JUL 06 1988

Docket No. 50-219

LICENSEE: GPU Nuclear Corporation
Jersey Central Power and Light Company

SUBJECT: JUNE 28, 1988 MEETING WITH GPU NUCLEAR CORPORATION (GPUN) TO DISCUSS MATTERS RELATED TO THE OYSTER CREEK-12R OUTAGE IGSCC INSPECTION/STRESS IMPROVEMENT PLANS

On Tuesday, June 28 1988, a meeting was held at NRC, One White Flint North, Rockville, Maryland, with GPUN to discuss matters related to the Oyster Creek-12R Outage IGSCC Inspection/Stress Improvement Plans. Attachment 1 is the list of individuals participating in the discussion

Attachment 2 is the licensee's agenda. The following is a summary of the significant items discussed.

The licensee presented their plans and indicated that they propose to inspect 58 inspectable welds during the 12R outage. This would leave 102 welds (this includes 40 uninspectable welds) that will not be inspected after the 12R outage. This does not include most of the reactor water cleanup system welds outside of the drywell. The licensee also discussed GPUN's IGSCC mitagition program in detail (see Attachment 2). GPUN also indicated that during the 13R outage they intend to replace all four isolation condenser penetrations including 4-8 welds inside the drywell and all piping outside drywell on 75' Elevation with IGSCC resistant material.

The licensee concluded that the inspection plan for the 12R outage was adequate to determine if major IGSCC problem exists at Oyster Creek. GPUN also concluded that (1) good water chemistry in cycles 10 and 11 and hydrogen water chemistry in cycle 12 significantly reduces potential for new cracks and growth rate of existing non detected cracks, if any, (2) their plans minimizes and balances man-rem exposures over three outages and (3) all welds will have been inspected at least once for IGSCC by the end of 13R except four recirculation safe ends (eight welds-to be inspected in 14R) and 13 RWCU welds outside the drywell (to be inspected in 14R).

The staff advised the licensee that they should (1) provide a comparison of GPUN's program with Generic Letter 88-01 at the end of 12R, 13R and 14R outages. GPUN should also include previous inspection results and indicate sample size used in the inspection, (2) discuss compensating measures for welds that have not been inspected including the welds in the reactor water cleanup system outside the drywell, (3) discribe how Oyster Creek's leakage detection system meets the requirements of Generic Letter 88-01 and (4) commit to a sampling expansion program in accordance with Generic Letter 88-01 for the 12R outage inspection.

DF01
1/1

GPUN advised the staff that they will respond to our request for the above information.

Alexander W. Dromerick, Project Manager
Project Directorate I-4
Division of Reactor Projects I/II

Attachments:
as stated

LA:PDI-4	PM:PDI-4	PD:PDI-4
SNorris	ADromerick	JStolz
06/30/88	06/07/88	06/07/88
	07	07

Mr. E. E. Fitzpatrick
Oyster Creek Nuclear Generating Station

Oyster Creek Nuclear
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cc:

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ATTACHMENT 1
OYSTER CREEK
DOCKET NO 50-219
MEETING JUNE 28, 1988
LIST OF ATTENDEES

Name	Organization
A.Dromerick	NRR/PDI-4
J.L.Sullivan	GPUN
R.F.Wilson	GPUN
C.Y.Cheng	NRC/EMTB
W.S.Hazelton	NRC/EMTB
W.Koo	NRC/EMTB
D.K.Croneberger	GPUN
J.E.Richardson	NRC/NRR/EAD
D.W.Covill	GPUN
J.F.Stolz	NRC/NRR/PDI-4
R.A.Herman	NRC/OSP

Attachment 2

OYSTER CREEK

IGSCC

INSPECTION/STRESS IMPROVEMENT

PLANS

JUNE 28, 1988

OUTLINE

- PURPOSE
- OYSTER CREEK IGSCC INSPECTION HISTORY
- HISTORY OF IGSCC REPAIRS
- GPUN'S IGSCC MITIGATION PROGRAM
- 12R IGSCC INSPECTION PLAN
  - CATEGORY "G" WELDS AFTER 12R
- BASIS FOR INSPECTION PLAN
  - PERCENTAGES
  - TECHNICAL
- INSPECTION AFTER STRESS IMPROVEMENT
- SUMMARY AND CONCLUSIONS

