



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303

MAY 29 1980

IE Investigation Report Nos. 50-553/80-05 and 50-554/80-04

Subject: Tennessee Valley Authority
Phipps Bend Nuclear Plant, Units 1 and 2
Docket Numbers 50-553 and 50-554

Allegation that a welding quality control inspector was instructed by supervision to exceed permissible weld bead widths.

Period of Investigation: February 20-22, 1980

Investigator: Robert J. Marsh
Robert J. Marsh, Regional Investigator
Office of the Director

May 23, 1980
Date Signed

Reviewed by: F. J. Long
F. J. Long, Acting Deputy Director

5/28/80
Date Signed

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I. INTRODUCTION

During the course of a routine inspection conducted in December 1979, an NRC inspector identified an item of noncompliance involving excessive bead widths for containment shell plate welds in unit one of the Phipps Bend Nuclear Station (PBNS). In discussing the discrepancy with a PBNS Quality Control inspector, the NRC inspector was advised that welding crafts and QC inspection personnel had been instructed by the Welding Engineer to exceed the dimensions provided in the pertinent process specification. The QC inspector further alleged the instructions to violate the process specification had been given in the presence of the Assistant Construction Superintendent (welding). Preliminary inquiry by the NRC inspector resulted in denials by the two supervisors that any instruction to intentionally violate an approved procedure had been issued.

Upon return to the NRC regional office, the conflict between the allegations of the QC inspector and statements of his supervisors was identified to the regional investigators. An investigation was initiated on February 20, 1980, in an attempt to determine the degree of factual basis for the allegation.

The NRC investigation was conducted under the authority provided by Part 1.64, Title 10, Code of Federal Regulations and required a total of 21 manhours of investigative effort.

II. SCOPE OF INVESTIGATION

The scope of the investigation included the following:

- A. Interview with the alleged
- B. Review of pertinent TVA procedural requirements (GM11-B-6) and process specification (G29M - 1.M.1.2.(b))
- C. Interviews with the QC Welding Supervisor, QC Welding Engineer, and Assistant Construction Engineer
- D. Interviews with QC Welding Inspection/Engineering personnel (9)
- E. Interviews with crafts (welding) personnel (5).

III. CONCLUSIONS

The investigation disclosed that the allegation was not substantiated.

IV. DETAILS

A. Persons Contacted

TVA, Phipps Bend Nuclear Plant

W. P. Kelleghan, Project Manager
A. A. Richardson, Construction Superintendent
G. Wadewitz, Construction Engineer
T. V. Abbatiello, Assistant Construction Engineer - QC

NOTE: The pronouns "he" and "his" are used throughout this report without regard to gender to protect identities of information sources to the maximum extent possible.

B. Allegations, Discussions, and Findings

1. Allegation

During November/December 1979, a quality control inspector was directed by a welding engineer, in the presence of the welding superintendent, to deviate from approved welding procedures involving weld bead width (weave).

Discussion

During a routine inspection being performed at the Tennessee Valley Authority's (TVA) Phipps Bend Nuclear Plant, December 11 through 14, 1979, an NRC inspector questioned a TVA Quality Control (QC) welding inspector concerning excessive weld bead widths observed on containment shell plate vertical welds. The use of excessive bead width was cited as an infraction (553/79-17-01) by the NRC inspector in Inspection Report 50-553/79-17, dated January 10, 1980. The welding inspector stated the weave, used to produce welds in excess of procedural requirements, was being employed at the verbal direction of the Welding Engineer with the knowledge and consent of the Assistant Construction Superintendent (welding).

The NRC inspector queried the Welding Engineer and his supervisor regarding instructions, verbal or written, issued to field personnel directing or permitting the use of bead widths in excess of those allowed by the procedural requirements of TVA's General Welding Specification G29M. Both individuals stated they had not issued any such direction but added they had instructed that full use be made of permissible allowances.

The NRC inspector queried the Assistant Construction Superintendent regarding verbal instructions received from welding engineering which allowed him to utilize bead widths outside procedural requirements. The Assistant Construction Superintendent stated he had been instructed by welding engineering

"to take full advantage of the 5/8" weave permitted by the procedure" but that he had not been instructed to violate the procedure by exceeding that dimension.

