A-77
12/1/83

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
DUKE POWER COMPANY, et al.	)	Docket Nos. 50-413
	)	50-414
(Catawba Nuclear Station, Units 1 and 2)	)	

TESTIMONY OF RICHARD W. IRBY

Q. STATE YOUR NAME AND YOUR WORK ADDRESS.

A. Richard W. Irby, Catawba Nuclear Project, P.O. Box 223, Clover, SC 29710.

Q. WHAT IS YOUR PRESENT JOB WITH DUKE POWER COMPANY?

A. I am a welding inspector - visual, MT, PT for Unit 1.

Q. SUMMARIZE YOUR EXPERIENCE AND QUALIFICATIONS, INCLUDING OTHER NON-DUKE JOBS, EDUCATION, CERTIFICATIONS, AND COMPANY SPONSORED COURSES AND TRAINING.

A. U. S. Navy retired after 20 years of service primarily in the area of welding related activities. I have been working for Duke since May 1977. I have been a welding inspector at Catawba since May 1978. I have a high school diploma, and an Associate Degree in Industrial Management from York Tech in Rock Hill, South Carolina.

Q. WHAT OTHER JOB POSITIONS HAVE YOU HELD WITH DUKE POWER COMPANY?

A. Welder.

Q. ARE YOU FAMILIAR WITH WHAT IS COMMONLY REFERRED TO AS THE WELDING INSPECTOR CONCERNS WHICH WERE EXPRESSED IN LATE 1981/EARLY 1982?

A. Yes.

Q. WHAT IS YOUR UNDERSTANDING OF WHAT THESE CONCERNS WERE?

A. Written concerns by welding inspectors of technical and administrative short comings in the QA Program (Catawba Project).

Q. DID YOU EXPRESS ANY CONCERNS AS A WELDING INSPECTOR TO ANY OF THE TASK FORCES OR TO DUKE POWER MANAGEMENT?

A. Yes.

Q. TO WHOM DID YOU EXPRESS YOUR CONCERNS?

A. Task Force I, Technical Task Force, and Gail Addis.

Q. WERE YOUR CONCERNS WRITTEN?

A. Yes.

Q. DESCRIBE EACH DOCUMENT WHICH CONTAINS YOUR EXPRESSION OF CONCERNS, AND INDICATE WHO IT WAS SUBMITTED TO.

A. My concerns were set forth in three document packages which contained questions and concerns related to resolution of the following three NCIs:

(1) Technical concern on resolution to NCI 13165 submitted through QA Technical Recourse.

(2) NCI 9092 (defects of Unit 2 dome plate) submitted through Bob Morgan and presented to the Task Force.

(3) NCI 12549 (defect in piping, Unit 1) submitted through Bob Morgan and presented to Task Force.

Q. DID YOU FEEL FREE TO EXPRESS ALL OF YOUR CONCERNS?

A. Yes.

Q. DID YOU EXPRESS ALL OF YOUR CONCERNS?

A. Yes.

Q. HAVE YOU DISCUSSED YOUR CONCERNS WITH ANYONE ELSE?

A. Yes, with my supervisor, Beau Ross. My concerns were turned in through the chain of command in the department.

Q. HAS ANYONE ELSE CONTACTED YOU AND ASKED YOU TO DISCUSS YOUR CONCERNS?

A. Jan Liegnette, "60 Min." staff at home, by phone early July, 1983.

Q. DOES THE DOCUMENTS ATTACHED TO YOUR TESTIMONY AS ATTACHMENT A, B AND C REFLECT ALL OF YOUR CONCERNS?

A. Yes.

Q. ARE ALL OF YOUR CONCERNS INCLUDED IN THESE DOCUMENTS?

A. Yes.

Q. PLEASE SUMMARIZE AND EXPLAIN WHAT YOU WERE TRYING TO COMMUNICATE BY YOUR CONCERNS.

A. I was trying to get specific items corrected that in my judgment was wrong by procedure or by technical nature. Important to me was the inefficient processing of nonconforming items relating to lack of support in the program. Decisions made were some time not conducive to the program and yielded to the needs of an overpowering construction element.

Q. WERE YOUR CONCERNS INVESTIGATED BY THE TASK FORCES?

A. Yes.

Q. DID YOU ATTEND ANY MEETINGS WITH TASK FORCE AND/OR QA MANAGEMENT MEMBERS WHERE THE TASK FORCE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS WERE DISCUSSED?

A. Yes. One such meeting was a final meeting with Larry Coggins, David Whitaker over technical concern (resolution) of NCI 13165. I have attended other meetings but don't remember the details.

Q. WERE THERE ANY CHANGES MADE IN THE QA PROGRAM AFTER THE WELDING INSPECTOR CONCERNS AND THE TASK FORCE INVESTIGATION OF THESE CONCERNS?

A. Yes.

Q. DESCRIBE THE CHANGES OF WHICH YOU ARE AWARE IN THE QA PROGRAM.

A. There were some changes in procedures and activities which resulted in some improvements in the QA program.

Q. TO WHAT EXTENT HAVE THESE CHANGES ADDRESSED ISSUES RAISED BY THE WELDING INSPECTOR CONCERNS? TO WHAT EXTENT HAVE THESE CHANGES ADDRESSED YOUR PARTICULAR CONCERNS?

A. In that I am unaware of all the concerns expressed by other inspectors, I do not know how these changes affected their concerns. With respect to my concerns, the task force addressed and resolved each concern.

Q. THE WELDING INSPECTOR CONCERNS HAVE BEEN CHARACTERIZED AS CONCERNS ABOUT THE QUALITY AND SAFETY OF CONSTRUCTION AT CATAWBA. DO YOU AGREE OR DISAGREE WITH THAT CHARACTERIZATION?

A. Disagree, I think the topic of concerns has been strongly or over characterized. Generally speaking, over a period of time quality has been sacrificed to some degree but not to the point of quality/safety dangers.

