

Originator: CONVERTED DATA**Originator Phone:** 0**Originator Group:** CONVERTED DATA**Operability Required:** N**Supervisor Name:** CONVERTED DATA**Reportability Required:** N**Discovered Date:** 09/24/1996 00:00**Initiated Date:** 09/24/1996 00:00**Condition Description:**

HIGH NITRATE LEVELS EXIST IN THE TBCCW SYSTEM. HIGH NITRATE CONCENTRATIONS HAVE BEEN ASSOCIATED WITH STRESS CORROSION CRACKING OF CARBON STEEL PIPING.

Immediate Action Description:**Suggested Action Description:****EQUIPMENT:**Tag NameTag Suffix Name Component Code Process System Code

30B

REFERENCE ITEMS:Type CodeDescription

CONVERTED PR

PR.96.0396

Initiated Date: 9/24/1996 0:00**Owner Group :**CA&A Staff**Current Contact:** MCDONALD, G.**Current Significance:** D - ADMIN CLOSE**Closed by:** MCDONALD, G.

10/1/1996 0:00

Summary Description:

HIGH NITRATE LEVELS EXIST IN THE TBCCW SYSTEM. HIGH NITRATE CONCENTRATIONS HAVE BEEN ASSOCIATED WITH STRESS CORROSION CRACKING OF CARBON STEEL PIPING.

Remarks Description:

HIGH NITRATE TBCCW CHEMISTRY TRENDING DECREASING NITRITE INCREASING CONDUCTIVITY RBCCW
STRESS CORROSION CRACKING BACTERIA CORROSION INHIBITOR SODIUM NITRITE EXCESS OXYGEN
CARBON STEEL PIPING

Closure Description:

PAC REVIEW AFTER EVALUATION

EVALUATION AND CORRECTIVE ACTION COMPLETE

Entergy

ASSIGNMENTS

CR-PNP-1996-00396

Version: 1

Significance Code: D - ADMIN CLOSE

Classification Code: NON-SIGNIFICANT

Owner Group: CA&A Staff

Performed By: Shatas, Albert A

09/24/1996 00:00

Assignment Description:

SCREEN IAW NOP92A1

CA Number: 1

Group**Name**

Assigned By: CA&A Staff

SHATAS, A.

Assigned To: CA&A Staff

Shatas,Albert A

Subassigned To :

Originated By: SHATAS, A.

9/24/1996 00:00:00

Performed By: SHATAS, A.

9/24/1996 00:00:00

Subperformed By:

Approved By:

Closed By: SHATAS, A.

9/24/1996 00:00:00

Current Due Date: 10/01/1996

Initial Due Date: 10/01/1996

CA Type: GENERAL

Plant Constraint: NONE

CA Description:

SCREEN IAW NOP92A1

Response:

CONVERTED DATA

Subresponse :

Closure Comments:

PAC APPROVED NOP92A1 EXHIBIT 3

CA Number: 2

Group	Name
Tech Chemistry Staff	LOOMIS, L.
Tech Chemistry Staff	Loomis,Larry

Assigned By: Tech Chemistry Staff

Assigned To: Tech Chemistry Staff

Subassigned To :

Originated By: LOOMIS, L.

9/24/1996 00:00:00

Performed By: LOOMIS, L.

7/14/1997 00:00:00

Subperformed By:

Approved By:

Closed By: LOOMIS, L.

7/14/1997 00:00:00

Current Due Date: 08/30/1997

Initial Due Date: 08/30/1997

CA Type: GENERAL

Plant Constraint: NONE

CA Description:

CONDUCT AN EVALUATION TO DETERMINE THE CAUSE OF THE HIGH NITRATE LEVELS IN THE TBCCW SYSTEM. DETERMINE CORRECTIVE ACTIONS AND ACTIONS TO PRECLUDE RECURRENCE.

Response:

COMPLETE EVALUATION PER NOP92A1, SECTION 6.4.

PROBLEM DESCRIPTION: HIGH NITRATE LEVELS EXIST IN THE TBCCW SYSTEM WHICH HAVE BEEN ASSOCIATED WITH SCC IN CARBON STEEL PIPING.