Prior to departure from the TVA Phipps Bend site at the completion of the December 1979 inspection the NRC inspector was again approached by the concerned QC inspector who reaffirmed the allegation that verbal instructions were given to weave weld beads in excess of procedural requirements. The alleged provided the NRC inspector the names of several workers who he stated would substantiate his allegations.

During this investigation a series of interviews was conducted by the NRC investigator with the three principle individuals, as well as fourteen (14) other members of the welding craft and quality control organizations. From these interviews the following descriptive scenario evolved of events leading up to NRC's receipt of this allegation.

In late 1979, as work progressed on containment shell plate vertical welds of unit one, a higher than normal rejection rate of completed welds was encountered. Nondestructive examination (by radiograph) of completed welds disclosed indications of entrapment of large amounts of slag in the welds causing them to be rejectable under the approved inspection criteria. The cause of this entrapped slag was attributed by site QC personnel to use of narrow (under 5/8 inch) weld bead weave patterns by the welders in accordance with approved procedures (para. 14.9.2, process specification 1.M.1.2(b), General Welding Specification G29M).

During November 1979, full use of the allowable 5/8 inch weave was being considered by the site welding engineering staff as a partial solution to the slag entrapment/high rejection rate problem.

It was explained to the investigator that TVA welding engineering personnel felt the wider weave would produce a less intense heat at the weld site and thereby decrease the slag formation.

In early December 1979, the Assistant Construction Engineer verbally directed the quality control welding engineer to make sure full use of the 5/8 inch weave permitted by the approved process specification was being made.

On an unspecified date prior to the NRC inspection of December 11-14, 1979, the alleged, a quality control inspector, challenged a welder for using a weld bead weave which the QC

inspector measured at 3/4 to 7/8 inch. The QC Welding Engineer and Assistant Construction Superintendent (welding) were brought into the discussion to resolve the interpretation of what was and what was not acceptable.

During an investigative interview the Welding Engineer stated to the NRC investigator that his measurement of the questioned welds (T2301629 and T2301631) reflected an acceptable 5/8 inch width. The alleged acknowledged to the NRC investigator during his interview that he was not directly told by the QC Welding Engineer or anyone else to specifically violate the established limits but his interpretation of the statement ("insinuations") by his supervisor led him to believe he should be accepting the 5/8 inch and wider weaves.

Additional details concerning the events leading up to NRC's receipt of this allegation can be found in Attachment A to this investigative report.

Investigative interviews conducted with the Welding Engineer and Assistant Construction Superintendent (welding) produced denials that any instruction to exceed permissible tolerances had been made. Both individuals provided the investigator signed statements affirming their position. These statements are provided as Attachments B and C to this investigative report.

Interviews conducted with those individuals named by the alleged as being capable of corroborating his allegation failed to uncover any information directly supporting the allegation. These individuals all recalled the specific incident discussed but none admitted to having drawn the interpretation/conclusion (as voiced by the alleged) from the discussion of the alleged with the Welding Engineer and Assistant Construction Superintendent (welding). None admitted any knowledge of having received specific instructions to violate approved procedures.

FINDING

The allegation is not substantiated. No items of noncompliances were identified. The findings of this investigation did not identify adequate facts to corroborate the statement that the alleged was directed to violate procedural requirements. The alleged stated during an investigative interview that he had not received direct instructions to do so and the two supervisory personnel denied they had given such instructions. Witnesses identified by the alleged as being capable of corroborating the issuance of these instructions failed to do so.

It was found during the inspection of December 11-14, 1979, as documented in Inspection Report 50-553/79-17 that the questioned welds were in excess of procedural limits and, therefore, an infraction was cited by the inspector. How the specified welds were produced in a manner exceeding criteria was not determined by this investigation. A statement by the allegor that QC inspection personnel possessed minimal (but acceptable) training and experience levels was found to be consistent with the training/experience of the personnel interviewed by the investigator. No items of noncompliances were identified in this area.

2. Allegation

The allegor expressed concern about the 40 degree F minimum temperature required for the gas (75% Argon -25% CO₂) being used for flux cored welding. The allegor stated the gas bottles are not being protected during the winter months.

Discussion

In addition to allegation 1, the allegor expressed concern about the storage of gas utilized in flux cored welding. He indicated winter months produce ambient temperatures at the site below 40°F and that he had observed a warning on the gas bottles indicating that at below 40°F the gas may tend to separate.

