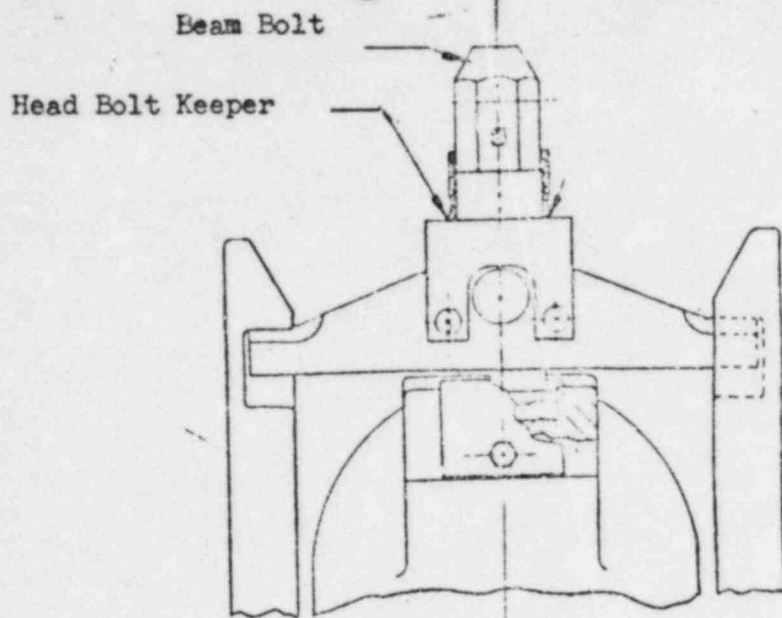
cc: Region III, Directorate of Regulatory Operations
J. S. Abel

attachments: Figure 1
Figure 2

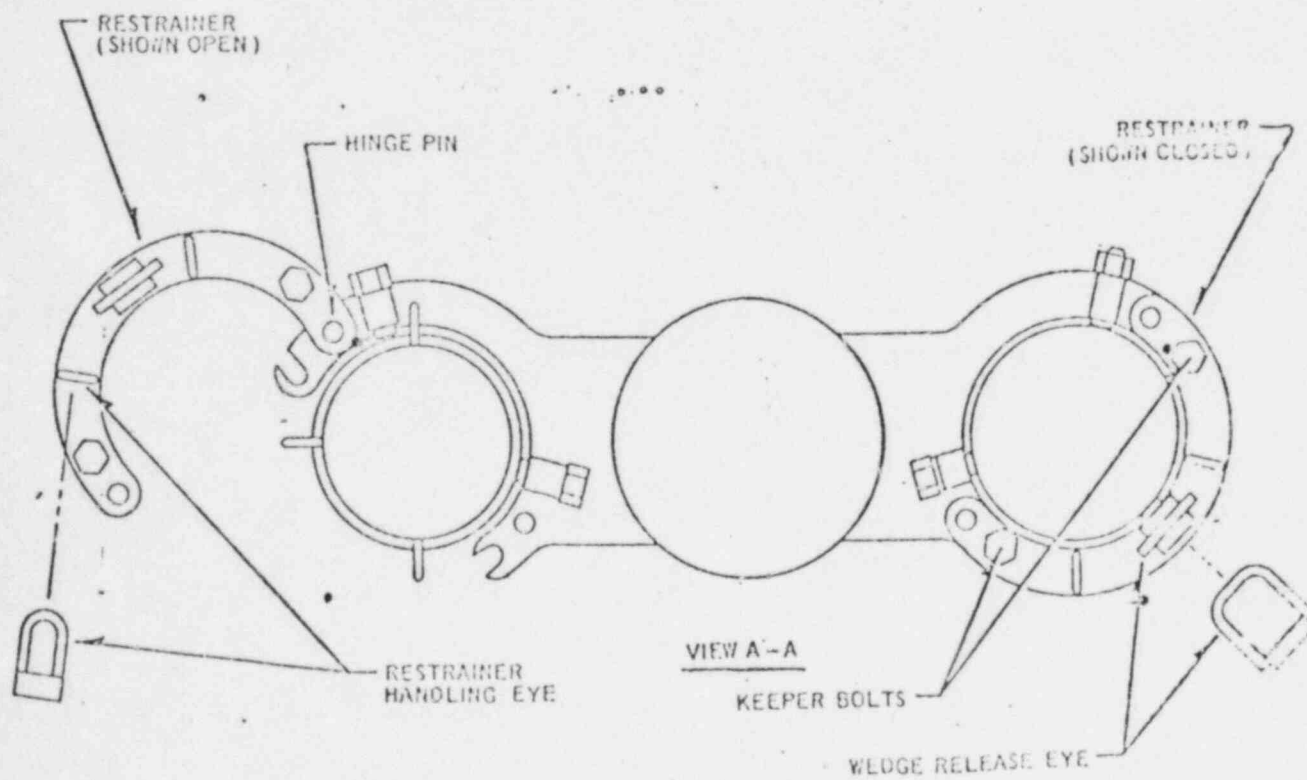
View B See Figure 2



Jet Pump Figure 1



View B
Jet Pump Beam Details



JET PUMP RESTRAINER DETAILS

Figure 2