DIRECT CAUSE: ONE LIKELY CAUSE COULD HAVE BEEN A SYSTEM LEAK WHICH INTRODUCES AIR WHICH CONVERTS NITRITE (THE CHEMICAL ADDITIVE) TO NITRATE. HOWEVER, THE TBCCW SYSTEM IS KNOWN TO BE A TIGHT SYSTEM WITH LITTLE LEAKAGE.

ANOTHER POSSIBLE CAUSE SEEN IN THE INDUSTRY IS THE CONVERSION OF NITRITE TO NITRATE DUE BACTERIA. THIS IS LIKELY CONSIDERING SYSTEM CONDITIONS SUCH AS TEMPERATURE AND FLOW.

REPEAT OCCURRENCE: NO

MAINTENANCE RULE: UNKNOWN

Subresponse :**Closure Comments:**

COMPLETE EVALUATION PER NOP92A1, SECTION 6.4.

PROBLEM DESCRIPTION: HIGH NITRATE LEVELS EXIST IN THE TBCCW SYSTEM WHICH HAVE BEEN ASSOCIATED WITH SCC IN CARBON STEEL PIPING.

DIRECT CAUSE: ONE LIKELY CAUSE COULD HAVE BEEN A SYSTEM LEAK WHICH INTRODUCES AIR WHICH CONVERTS NITRITE (THE CHEMICAL ADDITIVE) TO NITRATE. HOWEVER, THE TBCCW SYSTEM IS KNOWN TO BE A TIGHT SYSTEM WITH LITTLE LEAKAGE.

ANOTHER POSSIBLE CAUSE SEEN IN THE INDUSTRY IS THE CONVERSION OF NITRITE TO NITRATE DUE BACTERIA. THIS IS LIKELY CONSIDERING SYSTEM CONDITIONS SUCH AS TEMPERATURE AND FLOW.

REPEAT OCCURRENCE: NO

MAINTENANCE RULE: UNKNOWN

Entergy

CA DUE DATE EXTENSION

CR-PNP-1996-00396

Corrective Action : CR-PNP-1996-00396 CA-00002

Version: 3

Approved: ☒

Requested Duedate: 08/30/1997

Previous Duedate: 08/29/1997

Requested By: CONVERTED DATA

08/23/1997

Approved By: CONVERTED DATA

08/23/1997

Request Description:

CONVERTED DATA

Approved Description:

CONVERTED DATA

Entergy**CORRECTIVE ACTION****CR-PNP-1996-00396****CA Number:** 3**Group****Name****Assigned By:** Eng DE Mech Civil Struct Staff

WHITE, T.F.

Assigned To: Eng DE Mech Civil Struct Staff

Pace, Raymond M

Subassigned To :**Originated By:** WHITE, T.F.

9/24/1996 00:00:00

Performed By: PACE, R.

2/4/1997 00:00:00

Subperformed By:**Approved By:****Closed By:** WHITE, T.F.

2/4/1997 00:00:00

Current Due Date: 01/15/1997**Initial Due Date:** 01/15/1997**CA Type:** GENERAL**Plant Constraint:** NONE**CA Description:**

DETERMINE THE EFFECTS OF THE ELEVATED NITRATE LEVELS ON THE CARBON STEEL PIPING OF THE TBCCW SYSTEM.

Response:

MEMO DETAILING THE RESULTS THE EVALUATION AND THE REQUIRED CORRECTIVE ACTIONS.
CONCURRENCE MUST BE OBTAINED FROM ACTION ITEM OWNERS.

NOTE: CHEMISTRY HAS ALSO BEEN ASSIGNED AN ACTION TO DETERMINE THE CAUSE OF THE EXCESS NITRATE AND SHOULD BE ABLE TO PROVIDE ADDITIONAL INFORMATION TO ASSIST IN YOUR EVALUATION.

PROBLEM REPORT

PROBLEM REPORT No. 96.0396.02

1. Problem Description:

High Nitrate levels exist in the TBCCW System. High Nitrate concentrations have been associated with stress corrosion cracking of carbon steel piping.

2. Apparent/Direct Cause:

Based on a study of literature on this subject, the likely direct cause is Nitrobacter bacteria conversion of Nitrites to Nitrates. An action item should be given Chemistry to sample and analyze the RBCCW and TBCCW, including the make-up water source, for the presence of Nitrobacter bacteria.