The NRC inspector, in addressing the allegor's concern, identified a memorandum issued by the welding engineer stating that the bottles should be rolled to ensure a good mixture. Further checks by the NRC inspector with the gas manufacturer (Linde Division of Union Carbide) revealed the following:

At below 40 degrees F some condensate could occur resulting in less than 25% CO₂ in the mixture. The CO₂ adds heat to the welding arc. Unless the gas is being used to obtain unusual penetration such as in a square butt or other hard to penetrate joint, a decrease of CO₂ down to 5% of the mixture is of no consequence. The argon is the stabilizing gas and as long as a stable arc is achieved, there is no problem as long as deep penetration is not the objective.

The NRC inspector advised the investigator that the type of joints, i.e., grooved and backgouged, encountered at the site did not require excessive penetration.

Finding

No basis for the concern was found in view of the type of joints being welded at the site and the nature of the gas as described by the manufacturer. No items of noncompliance were identified.

ATTACHMENT A

RESULTS OF INTERVIEW WITH (NAME DELETED) AS RECORDED BY INVESTIGATOR, ROBERT J. MARSH, U.S. NUCLEAR REGULATORY COMMISSION ON FEBRUARY 21, 1980.

(Name Deleted), who is employed by the Tennessee Valley Authority (TVA) as a quality control (welding) inspector at the Phipps Bend Nuclear Plant (PBNP) was interviewed in Room 202, Administration Bldg., PBNP, under favorable conditions during the approximate period 8:00 a.m. to 8:45 a.m. with only the subject and R. J. Marsh, Regional Investigator, present. The purpose of this interview was to discuss (Name Deleted)'s oral allegation to B. R. Crowley, NRC Inspector, on December 11, 1979, that he had been directed to deviate from approved procedures by a welding engineer in the presence of the Assistant Construction Superintendent (welding).

(Name Deleted) discussed the events leading up to his statements to the NRC. Edited portions* of that discussed are provided in the following:

- A. In late 1977, I noticed a change in the welder's technique--in the welding on containment shell plates in unit one.
- Q. Was that in early December?
- A. Early December and I noticed that they were changing technique from a stringer top technique--using flux core. They changed to a weave and I questioned the welders as to what brought on the change. They said they were instructed by the Assistant Construction Engineer (welding) to utilize the weave, because we were getting bad shots on our root passes due to slag entrapment. Going to the wider weave or going to a weave was more suitable for our x-ray purposes as far as reducing our rejects was concerned. After that I measured the weave and discovered that they were in excess of 5/8ths of an inch.
- Q. Do you recall how much in excess?
- A. Approximately 3/4 to 7/8 inch throughout the weld. And, I in turn, requested the Welding Engineering and Assistant Construction Engineer (welding) to come to the containment jig, and they came down. Again, I put the scale there and said this exceeds 5/8ths of an inch and they each looked at it and said well, 3/4s looks more like 5/8ths to me. So I continued to tell them it is still out of procedure. What am I to do, I can't accept it? And they said, "Well, its like this, it looks more like 5/8ths than it does 3/4ths so, if anyone's got any questions pertaining to this, have them contact me (welding engineer)". And when the time came that someone did come around and perform an inspection over my inspection, I told him that the welding engineer was responsible. I had not signed off the final inspections on these welds because, to me, the stringers were in excess of 5/8ths inch.

*Edited by Regional Investigator to enhance readability (e.g., deletion of pauses, ahs, etc.) with no substantial impact on meaning.

Q. About how long after the meeting with the welding engineer did the NRC inspector show up to do the inspection? Are you talking in terms of days, or weeks, or hours?

A. It was about a month.

Q. So you're talking, really, in early November that you had the meeting with the welding engineer?

A. I would have to check my records for an exact date...I know it was close to November and December.

(General discussion of date of meeting deleted-- to later attempt to identify date from his records.)

Q. Did you indicate to the welding engineer that you interpreted that weld to be outside of specification?

A. Yes, I did.

Q. Did he acknowledge that it was outside of specification or that he interpreted it as still meeting the specification?

A. He interpreted it as being close to 5/8ths of an inch.

Q. Did he indicate that there was a contemplated change to procedure or that he was going to change the procedure to allow a wider weld?

