

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION IV

Report No. 50-382/80-17

Docket No. 50-382

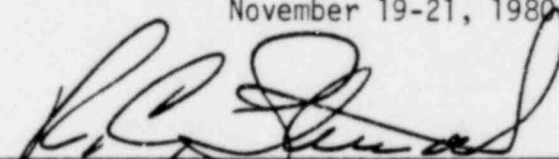
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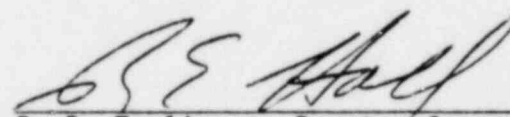
Licensee: Louisiana Power and Light Company
142 Delaronde Street
New Orleans, Louisiana 70174

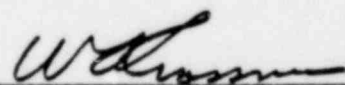
Facility Name: Waterford Steam Electric Station, Unit No. 3

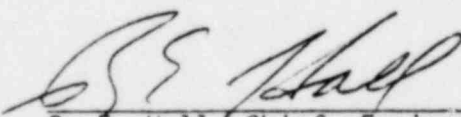
Investigation at: Waterford Site, Taft, Louisiana

Investigation Conducted: July 31 - August 1, 1980
August 21, 1980
September 18, 1980
November 19-21, 1980

Inspectors:  12/8/80
R. C. Stewart, Reactor Inspector, Projects Section Date

 12/9/80
D. P. Tomlinson, Reactor Inspector, Engineering Support Section Date

Approved:  12/9/80
W. A. Crossman, Chief, Projects Section Date

 12/9/80
R. E. Hall, Chief, Engineering Support Section Date

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Investigation Summary:

Investigation on July 31 - August 1, 1980, August 21, September 18, and November 19-21, 1980 (Report No. 50-382/80-17)

Areas Investigated: Special investigation of possible deficiencies identified during a telephone call to RIV on July 9, 1980. The caller, a former employee at the Waterford, Unit 3 site, expressed concern over five possible construction deficiencies noted by him while employed by an Ebasco subcontractor. The caller wished to remain anonymous. The investigation involved forty-five inspector-hours by two NRC inspectors.

Results: Of the five allegations investigated, four were either not substantiated or were partially substantiated, but were not detrimental to plant construction. The fifth allegation shall be considered an unresolved item pending further NRC and LP&L investigation.

INTRODUCTION

Waterford Steam Electric Station, Unit No. 3 (Waterford, Unit No. 3) is under construction in St. Charles Parish, Louisiana, near the town of Taft, Louisiana. Louisiana Power and Light Company is the Construction Permit holder with Ebasco, Inc. serving as both the Architect/Engineer and the Construction Manager.

REASON FOR INVESTIGATION

The Region IV Reactor Construction Projects Section Chief received a telephone call from a former site subcontractor employee on July 9, 1980. The caller expressed concern about five possible construction deficiencies noted by him during his employment at the Waterford, Unit No. 3 facility. The caller stated that he wished to remain anonymous.

SUMMARY OF FACTS

On July 31, 1980, two Region IV IE inspectors met with the alleger to obtain specific details of the allegations in order to assess the validity and impact on safety-related components and systems. The following information was gained from that interview:

Allegation No. 1

The alleger stated that the preheating of sole plates for the reactor coolant pump supports prior to welding could overstress the hold down bolts and degrade the grout beneath the embedded sole plates.

Allegation No. 2

The alleger stated that the "four inch thick sole plate is cracking due to the sole plate to reactor coolant pump support welding and no one seems to be concerned."

Allegation No. 3

The alleger stated that the azimuth of the reactor coolant pump volutes are changing due to thermal expansion during welding of the cold leg. Responsible personnel were indiscriminately changing settings as determined by plumb bobs.