3. Repeat Occurrence: ☒ YES ☐ NO

4. Maintenance Rule Functional Failure: ☐ YES ☒ NO ☐ Unknown

5. Corrective Actions Completed (include Dates if possible)

A literature search (See Attached Letter for details and date completed) was performed to determine the most probable cause of the Nitrate build-up and its affect on carbon steel piping. Based on this research for the Nitrate concentration, system operating conditions and the duration of the present problem, the probability of developing stress corrosion cracking is low. However due to the lack of conclusive data at the appropriate operating conditions there is sufficient probability of stress corrosion cracking that an action item should be given to the MSTP Group to develop a program of sufficient duration to inspect TBCCW piping welds. Civ/ Struct./ Mech will assist the MSTP Group in the selection of inspection locations, as necessary.

6. Corrective Actions Required ☐☐☐ (check "N/R" if not required) ☐ N/R

a) Action Required

Chemistry to sample and analyze the RBCCW and TBCCW, including the make-up water source, for the presence of Nitrobacter bacteria.

☐ Closure Requirement

If Nitrobacter bacteria are found a biocide should be introduced as a part of a chemical treatment program to eliminate the bacteria and reduce the Nitrate concentration.

Responsible Manager Dave Fountain

Due Date 04/01/97 ☐☐☐ Dead Date 05/30/97

b) Action Required

MSTP Group develop a weld inspection program.

☐ Closure Requirement

MSTP Group develop a weld inspection program of sufficient duration for TBCCW piping welds.

Responsible Manager Kevin Burke

Due Date 04/01/97 ☐ ☐ ☐ Dead Date 05/30/97

7. Corrective Actions Required to Preclude Recurrence (check "N/R" if not required) ____ N/R

a) Action Required

Mechanical select inspection points.

Closure Requirement

Mechanical/Civil/Structural selection of 5 to 10 inspection points based on the attached letter with proposed Altran criteria.

Responsible Manager Thomas White, Jr.

Due Date 04/01/97 ☐ ☐ ☐ Dead Date 05/31/97

b) Action Required

Closure Requirement

Responsible Manager

Due Date ____/____/____ ☐ ☐ ☐ Dead Date ____/____/____8. Trend Data for Apparent Cause ☐ ☐ (check "N/R" for Direct Cause Analysis) __u__ N/R**NOTE**

If more than 2 Inappropriate Actions are defined, use Exhibit 14.

a) Inappropriate Action (IA) Description:

IA Job Title _____ IA Group _____ IA Department _____

IA Job Title _____ IA Group _____ IA Department _____

BECO _____ ☐ Contractor _____

Work Process _____ Key Activity _____

Work Process _____ Key Activity _____

O&P Failure Mechanism _____ HEIA Failure Mechanism _____

Human Error Type (Circle 1): Skill Based ☐**Subresponse :**

Closure Comments:

MEMO DETAILING THE RESULTS THE EVALUATION AND THE REQUIRED CORRECTIVE ACTIONS.
CONCURRENCE MUST BE OBTAINED FROM ACTION ITEM OWNERS.

NOTE: CHEMISTRY HAS ALSO BEEN ASSIGNED AN ACTION TO DETERMINE THE CAUSE OF THE EXCESS NITRATE AND SHOULD BE ABLE TO PROVIDE ADDITIONAL INFORMATION TO ASSIST IN YOUR EVALUATION.

PROBLEM REPORT

PROBLEM REPORT No. 96.0396.02

1. Problem Description:

High Nitrate levels exist in the TBCCW System. High Nitrate concentrations have been associated with stress corrosion cracking of carbon steel piping.

2. Apparent/Direct Cause:

Based on a study of literature on this subject, the likely direct cause is Nitrobacter bacteria conversion of Nitrites to Nitrates. An action item should be given Chemistry to sample and analyze the RBCCW and TBCCW, including the make-up water source, for the presence of Nitrobacter bacteria.