Q. DID THE EXPRESSION OF YOUR CONCERNS INDICATE YOUR BELIEF THAT THERE WAS A BREAKDOWN IN THE QA PROGRAM OR INDICATE THAT THE QA PROGRAM WAS NO LONGER WORKING?

A. There was no breakdown in the QA program so as to affect safety. However, there was a breakdown as it affected the manner in which technical matters and NCI resolutions were handled.

Q. DID YOUR CONCERNS REFLECT A BELIEF ON YOUR PART THAT THE CATAWBA PROJECT IS NOT BEING CONSTRUCTED SAFELY?

A. No.

Q. IN YOUR VIEW, HAS THE QA PROGRAM BEEN EFFECTIVE WHILE YOU HAVE WORKED AS AN INSPECTOR AT CATAWBA?

A. Effective, with exceptions which have been listed through different individuals.

Q. ARE YOU AWARE OF ANY DEFICIENCIES IN CONSTRUCTION IN THE QA PROGRAM WHICH WOULD CAUSE YOU TO QUESTION WHETHER CATAWBA IS SAFELY BUILT?

A. No.

Q. IS THERE ANYTHING ELSE YOU WOULD LIKE TO ADD TO YOUR TESTIMONY?

A. Yes. I feel that my concerns, each in a unique way, touch a broad level of expertise and management (ranging from Catawba through the Charlotte office). The handling and solutions to my concerns

(prior to the task force review) clearly characterize (not a breakdown) but a lack of concern for practical, efficient working solutions.

I hereby certify that I have read and understand this document, and believe it to be my true, accurate and complete testimony.

Richard W. Irby

Sworn to and subscribed before me
this 22nd day of September, 1983.

Notary Public

Commission Expires March 7, 1993

Attachment A

UNIT ☑1, ☐2, ☐3

NONCONFORMING ITEM REPORT

USE BLACK BALL POINT PEN ONLY

JAN 04 1981 OCT 16 1981 OCT 2[illegible]

CONSTRUCTION RECV'D DATE

CW

PROBLEM STATEMENT

QA Required: ☒ Yes ☐ No

Condition: 1

Code: B

Identification Method: ☐ CHECS 2 ☐ Other ☐ Not Practical ☐ N C I Tape

Location of Item: Pipe chase 187° - 555

Serial No. 13165

Description of Item and Statement of Problem: During random inspection of weld # INV 193-30 an air hose was discovered taped in the end of the section being welded (approximately 24") providing a rapid cooling process of the welded joint. This process was being done without approved process control & controlled methods. Items in question are the rate of cooling, the moisture & oil content of the air & the cleanliness conditions of the assembly. (See attached DIA for additional note [illegible])

Evaluation/Disposition Responsibility: ☒ Const ☐ Design ☐ QA ☐ Steam ☐ Group CW

Originated: [signature] Date: 10-[illegible]-81 | Technical Review: R. B[illegible] Date: 10-15-81 | QA Review: J C [signature] Date: 10-15-8[illegible]

EVALUATION

Potentially Reportable Under 10CFR21/50.55e ☐ Yes ☒ No If yes, use Form 290.1

(1) Disposition/Justification: 2 PART RESOLUTION – IT IS WELDING TECH. SUPPORT'S OPINION THAT THIS IS AN ACCEPTABLE TECHNIQUE WHEN USED ON STAINLESS STEEL JOINTS SUCH AS THE ONE IN QUESTION. THE AIR FLOW THROUGH THE PIPE HAS NO DETRIMENTAL EFFECT ON THE WELD JOINT. NO SPECIAL PROCESS CONTROL IS NECESSARY FOR THE USE OF THIS TECHNIQUE AS IT VIOLATES NO CODE OR PROCEDURE. CONSTRUCTION ENGINEER SYSTEMS SHALL EVALUATE THIS TECHNIQUE FOR INTERNAL CLEANLINESS PROBLEMS AND FOR REPORTABILITY.

(2) (SEE SHEET 2 OF 2 ATTACHED)

Spec/Calc./Dwg Revised As Below

PR-202 Applicable (Design Only) ☐ Yes ☐ No

By: (1) B.E. [signature] Date: 11-10-81 | Technical Approval: (1) T.H. Robertson Date: 11/10/81 | QA Approval: H L Aitken Date: 1/4/82

CORRECTION ACTION

CORRECTIVE ACTION/INSPECTION REQUIRED	Assigned To	Performed By	Date
~~(SEE SHEET 2 OF 2 ATTACHED)~~			
(1) INSTRUCT POWERHOUSE MECHANICS NOT TO USE RAW CONSTRUCTION AIR TO BLOW OUT LINES OR VALVES WHICH HAVE BEEN CLEANED; FILTERED AIR OR INSTRUMENT AIR MAY BE USED.	PHST.		
(CONTINUED ON SH. 2 OF 2 ATTACHED [illegible] 12-5-81)			

By: Glenn Cornwell Date: 12-15-81 | QA Approval: H L Aitken Date: 1/4/82

Action/Inspection Exceptions or Remarks

Distribution	GEN. SUPT	Sr. Const Engr	Con. Eng Weld	Con. Eng	Project QA Engr	QC Supv Weld	QA Engi Mech	WHSE SUPV	DESIGN	QA Div	ANI	NRC		
Number Of Copies — Initial	2													
Number Of Copies — Final	1		1	1		(1)	1				1	1		1

Trend Info.

