U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-341/84-21(DRP)

Docket No. 50-341 License No. CPPR-87

Licensee: Detroit Edison Company
2000 Second Avenue
Detroit, MI 48226

Facility Name: Enrico Fermi Nuclear Power Station, Unit 2

Inspection At: Fermi Site, Newport, MI

Inspection Conducted: May 29 through August 13, 1984

Inspector: T. P. Gwynn

Approved By: R. C. Knop, Chief
Projects Section 1C

J. McCormick-Barger for
Date 8/23/84

Inspection Summary

Inspection on May 29 - August 13, 1984 (Report No. 50-341/84-21(DRP))
Areas Inspected: This is the report of the NRC observer of the Duke Power Company Final Assessment of Construction at Enrico Fermi 2. The observer provided an overview of the independence and technical merits of the Duke Construction Assessment. The report addresses the construction assessment team concept and selection; assessment phase I - detailed work plan development and review; assessment phase II - implementation of the detailed work plan; assessment phase III - final report writing; Fermi 2 final assessment of construction report review; significant findings of the assessment; and independent inspection effort. The inspection involved a total of 288 inspector-hours onsite by the NRC observer and the NRC Senior Resident Inspector, including 64 inspector-hours onsite during off-shifts.
Results: The NRC observer concluded that the Duke Construction Assessment Team maintained its independence throughout the duration of the assessment, and that the facts presented in the Duke Fermi 2 Final Assessment of Construction Report were consistent in all respects with the observations of the NRC. The report identifies 14 items requiring followup inspection by Region III.

DETAILS

1. Persons Contacted

P. Acharya, Construction Assessment Support Team (CAST) System Completion Organization Representative
#F. Agosti, Manager, Nuclear Operations
°*+T. Alessi, Assistant CAST Leader
J. Belko, CAST Coatings Leader
L. Bertani, CAST Mechanical/Hangers Leader
+L. Bregni, Licensing Engineer
J. Buck, Nuclear Quality Assurance (NQA)
#°+O. Earle, Supervisor, Nuclear Licensing Department
°+W. Fahrner, Manager, Fermi 2 Project
M. Gavin, CAST Records/Document Control Representative
#°E. Griffing, Assistant Manager, Nuclear Operations
°C. Heidel, President
#°+W. Holland, Vice President, Fermi 2 Project
#°+W. Jens, Vice President, Nuclear Operations
H. Keeler, CAST Administrative Services Representative
#°R. Lenart, Superintendent, Nuclear Production
J. Mullens, CAST Welding/NDE Leader
T. Nickelson, CAST Startup Representative
#°*+S. Noetzel, CAST Leader
°J. Nyquist, Assistant Superintendent, Nuclear Production
G. Preston, CAST Nuclear Production Representative
J. Rotondo, Maintenance and Modification QA
*G. Sharma, CAST Electrical/I&C Leader
°*W. Street, CAST Civil/Structural Leader
#°+G. Trahey, Director, Nuclear Quality Assurance
°R. Vance, Assistant Project Manager, Engineering

Duke Power Company

C. Arnold, Construction Assessment Team (CAT) Civil Team Member
T. Bowen, CAT Mechanical Team Member
J. Cavender, CAT Mechanical Team Member
G. Chronister, CAT Electrical Team Member
G. Fortenberry, CAT Civil Team Member
J. Hoover, CAT Electrical Team Member
R. Hulen, CAT Electrical Team Member
M. Lenderman, CAT Mechanical Team Member
D. Llewellyn, CAT Civil Team Member
R. Medlin, CAT Civil Team Member
J. Moore, CAT Civil Team Member
°+R. Morgan, CAT Civil Discipline Lead Engineer
°+B. Rice, CAT Electrical Discipline Lead Engineer
W. Robinson, CAT Civil Team Member
M. Shelby, CAT Electrical Team Member
J. Sigmon, CAT Mechanical Team Member
C. Tompkins, CAT Electrical Team Member
°*+J. Wells, CAT Leader
°+R. Williams, CAT Mechanical Discipline Lead Engineer

U. S. Nuclear Regulatory Commission

#°*+P. Byron, Senior Resident Inspector, Fermi 2
+A. Davis, Deputy Regional Administrator, Region III
°J. Keppler, Regional Administrator, Region III
°+R. Knop, Chief, Projects Section 1C, Region III
°M. Lynch, Licensing Project Manager, Division of Licensing, NRR
°+J. McCormick-Barger, Project Inspector, Fermi 2
#M. Parker, Resident Inspector, Fermi 2
+R. Spessard, Director, Division of Reactor Safety, Region III
°R. Warnick, Chief, Projects Branch 1, Region III
°B. Youngblood, Chief, Licensing Branch 1, Division of Licensing, NRR

The inspector also contacted other members of the applicant's construction project and operations staff.

