

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Reprort No. 50-546/79-07; 50-547/79-07

Docket No. 50-546; 50-546

License No CPPR-170;CPPR-171

Licensee: Public Service of Indiana
1000 East Main Street
Plainfield, IN 46168

Facility Name: Marble Hill Nuclear Generating Station, Units 1 and 2

Inspection At: Marble Hill Site, Jefferson County, Indiana

Inspection Conducted: June 9, 21-22, and 25-29 and July 2-7, 1979

Inspectors: *DW Hayes for* 9/18/79
P. C. Hawkins
CC Williams 9/18/79
C. C. Williams
for J. E. Konklin 9/18/79
RC Knapp for 9/18/79
F. J. Jablonski
DW Hayes for 9/18/79
J. F. Suermann
DW Hayes for 9/18/79
J. Hughes

Other Accompanying Personnel: J. G. Keppler
G. Fiorelli
D. W. Hayes
E. R. Schweibinz
J. E. Foster

Approved by: *DW Hayes* 9/18/79
D. W. Hayes, Chief
Engineering Support Section 1

1382 521

7911210

247

Inspection Summary

Inspection on June 9, 21-22, 25-29, and July 2-7, 1979 (Report No. 50-546/79-07; 50-547/79-07)

Areas Inspected: Follow-up on 10 CFR 50.55(e) Item concerning the repair of defective concrete located in the Auxiliary Building; Review of PSI and G. K. Newberg (N-MH) implementing procedures; Review of Qualification and Training records for licensee and contractor personnel; Interviews with licensee and contractor personnel; Observations of Category II Concrete Work under the provisions of the Region III Immediate Action Letter of June 27, 1979; Review of concrete quality records (Units 1 and 2); Review of the licensee's 100% "Overview Program"; Observation of concrete nondestructive testing work and review of related quality records. This inspection involved a total of 258 inspector-hours onsite by eleven inspectors.

Results: Of the eight areas inspected, no items of noncompliance or deviations were found in seven areas; one item of noncompliance was identified relative to the nondestructive concrete testing program (Infraction - Failure to assure purchased services conform to procurement documents - Paragraph 6.c.(1).

1382 322

Introduction

This report is one of several reports documenting results of inspections performed at the Marble Hill construction site over the past several months by the NRC Office of Inspection and Enforcement (IE) Region III and by the U. S. Army Engineer Waterways Experiment Station culminating in the issuance of an Order Confirming Suspension of Construction on August 15, 1979.

On June 12, 1979, the NRC received information that a former worker at the Marble Hill site had alleged improper repairs of honeycomb areas in concrete. The allegations were contained in a sworn statement submitted to the Office of Nuclear Reactor Regulation (NRR) through an attorney representing an Indiana intervenor group. Subsequently Region III IE received a copy and initiated an investigation on June 22, 1979. The results of this investigation are documented in Report No. 50-546/79-08.

Prior to receipt of the allegations during inspections conducted in April 3-6 and April 30-May 3, 1979, problems were identified relative to the placement and repair of concrete. A management meeting with PSI was held on May 15, 1979, to discuss these findings. The results of the inspections and the May 15, 1979, meeting are documented in Report Nos. 50-546/79-03, 79-04 and 79-05.

On June 26, 1979, a second meeting was held with PSI officials to discuss the findings of the investigation at that point and the fact that deficient repairs of concrete had been identified. As a result of this meeting PSI agreed to stop concrete activities for safety related structures, perform non-destructive examinations of various concrete structures, identify and evaluate repaired areas for adequacy and review their entire program for concrete activities on site. An Immediate Action Letter (IAL) dated June 27, 1979, was issued confirming this agreement. A copy of this letter is attached to Report No. 50-546/79-07.

On June 27-29 and July 2-7, 1979, an inspection was conducted relative to items 1, 2, 3, 4 and 5 of the IAL. Based on the results of this inspection, documented in Report No. 50-546/79-07, IE: Region III concurred in the resumption of concrete placement for Safety Related Structures. The conditions for this concurrence are contained in a Region III letter to PSI dated July 13, 1979. A copy of the July 13 letter is attached to Report No. 50-546/79-07.

Report No. 50-546/79-09 documents results of an inspection conducted during the period July 9 through July 27, 1979. Initial results of this inspection led to a site management meeting on July 20, 1979, and an understanding that PSI would again stop concrete activities for Safety Related structures. A second IAL dated July 23, 1979, was issued documenting this understanding and a copy is attached to Report No. 50-546/79-09.

Report No. 50-546/79-10 documents the results of an inspection conducted July 10-13, 1979, relative to the erection of safety related steel structures.

On July 24, 1979, IE: Region III learned that a team from the National Board of Boiler and Pressure Vessel Inspectors had conducted an inspection on June 12-14, 1979, at the Marble Hill site during which numerous items of noncompliance with the ASME Code were found. As a result of the National Board's inspection and the IE: Region III findings a comprehensive team inspection was conducted during the period July 26-28 and July 31-August 3, 1979. The purpose of this inspection was to identify the underlying causes leading to the concrete and ASME code deficiencies and to determine if they were symptomatic of problems in other areas. The results of this inspection, documented in Report No. 50-546/79-11, indicated that problems in the Quality Assurance/Quality Control (QA/QC) program in concrete construction activities extended to other construction areas as well.

At the request of PSI, representatives of Region III and PSI management met again on August 1, 1979, to discuss PSI's planned actions to correct the programmatic QA/QC problems at the Marble Hill site. The meeting included a discussion of the desirability of stopping all safety related construction activities at the Marble Hill site until such time as the licensee demonstrates that it has an effective QA program acceptable to the NRC. The licensee issued a stop work order on August 7, 1979, for all safety related construction. An order confirming this suspension of construction was issued on August 15, 1979, by the NRC. A Meeting was held with PSI management in the Region III offices on August 15, 1979, to discuss the conditions of the confirming order. The meeting is documented in Report No. 50-546/79-14.

On June 28, 1979, NRC headquarters personnel met with Congressman Deckard of Indiana. During this meeting Congressman Deckard provided information concerning allegations he had received involving improper activities by the concrete testing laboratory at the Marble Hill construction site. As a result of this information the U. S. Army Engineer Waterways Experiment Station was requested to perform an independent inspection of the testing laboratory activities. The results of the Corps of Engineers inspection conducted July 25-27, 1979, are documented in Report No. 50-546/79-16.

Report No. 50-546/79-18 documents the results of NRC Region III followup inspection conducted August 13 and 14 and September 4-7, 1979, relative to the unresolved items identified by the Corps of Engineers in report No. 50-546/79-16.

Report Nos. 50-546/79-06, 12, 13, 15 and 17 document results of routine or surveillance inspections conducted May 29-June 1, August 7-10, August 3-17, August 21-24 and August 27-31, 1979, respectively.

