

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

Region I

Report No. 50-289/80-07

Docket No. 50-289

License No. DPR-50 Priority -- Category C

Licensee: Metropolitan Edison Company

P.O. Box 542

Reading, Pennsylvania 19640

Facility Name: Three Mile Island Nuclear Station - Unit 1

Investigation at: GPU Service Corporation, Reading, Pennsylvania

Investigation conducted: March 21 and July 31, 1980

Investigators: *L. E. Tripp*
for P. Durr, Reactor Inspector

9/15/80
date signed

L. E. Tripp
for S. D. Reynolds, Reactor Inspector

9/15/80
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Approved by: *L. E. Tripp*
L. E. Tripp, Chief, ESS #1, RC&ES Branch

9/15/80
date signed

Investigation Summary:

Investigation on March 21 and July 31, 1980 (Report No. 50-280/80-07)

Area Investigated: Routine, announced meeting with GPU representative to follow up previous announced meeting dated March 21, 1980 to investigate an allegation concerning possible mis-marking of ASTM: A312 Grade 304 welded stainless steel pipe.

The investigation involved 13 investigative hours at the GPU Reading, PA office by one NRC inspector on March 21, 1980 and two NRC inspectors on July 31, 1980.

Results: The allegation investigated was not substantiated and no apparent items of noncompliance with regulatory requirements were identified.

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I. Background

A. Reason for Investigation

On or about March 1, 1979, the licensee's Legal Department received a phone call from an alleger who stated that he was in possession of information developed while he worked for a metallurgical laboratory in 1969 indicating that some of the small diameter welded austentic piping at TMI-1 was defective. The NRC was not informed by the alleger, but was informed of action of the alleger by the licensee and investigated the allegation.

B. Identification of involved Organizations

1. General Public Utilities Service Corporation (GPUSC) - A corporation that consists of a consortium of utilities that supplies QA support and services to the licensee, Metropolitan Edison.
2. Metropolitan Edison (Met Ed) - The licensee for the Three Mile Island Unit 1 power plant.
3. United Engineers and Constructors, Inc. (UE&C) - The architect/engineering company responsible for construction activities associated with Three Mile Island Unit 1.

II. Summary of Findings

A. Allegations and Investigation Findings

After being informed by the allegor of possible defective pipe, the licensee held a meeting with the allegor. A summary of the details of discussion notes made by the licensee are as follows:

The allegor informed Met Ed that while he was working for Time National Laboratories - a testing laboratory - in 1969, as Eastern Divisional Manager (out of Harrisburg), his company (Time National) was given a purchase order by Med Ed to analyze certain sections of seam welded stainless steel piping. Pipe sections were sent to their Chicago lab for analysis. The results of the lab analysis were conveyed to the allegor over the telephone. Based upon the phone information provided, he considered the material tested as not meeting acceptable standards (he called it "junk"). Based upon his recollection and as conveyed to a Pennsylvania Department of Environmental Resources (DER) representative (as will be elaborated upon in the ensuing paragraphs) the samples were tested for the following aspects:

Chemistry: C, Mn, P, S, Sr, Cr, Ni

Physical: Yield, tensile, elongation and H-factor, flat-to-flat (this may be flattening), fracture appearance.

The results were the following: Chemistry - within ASTM allowable limits, but not in accordance with more stringent "AEC Specs".

Physical - different properties between metal and weld metal.

The allegor indicated he did not have copies of the lab test report or any other information. He gave "lab sample numbers" (heat numbers) and they were:

125725
126019
158310
325950

When asked by the licensee if he (the allegor) knew if Time National was still in existence, he indicated that it probably was under a different name in Chicago. He did not know any more details than that. He said that if some funds were made available to him he would probably be able to get in touch with some people and may be able to provide documentation and other information. As a final note he also said that the licensee should not try to subpoena records from Time National as they had some "mafia" connections.

In early 1973, the alleged told Met Ed representatives that he met with Mr. Frank R. Clokey, Special Assistant to the Attorney General of DER and conveyed the defective piping information to him. Mr. Clokey wrote a letter to the alleged on March 7, 1973 indicating that he had prepared notes of their meeting and was enclosing them with his letter and asked that the alleged review them and return them to him with any comments. The alleged did not respond to this letter. He gave as a reason for not responding some of the personal problems he had about that time. There apparently was no further followup by DER.