Final QA Review ____ Date ____

UNIT ☐ 1, ☐ 2, ☐ 3

NONCONFORMING ITEM REPORT

USE BLACK BALL POINT PEN ONLY

Safety Related: ☐ Yes ☐ No
Condition:

CAM

Identification Method: ☐ Q-IBTS ☐ NCI Tape ☐ Other ☐ Not Practical

Location of Item:

Serial No. 13,165

PROBLEM STATEMENT

Description of Item and Statement of Problem: Two air bars containing oil contaminants were observed exiting the pipe assembly at this time.
K.W. Orth
10-27-81

EVALUATION

Evaluation/Disposition Responsibility ☐ Const ☐ Design ☐ QA ☐ Steam ☐ Group

Originated	NCR Date	Technical Review	Date	QA Review	Date
K.W. Orth	10-27-81	C.R. Baldwin	10-27-81	QC Nusshie	10-27-81

Potentially Reportable Under 10CFR21/50.55e ☐ Yes ☒ No If yes, use Form 290.1

Disposition/Justification: UNACCEPTABLE. OIL CONTAMINANT IN STAINLESS PIPING (IN PARTICULAR, DEMIN. WATER SYSTEMS) IS A VIOLATION OF CNS-1206.00-QP-1007, APPENDIX N, PIPING INTERNAL CLEANLINESS CRITERIA. THIS CRITERIA IS INTENDED FOR PIPING AFTER SYSTEM CLEANING AND APPLIES TO ANY WORK PERFORMED ON A CLEAN SYSTEM. IN ADDITION, INTRODUCTION OF OIL CONTAMINANTS INTO ANY ERECTED PIPING IS A VIOLATION OF M-34. ALTHOUGH THERE APPEAR TO BE NO QA OR CODE REQUIREMENTS AGAINST THIS WELDING TECHNIQUE, FOR THE ABOVE REASONS RAW CONSTRUCTION AIR SHOULD NOT BE USED. EITHER FILTERED CONSTRUCTION AIR OR INSTRUMENT AIR MAY BE USED. WITH REGARD TO THE GENERIC ASPECTS OF THIS PROBLEM, SAMPLES TAKEN DURING SYSTEMS FLUSHES REVEAL WHEN CONTAMINANTS ARE PRESENT. FINAL FLUSH SAMPLE REANALYSIS DOCUMENT THAT CONTAMINANTS ARE REMOVED. THIS ELIMINATES CONCERN THAT CONTAMINANTS INTRODUCED INTO PIPING AS A RESULT OF THIS TECHNIQUE MIGHT REMAIN IN PIPING.

Spec/Calc./Dwg Revised As Below

By	Date	Technical Approver	Date	QA Approval	Date
Glenn Connell	11-17-81	[signature]	11/23/81	HL Hillis	1/4/82

PR-202 Applicable (Design Only) ☐ Yes ☐ No

CORRECTION ACTION

CORRECTIVE ACTION/INSPECTION REQUIRED

	Assigned To	Performed By	Date
INSTRUCT WELDERS NOT TO USE RAW CONSTRUCTION AIR FOR THIS TECHNIQUE; STRESS IMPORTANCE OF USING EITHER INSTRUMENT OR FILTERED CONSTRUCTION AIR	PRMR		
REMOVE Q-IB TAG Rem 12/4/81	SVTW		
Attach a copy of this NCI to the process control. THR 12/4/81	CEWL		

By	Date	QA Approval	Date
Glenn Connell	12-15-81	CHO HL Hillis	1/4/82

Action/Inspection Exceptions or Remarks

Distribution	GEN. SUPT	Sr. Const Engr	Con. Eng	Con. Eng	Project QA Engr	QC Supv	QA Eng	WHSE SUPV	DESIGN QA Div	ANI	NRC		
Number Of Copies: Initial													
Number Of Copies: Final													

Trend Info.

Final QA Review Date

Additional Resolution to NCI # 13,165

The introduction of air to the internal weld surface solution anneals the weld joint. This actually provides a higher quality weld. This is due to the fact that the weld material spends less time in the 800 - 1600 °F range, thus decreasing the amount of sensitization that occurs. As the cooling mechanism was used after deposition of the initial deposition of the initial fill passes, the root had solidified; thus moisture in the air would evaporate and not contaminate the root as it was not in a molten state. Per conversation with Construction Services a statement in will be added in the current revision to L-200, L-300, and L-500. It will state that filtered construction air or instrument air may be used to accelerate cooling when properly authorized.

The weld in question is acceptable and shall remain as is. A copy of this NCI shall be attached to the process control.

[signature] 12/4/81
T.H. Robertson 12/4/81
[signature] 1/4/82

Attachment A

January 11, 1982

J R Wells
L R Davison

Re: Catawba 1-2
Management Procedure 8030-0003
Resolution of Technical Matters

We have an inspector R.W. Irby who has a technical concern on resolution to nonconforming item Serial Number 13165. This nonconformance was evaluated technically by the Catawba Project Technical Support welding group and approved by the QA Technical Group January 4, 1982.

Attached are Mr. Irby's concerns and a copy of Q-1A 13165.

R A Morgan
Project QA Engineer

Atttachments

Reasons that I feel the weld in question is rejectable and should be replaced.

Unknown Factors such as - temperature ranges during time of welding and at time of air injection?

Rate of Cooling?

The possible inducement of oil and moisture into the weld joint?

Up setting of the chemical balance of weld deposit and parent metal?

This nonconformance should be addressed entirely from a metallurgy view point and not as a cleanliness problem.

The additional resolution made note of the time factor of the weld deposit and surrounding metal in the critical temperature range (800 - 1600 degrees). This factor is true in respect to sensitization of the metal however accelerated cooling is not an approved method to correct this.
Correct application of the FWDS and following process specification will eliminate the problem of too much time in the critical temperature range. In regard to annealing of the weld joint, this process implies a slow rate of cooling and not an accelerated rate of cooling.

This question may not be technical, but <u>why</u> did the welder apply this method and <u>why</u> do current changes in the process specification (1-4-82) approve of this method that took place on (9-26-81).