1382 324

DETAILS

Persons Contacted

Public Service of Indiana (PSI)

S. W. Shields, Vice President - Electric System
J. Coughlin, Vice President - Nuclear
L. A. Crews, Vice President- Construction
F. R. Hodges, QA Manager
J. J. Cook, Senior Staff Construction Engineer-Nuclear
J. Simmons, Public Relations
R. M. Brown, Construction Project Superintendent
R. E. Woolley, Construction Supervisor, Engineering
W. E. Ward, Nuclear Construction Manager
T. L. McLarty, QA Construction Supervisor
W. A. Muensterman, Senior Construction Project Engineer
S. K. Farlow, Site Design Control Supervision
R. Latronica, Senior Construction Project Engineer
J. H. Mansker, Construction Project Engineer
D. L. Shuter, QC Engineer
W. T. Smith, Construction Field Office Supervisor
W. G. Minnick, QC Inspector
W. Emmerling, QC Inspector
M. Bright, QC Inspector
A. Kennedy, QC Inspector

Newberg - Marble Hill

F. Durocher, Construction Manager
C. Mayer, QA Administrator
C. E. Guy, QA Supervisor
J. Ball, QC Engineer
M. Rose, QC Engineer
J. Spann, QC Engineer
J. Moore, QC Engineer
R. Narva, QC Engineer
T. Zimmer, QC Engineer

U.S. Testing Laboratory

D. Lanham, Lab Manager
W. Thompson, Field Concrete Testing Supervisor

Whalen-Chilstrom Joint Venture

R. W. Noyes, Quality Assurance Supervisor

1382 525

Other Personnel:

K. T. Kostal, Senior Structural Project Engineer, S & L
A. M. Weiss, Concrete Technologist, S & L
R. Muenow, Muenow & Associates, NDE Specialists
J. Guest, Foreman, American Guniting Company
R. F. Klouthis, Material Technologist, Portland Cement Association

Other Inspection Areas:

Review of 10 CFR 50.55(e) Item Reported by the Licensee (Open)

On June 9, 1979, the inspector witnessed in-process work related to the repair of an area of defective concrete identified and reported by the licensee pursuant to the requirements of 10 CFR 50.55(e). The area is located at elevation 373'-6", L to N line and 28 to 31.3 line in the auxiliary building and is identified by Newberg NCR No. 347. The method of repair was as specified in G. K. Newberg procedure APN-33, Revision 0, entitled Guniting. Inspections were performed during pre-placement, placement and post-placement phases of the gunite repair work with the following specific observations being made.

1. Replacement Work Activities and Related Quality Records

The inspector:

- a. confirmed that Newberg Gunite Procedure WPN-33 Revision 0, dated June 9, 1979 had been reviewed and approved by the appropriate authorities prior to commencement of work.
- b. reviewed the qualification records of the two American Guniting Company personnel and confirmed that they met the minimum guidelines for experience as set forth in ACI 506-66, Chapter 5.
- c. confirmed that the back-up batch scales for cement/fly ash (due July 8, 1979) and aggregate (due July 8, 1979) were calibrated and properly tagged to indicate calibration status.
- d. confirmed that all unsound material was removed from the void area by chipping and the surface cleaned by water blasting. The prepared surface was dampened as directed by the architect engineer prior to the start of operations in accordance with ACI 506-66.
- e. confirmed that inspection and signoff had been completed and the prepared area released for placement by Newberg Quality Control. Placement Release had been received from PSI prior to commencement of the repair work.

1382 526

2. Placement Work Activities

- a. In addition to the actual repair, three 3' x3' x9" test panels were prepared and gunited to simulate the actual conditions to be encountered in the void repair. The investigation into the acceptability of these test panels is discussed in detail in Paragraph 3 below.
- b. The inspector verified that properly proportioned dry mix (3200 lbs. sand, 940 lbs. cement) was batched by the back-up batch plant (Tickets 1 through 4), and mixed in ready-mix trucks in accordance with ACI 504-44.

3. Post-Placement Work Activities

- a. Licensee personnel stated that six 3" diameter cores were taken from the overhead 3' x3' x9" test panel. Compressive strength testing yielded the following results:

| <u>Core No.</u> | <u>Compressive Strength (psi)</u> | <u>Test Age (days)</u> |
|-----------------|-----------------------------------|------------------------|
| 5-1 | 9720 | 6 |
| 2-0 | 6880 | 11 |
| 6-1 | 8680 | 11 |
| 5-0 | 5940 | 11 |
| 8-1 | 8990 | 11 |
| 3-0 | 5970 | 11 |

Minimum strength required for the repair material was 3500 psi.

- b. The vertical 3' x3' x9" test panel, which contained four layers of No. 11 reinforcing bars, was saw cut into quarters to determine if proper consolidation was achieved in this simulation of the actual repair area. The results of the investigation showed areas of poor gunite consolidation between and behind the No. 11 reinforcing steel. Licensee personnel stated that the repaired area would be re-evaluated using nondestructive ultrasonic testing to determine if proper bonding and consolidation was actually achieved in the repair area.

Pending review of the nondestructive ultrasonic test results, this matter remains open. (546/79-07-01; 547/79-07-01)

Functional or Program Areas Inspected

This report encompasses the events immediately following the IE Immediate Action Letter (IAL) of June 27, 1979 (see attached Exhibit A) Inspection results through July 7 and the July 13, 1979, RIII letter allowing the placement of safety related (Category I) concrete to resume based on PSI's completion of Items 3 and 4 of the IAL. The following specific areas were reviewed in detail:

1382 527

1. Review of PSI and G. K. Newberg Construction Company Procedures

- a. PSI Procedures - The RIII inspector reviewed the following PSI Construction Management Manual Procedure CMP 3.8 - "Surveillance of Site Activities." The procedure met requirements in that it included appropriate quantitative and qualitative acceptance criteria.
- b. G. K. Newberg (N-MH) Procedures - The inspector reviewed specific N-MH procedures related to the receipt and storage of concrete materials; the transportation, placement, curing and finishing of safety-related concrete; repair of defective in-place concrete; inspection and test control as related to concrete activities; audits; and nonconformance identification and corrective action. The following specific procedures were reviewed:

- WPN-7, Revision 5, dated June 23, 1979, "Receiving and Storage of Concrete Materials."
- WPN-9, Revision 10, dated July 3, 1979, "Concrete Placement, Cure, and Finish."
- WPN-25, Revision 0, dated July 25, 1978, "Major Void Concrete Repair."
- WPN-29, Revision 0, dated January 9, 1979, "Concrete Wall Sealing."
- WPN-31, Revision 0, dated March 13, 1979, "Grout Placement."
- WPN-33, Revision 0, dated June 8, 1979, "Guniting."
- WPN-35, Revision B, dated June 24, 1979, "Dry Pack Patching."
- QAPN-4 (latest revision), "Audits."
- WPN-10, Revision 4, dated June 24, 1979, "Inspection and Test Control."
- QAPN-14 (latest revision), "Nonconformance and Corrective Action."

Review of these procedures included verification that they contained the upgraded quality control program requirements. Following is a list of licensee commitments and their corresponding implementing procedures.