PURPOSE

° DISCUSS GPUN'S PLANT SPECIFIC PLANS FOR IGSCC MITIGATION/INSPECTION

° DISCUSS GPUN'S RESOLUTION TO SEP TOPIC III-5.B AND PIPE BREAK INSIDE PENETRATION

(ISOLATION CONDENSER PENETRATIONS AND PIPING OUTSIDE DRYWELL)

BACKGROUND/HISTORY OF IGSCC INSPECTIONS

SYSTEM	TOTAL WELDS	UNINSPECTABLE WELDS (NOTE 1)	10R INSPECTIONS	11R INSPECTIONS PI/NPI	UNINSPECTED INSPECTABLE WELDS REMAINING AFTER 11R
RECIRCULATION	89	25	31	29/33	0
SHUTDOWN COOLING	11	0	0	0/4	7
CORE SPRAY	26	4	1	1/7	14
RWCU (NOTE 2)	51	5	8	2/8	30
ISOLATION CONDENSER					
INSIDE 2ND VALVE	58	18	18	6/6	16
OUTSIDE 2ND VALVE	131	2	112	58/0	17
CLOSURE HEAD	8	0	0	0/0	8
TOTAL	374	54	170	96/58	92

NOTE 1: RECIRCULATION: 5 CASTING-TO-CASTING WELDS, 20 SAFE END WELDS (5 SAFE END TO PIPE/FITTING WELDS INSPECTED FROM ONE SIDE ONLY) DUE TO SAFE END AS-WELDED OD CLADDING.
RWCU: 5 WELDS IN PENETRATIONS
ISOLATION CONDENSER: 8 WELDS IN PENETRATIONS, 4 FLUED HEAD-TO-VALVE WELDS, 2 CASTING-TO-CASTING WELDS, 2 SADDLE WELDS (OUTSIDE), 4 SAFE END WELDS DUE TO AS-WELDED OD CLADDING
CORE SPRAY: 4 SAFE END WELDS DUE TO AS-WELDED OD CLADDING.

NOTE 2: RWCU: TOTAL WELDS INSIDE 2ND ISOLATION VALVE. 16 WELDS OUTSIDE DRYWELL OF WHICH 3 HAVE BEEN INSPECTED.

HISTORY OF IGSCC REPAIRS

CORE SPRAY:

- 7R
  - 1 CRACK IN SYSTEM 2 SPARGER

ISOLATION CONDENSER:

- OUTSIDE DRYWELL
  - 10R
    - 18 WELD OVERLAY REPAIRS
    - 9 WELDS WITH IGSCC REPLACED WITH 17 NEW WELDS
  - 11R
    - 1 WELD OVERLAY REPAIR

RECIRCULATION

- 11R
  - 2 WELD OVERLAY REPAIRS
  - 1 WELD LEFT AS "STRESS IMPROVED"

NOTE: ALL RECIRCULATION SYSTEM IGSCC INDICATIONS ON C-LOOP ONLY.

GPUN'S

IGSCC MITIGATION PROGRAM

- WATER QUALITY
- HYDROGEN WATER CHEMISTRY
- STRESS IMPROVEMENT
- SELECTED REPLACEMENT OF SUSCEPTIBLE MATERIAL
- REDUCTION OF UNINSPECTABLE WELDS-PENETRATION INTERNALS AND CLADDING MACHINING
- SELECTIVE USE OF CORROSION RESISTANT CLAD

GPUN'S

IGSCC MITIGATION IMPLEMENTATION SCHEDULE

CYCLE 10 (1984 TO PRESENT)

- IMPLEMENTED WATER QUALITY PROGRAM
  - AVERAGE ~11uS/CM., FEW UPSETS

CYCLE 11R (1986)

- 64 RECIRCULATION WELDS STRESS IMPROVED (100% OF SYSTEM EXCLUDING 10 SAFE ENDS AND 5 CASTING-TO-CASTING WELDS)

CYCLE 12R (1988)

- STRESS IMPROVEMENT
  - 2 RECIRCULATION SAFE ENDS (C-LOOP) (4 WELDS)
  - 2 CORE SPRAY SAFE ENDS (4 WELDS)
  - 2 ISOLATION CONDENSER SAFE ENDS (4 WELDS)
  - 22 CORE SPRAY WELDS (100% OF SYSTEM > 200° F)
  - 9 ISOLATION CONDENSER WELDS INSIDE DRYWELL