R W Irby
Welding Inspector

Attachment A

DUKE POWER COMPANY
ELECTRIC CENTER, P.O. BOX 33189, CHARLOTTE, N.C. 28242

GEORGE W. GRIER
CORPORATE QUALITY ASSURANCE MANAGER

TELEPHONE
(704) 373-4022

February 19, 1982

R W Irby

Re: Catawba 1-2
Resolution of Technical Matters
Your concern dated January 11, 1982

The resolution of the referenced technical concerns from a metallurgical viewpoint is answered in the attached memo to file and will be explained further to you by D E Whitaker, S H Van Malssen, and L M Coggins. The conclusion is that the weld quality is not jeopardized.

As you also know, there was a question as to whether the practice employed was actually quenching, which led to different conclusions regarding whether or not procedures were violated. My feeling is that there was no intent by people resolving the NCI to approve action in violation of the procedure. It is apparent that a better solution would be arrived at by recognizing that the action was not authorized beforehand in the proper manner and, separately, the individuals concerned will be instructed in future resolutions of this type.

G W Grier
Corporate QA Manager

GWG/ph

MEMO TO FILE

SUBJECT: Response to R. W. Irby's request for a "Resolution of Technical Matters Involving Differences of Opinion" Involving NCI Serial No. 13165
File No. K-1

The "Description of Item and Statement of Problem" from NCI Serial No. 13165" reads as follows:

> "During random inspection of Weld No. INV 193-30, an air hose was discovered taped in the end of the section being joined (approximately 24") providing a rapid cooling process of the welded joint. This process was applied without approved process control and controlled methods. Items in question are the rate of cooling, the moisture and oil content of the air, and the cleanliness. condition of the assembly (see attached QA for additional note) (RWI 10-27)."

Mr. Irby also expressed his concerns in a memo dated January 18, 1982 and in an attachment to a memo from R. A. Morgan to J. R. Wells and L. R. Davison dated January 11, 1982. The concerns are as follows:

> January 18, 1982: "My concerns involve specific technical matters and the efficient processing of non-conforming items, relating to lack of support in the program. I would like to point out short comings in decision making and proper research (to specific NCI resolution) that is not conducive to the program and not restricted to Catawba alone."
>
> January 11, 1982:
>
> - "Reason that I feel the weld in question is rejectable and should be replaced.
> - Unknown factors such as temperature ranges during time of welding and at time of air injection?
> - Rate of cooling?
> - Up setting of the chemical balance of weld deposit and parent metal?
> - This non-conformance should be addressed entirely from a metallurgy viewpoint and not a cleanliness problem.

- The additional resolution (signed by D. W. Llewellyn, T. H. Robertson, H. L. Atkins) made note of the time factor of the weld deposite and surrounding metal in the critical temperature range (800-1600 degrees). This factor is true in respect to sensitization of the metal; however, accelerated cooling is not an approved method to correct this. Correct application of the FWDS and following process specification will eliminate the problem of too much time in the critical temperature range. In regard to annealing of the weld joint, this process implies a slow rate of cooling and not an accelerated rate of cooling.

- This question may not be technical, but why did the welder apply this method and why do current changes in the process specification (January 4, 1982) approve of this method that took place on September 26, 1981."

This response will cover the technical questions concerning the weld rather than those concerning how the NCI was handled. Also, it is assumed that the concern for cleanliness of the system has been answered satisfactorily.

The rate of cooling of welds can effect material properties by determining temperature gradients, metallurgical structure, and amount of hydrogen retained in the weld. Temperature gradients or change of temperature across a thickness of material coupled with lower yield strength at high temperatures and thermal expansion result in the residual stress. Generally speaking, the higher the thermal gradient the higher the residual stress. For example, residual stresses close to welds where the thermal gradient is the highest are generally considered to be at or close to the yield point. In the postweld heat treatment to relieve stresses, there are rules governing the width to be covered by the blankets and the rate of cooling so that new residual stresses will not be introduced. The Procedure Qualification's Materials tests are used to prove the amount of residual stress induced is not detrimental; with heat input, preheat, interpass temperature and material thickness being the parameters controlling cooling rate. In order to determine whether accelerated cooling of the interior of the pipe affected the integrity of the weld in question, three facts should be taken into account.

First, the weld (a socket weld) was on the opposite wall of the pipe (0.343" thick) from the circulating air. Second, 304 stainless steel is a ductile material with an elongation of 55 percent in the annealed condition. Third, circulating air is not a severe quench as shown in Table 1. A faster cooling rate than circulating air could be produced by an increase in the thickness of the pipe. Thickness is not a limiting factor for fillet welds on P8 material.

	Air	Oil	Water	Brine
No circulation of fluid or agitation of piece	0.02	0.25 to 0.30	0.9 to 1.0	2
Mild circulation (or agitation)		0.30 to 0.35	1.0 to 1.1	2 to 22
Moderate circulation		0.35 to 0.40	1.2 to 1.3	. . .
Good circulation		0.4 to 0.5	1.4 to 1.5	. . .
Strong circulation	0.05	0.5 to 0.8	1.6 to 2.0	. . .
Violent circulation		0.8 to 1.1	4	5

Table 1. Severity of Quench (H) for Various Quenching Media (Grossmann & Bain)

For these reasons, I do not think the properties of the weld were effected due to an increase in residual stress.

The metallurgical structure can also be affected by the cooling rate. The most notable example of this occurs in carbon and low alloy steel where the cooling rate at the time of transition between a Face Center Cubic Structure to that of a Body Center Structure determines whether perlite, bainite or martensite is formed. Type 304 stainless steel is an austenitic material and does not undergo this transformation and is therefore not hardenable by heat treatment. The metallurgical structure of this material is affected by cooling rate due to the formation of chromium carbides between the temperature range of 550°C and 850°C. The formation of carbides is rate dependent allowing sensitization to be avoided by cooling at a fast rate between these temperatures. It should be noted that too fast a cooling rate at high temperature in stabilized stainless steel (Type 321 and 347) can lead to a problem known as knife line attack. I would therefore conclude that the effect of increasing the cooling rate on sensitization would be beneficial.