- Develop "Production Preplacement Evaluation" procedure; WPN-34, Rev. 0, dated June 23, 1979.

1382 528

- Proceduralize that a minimum of one N-MH QC inspector will be at concrete truck discharge for assurance of proper mix and one N-MH QC inspector (minimum) at point of placement to assure proper concrete placement and consolidation; QAPN-10, Rev. 4, Section 4.1.4, dated June 24, 1979.
- Procedurealize the use of 3" air vibrators in lieu of 2" electric vibrators to increase the sphere of influence in some applications; WPN-34, Rev. 0, dated June 23, 1979.
- Provide concrete placing personnel with additional indoctrination; WPN-9, Rev. 10, Section 4.5.3 dated July 3, 1979.
- Provide one concrete foreman for each concrete placement team; WPN-9, Rev. 10, Section 4.1.2, dated July 3, 1979.
- Only a maximum of two Category I (safety-related) placements will occur at the same time to assure direct control of placement operations by N-MH QC personnel; WPN-9, Rev. 10, Section 4.2.1, dated July 3, 1979, and QAPN-10, Rev. 5, Section 4.9 (approval pending).
- Only the concrete superintendent can order concrete after being notified of complete sign off by PSI and N-MH QC personnel; WPN-9, Rev. 10, Section 4.1.2.
- *- Develop "Dry Pack Repair" procedure; WPN-35 (approval pending).
- *- Provide additional Finisher superintendent to allow one Superintendent for patching of defective concrete and one superintendent for concrete finishing; WPN-35 (approval pending).
- *- Provide training of finishers to job patching standards by superintendent before being allowed to begin work. Only trained finishers will be allowed to patch defective concrete repair areas; WPN-9, Rev. 10, Section 4.7.2, dated July 3, 1979, and WPN-35, Section 4.13 (approval pending).
- *- Provide training of laborers for mixing of dry pack patching materials; WPN-35, Section 4.14 (approval pending).
- *- Proceduralize the use of bag cement for patching; WPN-35 (approval pending).
- *- Proceduralize the practice of discarding mixed dry pack material after two hours; WPN-35, Section 4.7 (approval pending).

1382 529

- *- Proceduralize the use of a volume container for mixing of dry pack patch materials; WPN-35, Section 4.8 (approval pending).
- Revise the honeycomb repair sections of QAPN-10 to allow control of identification, chipping, and patching of defective concrete areas and to allow for PSI concurrence; QAPN-10, Rev. 4, Section 4.10.3, dated June 24, 1979.
- Proceduralize the use of the N-MH Daily Work Schedule to notify N-MH QC personnel and PSI personnel of areas being form stripped to assure timely identification of defective concrete areas; QAPN-10, Rev. 4, Section 4.1.1, dated June 24, 1979.
- Assign N-MH, QC personnel to specific areas of responsibility; N-MH letter dated May 3, 1979, and subsequent N-MH letter dated July 20, 1979.
- *- Appoint an assistant to N-MH site Vice President to allow closer management involvement; no confirmation that this commitment has been met at the time of this inspection.
- Proceduralize the requirement to place a member of the concrete curing crew with the form stripping crew when form removal is accomplished prior to the end of the specified curing period; WPN-9, Rev. 10, Section 4.8.2 dated July 3, 1979.
- Assure sign off of the Concrete Placement Check List by N-MH QC personnel and subcontractor QC personnel is accomplished only when there is evidence that the in-place work will not be rendered unacceptable by work still in progress. Sign off is valid only for the date indicated. If for any reason, concrete placement is postponed beyond the indicated sign off date, a reinspection and sign off will be accomplished prior to the new scheduled date; QAPN-10, Rev. 4, Section 4.5, dated June 24, 1979.
- Proceduralize the requirement to conduct a training class by N-MH QC and production supervisor immediately prior to commencement of concrete placement with emphasis on placement in unique areas; QAPN-10, Rev. 4, Section 4.9, dated June 24, 1979.
- N-MH QA Administrator will be on-site to conduct an indepth review of existing procedures and to assist in further intensified training of supervisory personnel; the RIII inspector verified that the QA Administrator was on-site and performing the necessary reviews and training.

1382 530

- *- Reduce mix coarse aggregate by 10% for conveyor mixes; the licensee informed the RIII inspector that mix qualification tests were underway for these adjusted mixes but that the mixes were not approved or presently being used on site.
- *- Contact Scott Co. Stone Company and request that screening at the quarry be changed to allow the coarse aggregate gradation to move toward the finer end of the established gradation scale; the N-MH June 22, 1979, memo from H-MH QA manager to Scott Co. Stone Co. requesting them to increase the fine content was reviewed by the RIII inspector. The licensee stated that this requirement has not been fully implemented as of this date.

Items denoted above with an asterisk (*) are considered to be unresolved and will be further reviewed during a future inspection. (546/79-07-02; 547/79-07-02)

No items of noncompliance were identified.

2. Review of Qualification and Training Records for Marble Hill Site Personnel

a. PSI QC Personnel

- (1) The IE inspector reviewed PSI procedures CMP 3.10 "Qualification of Construction QA Personnel," Rev. 1, dated November 7, 1977, and QAP 6.8 "Training and Qualification," Rev. 21, dated July 17, 1978. Both of these documents are PSI's implementation of ANSI Standard N45.2.6-1973 "Qualifications of Inspection, Examination, and Testing Personnel for the Construction Phase of Nuclear Power Plants." The inspector reviewed the personnel records of seven PSI QC inspectors against the requirements stated in the above documents.
- (2) The qualification and training records for four U.S. Testing Co. (Hoboken, NJ office) personnel, hired as temporary augmentation of PSI's QC staff, were evaluated against the requirements of ANSI N45.2.6-1973 and each was found to be qualified.
- (3) The qualification and training records for three Sargent and Lundy (S&L) personnel, hired as temporary augmentation of PSI's QC staff, were evaluated against the requirements of ANSI N45.2.6-1973 and each was found to be qualified.
- (4) Subsequent to these reviews (Items 1-3), the RIII inspector reviewed records of training classes given concerning the upgraded program requirements as follows:

1382 331

- (a) Training class records showed that on July 2-3, 1979, five PSI QC inspectors, four U.S. Testing Co. (Hoboken, NJ office) personnel, and two S&L personnel were given training on the latest revisions of WPN-34, WPN-9, QAPN-10, and WPN-35. The U.S. Testing and S&L personnel referred to here are part of the PSI augmented QC program.