CYCLE 12 (JAN/FEB 1989)

- IMPLEMENT HYDROGEN WATER CHEMISTRY (HWC)

GPUN'S IGSCC MITIGATION IMPLEMENTATION SCHEDULE (CONTINUED)

CYCLE 13R (1990)

- STRESS IMPROVEMENT
  - 4 RECIRCULATION SAFE ENDS (VESSEL INLET) (8 WELDS)
  - 10 ISOLATION CONDENSER WELDS INSIDE DRYWELL
  - 11 SHUTDOWN COOLING WELDS (100% OF SYSTEM > 200°F)
- REPLACE WITH IGSCC RESISTANT MATERIAL
  - ISOLATION CONDENSER
    - ALL FOUR PENETRATIONS INCLUDING 4-8 WELDS INSIDE DRYWELL
    - ALL PIPING OUTSIDE DRYWELL ON 75' ELEVATION. TO RESOLVE SEP TOPIC III-5.B
  - CLOSURE HEAD
    - 5 WELDS
  - RWCU
    - 4 WELDS AT ELBOWS NEAR PENETRATIONS TO GAIN ACCESS FOR CRC OF WELDS IN PENETRATIONS

GPUN'S IGSCC MITIGATION IMPLEMENTATION SCHEDULE (CONTINUED)

- CORROSION RESISTANT CLAD
  - 5 RWCU WELDS IN PENETRATIONS
  - 3 CLOSURE HEAD NOZZLE-TO-FLANGE WELDS
  - ALL ISOLATION CONDENSER CASTING WELDS ON 75' ELEVATION (VALVE-TO-VALVE, VALVE-TO-PENETRATION AND VALVE-TO-PIPE)

CYLE 14R (1992)

- DECON RECIRCULATION (BEING EVALUATED) AND RWCU
- STRESS IMPROVEMENT
  - 4 REMAINING RECIRCULATION SAFE ENDS (VESSEL OUTLET) (8 WELDS)
  - 17-21 REMAINING ISOLATION CONDENSER WELDS INSIDE DRYWELL.

SUMMARY OF IGSCC MITIGATION STRATEGY

- GPUN INTENDS TO HAVE ALL WELDS PROTECTED BY AT LEAST ONE IGSCC MITIGATOR BY THE END OF THE 14R REFUELING OUTAGE.
  - RECIRCULATION: STRESS IMPROVEMENT AND HWC
  - SHUTDOWN COOLING: STRESS IMPROVEMENT
  - CORE SPRAY: STRESS IMPROVEMENT
  - RWCU PIPING: HWC
    - RWCU PENETRATIONS: HWC AND CRC
  - ISOLATION CONDENSER
    - INSIDE DRYWELL: STRESS IMPROVEMENT
    - INSIDE DRYWELL PENETRATIONS: REPLACE WITH RESISTANT MATERIAL, AND NO WELDS IN PENETRATIONS
    - OUTSIDE DRYWELL ON 75' ELEVATION: REPLACE WITH RESISTANT MATERIAL
  - CLOSURE HEAD: REPLACE WITH RESISTANT MATERIALS AND CRC

SUMMARY OF IGSCC MITIGATION STRATEGY (CONTINUED)

- GPUN PROGRAM BALANCES MAN-REM EXPOSURES AND SCHEDULE OVER THE 12R, 13R AND 14R OUTAGES

- GPUN PLAN RESOLVES SEP TOPIC III-5.B AND PIPE BREAK INSIDE PENETRATION CONCERNS
  - REPLACE ALL ISOLATION CONDENSER PENETRATIONS WITH IGSCC RESISTANT MATERIALS AND NO WELDS IN PENETRATIONS
  - CRC ALL VALVE-TO-PENETRATION, VALVE-TO-VALVE AND VALVE-TO-PIPE WELDS ON THE 75' ELEVATION
  - REPLACE ALL PIPING ON 75' ELEVATION WITH IGSCC RESISTANT MATERIAL