3. Repeat Occurrence: ☐ YES ☒ NO

4. Maintenance Rule Functional Failure: ☐ YES ☒ NO ☐ Unknown

5. Corrective Actions Completed (include Dates if possible)

A literature search (See Attached Letter for details and date completed) was performed to determine the most probable cause of the Nitrate build-up and its affect on carbon steel piping. Based on this research for the Nitrate concentration, system operating conditions and the duration of the present problem, the probability of developing stress corrosion cracking is low. However due to the lack of conclusive data at the appropriate operating conditions there is sufficient probability of stress corrosion cracking that an action item should be given to the MSTP Group to develop a program of sufficient duration to inspect TBCCW piping welds. Civ/ Struct./ Mech will assist the MSTP Group in the selection of inspection locations, as necessary.

6. Corrective Actions Required ☐☐☐ (check "N/R" if not required) ☐ N/R

a) Action Required

Chemistry to sample and analyze the RBCCW and TBCCW, including the make-up water source, for the presence of Nitrobacter bacteria.

☐ Closure Requirement

If Nitrobacter bacteria are found a biocide should be introduced as a part of a chemical treatment program to eliminate the bacteria and reduce the Nitrate concentration.

Responsible Manager Dave Fountain

Due Date 04/01/97 ☐☐☐ Dead Date 05/30/97

b) Action Required

MSTP Group develop a weld inspection program.

☐ Closure Requirement

MSTP Group develop a weld inspection program of sufficient duration for TBCCW piping welds.

Responsible Manager Kevin Burke

Due Date 04/01/97 ☐☐☐ Dead Date 05/30/97

7. Corrective Actions Required to Preclude Recurrence (check "N/R" if not required) ____ N/R

a) Action Required

Mechanical select inspection points.

Closure Requirement

Mechanical/Civil/Structural selection of 5 to 10 inspection points based on the attached letter with proposed Altran criteria.

Responsible Manager Thomas White, Jr.

Due Date 04/01/97 ☐☐☐ Dead Date 05/31/97

b) Action Required

Closure Requirement

Responsible Manager

Due Date ____/____/____ ☐☐☐ Dead Date ____/____/____8. Trend Data for Apparent Cause ☐☐ (check "N/R" for Direct Cause Analysis) __u__ N/R**NOTE**

If more than 2 Inappropriate Actions are defined, use Exhibit 14.

a) Inappropriate Action (IA) Description:

IA Job Title _____ IA Group _____ IA Department _____

IA Job Title _____ IA Group _____ IA Department _____

BECO _____ ☐ Contractor _____

Work Process _____ Key Activity _____

Work Process _____ Key Activity _____

O&P Failure Mechanism _____ HEIA Failure Mechanism _____

Human Error Type (Circle 1): Skill Based ☐

Corrective Action : CR-PNP-1996-00396 CA-00003**Version:** 1**Approved:** ☒**Requested Duedate:** 01/15/1997**Previous Duedate:** 01/14/1997**Requested By:** CONVERTED DATA

01/08/1997

Approved By: CONVERTED DATA

01/08/1997

Request Description:

CONVERTED DATA

Approved Description:

CONVERTED DATA

CA Number: 4

Group**Name**

Assigned By: Tech Chemistry Staff

SMALLEY, P.

Assigned To: Training Technical Staff

Fountain, David W

Subassigned To :

Originated By: SMALLEY, P.

2/6/1997 00:00:00

Performed By: FOUNTAIN, D.

4/3/1998 00:00:00

Subperformed By:

Approved By:

Closed By: SMALLEY, P.

4/3/1998 00:00:00

Current Due Date: 04/01/1998

Initial Due Date: 04/01/1998

CA Type: GENERAL

Plant Constraint: NONE

CA Description:

CHEMISTRY TO SAMPLE AND ANALYZE THE RBCCW AND TBCCW, INCLUDING THE MAKE-UP WATER SOURCE, FOR THE PRESENCE OF NITROBACTER BACTERIA.

Response:

IF NITROBACTER BACTERIA ARE FOUND A BIOCIDES SHOULD BE INTRODUCED AS A PART OF A CHEMICAL TREATMENT PROGRAM TO ELIMINATE THE BACTERIA AND REDUCE THE NITRATE CONCENTRATION. PROVIDE MEMO DOCUMENTING DETAILS OF TASK COMPLETION.

[4/2/98; FOUNTAIN, D.] TESTING WAS PERFORMED IN HOUSE DUE TO THE INABILITY TO LOCATE A QUALIFIED LABORATORY CAPABLE OF PERFORMING TESTING IN THIS AREA. (SAMPLES MUST BE AT THE VENDORS LABORATORY LESS THAN 24 HOURS AFTER SAMPLING.)