The July 2-3, 1979, class topics were:

- 1 N-MH construction organization
- 2 Prerequisites for concrete placement
- 3 Concrete placement and inspection during placement
- 4 Post-placement inspections
- 5 "Hold" and repair procedures for defective concrete
- 6 Repair inspections and release
- 7 Documentation

- (b) A subsequent review on July 12, 1979, revealed that two PSI QC inspectors received training on QAPN-10, Rev. 4, WPN-9, Rev. 10, and WPN-34, Rev. 0. The RIII inspector confirmed that all PSI QC personnel performing inspections under the upgraded QC program had received training on the latest approved revisions to that program.

b. N-MH QC Personnel

- (1) The qualification and training records for twelve N-MH QC personnel were evaluated against the requirements of ANSI N45.2.6-1973.
- (2) In addition, the RIII inspector reviewed records of training classes given relative to the upgraded program requirements as follows:
 - (a) Training class records showed that on June 25, 1979, eight N-MH QC inspectors received training on QAPN-10, Rev. 4.
 - (b) Training class records showed that on July 5, 1979, eight N-MH QC inspectors received training on WPN-34, Rev. 0, and WPN-7, Rev. 5.
 - (c) On July 3, 1979, a training class which outlined and defined the five PSI "Hold Points" was given to seven N-MH QC inspectors.
 - (d) Subsequent review of training class records on July 13, 1979, showed that on July 12, 1979, eight N-MH QC inspectors received training on WPN-9, Rev. 10.

The RIII inspector confirmed that all N-MH QC personnel presently inspecting under the upgraded QC program have received training on the latest approved revisions to that program.

c. N-MH Production Personnel

Records of indoctrination and orientation training of production personnel were reviewed. On July 3, 1979, two concrete superintendents were given training relative to the requirements of N-MH procedures WPN-7, Rev. 5, WPN-9, Rev. 10, and WPN-34, Rev. 0.

d. Whalen-Chilstrom Personnel

- (1) The qualification and training records for three Whalen-Chilstrom (W-C) QC personnel were evaluated against the requirements of ANSI N45.2.6-1973 and found to be qualified in accordance with this standard.
- (2) Subsequently, on July 10, 1979, the RIII inspector confirmed that on July 9, 1979, the W-C QA supervisor conducted a training session on WCQAP-9, Rev. 5 (upgraded program requirements) for three QC inspectors. This training was conducted in accordance with WCQAP-7.

Overall, the training records appeared to meet the requirements of the applicable procedures or standard; but in some cases for PSI and N-MH QC personnel, it appears a liberal interpretation of "prior experience" (an allowable factor in determining level of capability according to ANSI N45.2.6-1973) was used in assigning levels of capability to QC personnel.

The ANSI standard is recognized as a guide and the requirements are not absolute, but the judgment used in giving credit for non-technical degrees or length of service in related but not similar inspection or testing work is open to question. The lack of nuclear QA/QC experience places a heavy burden on the licensee's training program to insure capable fully qualified inspectors. In the specific case of PSI, the fact that PSI procedure CMP 3.10, Rev. 1, allowed for a liberal interpretation of the educational and prior experience requirements enumerated in ANSI N45.2.6, resulted in several personnel being only marginally qualified. This matter is considered unresolved. (546/79-07-03; 547/79-07-03)

No items of noncompliance were identified.

1382 333

3. Personnel Interviews

The RIII inspectors conducted interviews with QC and production personnel concerning their knowledge of QC program requirements and general construction practices.

a. PSI QC Inspectors

On June 29, 1979, the inspector talked to two PSI civil inspectors who are qualified to sign off for concrete placement on safety-related pours, but who had not done so because safety-related concrete had been stopped at this time. The purpose of the discussion was to assess the PSI inspector's knowledge of the requirements for the activities they are performing, including their familiarity with the recent changes to the procedures which are part of the PSI upgraded program.

The inspector found that neither of the two PSI civil inspectors had reviewed the recent procedure changes and that, therefore, they were not able to discuss the upgraded program requirements for concrete work in a knowledgeable manner.

In addition, both PSI civil inspectors exhibited a lack of knowledge regarding specific requirements relating to concrete inspection. For example, neither inspector could correctly define the difference between a major honeycomb and a minor honeycomb, one inspector did not know the curing time requirement for a grout placement used in void repair, neither inspector was clear regarding what constitutes clean reinforcing steel, and one inspector who performs inspections on concrete materials did not know the requirements for water quality or where to find them.

Subsequent to these interviews, the licensee conducted training classes to familiarize the responsible PSI QC inspectors with the requirements of the upgraded program. These training classes are discussed in detail in Paragraph 2.a(4) above. Through additional discussions, the RIII inspector confirmed that the PSI QC inspectors were cognizant of the upgraded program requirement prior to the start of Category I (safety-related) concrete activities.

The inspector discussed the results of the above interviews with the PSI QA Manager and Construction Project Superintendent. The licensee stated that the training requirements for inspectors are being evaluated as part of the upgraded program. This is considered to be an unresolved item. (546/79-07-04; 547/79-07-04)

1382 334

b. N-MH QC Inspectors

On July 2, 1979, the RIII inspector held discussions with two N-MH QC inspectors to assess their knowledge of concrete placement techniques and general construction knowledge. The two inspectors were knowledgeable of specific concrete specification requirements, applicable industry standards requirements, and the requirements of the upgraded QC program.

c. N-MH Production Personnel

On July 2 and 6, 1979, the RIII inspector discussed with four N-MH concrete placing personnel the proper methods of concrete placement and consolidation. Each was aware of specific placing and consolidation techniques which apply to the Marble Hill site.

4. Observation of Category II Concrete Work and Associated Concrete Quality Records

The RIII inspectors observed two Category II concrete placements (non-safety related) during the week of July 2, 1979, under the provisions in Item 3 of the IE Immediate Action Letter of June 27, 1979. This program was implemented to permit the NRC to review and evaluate QA program improvements instituted by PSI as a result of previously identified concrete deficiencies in Category I work. Under this revised program, QA/QC controls for Category II concrete activities were the same as would be applied for Category I concrete work in safety related structures. Specific observations for each Category II placement are as follows:

a. Radwaste Tunnel Walls Placement

The RIII inspector observed the in process pre-placement, placement, and post-placement concrete work activities for the July 2, 1979, placement of pour No. RTW-388-2A and 3A. The placement consisted of approximately 60 cubic yards of mix No. 3504 concrete and 17 cubic yards of mix No. 3551 grout.

(1) Pre-Placement Inspection

- (a) Horizontal and vertical construction joints were observed to be properly prepared for concrete placement.
- (b) Reinforcing steel and embedments were observed to be free of excessive rust, mill scale, concrete, or other contaminants.
- (c) Formwork was observed to be properly cleaned and prepared for concrete placement.

- (d) Review of the N-MH "Check Placement Check Sheet" confirmed that all applicable pre-placement check points had been met and signed off on July 2, 1979, by the responsible N-MH QC inspectors, subcontractor QC inspectors and the N-MH QC Engineer. The area was finally released for concrete placement through completion of the PSI Placement Check Sheet.
- (e) The RIII inspector reviewed Contractor Change Request (CCR) No. 330 requesting that grout be used in lieu of concrete in congested areas of the radwaste tunnel east wall. CCR No. 330 was properly approved prior to commencement of the pour.