GPUN 12R IGSCC
INSPECTION PLAN

SYSTEM	TOTAL WELDS	UNINSPECTABLE WELDS (NOTE 1)	10R INSPECTIONS	11R INSPECTIONS PI/NPI	12R INSPECTIONS PI	/ NPI	/IGSCC	UNINSPECTED INSPECTABLE WELDS REMAINING AFTER 12R
RECIRCULATION	89	25	31	29/33	7	0	3	0/0%
SHUTDOWN COOLING	11	0	0	0/4	0	2	0	5/45%
CORE SPRAY	26	4	1	1/7	0	5	0	9/41%
RWCU (NOTE 2)	51	5	8	2/8	0	10	0	20/43%
ISOLATION CONDENSER								
INSIDE 2ND VALVE	58	18	18	6/6	3	7	0	9/22%
OUTSIDE 2ND VALVE	131	2	112	58/0	11	4	4	13/10%
CLOSURE HEAD	8	0	0	0/0	0	2	0	6/75%
TOTAL	374	54	170	96/58	21	30	7	62/19%

NOTE 1:
RECIRCULATION: 5 CASTING-TO-CASTING WELDS, 20 SAFE END WELDS (5 SAFE END TO PIPE/FITTING WELDS INSPECTED FROM ONE SIDE ONLY) DUE TO SAFE END AS-WELDED OD CLADDING.

RWCU: 5 WELDS IN PENETRATIONS

ISOLATION CONDENSER: 8 WELDS IN PENETRATIONS, 4 FLUED HEAD-TO-VALVE WELDS, 2 CASTING-TO-CASTING WELDS, 2 SADDLE WELDS (OUTSIDE), 4 SAFE END WELDS DUE TO AS-WELDED OD CLADDING
CORE SPRAY: 4 SAFE END WELDS DUE TO AS-WELDED OD CLADDING.

NOTE 2:
RWCU: TOTAL WELDS INSIDE 2ND ISOLATION VALVE. 16 WELDS OUTSIDE DRYWELL OF WHICH 3 HAVE BEEN INSPECTED.

RECIRCULATION SYSTEM SAFE END IGSCC IMPROVEMENT/INSPECTION PLANS

- 20 RECIRCULATION SYSTEM SAFE END WELDS
  - INSPECT AND STRESS IMPROVE 4 C-LOOP SAFE-END WELDS DURING 12R
  - IF IGSCC DETECTED IN C-LOOP SAFE ENDS DURING 12R, ALL REMAINING SAFE ENDS WILL BE STRESS IMPROVED AND INSPECTED
  - SAFE ENDS HAVE OD CLAD REQUIRING MACHINING PRIOR TO INSPECTION
  - SAFE ENDS ALSO HAVE ID CLAD OF "LOW CARBON-HIGH FERRITE", EXCEPT OVER ROOT PASS OF NOZZLE-TO-SAFE END WELD (INCONEL 182)
  - REMAINING SAFE-ENDS WILL BE PROTECTED BY HYDROGEN WATER CHEMISTRY
  - HIGH RADIATION EXPOSURE (~180 MAN-REM TO MACHINE OD CLAD, STRESS IMPROVE AND INSPECT)
  - UTILIZE 12R EXPERIENCE TO REDUCE FUTURE RADIATION EXPOSURE
  - 4 VESSEL INLET SAFE ENDS WILL BE STRESS IMPROVED AND INSPECTED DURING 13R (NO DECON BENEFIT)
  - 4 VESSEL OUTLET SAFE ENDS WILL BE STRESS IMPROVED AND INSPECTED DURING 14R (DECON REDUCES RADIATION EXPOSURE BY FACTOR OF TWO MINIMUM)