Allegation No. 4

The alleger stated that a stainless steel weld connecting the reactor coolant pump discharge to the cold leg failed to pass radiographic examination. The welders had complained that the welding rods were no good and, because of this, another rod supplier was contacted. The weld that did not pass the radiographic examination had not been removed.

Allegation No. 5

The allegor stated that "several" of the bolts on the reactor coolant pump supports broke while being torqued and that the technique for torquing the bolts was wrong due to the use of extensions and a torque multiplier in unusual positions.

CONCLUSIONS

Allegation No. 1

Although some cracking of the grout occurred because of thermal stressing, it was not of sufficient magnitude to be considered detrimental to the integrity of the structure. The sequence of operations during the bolting and welding stages, along with the heat-sink capability of the base plate and adjacent parts, precluded any possibility of damage to the bolts by the relatively low (250°F) preheat temperature.

This allegation was partially substantiated but was technically of no merit.

Allegation No. 2

The cracking described by the allegor was not in the sole plates for the reactor coolant pump supports but in welds attaching the horizontal sole plates and vertical gussets. The problem was identified and analyzed prior to the allegor's termination and an alternate design selected. Rework of these joints is approximately one-half completed.

This allegation was not substantiated.

Allegation No. 3

Alignment of the volutes, prior to and during the welding operation, was accomplished by using field transits, jig transits, piano wire and optical levels. The plumb bobs mentioned by the allegor were used only to monitor movement caused by welding and not to establish the true position of the component.

This allegation was not substantiated.

Allegation No. 4

The cold leg weld described by the allegor was radiographed and was rejected. Repair of this joint was successfully accomplished after the allegor's termination of employment at Waterford, Unit No. 3.

This allegation was partially substantiated but had been routinely corrected in accordance with the site QA program.

Allegation No. 5

The reactor coolant pump support bolts referred to by the allexer did break during installation. Full investigation of this allegation has not been completed.

This allegation appears to be substantiated. It shall be considered an unresolved item pending completion of further IE investigation in this area.

DETAILS

1. Persons Contacted

Principal Licensee Employees

- *L. Bass, Project QA Engineer
- *B. Brown, QA Engineer

Ebasco, Inc. Employees

P. Harrington, Construction Engineer

Others

Various persons employed by Ebasco and NISCO from the areas of supervision, construction, engineering and quality assurance.

*Denotes those attending the exit interview.

2. Investigative Details

The following conclusions are based on known conditions at the Waterford, Unit No. 3 site; a review of selected records; visual inspection of the hardware in question; and interviews with various QA, QC and engineering personnel:

Allegation No. 1

The condition described was partially correct but was found to be nondetrimental. A review of Field Requests revealed that FR-3015-36, dated May 7, 1980, with a response dated May 28, 1979, addressed the problem of grout cracking under the reactor coolant pump support base plates. An engineering analysis determined that the grout cracking was caused by thermal stress induced by preheating of the base plate prior to welding but this was not deleterious due to the location, direction and severity of the cracking.

The unsubstantiated portion of this item was that the preheating of the support base plates might have overstressed the support hold down bolts. A review of construction documentation indicated that all hold down bolts were properly torqued to the required 400 kips prior to initiation of preheating and welding operations. Torque values for support structure bolts and studs are specified on Drawing LOU 5817-G696, Sheet 2. The preheat temperature of 250^oF was attained, as required, and documented on the construction records. The 4" thickness of the base plate and support members being welded precluded the possibility of a general preheating of the material. Because of this relatively low heat input, the localization of its application and the physical separation of the heated members from the bolts, it was not possible for the preheating operation to induce any stress on the hold down bolts.

Allegation No. 2

This item was not substantiated. Field Change Request, FCR-AS-1631, dated December 20, 1979, addresses the problem of cracking in welds attaching the gusset plates to the reactor coolant pump support sole plates. No cracking was found in the sole plates. The FCR was issued following an Ebasco design analysis to determine the cause of the cracked welds. An alternate design was selected and approved which eliminated some of the stresses induced into the gusset plates. The full penetration welds at the bottom of each gusset were removed and replaced with angle clips as shown on Attachment 1 of FCR-AS-1631. The alternate design allows the same load bearing capacity but reduces the rigidity and stress in the supports. The modifications to these supports had been approved prior to the former employee's termination but actual weld removal and clip installation did not begin until after he had left. Rework of the gusset attachments is approximately half completed.