THE HACH COMPANY PROVIDES TEST KITS FOR PERFORMING NITROBACTERIA TESTING ON SITE. THESE TEST KITS WERE PURCHASED AND SAMPLES WERE ANALYZED IN HOUSE FOR THE RBCCW, TBCCW AND MAKEUP WATER SYSTEMS. NO DETECTABLE NITROBACTERIA WAS IDENTIFIED.

MULTIPLE SAMPLES WERE ANALYZED ON THE TBCCW SYSTEM FROM VARIOUS LOCATIONS WHERE THE HIGHEST POTENTIAL FOR BACTERIA EXISTED. SAMPLES FROM THE SLIPSTREAM FILTER WERE INCUBATED TO INCREASE THE NUMBER OF COLONIES PRESENT IF ANY NITROBACTERIA EXISTED. THESE SAMPLES ALSO SHOWED NO SIGNS OF DETECTABLE NITROBACTERIA WHEN TESTED WITH THE HACH TEST KITS.

ADDITIONALLY, SAMPLES WERE TAKEN FOR TOTAL BACTERIA ON THESE SYSTEMS AND ZERO COLONIES WERE DETECTED. MONTHLY SAMPLING FOR TOTAL BACTERIA IS NOW ROUTINELY PERFORMED ON ALL CLOSED COOLING WATER SYSTEMS.

SAMPLING FOR NITRATE LEVELS IN THE TBCCW SYSTEM (AND RBCCW) ARE ALSO PERFORMED MONTHLY. NO SIGNIFICANT TRENDS IN NITRATE HAVE BEEN IDENTIFIED.

THE RATIO OF THE 'SYSTEM CONDUCTIVITY' TO 'NITRITE' IS ALSO CALCULATED DURING WEEKLY ANALYSIS. THIS IS ANOTHER METHOD TO DETERMINE IF ANY ADVERSE TRENDS ARE OCCURRING WITHIN A CLOSED COOLING SYSTEM. AGAIN NO SIGNIFICANT TRENDS HAVE BEEN IDENTIFIED.

DUE TO THE LACK OF TOTAL BACTERIA AND NITROBACTERIA AS DETERMINED BY GRAB SAMPLING THIS ITEM IS CLOSED. NO ADDITIONAL ACTIONS ARE REQUIRED UNLESS FUTURE ROUTINE TESTING WERE TO REVEAL ADVERSE TRENDS. A NEW PROBLEM REPORT WOULD BE GENERATED AT THAT TIME.

Subresponse :**Closure Comments:**

IF NITROBACTER BACTERIA ARE FOUND A BIOCIDES SHOULD BE INTRODUCED AS A PART OF A CHEMICAL TREATMENT PROGRAM TO ELIMINATE THE BACTERIA AND REDUCE THE NITRATE CONCENTRATION. PROVIDE MEMO DOCUMENTING DETAILS OF TASK COMPLETION.

[4/2/98;FOUNTAIN, D.] TESTING WAS PERFORMED IN HOUSE DUE TO THE INABILITY TO LOCATE A QUALIFIED LABORATORY CAPABLE OF PERFORMING TESTING IN THIS AREA. (SAMPLES MUST BE AT THE VENDORS LABORATORY LESS THAN 24 HOURS AFTER SAMPLING.)

THE HACH COMPANY PROVIDES TEST KITS FOR PERFORMING NITROBACTERIA TESTING ON SITE. THESE TEST KITS WERE PURCHASED AND SAMPLES WERE ANALYZED IN HOUSE FOR THE RBCCW, TBCCW AND MAKEUP WATER SYSTEMS. NO DETECTABLE NITROBACTERIA WAS IDENTIFIED.

MULTIPLE SAMPLES WERE ANALYZED ON THE TBCCW SYSTEM FROM VARIOUS LOCATIONS WHERE THE HIGHEST POTENTIAL FOR BACTERIA EXISTED. SAMPLES FROM THE SLIPSTREAM FILTER WERE INCUBATED TO INCREASE THE NUMBER OF COLONIES PRESENT IF ANY NITROBACTERIA EXISTED. THESE SAMPLES ALSO SHOWED NO SIGNS OF DETECTABLE NITROBACTERIA WHEN TESTED WITH THE HACH TEST KITS.