BASIS FOR GPUN'S 12R INSPECTION PLAN

- FOCUS ON WELDS NOT INSPECTED IN 10R (82-03) OR 11R (84-11)
- PERCENTAGES ARE A COMBINATION OF 84-11 AND DRAFT REV. 2 OF NUREG 0313
  - STRESS IMPROVED IN 11R (RECIRC-61, ALL POST PROCESS INSPECTED): 10% OF TOTAL SYSTEM WELDS
  - REMAINDER OF SYSTEMS INSIDE 2ND VALVE: 20% OF TOTAL SYSTEM WELDS, MOSTLY UNINSPECTED IN 10R OR 11R
  - ISOLATION CONDENSER OUTSIDE 2ND VALVE: 10% OF TOTAL SYSTEMS WELDS (ALL INSPECTABLE WELDS INSPECTED IN 10R, 17 NEW WELDS INSTALLED IN 10R)
  - IGSCC FOUND IN 11R: FOUR WELDS (3 IN RECIRC., AND 1 IN ISOLATION CONDENSER OUTSIDE DRYWELL)
  - THREE OF THE OVERLAYS DEPOSITED IN 10R (ISOLATION CONDENSER): 10% OF TOTAL SYSTEM WELDS
  - ALL SAFE END WELDS WHICH ARE STRESS IMPROVED WILL BE POST PROCESS INSPECTED
  - SAMPLE EXPANSIONS, SHOULD IGSCC BE FOUND, IN ACCORDANCE WITH 84-11 ON A SYSTEM BASIS.

BASIS FOR GPUN'S 12R PLAN (CONTINUED)

- 84-11 REQUIRED REINSPECTION OF WELDS INSPECTED TO 82-03
  - 84-11 INSPECTIONS PERFORMED UNDER PERSONNEL REQUALIFICATION PROGRAM
  - VERIFIED ADEQUACY OF 82-03 INSPECTIONS
- HWC TO BE IMPLEMENTED START OF CYCLE 12
- NWC CONDUCTIVITY SINCE 82-03 INSPECTIONS EXCELLENT
  - AVERAGE~0.11 uS/CM., FEW UPSETS
  - CRACK GROWTH VERY SLOW UNDER THESE CONDITIONS
- GPUN'S PLAN, CONSISTENT WITH DRAFT REV. 2 OF NUREG-0313, DOES NOT REQUIRE SUCCESSIVE-OUTAGE INSPECTION OF CATEGORY D WELDS

INSPECTION AFTER STRESS IMPROVEMENT

- PLAN
  - 2 RECIRC SAFE ENDS (4 WELDS) - INSPECT AFTER SI
  - 2 CORE SPRAY SAFE ENDS (4 WELDS) - INSPECT AFTER SI
  - 2 ISOLATION CONDENSER SAFE ENDS (4 WELDS) - INSPECT AFTER SI
  - 22 CORE SPRAY PIPE WELDS (8" NPS)-INSPECT 5, AIM TO PERFORM AFTER SI
  - 9 ISOLATION CONDENSER PIPE WELDS (10" NPS) - INSPECT 5, AIM TO PERFORM AFTER SI
- BASIS FOR INSPECTING < 100% OF SI'D WELDS
  - GENERAL PHILOSOPHY - BETTER TO SI AND INSPECT < 100% THAN NOT PERFORMED SI
  - ALARA - WELD CROWN REDUCTION AND INSPECTION HAVE BIG IMPACT ON DOSE (~18 MAN-REM FOR CURRENT PIPE SI SCOPE)

SUMMARY AND CONCLUSIONS

- INSPECTION PLAN ADEQUATE TO DETERMINE IF MAJOR IGSCC PROBLEM EXISTS AT OYSTER CREEK
- GOOD WATER CHEMISTRY IN CYCLES 10 AND 11 AND HYDROGEN WATER CHEMISTRY IN CYCLE 12 SIGNIFICANTLY REDUCES POTENTIAL FOR NEW CRACKS AND GROWTH RATE OF EXISTING NON DETECTED CRACKS, IF ANY
- MINIMIZES AND BALANCES MAN-REM EXPOSURES OVER THREE OUTAGES
- ALL WELDS WILL HAVE BEEN INSPECTED AT LEAST ONCE FOR IGSCC BY THE END OF 13R EXCEPT 4 RECIRCULATION SAFE ENDS (8 WELDS) (14R) AND 13 RWCU WELDS OUTSIDE DRYWELL (14R)
- RESOLVES ALL OPEN CONCERNS WITH SEP TOPIC III-5.B AND PIPE BREAK INSIDE PENETRATION. THEREFORE, GPUN WILL PROPOSE DEFERRING PENETRATION X-5A REPAIR TO 13R TO ALLOW PERMANENT RESOLUTION OF ALL ISSUES RATHER THAN INSTALLING A FLOW BAFFLE

DISTRIBUTION
Docket
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