(2) Placement Inspection

(a) In-Process Concrete Testing

- 1 The RIII inspector observed U.S. Testing (UST) field QC personnel perform temperature tests, percent entrained air tests, unit weight tests, and cast compressive strength cylinders as required by specification No. Y-2850 Amendment 3, Section 411 for grout used in lieu of concrete. The test results were within the allowed limits and performed at the frequencies specified.
- 2 The RIII inspector observed UST field QC personnel perform slump tests, temperature tests, percent entrained air tests and cast compressive strength cylinders for concrete mix No. 3504 delivered to the pour area. The test results were within the allowed limits and performed at the frequencies specified.
- 3 Concrete test equipment was observed to be calibrated and properly marked to indicate calibration status.
- 4 Field curing boxes which were suitably equipped to maintain freshly cast compressive strength cylinders at the initial curing temperature specified by ASTM C31 were inspected. The 60-80°F temperature required was verified during this inspection.

(b) Delivery and Placement

- 1 Concrete was pumped to the placement area and then deposited via concrete drop chutes which adequately confined the concrete with a maximum

five foot free fall. Lift height thicknesses of deposited concrete was verified not to exceed 24 inches when consolidated.

- 2 Concrete was observed to be properly consolidated using internal concrete vibrators, which had been checked as required by WPN-9, Rev. 10 to verify the minimum 8000 cpm required. The vibrators were observed to be properly inserted at 12-18 inch intervals for time periods not exceeding 15 seconds.
- 3 The RIII inspector observed, two PSI QC inspectors and two N-MH QC inspectors present at the placement area (one at truck discharge and one at the placement area). This amount of QC coverage on a placement of this magnitude is considered adequate to assure proper placement and consolidation.

(3) Post Placement Inspection

The RIII inspector verified proper curing of the radwaste walls throughout the specified 7 day cure period. In addition, the RIII inspector verified through review of the N-MH "Concrete Curing Card," that N-MH QC inspectors physically checked proper cure on a daily basis throughout the cure period.

b. Unit No. 2 Turbine Pier

The RIII inspectors observed the in-process pre-placement, placement, and post-placement concrete work activities for pour No. 2TS-451-1. The Turbine Pier pour was placed on July 6-7, 1979, and consisted of approximately 4050 cubic yards of concrete (mix No. 3503 and 3504).

(1) Pre-Placement Inspection

- (a) Horizontal construction joints were observed to be properly prepared for concrete placement.
- (b) Reinforcing steel and embedments were observed to be free of excessive rust, mill scale, or other contaminants.
- (c) Formwork was observed to be properly cleaned and prepared for concrete placement.

1382 537

- (d) The RIII inspector witnessed the completion of the N-MH "Pre-Placement Evaluation Checklist" on July 5, 1979, by the N-MH Concrete Superintendent in accordance with WPN-34, Rev. 0.
- (e) Review of the N-MH "Concrete Placement Check Sheet" confirmed that all applicable pre-placement check points had been met and signed off on July 6, 1979, by the responsible N-MH QC inspectors, subcontractor QC inspectors and the N-MH QC Engineer. The area was finally released for concrete placement through completion of the PSI Placement Check Sheet.
- (f) The RIII inspector witnessed two training sessions conducted by the area N-MH QC Engineer. and the concrete supervisor (foreman). The purpose of the training sessions were to review proper placement and consolidation methods with the concrete placing crews. Areas which might pose potential placing and consolidation difficulties were highlighted to the placing crews. The training session was properly documented on the N-MH Placement Check List.

(2) Placement Inspection

(a) In-Process Concrete Testing

- 1 The RIII inspector observed United States Testing (UST) field QC personnel perform slump tests, temperature tests, percent entrained air tests, and cast compressive strength cylinders. The tests were performed in accordance with the applicable ASTM designation for each and performed at the frequencies specified by job specification Y-2722.
- 2 Concrete test equipment was observed to be calibrated and properly marked to indicate calibration status as follows:

| <u>Item</u> | <u>ID No.</u> | <u>Calibration Due</u> |
|-------------|---------------|------------------------|
| Thermometer | 314.0 | 7/17/79 |
| " | 347.0 | 8/8/79 |
| " | 427.0 | 12/8/79 |
| " | 432.0 | 12/8/79 |
| Air Meter | 272 | 7/9/79 |
| " | 273 | 9/5/79 |
| " | 274 | 9/15/79 |
| " | 318 | 8/7/79 |

| | | |
|--------------------|-----|----------|
| Field Scale | 232 | 11/7/79 |
| Unit Wt. Container | 217 | 8/18/79 |
| " | 264 | 11/10/79 |
| " | 265 | 11/14/79 |
| " | 267 | 11/14/79 |
| Slump Cone | 249 | 10/17/79 |
| " | 252 | 10/17/79 |
| " | 364 | 9/19/79 |
| " | 367 | 9/19/79 |
| " | 438 | 6/8/80 |
| " | 441 | 6/8/80 |

- 3 Field curing boxes which were suitably equipped to maintain freshly cast compressive strength specimens at the initial curing temperature specified by ASTM C31 were inspected. The 60-80°F temperature required was verified for two curing boxes during this inspection.

(b) Delivery and Placement

- 1 Concrete was transported to the placement area using one conveyor system and two pumps. Concrete hoppers with drop chutes placed throughout the pour assured that concrete during placement was adequately confined with a maximum five foot free fall.
- 2 The RIII inspector observed one instance in which concrete placing personnel exceeded the allowable 24" consolidated lift thickness. The matter was brought to the attention of PSI QC, N-MH, and N-MH Production personnel. Action was immediately taken to properly consolidate the concrete in this area.
- 3 The RIII inspector observed the use of internal concrete vibrators, which had been checked as required by WPN-9, Rev. 10 to verify the minimum 8000 cpm required. The vibrators were observed to be properly inserted at 12-18" intervals for time periods not exceeding 15 seconds. Specific vibrators checked are as follows:

| <u>Vibrator No.</u> | <u>Calibration Due Date</u> |
|---------------------|-----------------------------|
| 55 | 7/26/79 |
| 65 | 8/4/79 |
| 67 | 7/26/79 |
| 69 | 7/19/79 |

| | |
|----|--------|
| 80 | 8/4/79 |
| 84 | 8/4/79 |
| 85 | 8/4/79 |
| 86 | 8/4/79 |
| 91 | 8/4/79 |
| 76 | 8/6/79 |
| 77 | 8/6/79 |
| 79 | 8/6/79 |
| 81 | 8/6/79 |
| 75 | 8/6/79 |

- 4 The RIII inspector observed a minimum of three PSI QC personnel, seven N-MH QC personnel, one at each of three truck discharge points as required by QAPN-10, Rev. 4, Section 4.1.4), and five N-MH labor crew foremen (one for each placement team as required by WPN-9, Rev. 10, Section 4.1.2) present at the placement area.

(3) Post-Placement Inspection

The RIII inspector verified, through observation of curing compound application and wet cure of the cold joint and review of the N-MH "Curing Card" which stated that the placement was properly cured for the specified seven days. In addition, the inspector verified that a member of the concrete curing crew accompanied the form stripping crew during form removal prior to the expiration of the cure period, as required by WPN-9, Rev. 10, Section 4.8.2.