Quenching metal after welding can increase the probability of hydrogen cracking in carbon and low alloy steel by slowing down the diffusion rate of hydrogen and by adding to the residual stress. This is not a problem with 304 stainless steel which is an austenitic material and not susceptible to hydrogen cracking.

In welding stainless steel joint cleanliness is extremely important. Small amounts of impurities can cause hot cracking or sensitization of the weld metal. Hot cracking is caused by the presence of small amounts of low melting point constituents to the weld metal such as lead or sulfur. Sensitization would be caused by the addition of carbon. Both carbon and sulfur are present in oil but in the case in question the air was not used until after the first pass which sealed the pipe. Another possibility which was looked into was the diffusion of carbon from oil on the inside of the pipe. The idea was discounted or considered superficial due to the short period experienced by the I.D. of the pipe at temperatures which carburizing would take place. Figure 1 and Figure 2 show the relation between time, temperature, percent carbon, and distance below the surface for 1020 during liquid carburizing and 3115 steel during pack carburizing respectively.

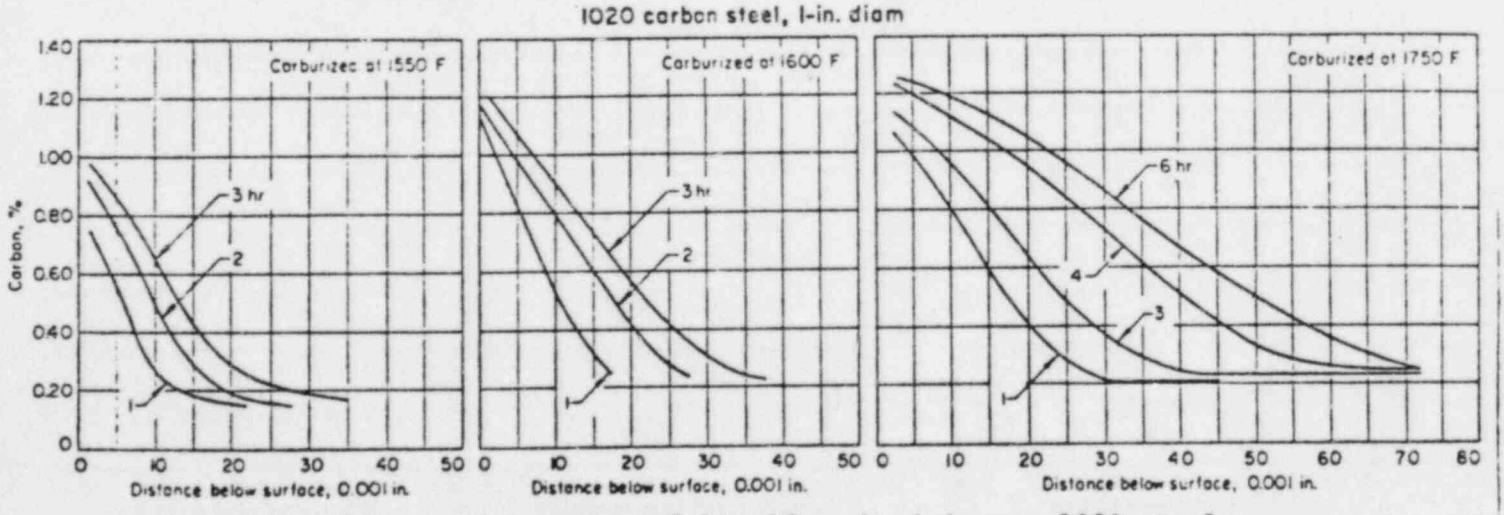

Figure 1. Effect of duration of liquid carburizing on 1020 steel (ASM Handbook, 8th Edition, Vol. 2)

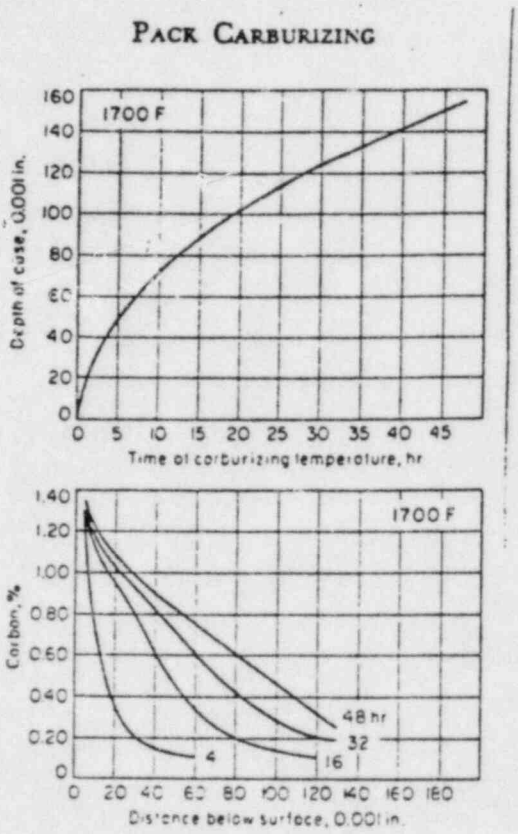

Figure 2 Effect of duration of pack carburizing on 3115 steel (ASM Handbook, 8th Edition, Vol. 2)

Stating that the weld is technically sound does not mean that Mr. Irby's concerns were not legitimate. I especially agree with his point of view that the FWDS is the vehicle for insuring that sensitization does not occur. Also, I would like to point out that although quenching was not a problem with 304 stainless steel, it could very well be for carbon and low alloy steel. The cooling rate is one of the determining factors for whether preheat or postweld heat treatment is needed for different thickness.

David E. Whitaker

David E. Whitaker
Assistant Engineer

G.O. 373-7602

VERIFICATION - INDIVIDUAL CONCERN

FILE NO. K-1

I concur with the conclusions made by D.E. Whitaker. The following additional points should be made:

1. There was some question as to whether the method being used by the welder was actually "quenching." The use of forced air is quenching; and, therefore, the welder was in violation of the process specification at the time he used the method.