A. He indicated to me that this has been a problem in the past. He said that they had time and time again tried to change this procedure from Knoxville and he had no luck in it--getting that procedure changed. And he said that he was again going to try to push to get this procedure changed.

Q. The Welding Engineer stated that he did make indications to make full use of the available 5/8ths?

A. Correct.

Q. Did you three then go off for a separate meeting?

A. We thought we had everything ironed out there except I was still in question as to what am I to do? And, there again, they said if anyone has got any questions to have them come and see me (welding engineer) and also they told me you inspect this in stages: you've got your fit up, and your root PT's (root pass, penetrant dye examination), and your final visual or your MT's (magnetic particle examinations) which everyone you got on your cards. In between welding, in between these hold points, you've got a surveillance type inspection to perform. Its a documented inspection so; therefore, we'll stringer the caps. They way I interpreted their insinuation is that I was not to see the exceeding of 5/8ths of an inch weave but when it came time for my final visual of the weld that I could see that the weld had been stringered in less than 5/8ths of an inch weave. That's just the way I took it.

(Name Deleted) added a brief additional statement that during the meeting the welding engineer made it clear and provided adequate information regarding interpretation of the code that the 5/8ths inch weave was permitted by the code.

In additional conversation, (Name Deleted) provided his description of the basic problem leading to the above "difference of interpretation" as stemming from the minimum training and experience levels of Phipps Bend QC inspection staff and their total dependence on printed guidelines (specifications, procedures, etc.).

In conclusion, (Name Deleted) stated he had full confidence in the capability of his supervisors and the adequacy of the overall quality control program which he would categorize as extremely strict in their efforts to insure compliance with existing requirements. He indicated he viewed the efforts of his fellow QC inspectors as being effective with strict application of the provided acceptance criteria.

Investigation: _____
Location: Phipps Bend Nuclear Plant

February 20, 1980

I (name deleted) make the following statement freely and voluntarily to Mr. R. J. Marsh who has identified himself to me as an Investigator, U. S. Nuclear Regulatory Commission. Mr. Marsh has informed me of the authority under which this investigation is being conducted, its scope, and of the fact that I do not have to make a statement if I do not want to. I recognize that my statement is part of an official investigation by the U. S. Nuclear Regulatory Commission and, as such, may later be used in a judicial proceeding.

On approximately the latter part of November or the first part of December, 1979, verbal instructions were given by me to the Quality Control-Welding personnel and the related craft welders and supervision personnel to utilize weave bead widths in gas metal arc flux core welding processes to the maximum extent allowed by the Tennessee Valley Authority, General Welding Process Specification, G-29M.

I have read the above statement consisting of 1 page and have initialed all corrections. This statement is true and correct to the best of my knowledge and belief and has been made freely with no threats or promises of reward having been made to me.

Signed _____ (Signed)
Welding Engineer

Date _____

Witnessed: _____ (Name Deleted)

ATTACHMENT B

Date: February 20, 1980

I (name deleted) make the following statement freely and voluntarily to Mr. R. J. Marsh who has identified himself to me as an Investigator, U. S. Nuclear Regulatory Commission (NRC). Mr. Marsh has informed me of the authority under which this investigation is being conducted, its scope, and of the fact that I do not have to make a statement if I do not want to. I recognize that my statement is part of an official investigation by the U. S. NRC and, as such, may later be used in a judicial proceeding.

On February 20, 1980, at 9:30 a.m., I made the following statement to NRC concerning that allegation that I had been instructed by QC Welding to exceed the 5/8" maximum weave width with the flux core mig welding process on ring number two containment vessel welds.

Prior to start-up of welding operations on ring two, unit one containment plates (name deleted) advised me that to minimize weld defects and clean-up time we should take full advantage of the 5/8" permissible weave width. He did not tell me then or at any other time to intentionally exceed the weave width permitted by the procedure. I personally know of no instances where others were told by (name deleted) to exceed permitted weave widths.

I have read the above statement consisting of one page and have initialed all corrections. This statement is true and correct to the best of my knowledge and belief and has been made freely with no threats or promises or reward having been made to me.

(Signed)

Assistant Construction Engineer

Date

Witnessed: _____