ADDITIONALLY, SAMPLES WERE TAKEN FOR TOTAL BACTERIA ON THESE SYSTEMS AND ZERO COLONIES WERE DETECTED. MONTHLY SAMPLING FOR TOTAL BACTERIA IS NOW ROUTINELY PERFORMED ON ALL CLOSED COOLING WATER SYSTEMS.

SAMPLING FOR NITRATE LEVELS IN THE TBCCW SYSTEM (AND RBCCW) ARE ALSO PERFORMED MONTHLY. NO SIGNIFICANT TRENDS IN NITRATE HAVE BEEN IDENTIFIED.

THE RATIO OF THE 'SYSTEM CONDUCTIVITY' TO 'NITRITE' IS ALSO CALCULATED DURING WEEKLY ANALYSIS. THIS IS ANOTHER METHOD TO DETERMINE IF ANY ADVERSE TRENDS ARE OCCURRING WITHIN A CLOSED COOLING SYSTEM. AGAIN NO SIGNIFICANT TRENDS HAVE BEEN IDENTIFIED.

DUE TO THE LACK OF TOTAL BACTERIA AND NITROBACTERIA AS DETERMINED BY GRAB SAMPLING THIS ITEM IS CLOSED. NO ADDITIONAL ACTIONS ARE REQUIRED UNLESS FUTURE ROUTINE TESTING WERE TO REVEAL ADVERSE TRENDS. A NEW PROBLEM REPORT WOULD BE GENERATED AT THAT TIME.

Entergy

CA DUE DATE EXTENSION

CR-PNP-1996-00396

Corrective Action : CR-PNP-1996-00396 CA-00004

Version: 3

Approved: ☒

Requested Duedate: 04/01/1998

Previous Duedate: 03/31/1998

Requested By: CONVERTED DATA

03/25/1998

Approved By: CONVERTED DATA

03/25/1998

Request Description:

CONVERTED DATA

Approved Description:

CONVERTED DATA

Entergy**CORRECTIVE ACTION****CR-PNP-1996-00396**

CA Number: 5

Group

Name

Assigned By: CA&A Staff

WOLLMAN, S.

Assigned To: Operations Support Staff

Burke, Kevin R

Subassigned To :

Originated By: WOLLMAN, S.

2/6/1997 00:00:00

Performed By: BURKE, K.

5/22/1997 00:00:00

Subperformed By:

Approved By:

Closed By: WOLLMAN, S.

5/22/1997 00:00:00

Current Due Date: 05/30/1997

Initial Due Date: 05/30/1997

CA Type: GENERAL

Plant Constraint: NONE

CA Description:

MSTP GROUP DEVELOP A WELD INSPECTION PROGRAM.

Response:**PROBLEM REPORT**

PROBLEM REPORT No. PR96.0396.05

1. ☐ Problem Description:

High nitrate levels exist in the TBCCW system. High nitrate concentrations have been associated with stress corrosion cracking of carbon steel piping.

2. ☐ Apparent/ Direct Cause:

Based on a study of literature on this subject, the likely direct cause is Nitrobacter bacteria conversion of Nitrites to Nitrates.

3. ☐ Repeat Occurrence: _ _ YES _ X NO4. ☐ Maintenance Rule Functional Failure: _ _ YES _ X _ NO Unknown5. ☐ Corrective Actions Completed (include Dates if possible)

A past action item (PR.0396.02) was given Chemistry to sample and analyze the RBCCW and TBCCW, including the make-up water source, for the presence of Nitrobacter bacteria.

Mechanical/ Civil/ Structural selection of 5 to 10 inspection points based on the Altran Letter with proposed criteria.

6. ☐ Corrective Actions Required ☐☐ (check "N/R" if not required) _ _ N/R

a) Action Required

Visual inspection program developed for selected points. See Attached.

Closure Requirement

Visual inspection program implemented. See Attached.