+ Denotes those attending the June 11, 1984 presentation.
* Denotes those attending the July 19, 1984 review.
° Denotes those attending the July 31, 1984 presentation.
# Denotes those attending the August 13, 1984 exit meeting.

2. Introduction

During the period June 1 - July 31, 1984, the Duke Power Company conducted a Final Assessment of Construction at Detroit Edison's Enrico Fermi 2 Nuclear Power Station. The assessment was to determine if significant deviations from the final design disclosure documents exist that were not previously detected. NRC Region III assigned a full-time observer to the assessment in order to assure the independence of the Duke assessment team, and to provide Region III and the public with an adequate level of confidence in the technical merits of the assessment.

The observer was formerly the Senior Resident Inspector at Cincinnati Gas and Electric (CG&E) Company's Wm. H. Zimmer Nuclear Power Station. The observer acted as administrative coordinator during the NRC Evaluation Team assessment of the quality of construction at the Zimmer station, and had extensive experience in the identification of construction-related deficiencies during the conduct of CG&E's Quality Confirmation Program.

The assessment was conducted by a Duke Power Company (DUKE) team of experienced, nuclear power professional engineers, technicians, and quality control inspectors divided into three discipline teams; Civil (consisting of civil, structural, pipe supports, cable tray supports, and HVAC supports); Electrical (consisting of electric power, control, and instrumentation); and Mechanical (consisting of mechanical, welding, and NDE). This team was referred to as the Construction Assessment Team or CAT.

The CAT was supported by a team of Detroit Edison Company (DECo) personnel headed by the DECo contract administrator (see Attachment 1). This team was referred to as the Construction Assessment Support Team or CAST. The

CAST provided documentation, assisted the CAT in locating plant structures, systems, and components (SSCs), provided quality services (such as bolt torque verification, nondestructive examination, equipment disassembly, etc.), and responded to CAT findings.

The observation consisted of attendance at all DECo/Duke meetings, selective observation of Duke assessment activities in all disciplines, observation of DECo CAST activities, and review of all CAT findings. In addition, the observer reviewed the qualifications of all Duke team members; attended site specific orientation training sessions provided to the CAT by DECo; provided input during development of the detailed CAT work plan; participated in the technical review of the detailed CAT work plan; and reviewed and commented on a draft of the final assessment report.

This report provides a record of the activities of the NRC observer of the Duke CAT.

3. Construction Assessment Team Concept and Selection

DECo proposed that an independent assessment of construction be performed at its Enrico Fermi 2 Nuclear Power Plant after discussions with Region III. The assessment was to determine if significant deviations from the final design disclosure documents exist which were not detected previously. The intent of the assessment was to provide Region III and the public with reasonable assurance that Enrico Fermi 2 was constructed in accordance with the final design disclosure documents.

DECo prepared a "Specification for Fermi 2 Final Assessment of Construction" which was issued for bids to three qualified bidders. DECo selected the Duke Power Company to perform the final assessment of construction.

Duke Power Company proposed a team of individuals consisting of a team leader, three discipline lead engineers, and additional engineering, technical, and inspection personnel as necessary to accomplish the assessment (see Attachment 2). Resumes of potential team members were submitted to DECo for review and approval. All resumes were also reviewed by the NRC observer. Of the 28 resumes submitted by Duke, 26 individuals were acceptable to the NRC observer and 19 individuals actually participated in the CAT. The two individuals not acceptable to the NRC observer had insufficient field experience (i.e., their previous experience had been exclusively in design engineering).

The Duke assessment was divided into three phases; phase one was the development of the detailed work plan; phase two was the actual work of the assessment, including evaluation of previous third party assessment reports; and phase three was the final report writing.

4. Assessment Phase I - Detailed Work Plan Development and Review

The first week of the Duke assessment was spent in preparation of a detailed work plan. The plan was developed by the Duke team leader with the three

discipline lead engineers based upon their experience in the construction of several Duke nuclear facilities and input from the NRC observer with reference to NUREG-0969, Report of the NRC Evaluation Team on the Quality of Construction at the Zimmer Nuclear Power Station.

A preliminary detailed work plan was distributed to DECo, the NRC observer, and the NRC Senior Resident Inspector for review and comment. There were no substantive changes made to the preliminary work plan as a result of DECo comments. In addition, virtually all suggestions made by the NRC observer had been incorporated into the plan.