The NRC investigation found no information or evidence to support the allegation and found that the licensee took prudent action to investigate and evaluate a potential material mismarking problem that was later verified to be a nonexistent problem.

B. Conclusions

No items of noncompliance with regulatory requirements were identified.

III. Details

A. Introduction

No allegation was made to the NRC. The NRC responded and instituted an investigation when informed by the licensee that they received an allegation. An NRC inspector followed the progress of the licensee's investigation through a series of telephone contacts and held a preliminary meeting with representatives of GPUSC on March 21, 1980.

B. Scope of Investigation

This investigation consisted of two meetings with GPUSC (March 21, 1980 and July 31, 1980), review of applicable UE&C QC documents, review of Pittsburgh Testing Laboratory metallurgical analysis of samples of the subject pipe, telephone conversations with representatives of the pipe manufacturers, review of GPUSC reports on the subject pipe and UE&C QC memorandum on an inventory of the subject pipe.

C. Persons Directly Interviewed and/or Contacted During the NRC Investigation

1. GPUSC

*F. S. Giacobbe, Manager, Materials Lab
G. Troffer, Manager, Quality Assurance
J. Janiszewski, Metallurgical Engineer

2. Wallingford Steel Division of Allegheny-Ludlum

Gilbert Boyd, Manager, Market Development

3. Union Steel

G. Keslowe, Marketing

4. Summerset Tube

R. Cunningham (formerly of Union Steel)

5. Youngstown Welding

Frank Watson, President

*Denotes those present at exit interview.

D. Investigation

On or about March 1, 1979, Mr. John Wilson of the licensee's Legal Department received a call from an allexer who stated that he was in possession of information indicating that some of the stainless steel piping in TMI-1 was defective. The allexer based his conclusions on the quality level of the pipe as determined by metallurgical analyses of four sections of pipe supplied by UE&C personnel to Time National Laboratories in 1969 (at which time the allexer was Eastern Division Manager). Representatives of the licensee held an informal meeting with the allexer to obtain more information on the subject. The licensee informed the NRC of this contact (Mr. George Troffer, Met Ed, phone call to NRC-Region I on March 2, 1979).

The allegation concerns whether certain pipe as supplied is seamless or autogenously welded to ASTM:A312 requirements, or if it is welded with filler metal to ASTM:A358 requirements.

Notice of a potential materials problem was first made by UE&C in Deficiency Report DR0091 dated March 3, 1970 by an inspector who indicated that the pipe was welded "apparently with filler metal" which was interpreted to signify that the material was ASTM:A358 instead of A312. The written disposition called for selective utilization of the subject material in noncritical areas. A report of radiographic examination in Deficiency Report DR 0093 was interpreted as further verification that the material was A358.

The purpose of the NRC investigation was to determine if the pipe marked as A312 was in fact A358 and if there was any safety related problem associated with the piping systems if A358 was erroneously substituted for A312.

E. Findings and Conclusions

The NRC representatives reviewed the following documents associated with the allegation.

1. Material certifications for the piping identified by the allexer as being welded with filler metal.
2. UE&C Deficiency Reports DR 0091, DR0093 and DR0099 which identified the subject piping as a potential problem of possible material mis-marking.
3. Med Ed letter (Hreczuch to Hardy dated February 26, 1970) indicating the material in the aforementioned DR's will be utilized in non-safety related applications.
4. UE&C letter (Branch to Fant dated March 27, 1970) indicating that in piping specification SP-5661, page II-49 and GAI flow diagram C-302-719 that ASTM:A312, A358 or A376 are all equally satisfactory for use.

5. Met Ed report of meeting held with the allegor dated March 7, 1979.
6. Pittsburgh Test Laboratory reports 698693 dated September 9, 1969 and October 20, 1969.
7. UE&C memorandum (DeArmit to Hardy dated October 19, 1969) identifying the location and disposition of the subject piping.
8. Met Ed report "Investigation into the Use of Welded Stainless Pipe" dated November 21, 1979.
9. Met Ed letter (Prabhakar to Troffer et al), subject "Investigation of Stainless Steel Pipe at TMI" dated March 6, 1979.