2. Further support that quenching of stainless steel weldments is acceptable is provided by the fact that this method is frequently used to change the nature of residual stresses in pipe welds. In heat sink welding, the root pass is made and then the pipe is filled with water or a jet of water is sprayed on the root ID during subsequent welding in order to change the stresses from tensile to compressive on the root ID, which eliminates the possibility of stress corrosion cracking.

SIGN-OFF

VERIFICATION

PERFORMED BY: [signature]

DATE: 2-15-82

Attachment A

QA/QC INQUIRY RECORD COPY

SERIAL # 46

STATEMENT OF PROBLEM OR INQUIRY:

During random inspection of weld # IWV 193-30 an air leak was discovered taped in the end of the section being joined (approximately 24") providing a rapid cooling process of the weld joint.

By telephone conversation with Rob Atkins (QA tech.) (Charlie Ferrell + Billie Smith) at 8:05 AM verbal approval was given to complete the weld for Q.C. inspector to sign final visual per L-80.

R. Riley QC welding 9-26-8
INSPECTOR/TECHNICIAN DATE

EVALUATION:

BLOWING AIR THROUGH the I.D. OF A STAINLESS STEEL SOCKETWELD JOINT DURING THE WELDING PROCESS does NOT VIOLATE the 200 PROCESS.

"QUENCHING" AS DESCRIBED & RESTRICTED by the 200 PROCESS REFERS to ~~the~~ ACCELERATED COOLING USING A LIQUID COOLING METHOD.

The INCIDENT DESCRIBED ABOVE IS ACCEPTABLE AS IS

When ENCOUNTERING A SIMILAR SITUATION the INSPECTOR should ASSURE that M-24 cleanliness REQ'TS ARE NOT VIOLATED.

H C Atkins 9/3/81
QA TECH GROUP DATE

Attachment A

RECORD COPY (3)

DUKE POWER COMPANY
STATION/PROJECT CATAWBA
UNIT ☑ 1, ☐ 2, ☐ 3
NONCONFORMING ITEM REPORT
USE BLACK BALL POINT PEN ONLY

Drawing No.: 1-A / 1-4

QA Required: ☑ Yes ☐ No — Class: A

Identification Method: ☐ N C I Tag

Location of Item: RB 1 Elev 30° - 564

Serial No. 12549

PROBLEM STATEMENT

Description of Item and Statement of Problem: When called for closeout inspection on weld # 1NC 56-7 it was observed that weld # 1NC56-8 (not made visible by cut out) shows excessive penetration + concave in the root pass.

Evaluation/Disposition Responsibility ☐ Const ☐ Design ☑ QA ☐ Steam ☐ Group QT

Originator	Date	Technical Review	Date	QA Approval	Date
[signature] DEQ	8-24-81	C R B[signature]	8-25-81	[signature]	8-26-81

EVALUATION

Potentially Reportable Under 10CFR21/50.55e ☐ Yes ☒ No If yes, see Form 250.1

Disposition/Justification: This weld has been accepted by radiography and judged to meet the requirements of NB4424(e) for internal root weld conditions. In addition, the radiographs were reevaluated and judged acceptable by the Level III radiographer. Radiography is the Code specified examination method. Therefore, this weld meets Code requirements and shall remain. Future instances of weld interior surfaces becoming accessible when the weld has been examined and accepted by radiography are not required to be visually inspected.

(2) SEE ATTACHMENT #1

Spec/Calc/Dwg Revised As Below: N/A

PR-200 Applicable (Design Only) ☐ Yes ☐ No

By	Date	Technical Approval	Date	QA Approval	Date
[signature]	8/27/81	[signature]	8-27-81	[signature]	8/27/81

CORRECTIVE ACTION

CORRECTIVE ACTION/INSPECTION REQUIRED	Assigned To	Performed By	Date

By: Date: QA Approval: Date:

Action/Inspection Exceptions or Remarks:

Distribution												
Number Of Copies	Initial	2		1			1		1			1
	Final					1			1	1	1	

Trend Info.: Final QA Review: Date:

Amm Larry Cassins

RECORD COPY

Form ...

DUKE POWER COMPANY

STATION/PROJECT CATAWBA

UNIT ☒ 1, ☐ 2, ☐ 3

NONCONFORMING ITEM REPORT

USE BLACK BALL POINT PEN ONLY

CONSTRUCTION RECV'D DATE SEP 10 1981

CE-JW

No.: NA	Vendor/Location: NF	Document Violated: M-H F-9	
P.O. No.: NA	Mech/Elec. System: INC		
QA Required: ☒ Yes ☐ No; Condition: 1	Class: A	Identification Method: ☒ Q-IB'S 2; ☐ Other; ☐ Not Practical; ☐ N C I Tape	

Location of Item: RB 1 REB 80° - 564

Serial No. 12549

PROBLEM STATEMENT

Description of Item and Statement of Problem: when called for clean-up inspection on weld # INC 56-7 it was discovered that weld # INC 56-8 (id made visible by cut out) shows excessive penetration + sugar in the root pass.

Evaluation/Disposition Responsibility ☐ Const ☐ Design ☒ QA ☐ Steam ☐ Group QT

Originated	Date	Technical Review	Date	QA Review	Date
[signature] D.E.R.	8-24-81	C R B[illegible]	8-25-81	J C Shropshire	8-26-81

Potentially Reportable Under 10CFR21/50.55e ☐ Yes ☐ No If yes, use Form 290.1

EVALUATION

Disposition/Justification

Spec/Calc./Dwg Revised As Below

PR-202 Applicable (Design Only) ☐ Yes ☐ No

By	Date	Technical Approval	Date	QA Approval	Date

CORRECTION ACTION

CORRECTIVE ACTION/INSPECTION REQUIRED	Assigned To	Performed By	Date
REMOVE Q-IB TAG AND CONTINUE INSPECTION ON WELD INC 56-7	SUTW	D.E. Ross	8-31-81

By	Date	QA Approval	Date
B F S[illegible]	8-28-81	J C Shropshire	9-9-81 8-28-81

Action/Inspection Exceptions or Remarks

Distribution		GEN. SUPT	Sr. Const Engr	Con. Eng WK	Con. Eng	Project QA Engr	QC Supv Weld	QA Eng Mech	WHSE SUPV	DESIGN	QA Div TUC	ANI	NRC	[illegible]
Number Of Copies	Initial	2		1				1			1			1
	Final	2		1			1	1			1	1	1	1

Trend Info.