The reviewed preliminary plan was presented to Region III management by Duke Power Company for comment in a meeting held onsite on June 11, 1984 (paragraph 1 denotes those personnel attending the presentation). Region III comments were incorporated in the final detailed work plan which was then approved for use by DECo. The final plan was submitted by DECo to Region III on June 18, 1984 and was accepted by Region III in correspondence dated July 12, 1984.

5. Assessment Phase II - Implementation of the Work Plan

The Duke CAT commenced assessment activities on June 12, 1984 with 12 personnel onsite. Assessment activities generally consisted of one or two Duke assessors with whatever DECo support was required for the particular activity.

All physical work performed in support of the assessment was performed by qualified DECo personnel using appropriate DECo procedures including quality control activities.

Daily morning meetings of the DECo CAST were attended by the NRC observer in order to maintain an overview of DECo CAST activities. Duke issued daily planning documents throughout the assessment for the following day's activities. In addition, the NRC observer attended daily afternoon Duke briefings provided to DECo to identify any significant findings, to discuss the next day's activities, and to resolve any problems encountered during the assessment.

Duke potential finding reports (Forms CAT-1) were issued daily, as they were generated, to both DECo and the NRC observer. These forms were reviewed and trended on a daily basis in order to determine if any generic problems existed or if any additions to the scope of the work plan were required.

a. Activities Observed

Duke assessment activities were observed in order to evaluate the performance of the assessor; to observe the maintenance of CAT independence; to verify CAT findings as they were identified; to evaluate the SSC attributes assessed against the requirements of the detailed work plan; and, where CAT findings were resolved on-the-spot (i.e., the

deficiency identified had been previously identified by the applicant or the applicant's contractors), to verify that information provided by the CAST supplied a valid basis for determination of a non-finding. The following CAT assessment activities were directly observed:

Mechanical Discipline

- Core Spray System piping walkdown
- Core Spray System restricting orifice disassembly and inspection
- High Pressure Coolant Injection (HPCI) pump discharge isolation valve checks
- QA Level-1 ESF room coolers for one Core Spray pump room, the HPCI pump room, and one control air compressor room cooler
- Emergency Equipment Cooling Water pump disassembly and inspection
- Residual Heat Removal manual isolation valve disassembly and inspection
- HPCI suction motor-operated isolation valve disassembly and inspection

Electrical Discipline

- 125 VDC Battery inspection and test
- 4160 VAC Switchgear 64C inspection
- 480 VAC Motor Control Center 72C-3A inspection
- Environmental qualification of electrical equipment records examination
- Main Steam Line Radiation Monitor loop checks

Civil Discipline

- Torus Support column #12 inspection
- Cable tray support inspection (2 locations)
- GE pipe whip restraint ultrasonic examination
- Drywell coatings tests and inspection (concrete and steel coatings; adhesion and dry film thickness checks)
- Magnetic particle testing of torus support welds, torus attachment welds, and containment penetration welds
- Pipe whip restraint inspection (2 restraints)
- Drywell structural steel inspection (1 location)
- Embedment location checks (2 locations)
- Dye Penetrant testing of ASME Code Class 1 socket welds
- Brinnell hardness testing of high strength structural steel, one torus support, and one containment plate
- Shore barrier survey (observed by a Region III based specialist inspector)
- Concrete walkdown inspection (observed by a Region III based specialist inspector)
- Concrete expansion anchor inspection
- Windsor probe testing of concrete for compressive strength

b. Results

The following results/conclusions were reached based upon the above observations:

(1) The performance of the entire Duke team was professional, technically competent, and aggressive. The Duke team leader was particularly impressive and was primarily responsible for the successful completion of the assessment.

(2) The Duke team maintained its independence without question. Again, the Duke team leader was primarily responsible for maintaining the independence of the team.

(3) The requirements of the detailed work plan were fully met for every activity observed. One omission was observed early in the assessment, related to field verification of quality records for the Core Spray System, but was promptly corrected when brought to the attention of the team leader.

(4) All findings documented by the CAT with the NRC observer present were verified by the observer. Those findings resolved on-the-spot with the NRC observer present were in fact either not an actual deviation from the final design disclosure documents (i.e., additional change paper was produced which had resulted in the as-built condition) or had been previously identified by the applicant (i.e., a nonconformance report, punch list card, or another controlled document was produced which indicated the deficiency was controlled by the applicant). There were a very limited number of on-the-spot resolutions observed by the NRC observer; most deviations identified by the CAT were documented on CAT-1 forms.