Responsible Manager C. Garrow

Due Date: 06 / 30 / 97 ☐☐☐ Dead Date: 08 / 31 / 97

7. ☐ Corrective Actions Required to Preclude Recurrence (check "N/R" if not required) _ 4 _ N/R☐ 8. ☐ Trend Data for Apparent Cause ☐☐ (check "N/R" for Direct Cause Analysis) _ X _ N/R9. ☐ The Significance should: _ _ Be Upgraded 4 Remain the Same

If applicable, the reason for the upgraded: N/A

Completed By: _ R. PACE _ Date: _ 4 _ / _ 8 _ / 97 _

☐☐ Evaluator/Mentor

Approved By: _ T. WHITE _ Date: _ 4 _ / _ 8 _ / 97 _

☐☐ Manager

PROBLEM STATEMENT

As discussed in PR 96.0396.02 [3] it has been determined that elevated nitrate concentrations can result in intergranular stress corrosion cracking (IGSCC) of carbon steel (CS) piping. Because Pilgrim Nuclear Power Station (PNPS) has had a short duration of marginally unacceptable nitrate concentrations, PR 96.0396.05 requests that NESG, Mechanical/ Civil/ Structural select 5 to 10 inspection locations on the affected Turbine Building Closed Cooling Water (TBCCW) system [4].

SUMMARY

Eleven inspection locations have been selected for the inservice inspection (ISI) of the TBCCW piping for IGSCC. It is recommended that an inspection program be implemented that is 10 years in duration with 2 year inspection intervals. The duration of the program is selected to cover the incubation period necessary for the formation of IGSCC. Five inspection

locations should be selected for each inspection interval and results reported to NESG (Mechanical/ Civil/ Structural). All locations should be visually inspected at a minimum of two inspection intervals over the program duration.

If problems are discovered during later inspections the scope would be expanded by the addition of several new locations for inspection and the use of volumetric inspection techniques. In this case, criteria for scope expansion will be developed based on the inspection results and water chemistry history. Therefore nitrate concentration history is an important input to the program. Chemistry was given an action item [3] to develop a program and document this information to NESG. If no IGSCC is found over the recommended program duration and low nitrate levels (<500 PPM) are maintained the inspection program can be discontinued.

A closed cooling water/ plant heating corrosion monitoring system will be installed in the near future. If a corrosion sample for the TBCCW system containing a carbon steel weld (P1) can be incorporated into the program the piping inspections may be eliminated. The monitoring of the corrosion sample is a more accurate predictor of the system condition.

ASSUMPTIONS

As stated in the Altran Corporation letter attached to the problem report, IGSCC is not co

Subresponse :**Closure Comments:**

MSTP GROUP DEVELOP A WELD INSPECTION PROGRAM OF SUFFICIENT DURATION FOR TBCCW PIPING WELDS. PROVIDE MEMO DOCUMENTING DETAILS OF TASK COMPLETION.

CLOSURE: MSTP NODE S001262 CREATED TO TRACK WELD SELECTION AND EXAMINATION.

Entergy**CORRECTIVE ACTION****CR-PNP-1996-00396****CA Number:** 6**Group****Name****Assigned By:** Eng DE Mech Civil Struct Staff

WHITE, T.F.

Assigned To: Eng DE Mech Civil Struct Staff

Pace, Raymond M

Subassigned To :**Originated By:** WHITE, T.F.

2/6/1997 00:00:00

Performed By: PACE, R.

5/7/1997 00:00:00

Subperformed By:**Approved By:****Closed By:** WHITE, T.F.

5/7/1997 00:00:00

Current Due Date: 05/31/1997**Initial Due Date:** 05/31/1997**CA Type:** GENERAL**Plant Constraint:** NONE**CA Description:**

MECHANICAL SEAL INSPECTION POINTS.

Response:

CONVERTED DATA

Subresponse :

Closure Comments:

MECHANICAL/CIVIL/STRUCTURAL SELECTION OF 5 TO 10 INSPECTION POINTS BASED ON THE ATTACHED LETTER WITH PROPOSED ALTRAN CRITERIA

PROBLEM REPORT

PROBLEM REPORT No. PR96.0396.05

1. ☐ Problem Description:

High nitrate levels exist in the TBCCW system. High nitrate concentrations have been associated with stress corrosion cracking of carbon steel piping.

2. ☐ Apparent/ Direct Cause:

Based on a study of literature on this subject, the likely direct cause is Nitrobacter bacteria conversion of Nitrites to Nitrates.