(4) Review of Nonconformance Reports (NCR)

- (a) N-MH NCR No. 396 - Main Batch plant operated in manual mode due to computer malfunction without procedural requirements (WPN-11). This NCR remains open.
- (b) N-MH NCR No. 397 - Out of specification concrete placed.
- Ticket 5427716; 6 1/4" slump (maximum allowed is 6") 9 cubic yard placed
 - Ticket 670457; 76°F temp. (maximum allowed is 75°F) 10 cubic yards placed

Two compressive strength cylinders were cast in each instance, for engineering evaluation. This NCR remains open.

1382 340

- (c) N-MH NCR No. 398 - Non plastic (cold) joint (12' x 12' x 2') formed in the West middle of the Turbine Pier. The area is to be treated in accordance with S&L Specification 2722, and ACI 301-72. This NCR remains open.

c. Review of Batch Plant Quality Records

The RIII inspector performed a surveillance inspection of the main batch plant during concrete production on July 6, 1979, and reviewed selected quality records on July 10, 1979. Specifics are as follows:

- (1) The main and back-up batch plant NRMCA certificates were reviewed by the inspector and found to be in current status.
- (2) Volumetric batching devices and scales for the main and back-up batch plant were observed to be calibrated and properly tagged to indicate calibration status as follows:

| <u>Main Plant Device</u> | <u>Date Due</u> |
|-----------------------------|-----------------|
| Aggregate Scale | 7/20/79 |
| Cement/Fly Ash Scale | 7/20/79 |
| Ice Scale | 7/20/79 |
| Water Meter | 7/15/79 |
| Darex Dispenser | 7/18/79 |
| | |
| <u>Back-up Plant Device</u> | <u>Date Due</u> |
| Aggregate Scale | 10/3/79 |
| Cement/Fly Ash Scale | 10/3/79 |
| Water Meter | 10/3/79 |
| Darex Dispenser | 7/19/79 |

Review of the calibration reports confirmed that the main and back-up batch plant devices were calibrated and that the calibrations were performed at the required intervals.

During review of these reports, the RIII inspector requested documentation verifying NBS traceability of the test weights used by the two scale calibration companies performing work at the Marble Hill site. N-MH QC personnel stated that that information was not available on site, but had been requested from the two respective companies. This item is considered unresolved and will be reviewed during a future inspection. (546/79-07-05; 547/79-07-05)

1382 341

- (3) The most recent main and truck mixer uniformity test results were reviewed and found to meet the requirements of ASTM-C94-74. The test frequency was also found to meet the 6 month interval specified in S&L Specification Y-2850 Section 411B.3.
- (4) The water sight gauges on Truck Nos. 1, 5, 7, 8, 11, 12, 13, and 14 were observed to be calibrated and properly tagged to indicate calibration status. Review of the calibration reports confirmed that the truck water sight gauges met the discharge tolerances specified in the NRMCA checklist.
- (5) N-MH QC inspection reports for the main batch plant mixer and truck mixers to verify proper blade height and condition, mixer condition and revolution counter operation (truck mixers) were reviewed. The report showed all items met requirements.

No items of noncompliance were identified.

5. Review of PSI 100% "Overview" Program (Item 5 of the IE IAL of June 27, 1979)

On July 3, 1979, the licensee submitted for approval the 100% "Overview Program" encompassing safety related concrete activities performed by the G. K. Newberg Company. The program as proposed, consisted of the following:

- a. Gust K. Newberg has upgraded certain work and quality control procedures; based on the revisions, PSI will institute a "Hold Point" program consisting of activities that cannot be gone beyond without PSI QC verification that the activity has been accomplished correctly. This verification will consist of actual physical inspections and surveillances performed and documented in accordance with approved procedures.
- b. The "Hold Points" will be transmitted to the Newberg QA Supervisor on a weekly basis or until such time the "Hold Points" are changed or recinded.
- c. Each "Hold Point" is defined as follows:

(1) Hold Point No. 1

N-MH's Production Department will notify PSI when final evaluation for major placement areas will be accomplished in accordance with Procedure WPN-34, "Production Preplacement Evaluation". PSI Engineering Representative will participate

1382 342

in this function to assist in the evaluation of critical areas that may require special mix considerations and release the hold point by initialing the "Pre-Placement Checklist".

(2) Hold Point No. 2

In accordance with WPN-11 and QAPN-10, the N-MH QC Engineer at the Batch Plant will prepare the Preplacement Batch Plant Checklist once daily. This will occur with the start up of normal operations at 7:00 a.m. The responsible PSI QC inspector will release the hold point by initialing the "Batch Plant Checklist".

(3) Hold Point No. 3

The N-MH field QC Inspectors will accomplish normal inspections through sign off of N-MH Concrete Placement Checksheet in accordance with QAPN-10. NOTE: Meeting with placement personnel as required by QAPN-10 will be conducted at sign off of PSI Placement form. Subsequent to completion of PSI's duplicate visual pre-placement inspection, the PSI QC inspector will release the hold point by initialing the N-MH Concrete Placement Check Sheet.

(4) Hold Point No. 4

N-MH Concrete Cure Card (QAPN-10) will be initiated by the N-MH QC Inspector indicating the method to be used. As curing may start prior to completion of the placement, this will be accomplished as soon as the placement is released. The responsible PSI QC inspector will verify proper method of curing and release the hold point by initialing the N-MH Concrete Curing Card.

(5) Hold Point No. 5

As stripping is in progress, the N-MH QC Inspector will inspect the area and complete Part I of the Honeycomb Report in accordance with QAPN-10. Copy of this preliminary report will be transmitted to PSI. When the area is ready for preparation inspection, PSI will be notified and Part II completed. NOTE: The amount of stripping in any area will be controlled by subsequent operations and may only be partial, in which case a new Honeycomb Report if required will be initiated when the balance of forms are removed.

- d. The "Hold Point" program was instituted July 3, 1979, in order to "burn in" the system to demonstrate it's effectiveness.

1382 343

- e. PSI has augmented its QC inspection and engineering staff (two QC engineers, three Level II Concrete inspectors, and one Level I concrete inspector) to perform or survey concrete activities as required.
- f. PSI has performed and documented an indoctrination review and training session of the "Hold Point" program as well as the revised N-MH work and QC procedures.
- g. PSI has implemented the program effective July 3, 1979, per CMP 3.8.

On July 7, 1979, verbal approval of the PSI 100% "overview" program and verbal release to begin safety related (Category I) concrete work was given by the RIII staff.

On July 13, 1979, the RIII office released a letter (Exhibit B) to PSI to confirm the following points.

- Items 3 and 4 of the June 27, 1979, IAL have been met.
- The proposed PSI 100% "overview" program is approved for use.
- Placement of concrete for safety related structures (Category I) may resume with the understandings specifically addressed in Exhibit B.