Final QA Review: [signature] Date: [illegible]

SIGNED BY MISTAKE [illegible] 9/2/81

Attachment 1
NCIR #12549
Page 1 of 1

(2)

The radiographs of this weld were reevaluated and the internal surface was also investigated visually. Based on the reevaluation, this weld is judged to be acceptable to the requirements of the Code.

(2) J.E. Canerdes 9/4/81 (2) W.W. Coggins 9/4/81 (2)

(2) W.D. [illegible] 9/4/81

Does an RT override a visual insp.

~~judgment call~~

- whether or not the weld in question was subject to oxidation was a judgment call — this should not be backed up by radiograph
- radiography is subject to human error and a number of factors can contribute to a defect being shown, see attachment 1.

+ argon or oxidation that has not completely boiled out will not show up on RT

+++ the absolute fact is that the defect is still in the pipe

other factors in this was need to be considered - ~~to~~ due to nature & significance of sys.

- possible stress risers.
- trap or pocket for radioactive accumulation causing hot spots.
- flow resistance
- possible corrosion action takes place.

++ the weld should be viewed on most practical basis — even with the overriding decision by the Level III radiography the NCI could have had a greater satisfaction by buffing or

grinding the internal surface of the pipe.

after all the joint in question was unreliable.

Attachment A

CONSTRUCTION NEED D[illegible] 11-23-[illegible]

(2)

25679 (11-80)

Form Q-1A	Revision 10

RECORD COPY

DUKE POWER COMPANY
CONSTRUCTION DEPARTMENT
PROJECT CATAWBA 1.
NONCONFORMING ITEM REPORT
USE BLACK BALL POINT PEN ONLY

2. Requisition No. NA	3. Vendor/Location NEWPORT NEWS ~~[illegible]~~ [illegible]	4. Documents Violated CNS 1144.09-1
5. MPS PO No. NA	6. Mech/Elec System NA	
7. QA Required ☒ Yes ☐ No Condition 1	8. Identification Method ☐ Q-18's ☐ NCI Tape ☐ Other ☒ Not Practical	

9. Location of Item RB 2 (DOME)

18. Serial Number 9092

10. Description of Item and Statement of Problem ROUTINE INSPECTIONS OF CONTAINMENT PLATE (DOME) RB 2 REVEAL A NUMBER OF PLATES TO BE PITTED AND HAVING A POOR SURFACE FINISH. IN GENERAL THE DEFECTS RANGE FROM SMALL SCATTERED PITS (WITH A DEPTH OF 5/32" x 3/8" IN DIA.) TO LARGE CONCENTRATIONS.

NOTE: DEFECTS ARE APPARENTLY MANUFACTURING DEFECTS.
WORK MAY CONTINUE DURING EVALUATION [illegible] 8/4/80

14. Evaluation/Disposition Responsibility ☐ Const. ☒ Design ☐ QA ☐ NSSS Div. Civil DC

11. Originated	Date	13. Senior Engr. Review	Date	15. QA Review	Date
[signature]	7-31-80	[signature]	7-31-80	[signature]	8-1-80

17. Disposition AS STATED BELOW

18. Report to Management ☐ Yes ☒ No

Evaluation/Justification

ALL PITS LESS THAN OR EQUAL TO 1/8 INCH IN DEPTH SHALL BE GROUND SMOOTH AND BLENDED INTO ADJACENT MATERIAL. PITS WITH A DEPTH GREATER THAN 1/8 INCH SHALL BE WELD REPAIRED ACCORDING TO ASME PROCEDURES. MT OR PT GROUND AREAS AND WELD REPAIR AREAS. FOR ADDITIONAL EVALUATION SEE ATTACHMENT (1).
(SEE ATTACHMENT (2) FOR EVALUATION OF VENDOR QA. [illegible] 7/13/81) - ALSO FOR SITE QA [illegible]

19. By	Date	20. Technical Approval	Date	21. QA Approval	Date
R.F. Vause	7-28-81	D.C. DeMark	8-24-81	[signature]	9/3/81

22. Action/Inspection Required	23. Assigned To	27. Performed By	Date
(1) INSPECTORS SHALL CHECK PLATES per CRITERIA OF ATTACH NO. 3 ~~OR 64~~ & MARK AREAS THAT REQUIRE WELD REPAIR.	SVTW		
(2) STEELWORKERS ARE TO GRIND DEFECTS AS NECESSARY.	STST.		
(3) WELDERS ARE TO BUILD UP AREAS ~~THAT~~ GREATER THAN ~~[illegible] MINIMUM WALL~~ 1/8" IN DEPTH (GRIND FLUSH)	WLST.		
(4) PERFORM MT OR PT ON WELDED AREAS	SVTW.		

