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SOUTHERN COMPANY
Energy to Serve Your World℠

May 26, 2004

Docket No.: 50-364

NL-04-0910

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Joseph M. Farley Nuclear Plant – Unit 2
Results of Reactor Pressure Vessel Head Inspections
Required by First Revised NRC Order EA-03-009

Ladies and Gentlemen:

During the recent spring refueling outage at Unit 2 of the Farley Nuclear Plant (FNP), Southern Nuclear Operating Company (SNC) completed inspections as required by First Revised NRC Order EA-03-009. The Revised Order was issued February 20, 2004 to establish interim inspection requirements for reactor pressure vessel (RPV) heads at pressurized water reactors. SNC hereby reports the results of those inspections as required by Paragraph E of Section IV of the Order. In addition, this letter reports the results of a bare metal visual examination of the RPV bottom head penetrations as requested by NRC Bulletin 2003-02.

With an Effective Degradation Year (EDY) value at the start of the spring refueling outage of 16.8 years as calculated per Section IV.A of the Revised Order, FNP Unit 2 fell into the High (EDY >12) category for susceptibility to primary water stress corrosion cracking (PWSCC) established by Section IV.B, hence, the inspection requirements of Section IV.C(5) were applied along with the inspection requirements of Section IV.D.

As permitted by Footnote 2 to Section IV.C of the Revised Order and cited in SNC's March 10, 2004 Answer to the Revised Order, the FNP Unit 2 RPV head inspections were performed in accordance with a previously accepted inspection plan. This plan was approved by an NRC letter dated April 25, 2003 and relaxed by an NRC letter dated April 2, 2004, as requested by SNC letters dated March 25, 2004 and April 1, 2004. The approved relaxation pertained to the requirements of Section IV.C.(5)(b)(i) due to limitations in the non-destructive examination (NDE) coverage achieved at five Unit 2 RPV head penetration nozzles (see Table 1).

Inspection Results:

Revised Order Section IV.C.(5)(a):
No evidence of head material wastage or of leaking or cracked nozzles was found by bare metal visual examination of the RPV top head. Some white crystalline debris was noted,

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possibly boric acid residue from previous Conoseal or other leaks above the head, but this debris did not preclude visual inspection of the head surface. SNC's previously accepted inspection plan required examination of the head surface to the extent possible, with 100% coverage of surface areas adjacent to the penetration nozzles. This was a relaxation of the original Order's requirement to inspect 100% of the head surface. SNC requested this relaxation because of the small area (<1% of the gross external head surface) made inaccessible by the support structure for the ventilation shroud. Examination of the RPV top head in accordance with the relaxed requirement was achieved, with all penetration nozzles (69 – 4" OD nozzles plus 1 – 1" OD head vent nozzle) examined 360° around.

Revised Order Section IV.C.(5)(b)(i):
No evidence of PWSCC or of leakage into the interference fit zone was found by ultrasonic testing (UT) of the 69 – 4" OD RPV top head penetration nozzles. Per SNC's previously accepted inspection plan, UT coverage was required to extend from 2" above the J-groove weld down to at least 1" below the lowest point of the toe of the J-groove weld. This UT coverage criterion reflected inspection limitations imposed by the physical configuration of the 4" OD nozzle ends, which are externally threaded and internally tapered. Complete UT coverage was achieved for the 4" OD nozzles in accordance with this requirement except for five nozzles where UT coverage did not extend at least 1 inch below the J-groove weld (see Table 1). Relaxation for these nozzles was requested in an SNC letter dated March 25, 2004 and was approved by an NRC letter dated April 2, 2004. The required assessment to determine if leakage had occurred into the interference fit zone was performed for each nozzle. In addition to the UT examination, eddy current testing (ECT) was performed on the internal surface of the 4" OD nozzles down to the taper. Very small indications were noted on the ID of some nozzles during this supplemental ECT examination. These indications were not confirmed with UT data and were considered inconsequential.

Table 1 – From SNC's Letter of March 25, 2004
FNP Unit 2 Spring 2004 RPV Head Inspection
Nozzles With UT Coverage Less Than 1 Inch
Below Lowest Point of Toe of J-Groove Weld (i.e. downhill side)

Nozzle #	Weld Angle	Minimum UT Coverage Achieved Below J-Groove Weld	Hoop Stress at Lowest Point of Coverage[1]
62	42.6°	0.76 inches	5000 psi
63	42.6°	0.92 inches	zero to compressive
65	42.6°	0.92 inches	zero to compressive
66	42.6°	0.96 inches	zero to compressive
69	42.6°	0.76 inches	5000 psi

1. Approximate values taken from Figure 9 hoop stress curves provided in Enclosure 1 of April 11, 2003 SNC letter to NRC

Revised Order Section IV.C.(5)(b)(ii):
No evidence of PWSCC was found by ECT of the 1" OD head vent penetration nozzle and associated J-groove weld. ECT was performed on the wetted surface of the J-groove weld and on the internal surface of the nozzle from 2" above the J-groove weld down to the bottom of the nozzle.

Revised Order Section IV.D:
Visual inspections were performed to identify potential boric acid leaks from pressure-retaining components above the RPV top head. No evidence of current leakage was found and no post-inspection cleaning was warranted.

Bulletin 2003-02 RPV Bottom Head Inspection:
In addition to the bare metal visual examination of the RPV top head required by the Revised Order, a visual examination was performed on the outer surface of the RPV bottom head, as described in SNC's September 19, 2003 response to NRC Bulletin 2003-02. Visual examination was performed around the 50 – 1.5" OD bottom mounted instrument (BMI) nozzles and on the RPV bottom head surface surrounding the nozzles. No evidence of head material wastage or of leaking or cracked nozzles was found by this examination. The as-found condition of the bottom head and nozzles included such non-relevant indications as light rust stains and tape residue with adhered fibers. No post-inspection cleaning was warranted.

Conclusion:
The inspections performed on the FNP Unit 2 RPV head during the recent refueling outage disclosed no indications of PWSCC, active leakage, or head material wastage. These inspections are anticipated to be the last performed on the current head, which is scheduled to be replaced at the next FNP Unit 2 refueling outage in fall 2005.

This letter contains no new NRC commitments. If you have any questions, please advise.

Mr. L. M. Stinson states he is a Vice President of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

R. M. Stinson

L. M. Stinson

Sworn to and subscribed before me this 26 *day of* May, *2004.*

Gloria D. Byrd
Notary Public

My commission expires: 6-7-05

LMS/DWD/sdl

cc: Southern Nuclear Operating Company
Mr. J. B. Beasley, Jr., Executive Vice President
Mr. D. E. Grissette, General Manager – Plant Farley
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U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. S. E. Peters, NRR Project Manager – Farley
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