6. Nondestructive Examination (Microseismic) of Safety Related Concrete Structures

(Reference NRC III Reports 50-546/79-08, 50-547/79-08, and Immediate Action Letter dated June 27, 1979)

a. Background

- (1) As the result of the identification of hundreds of instances of major and minor concrete honeycombing in plant structures, nonconforming concrete placement and repair activities, the licensee committed to evaluate the adequacy of all existing safety related concrete structures by nondestructive examination. Moreover, certain of the nondestructive test results are to be verified by destructive testing (coring) and evaluation.
- (2) As documented in RIII Immediate Action Letter dated June 27, 1979, (copy attached) the licensee is to ". . . continue surface and volumetric examination of existing concrete to establish its adequacy, and randomly select and test a statistical sample, representative of both congested and

1382 344

other concrete volumes to assure with 95% reliability and 95% confidence level, that concrete quality meets requirements"

- (3) To accomplish this the licensee and it's civil contractor (Newburg) contracted the Portland Cement Association. The Portland Cement Association provided, under their P. O., Richard Muenow and others to conduct the nondestructive examinations.
- (4) The nondestructive test technique employs an "ultrasonic" test technique developed by Richard Muenow and Associates. The examination is titled "Test Method for Microseismic Evaluation of Concrete (Pulse Echo Method)."
- (5) Fundamentally, this test method evaluates the seismic response of a volume of concrete. It employs an array of transducers in one housing, which are coupled to the test specimen with a liquid or grease; a cathode ray scope with associated devices for signal processing , and memory; a five pound Schmidt hammer to initiate a seismic event within the specimen under test; and a Polaroid Camera for recording.
- (6) The response of the test specimen is retained on the "memorizing cathode ray tube."
- (7) This system, from one side of the test specimen, is capable of providing highly reliable information regarding the depth of an inhomogeneity in concrete, and its area as determined by translating the transducer over the inspection surface. It does not provide a measure of the volume of the inhomogeneity (i.e. honeycomb, or embeds). Also, the compressive strength of concrete is measureable by this test method as determined by the velocity of the microseismic disturbances within the concrete.

While this system provides an indication of the character of an inhomogeneity in concrete, the accuracy of these characterizations (i.e. honeycomb, reinforcement steel, embeds, etc.) depends entirely upon the skill and experience of the test engineer and his knowledge of the configuration and content of the concrete structure.

- (8) Demonstration of this test technique on a prepared concrete specimen three feet thick (and actual test to 12 feet thick) with known and observable inhomogeneities (honeycomb, reinforcing steel and air voids) was witnessed by the NRC inspector. This testing disclosed all of the known and observable conditions (cracking, honeycomb and embeds)

1382 345

with complete accuracy as to depth, extent and description. Subsequently, microseismic examination on six of the existing concrete patches (all of which are to be removed, see report No. 79-15) again demonstrated that the test system and Mr. Muenow's interpretation are highly reliable. All six of the patches were subsequently destroyed (removed) and in each instance the test results (all rejectable) were verified to be correct.

b. Test Program Requirements

As a result of inspection, and discussion with licensee representatives, the following commitments were established or reconfirmed on or about June 29, 1979.

- (1) Microseismic evaluation of existing concrete shall be conducted in accordance with a scientific sampling plan.
- (2) All indications of inhomogeneity are to be subjected to an engineering evaluation based on design drawings to determine if a planned embed or a nonconforming condition is responsible for the indication.
- (3) All indications of inhomogeneity in the concrete, which are not attributable to a planned condition, are to be further evaluated by destructive test (i.e. coring) to determine their acceptability.
- (4) The licensee shall randomly core some areas judged to be acceptable by microseismic evaluation to further verify the accuracy of these techniques. These areas may be at the same locations where cores planned for other purposes are to be located.
- (5) All processes (testing, documentation, evaluation, etc.) are to be controlled and in accordance with fully documented and comprehensive procedures.
- (6) NRC shall be informed of any test results prior to any destructive evaluation and removal of defective materials.

c. Personnel, Equipment, and Procedural Documentation

- (1) On June 27, 28, and 29 the NRC inspector reviewed the test procedure for concrete nondestructive examination titled "Test Method for Microseismic Evaluation of Concrete (Pulse Echo Method)." (Note: This method is not relatable to the ASTM-C-597 test, and is considered by this evaluator to be a considerably superior concrete test technique). The copy of the procedure reviewed is considered Revision

A. As a result of this document review and discussion with the licensee's representative, it was determined that the procedure as written was not comprehensive enough for application at Marble Hill, in that it (1) did not fully address specimen scanning methodology, (2) did not provide an adequate common criterion for evaluation of adverse indications, (3) did not adequately indicate how records were to be accumulated and controlled, (4) provided a less than comprehensive basis for its reported capabilities, and (5) did not show evidence of proper control within the civil contractor's QA system.

Subsequent to the identification of the above the licensee stopped testing and provided comprehensive procedures to control this work, now documented as "Test Method for Microseismic Evaluation of Concrete (Pulse Echo Method), Newburg Marble Hill, Revision B, dated July 5, 1979. Other instructions as necessary for control of this work were also provided.

The adverse conditions identified in the above paragraph C(1) are considered to be nonconforming to the licensee's QA commitments. See Appendix A of this report. (546/79-07-06; 547/79-07-06)

- (2) On June 27, 28 and 29 the NRC inspector examined the electronic and mechanical equipment which included: (a) the oscilloscope and associated signal processing equipment, (b) the transducer (receiver) array, and (c) the Schmidt hammer used in the microseismic testing. It was determined that documentation to certify adequate calibration of performance of those devices, and thereby conformance to purchase requirements was unavailable for review. Further, some method for verifying the operability of the system routinely was required.

Note that these electronic devices are unique to Mr. Richard Muenow, as he is apparently their sole developer with the exception of the memory scope.

Subsequent to the identification of these adverse conditions by the NRC inspector, the licensee and its agents took immediate corrective actions. Conforming equipment performance documentation and requirements were made available prior to resuming concrete testing for the record.

The conditions adverse to quality noted in this subparagraph are considered to have been in nonconformance to the licensee's quality requirements, in that documentary evidence of quality was not available prior to use. See Appendix A of this report. (546/79-07-06; 547/79-07-06)

- (3) Review of personnel qualification records for concrete evaluation disclosed that the personnel qualification records for one of the test Engineers was unavailable at the site. This condition is contrary to PSI quality assurance commitments, and is considered an element of nonconformance. It is noted that the performance of all the test engineers was in accordance with the existing instructions and procedures. Subsequently, the licensee requested and received the required documentation. This adverse condition is considered in noncompliance to the licensee quality commitments. See Appendix A (546/79-07-06; 547/79-07-06). Subsequent corrective actions are identified in licensee letter dated July 18, 1979, file No. 0718795013.

d. Subsequent Surveillance of Concrete Testing

Subsequent to the identification of the documentation noncompliances identified in this report, it has been observed that the ongoing conduct of the microseismic evaluation of existing concrete has met all quality requirements as documented in approved procedures and instructions. Examples of these NRC surveillance activities are documented in RIII Report Nos. "...79-10" and "...79-15".

Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance or deviations. Unresolved items disclosed during the inspection are discussed under Functional Areas Inspected in Paragraphs 1.b, 2.d(2), 3.a and 4.c(2).

Exit Interview

The inspectors met with corporate and site staff representatives (denoted under Persons Contacted) at the conclusion of the inspection on July 7, 1979. The inspector summarized the purpose and findings of the inspection. The licensee acknowledged the findings reported herein.

Attachments: Exhibits A & B

1382 348



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

June 27, 1979

4H.A.

Me IAL
Exhibit A

Docket Nos. 50-546
50-547

Public Service of Indiana
Attention: Mr. S. W. Shields
Vice President
Electric System
1000 E. Main Street
Plainfield, IN 46168

Gentlemen:

This refers to the discussion between you and I and others of our respective staffs on June 26, 1979, regarding the quality of concrete construction activities at the Marble Hill Units 1 and 2 plant site. We understand based on these discussions that Public Service of Indiana will:

1. With its contracted organizations, continue surface and volumetric examination of existing concrete to establish its adequacy and randomly select and test a statistical sample, representative of both congested and other concrete volumes to assure with 95% reliability and 95% confidence level, that concrete quality meets requirements. This examination program shall be expeditiously implemented and completed.

Evaluate and take appropriate corrective actions of all identified deficiencies and assess them in terms of their impact on safety related concrete construction activities.

2. Identify and evaluate concrete repair areas for adequacy. This effort is to include no less than those areas referenced by existing QA/QC documentation for repaired areas and those identified by 100% visual/mechanical examination of existing concrete structures.
3. Limit future concrete placement to non-safety related structures to permit the NRC to review and evaluate QA program improvements. Instituted on or about May 16, 1979 by PSI as a result of previously identified concrete deficiencies. During the existence of this concrete placement limitation, QA/QC controls for non-safety related concrete activities will be the same as would be used for safety related structures.

dep
7908100365

1382 349

Not resume concrete placement for safety related structures
until the NRC is satisfied by comprehensive demonstration that
your upgraded QA/QC program and process controls are adequate.

5. Following resumption of concrete placement for safety related structures, provide complete (100%) "overview" of all safety related concrete activities at the site. This "overview" is to continue until adequate confidence is established to the satisfaction of PSI and NRC.

Evidence of PSI's overview of the involved contractor's quality related activities is to be documented.

6. Stop all safety related concrete activities until the cause and consequent conditions are fully rectified if significant deficiencies are identified during the course of completing the above actions. NRC is to be immediately informed of such occurrences.

Please inform us if your understanding of this program is different from that stated.

Sincerely,

James G. Keppler
Director

cc: R. M. Brown, Construction
Project Superintendent
Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC
LeBoeuf, Lamb, Leiby & MacRae

1382 350



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

Exhibit B
ATT. B

JUL 13 1979

Docket No. 50-456
Docket No. 50-457

Public Service of Indiana
ATTN: Mr. S. W. Shields
Vice President - Electric
Systems
1000 East Main Street
Plainfield, IN 46168

Gentlemen:

This refers to the meetings held at the Marble Hill construction site on June 29, and July 7, 1979, between Mr. R. M. Brown and representatives of Public Service of Indiana, Newberg-Marble Hill and Sargent and Lundy Engineers and D. W. Hayes, C. C. Williams and others of my staff. This also refers to the meeting held in the Region III office on July 10, 1979, between you and I and members of my staff. The purpose of the meetings was to discuss the status of: (1) the upgraded program for the control of concrete activities, (2) your "overview" program for concrete activities, and (3) your examination and testing program to confirm existing concrete quality.

Based on our review of your upgraded program and its implementation in connection with portions of the Rad-Waste building and the Unit 2 Turbine building, we have concluded that the conditions outlined in Items 3 and 4 of our Immediate Action Letter (IAL) dated June 27, 1979, have been met. As discussed in the July 7, 1979, meeting, placement of concrete for safety related structures may resume with the following understanding:

1. The PSI "overview" program for concrete work will be fully implemented as discussed with you and as outlined in your letter to us dated July 3, 1979.
2. The examination and testing program discussed in Item 1 of the IAL will be completed expeditiously.
3. Identified deficiencies will be evaluated in terms of their impact on the current concrete placement program.

dup
7908 209131

1382 351

JUL 13 1979

4. No concrete will be placed or other work performed that will coverup or otherwise prevent access to previously placed concrete relative to the surface and volumetric examination program.

In regard to the PSI "overview" program it is our understanding that all PSI "hold points" discussed in the Newberg-Marble Hill letter to PSI dated June 28, 1979, will apply until adequate confidence that future concrete activities will continue to meet requirements is established to the satisfaction of PSI and the NRC. Further, PSI quality control personnel will inspect all Category I concrete placement areas to verify requirements have been met. The PSI inspections are to be conducted after Newberg QC has accepted the area, but prior to placement of concrete. PSI QC personnel are also to be present full-time at all Category I pours to verify adequate contractor QC involvement and to assure proper placement and consolidation of the concrete.

Concerning Items 1 and 2 of our IAL involving the testing and evaluation of existing concrete we have concluded that:

1. Our initial review of your identification and evaluation of concrete repairs indicates it is not yet sufficiently comprehensive.
2. The adequacy of the preparation of concrete defective areas (honeycomb) for repair and the procedure and material in making some of the repairs continue to remain unresolved at this time.
3. Your program for acquiring and evaluating test data has not been fully developed and approved.

As discussed with you during our meeting on July 10, 1979, we understand that additional and comprehensive efforts will be made to assure all repaired areas are identified, that all material will be removed from the repaired areas and the repairs be redone. We note that some repairs were made with adequate QC coverage and are not in question. Verification of the adequacy of these repairs will be made on an individual basis with both PSI and the NRC concurring in the resolution. Further, the NRC is to be notified in advance of the removal of material and rerepair so we may elect to witness the activity. It is not intended that repairs made for cosmetics, such as tie holes be redone.

It is also our understanding that your activities for acquiring and evaluating test data relative to existing concrete is to be fully documented and controlled in accordance with your QA program with each major responsibility relative to the involved organizations being identified.

1382 352

YELLOW FILE COPY

Public Service of Indiana

- 3 -

JUL 13 1979

Please inform us if your understanding of the items discussed in this letter is different from that stated.

Sincerely,

James G. Keppler
Director

cc: Mr. R. M. Brown, Construction
Project Superintendent

cc w/ltr dtd 7/3/79:
Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC
LeBoeuf, Lamb, Leiby & MacRae

1382 353

RIII
[Signature]
Hayes/sr
7/12/79

RIII
[Signature]
Williams

RIII
[Signature]
Fiorelli

RIII
[Signature]
Norellus

RIII
[Signature]
Keppler

RIII
[Signature]
Schweibinz
7-12-79