CONSTRUCTION RECV'D DATE SEP 21 1981

INITIAL DISTRIBUTION RBAD

DEC 02 1981

FINAL DISTRIBUTION

[illegible] 12-1-81 SWW 12-18-81

25 179 (4-81)

Form Q-1A | Revision 12

DUKE POWER COMPANY
STATION/PROJECT CATAWBA
UNIT ☐ 1, ☒ 2, ☐ 3
NONCONFORMING ITEM REPORT
USE BLACK BALL POINT PEN ONLY

PROBLEM STATEMENT

Requisition No.	Vendor/Location	Documents Violated
N/A	Newport News	CNS 1144.09-1
MPS P.O. No	Mech/Elec System	
N/A	N/A	

QA Required: ☒ Yes ☐ No — Condition 1 — Class — Identification Method: ☐ Q-18 "S" ☐ NCI Tape ☐ Other ☒ Not Practical

Location of item: R.B. 2 (DOME) — Serial No.: 9092

Description of Item and Statement of Problem:

See Sheet 1 for description of problem

Evaluation/Disposition Responsibility: ☐ Const ☐ Design ☐ QA ☐ Steam ☐ Group

Originated	Date	Technical Review	Date	QA Review	Date

EVALUATION

Potentially Reportable Under 10CFR21.50.56e ☐ Yes ☒ No — If yes, use Form 290.1

Disposition/Justification: See Attachment (3) for additional clarification of the repair procedure for surface defects with a depth of less than or equal to 1/8".

Spec/Calc./Dwg Revised As Below:

PR-202 Applicable (Design Only) ☐ Yes ☒ No

By	Date	Technical Approval	Date	QA Approval	Date
Richard H. Benoit	11/4/81	D.E. DeMark	11/4/81	See final page for Approval	

CORRECTIVE ACTION

CORRECTIVE ACTION/INSPECTION REQUIRED	Assigned To	Performed By	Date

Attachment (1) to NCI 9092

Surface defects are judged not to be significant based on engineering judgement gained by prior experience in containment vessel and pressure vessel design.

Site QA and QA Vendor surveillance shall address and evaluate why defects were not discovered during shop inspection and receiving inspection.

...pairs to be done in accordance with Section III, Subsection NE, of the ASME Code.

D.E. DeHart 8-24-81 R.F. Vause/DED 8-24-81

Attachment (2) to NCI 9092

Response to Attachment (1) to NCI 9092

Vendors supplying safety-related materials or components have an approved QA Program. This program includes QC and inspection that we are confident is satisfactory. Duke Power QA performs surveillance on their program to maintain a good confidence level. The surveillance does not include 100% inspection of the material or component. Minor or extremely small irregularities can go unnoticed depending on inspection or NDE requirements. Shipping damages and normal oxidation are factors to consider in reviewing the containment plate.

J M Cintra 9-1-81

AB # W1-3 DESCRIBES THE REQUIRED RECEIVING INSPECTION FOR CONTAINMENT PLATE. THE INSTRUCTIONS state: "IF there is ANY damage or ANY QUESTION of damage... contact the Const. ENGINEER Welding." These INSTRUCTION seem adequate. It appears that these defects were missed due to the small nature of the indications. This does NOT appear to be a GENERIC or RECURRENT problem. No TRAINING or PROGRAM REVISIONS are REQUIRED.

H C Tucker 9/21/81
SITE QA

Attachment (3) to NCI 9092

This attachment provides additional guidance to the resolution of original NCI dated 7-28-81.

Surface defects have already been judged not to be significant based on engineering judgement (see attachment (1)). This attachment provides additional criteria for the surface preparation and inspection of pitting and surface roughness less than or equal to 1/8 inch in depth.

has been RHB 11/17/81 DED 11/17/81 TR 11/17/81

The containment dome plate ~~shall be~~ sand blasted to a "white metal surface" in accordance with Surface Preparation Procedure DPSP5-I. This process ~~will~~ has ~~remove~~ removed all surface foreign debris, scaling, rusting, etc. to sound metal. RHB 11/17/81 DED 11/17/81 TR 11/17/81

ASTM A20, paragraph 9.2.1.1, requires all imperfections to be removed to sound metal and to be well faired. Procedure MSS SP-55 shall be used as a guide to determine well faired conditions. Type II, Type VII and Type VIII photographs shall be used for representative acceptable surfaces.

All pits greater than 1/8 inch in depth shall be weld repaired in accordance with ASTM A20, paragraph 9.4.

By:

Richard H. Benoit 11/4/81 RHB 11/17/81

Technical Approval:

D.E. DeHart 11/4/81

QA Approval:

TC Roberts 11-7-81

Items of concern or question in regard to efficient handling in the support & resolution of NCI 9092

CP-64 are slivers & minor surface repair of coat/plate

To one concerned prior to NCI
- verbal instructions were to follow criteria of CP-64 which does not apply in full to this problem.
- const. tech. supp. welding (David Dodd) told me that if Duke Power representative in New Port News, Va. accepted the plates they were ok as far as he was concerned.

* Attachment 1. to NCI judged surface defects not to be significant — to my knowledge no one has ever visually inspected the plates be sides Kirk Rouse (1-12-82 representative from Charlotte office) 18 mos. from NCI initiation

Attachment 2. relates to engineering judgment based on prior experience and Duke Power QA surveillance of vendor supply. Minor or extremely small irregularities can go un-noticed and shipping damages & normal oxidation are factors to consider.

** Everyone writes something in response to NCI 9092 but does not address the ... [illegible]

attachment 3. once again, the surface defects have been judged not to be significant but only i. repair work prescribed?

- make decision to correct the defects but may be questionable.
- all defect removal to sound metal & will faired condition may be detrimental to plate as far as required thickness.
- procedure MSS SP55 was issued only after NCI was sent back for further evaluation.
- present surface condition of COPS plates exceed the acceptable criterion shown in photographs in SP55

Questions of Support

why did this issue have to be forced?

why an over extended time frame (16 mos) with a questionable resolution 7-31-80 — 12-2-81 ?

why so much correspondence & explanation & no one addresses the problem?

why did the proper initiative in Plant & solution not be put forth at the introduction of NCI 9192?

** why or how were all decisions made without one or in authority physically making an examination of the plate in question.

why MCI could not have been resolved
immediately or soon after introduction; during
the time of erection while many plates were
still on the ground?

Knowing these question cannot be answered, ~~but~~ what
I want to point out is the

pass it around
write something about it
and say it is ok

attitude

This needs to be checked