3. ☐ Repeat Occurrence: _ _ YES _X_ NO**4. ☐ Maintenance Rule Functional Failure: ____ YES _X_ NO Unknown****5. ☐ Corrective Actions Completed (include Dates if possible)**

A past action item (PR.0396.02) was given Chemistry to sample and analyze the RBCCW and TBCCW, including the make-up water source, for the presence of Nitrobacter bacteria.

Mechanical/ Civil/ Structural selection of 5 to 10 inspection points based on the Altran Letter with proposed criteria.

6. ☐ Corrective Actions Required ☐☐☐ (check "N/R" if not required) _ _ N/R**a) Action Required**

Visual inspection program developed for selected points. See Attached.

Closure Requirement

Visual inspection program implemented. See Attached.

Responsible Manager C. Garrow

Due Date: 06 / 30 / 97 ☐☐☐ Dead Date: 08 / 31 / 97

7. ☐ Corrective Actions Required to Preclude Recurrence (check "N/R" if not required) _4_ N/R**☐ 8. ☐ Trend Data for Apparent Cause ☐☐ (check "N/R" for Direct Cause Analysis) _X_ N/R****9. ☐ The Significance should: ____ Be Upgraded 4 Remain the Same**

If applicable, the reason for the upgraded: N/A

Completed By: _____ R. PACE _____ Date: _4_ / _8_ / _97_

☐☐ Evaluator/Mentor

Approved By: _____ T. WHITE _____ Date: _4_ / _8_ / _97_

☐☐ Manager

PROBLEM STATEMENT

As discussed in PR 96.0396.02 [3] it has been determined that elevated nitrate concentrations can result in intergranular stress corrosion cracking (IGSCC) of carbon steel (CS) piping. Because Pilgrim Nuclear Power Station (PNPS) has had a short duration of marginally unacceptable nitrate concentrations, PR 96.0396.05 requests that NESG, Mechanical/ Civil/ Structural select 5 to 10 inspection locations on the affected Turbine Building Closed Cooling Water (TBCCW) system [4].

SUMMARY

Eleven inspection locations have been selected for the inservice inspection (ISI) of the TBCCW piping for IGSCC. It is recommended that an inspection program be implemented that is 10 years in duration with 2 year inspection intervals. The duration of the program is selected to cover the incubation period necessary for the formation of IGSCC. Five inspection locations should be selected for each inspection interval and results reported to NESG (Mechanical/ Civil/ Structural). All locations should be visually inspected at a minimum of two inspection intervals over the program duration.

If problems are discovered during later inspections the scope would be expanded by the addition of several new locations for inspection and the use of volumetric inspection techniques. In this case, criteria for scope expansion will be developed based on the inspection results and water chemistry history. Therefore nitrate concentration history is an important input to the program. Chemistry was given an action item [3] to develop a program and document this information to NESG. If no IGSCC is found over the recommended program duration and low nitrate levels (<500 PPM) are maintained the inspection program can be discontinued.

A closed cooling water/ plant heating corrosion monitoring system will be installed in the near future. If a corrosion sample for the

CA Number: 7

Group

Name

Assigned By: QA Staff

SHERIDAN, R.

Assigned To: QA Staff

Garrow, Charles G

Subassigned To :

Originated By: SHERIDAN, R.

5/14/1997 00:00:00

Performed By: GARROW, C.

5/19/1997 00:00:00

Subperformed By:

Approved By:

Closed By: SHERIDAN, R.

5/19/1997 00:00:00

Current Due Date: 08/31/1997

Initial Due Date: 08/31/1997

CA Type: GENERAL

Plant Constraint: NONE

CA Description:

VISUAL INSPECTION PROGRAM DEVELOPED FOR SELECTED POINTS.

Response:

CONVERTED DATA

Subresponse :

Closure Comments:

VISUAL INSPECTION PROGRAM IMPLEMENTED.

CLOSURE: THE EXAMINATION REQUIREMENTS WILL BE TRACKED BY THE MSTP TRACKING PROGRAM (ATTACHED FORM) WITH EXAMINATION PERFORMED TO EXISTING PROCEDURES. THE INSPECTIONS WILL BE IMPLEMENTED WITH AN MR AS WITH ALL OTHER ISI EXAMINATIONS. NODE #S001262.