(5) The DECo CAST performance was initially slow and ineffective. Management action by the applicant resulted in a higher priority for CAT support work, a smoothing of organizational interfaces, and additional manpower from affected organizations. This action corrected the initial problems encountered. Subsequent CAST performance was effective and allowed efficient performance of CAT activities.

(6) DECo NQA provided surveillance of CAST activities during the assessment. The surveillance provided by NQA was effective in identifying and resolving potential problems. Surveillance reports prepared by DECo NQA were reviewed by the NRC observer as the assessment progressed and the results were discussed with cognizant management.

(7) Review and informal trending of CAT findings revealed several repetitive findings which were reviewed with cognizant management during the assessment. The findings related to identification of structures, systems and components; document deficiencies; and loose electrical terminations were of particular concern. Each of these items will be addressed later in this report.

(8) Additional magnetic particle examination was performed because of repetitive findings on containment penetration welds.

(9) Additional containment plate weld radiographs were reviewed because of damaged film identified by the Duke assessor.

(10) Duke was directed by the NRC observer to assess the environmental qualification of coaxial cables utilized in the Main Steam Line Radiation Monitoring System.

These results/conclusions, based on independent NRC observations, support and validate the findings of the Duke team.

6. Assessment Phase III - Final Report Writing

The Duke assessment, phase II, was concluded on July 10, 1984. The actual work of writing the assessment report started a day earlier. A preliminary draft report was completed and issued to the NRC and DECo on July 14, 1984.

The following ground rules were applied to the review and comment on the draft report:

- Draft distribution was limited to 5 copies with no additional copies to be made.
- Distribution was controlled with those on the distribution list responsible for their own copy.
- The review was limited to a working level review - upper management was not afforded an opportunity to comment.
- Comments were limited to the technical merits of the report - no comments were allowed which questioned the judgment of the Duke team.
- The results of the draft review were not to reflect adversely on the independence of the Duke team.
- Detailed minutes were to be maintained of the review and comment meeting, including all comments and Duke's actions resulting from each comment. The minutes were to be appended to the Duke report as Appendix 5.

A meeting was held on July 19, 1984, to review all technical comments on the draft report. Those persons who attended that meeting are denoted in paragraph 1 of this report. The meeting minutes reflect that a total of 31 comments were made during that meeting, as follows:

DECo - 15 comments
NRC - 15 comments
Duke - 1 comment

When the meeting adjourned, it was agreed that any further communication between Duke and DECo would be documented and the NRC observer would be apprised of any further substantive communication between Duke and DECo. No further substantive communication took place prior to the Duke presentation of the results of the assessment on July 31, 1984 (paragraph 1 denotes those personnel attending the Duke presentation).

7. Fermi 2 Final Assessment of Construction Report Review

On July 31, 1984, Duke Power Company presented their Final Assessment of Construction Report to DECo and the NRC staff. That presentation included significant findings of the assessment and recommendations of the Duke team based on the assessment results.

DECo submitted the Duke Power Company report to Region III on August 1, 1984. A detailed review of the Fermi 2 Final Assessment of Construction Report revealed that the facts presented in the report were consistent in all respects with the observations of the NRC observer.

8. Significant Findings of the Assessment

The findings and concerns identified by the Duke CAT are summarized in Appendix 4 of the Duke report. Those findings and concerns are generally not of significance with respect to the safety of operation of the nuclear facility.

The Duke findings and concerns were reviewed in detail by Region III specialists in each affected discipline (Civil/Structural, Mechanical, and Electrical) to evaluate their significance. The 24 conclusions and recommendations of the Duke team were also reviewed. The following items were considered by Region III to be of sufficient importance to require NRC inspection of the applicant's corrective actions:

a. GE Pipe Whip Restraints

The Duke team identified that GE pipe whip restraints used on the 28 inch reactor recirculation loop piping had been fabricated using one-half inch fillet welds where the GE design drawing specified full penetration welds. This matter was reported by the applicant as a potential 10 CFR 50.55(e) reportable deficiency (50-341/84-25-EE) (applicant designated 133) on July 9, 1984. This matter will be reviewed by Region III under that report.

b. Loose Bolted Connections

The Duke team identified that originally installed bolted connections in the slab-over-torus area of the reactor building were not torqued to the value required. Duke recommended that DECo "Tighten the originally installed bolted connections in the Slab-Over-Torus area to the required values or provide an analysis for the acceptance of the connections as presently installed." Region III believes that,

in addition to the Duke recommendation, DECo should review quality records to determine the root cause of the condition and evaluate the Duke findings to determine whether the loose connections are indicative of a generic problem. This is an unresolved item (341/84-21-01).