Allegation No. 3

This item was not substantiated. The initial positioning of the volutes was accomplished using field transits to establish the plan view lines. Orientation of the alignment marks on the volutes to the true position lines was accomplished with a jig transit and an optical level was used to establish the required elevation of each volute. The volute set-back required, to allow for shrinkages during the pipe welding operation, was also established by use of a jig transit prior to tie-in with each cold leg. After the cold leg piping was tack welded, piano wires were stretched across the alignment marks to establish the major axis of the volutes. From these wires, a 26 inch diameter circle was established above the volute's true position center and four plumb bobs were positioned, for reference, 1/8 inch above each base plate's upper surface at elevation 9'-5". At this time, the major axis lines were scribed on the volutes. Day by day movement was monitored by measuring the movement of the plumb bobs from the scribe lines. Periodic jig transit readings measured the displacement of the piano wires from the scribe lines. After the cold leg welding, post weld heat treatment and cool down were completed, the actual positions of the volutes were measured using jig transits and optical levels. Final measurements and inspection confirmed that each volute is within the 1/4 inch true position dimensional tolerance. The plumb bobs, as seen by the allegor, were not used for actual measurement of the volutes' locations but were only to monitor movement induced by the welding operations. The IE inspectors reviewed NISCO construction and inspection documentation to verify that the above steps were accomplished. All data reviewed indicated that the true positions of the volutes were within specification limitations.

Allegation No. 4

This item was partially substantiated. The weld identified by the allegor is carbon steel and not stainless steel. Radiographs of the joint in question did reveal unacceptable indications and the interpretation sheet for the radiographs did indicate this. Repair of the weld was not accomplished immediately but was successfully completed several months later, after the allegor's termination. It is not uncommon for rejectable weld areas to remain unrepaired for long periods of time due to scheduling, availability of qualified welders or other limiting conditions. Rejected radiographs and inspection reports are systematized in such an overlapping manner that inadvertent acceptance of an inadequate weld is virtually impossible. A review was made of all cold leg radiographs and inspection reports. Repairs were made in various areas of the welds but subsequent radiography indicates that all unacceptable indications were removed and that all cold leg welds are now sound. All rejected radiographs, accepted radiographs and attendant interpretation sheets have been forwarded and are now stored in the Ebasco record vault.

The portion of this allegation pertaining to welding rod that was "no good" could not be substantiated. Weld filler material is required to be maintained in such a manner that each lot is stored in isolation from others once the rod container is opened. Each storage oven is allowed to contain only one type and lot number of filler material. Site records indicate that only one manufacturer's lot of E-7018 rod was on site at the time the cold leg welds were made. As stated earlier, the welds were carbon steel and not stainless steel. Interviews with welding personnel did not reveal any dissatisfaction with the filler material that had been issued.

Allegation No. 5

This allegation is still being investigated. As was stated by the allegor, several bolts used on the reactor coolant pump supports did break during the bolt torquing operation. The bolts were ordered and manufactured to the requirements of ASTM A-490. LP&L Quality Assurance is currently conducting tests on both new and used bolts to determine if the cause of the failures is in the material or in the methods for installation and control of the bolts.

This shall be considered an unresolved item pending the results of further NRC and LP&L investigations.

3. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items or items of non-compliance. An unresolved item is discussed in Allegation No. 5.

4. Exit Interview

The IE inspectors met with licensee representatives (denoted in paragraph 1) on November 21, 1980, to summarize the purpose and findings of this investigation. It was agreed that Allegation No. 5 required further investigation and would be considered an unresolved item.