The NRC inspectors also contacted representatives (in some cases previous employees) of Union Steel, Wallingford, Allegheny Ludlum, and Youngstown Welding who were associated in the manufacture of the subject piping. It was determined that Union Steel had no capability of making stainless pipe to A358 requirements, but that Wallingford Division of Allegheny Ludlum obtained the subject pipe through a subcontractor (Youngstown Welding) who had the capability at the time the pipe was manufactured to produce either A312 or A358 in the 6", schedule 40 size. The President of Youngstown Welding indicated that if the order was for 6", schedule 40, A312 pipe that there would be no manufacturing incentive to make the pipe to A358 and, in fact, current practice would limit A358 to 8 inch and over sized pipe

A review of the previously mentioned documents has produced the following findings:

1. UE&C identified a potential problem of possible material mismarking. There may have been a misinterpretation of the visual appearance of the pipe weld at that time as there is no way to visually determine whether the weld is made with or without filler metal. The process employed for pipe of the size under consideration is the GTAW process for A312 and the GTAW process with cold wire feed for A358.
2. Radiographic examination is also not a technique that can distinguish between the aforementioned processes.
3. UE&C took immediate steps to identify, locate and restrict the use of the subject pipe. A summary of this information is shown in UE&C memo dated November 19, 1969, subject "Stainless Steel Pipe".
4. UE&C sent four samples of pipe to Time National Laboratory for test on P09459-01-2873 and twelve samples of pipe to Pittsburgh Testing Laboratory on PO MEC-37 C0.11. There are no copies of the Time National Laboratory Report on file at Met Ed or Time National Laboratory. The conclusions of the Pittsburgh Testing Laboratory Reports 698693 Order No. PG-2642, dated September 18, 1969 and November 20, 1969, indicate the pipe to be welded without filler metal. The preliminary conclusion on the report

dated September 18, 1969 that the 6", schedule 40 pipe "appeared to have filler metal applied over seamless pipe" is most probably due to observing a longitudinally cut specimen rather than a transverse specimen and misinterpreting the results.

5. Discussions with the manufacturers indicates that Union Steel had manufacturing capability to make A312 pipe, but no capability to make A358 pipe. The pipe purchased from McJunkin, a distributor, was not made by Wallingford or Allegheny Ludlum, but rather by Youngstown Welding who had the capability to make either A312 or A358 pipe.
6. UE&C (March 27, 1979 Mr. Branch to Mr. Fant Memo) engineering evaluation of the 6", schedule 40 pipe which was used in the Reactor Building Sump drain indicated that either A312 or A358 was satisfactory for use. This is a portion of the piping in question. Met Ed was able to trace all but a few feet of the potentially mismarked piping and found that it was not used in safety related applications.

The NRC investigation has resulted in the following conclusions:

1. Review of the data, documentation, and metallurgical laboratory reports indicate the pipe was welded to ASTM:A312 requirements and not to A358 requirements, i.e., the welding of the pipe less than 6", OD was accomplished by the single OD oriented GTA autogenous (without filler metal) technique and the 6" OD pipe was welded with the ID and OD converted GTA autogenous technique.
2. The possible material mismarking (A312-A358) was identified by UE&C prior to the test laboratory analysis made by the allegor's company.
3. The most probable cause of UE&C DR's was the erroneous conclusion that A312 welded pipe could not have ID and OD reinforcement whereas the amount of reinforcement in the A312 process is a function of the compressive stress applied to the square butt joint by the alignment fixture.
4. Radiographic examination of GTA welded pipe cannot distinguish between GTAW pipe with or without cold wire feed additions.
5. The unusual characteristics of the metallographic sample shown in the PTL report for the 6" pipe weld are a result of a sectioning error where the section shown is longitudinal rather than transverse.
6. Although the pipe is not A358, it would be acceptable for the service intended if it were A358.