c. Shore Barrier Not As-Built

The Duke team identified that the top of the shore barrier was below specified grade by greater than the value allowed by the design in several locations. The Duke team recommended that DECo "Obtain an engineering evaluation to determine if the lower than specified top of the barrier has any significance to the barrier's intended function. Establish additional points on the slope of the barrier and incorporate them into the annual surveys. This would give assurance that the barrier is not sliding down the slope. The location of the points should be determined by the engineer who designed the barrier." This matter was reviewed by a Region III specialist inspector during the course of the Duke assessment. The results of that review were documented in Inspection Report 50-341/84-30, including an item of noncompliance (341/84-30-01). This matter will be reviewed by Region III under that noncompliance item.

d. Deficient Watertight Doors

The Duke team identified that both watertight doors assessed were deficient in workmanship and that no quality control inspection records were available for those doors. The Duke team recommended that DECo "Inspect all watertight doors for conformance to the design drawings." Region III believes that, in addition to the Duke recommendations, DECo should determine the root cause of the condition and evaluate the Duke findings to determine whether deficient watertight doors are indicative of a generic problem. This is an unresolved item (341/84-21-02).

e. Drywell Coatings Deficiencies

The Duke team identified damaged and deficient coatings inside containment. The Duke team recommended that "A final inspection should be made to ensure that the damages to the coatings inside the drywell have been repaired as required. Clarify the commitments concerning coatings within the drywell." This matter was reviewed by the NRC observer during the assessment as documented in paragraph 9.a of this report. This is an unresolved item (341/84-21-03).

f. Concrete Expansion Anchors With High Torque Values

The Duke team identified that several concrete expansion anchors had considerably higher torque values than that shown on the latest revision of the applicable drawing (see Duke report, paragraph 3.1.5.4). Region III believes that DECo should perform an engineering evaluation of the higher than expected torque values and review quality records relative to concrete expansion anchor installation to determine the cause of this condition. This is an open item (341/84-21-04).

g. Loose Pump Pressure Boundary Bolting

The Duke team identified pumps with pressure boundary fasteners which were undertorqued and which lacked full thread engagement. The Duke team recommended that DECo "Inspect additional pumps for torquing of pressure boundary bolting and full thread engagement on nuts. Further action will depend on the results of this inspection." This matter is an open item (341/84-21-05).

h. Conflicting Valve Design Conditions

The Duke team identified that several valves installed in the residual heat removal system had nameplate design conditions which conflicted with the plant design documents. The Duke team recommended that DECo "Compare the design conditions on nameplate, master list and vendor drawings for some additional valves to check for further discrepancies. Further action will depend on the results of this inspection." This matter is an open item (341/84-21-06).

i. Identification Errors

The Duke team identified a number of identification errors during the assessment, affecting the Mechanical and Electrical Disciplines (reference CAT-1 item Nos. 9, 16, 23, 24, 32, 40, 50, 71, 73, 76, 89, 97, 98, 103, 116, 137, 172, 173, 195, and 197, and Duke final report recommendation Nos. 15 and 24). These findings reflect poorly on the quality of the applicant's plant identification program requiring further review by Region III. This matter is an unresolved item (341/84-21-07).

j. Miswired Control Switches

The Duke team identified that the open and close push button switches on the remote shutdown panel for control of the RHR shutdown cooling suction isolation valve (E1150-F009) had their wiring reversed such that pushing the open push button would close the valve and vice versa. The Duke team recommended that "the deviations found in the internal wiring of the remote shutdown panel (H21-P100/C35-P001)...be corrected. Since portions of the preoperational test on these units had been completed, it is recommended that those tests be completely redone for this equipment to verify system adequacy. It is further recommended that the preoperational test program should be reviewed to determine why the above deviations were not identified during the original tests and, if there were generic breakdowns in the preoperational test program, further preoperational tests be repeated, as required."

Region III is concerned about the circumstances surrounding the cause of this deficiency and the potential generic significance of this item. This matter is unresolved (341/84-21-08).

k. Electrical Penetration Fuse Protection

The Duke team identified electrical penetration fuses which were not sized in accordance with the applicable design document. The Duke team also identified conflicting design documents related to these fuses. This matter had been previously identified by Region III as an item of noncompliance in Inspection Report 50-341/84-17 (noncompliance item 341/84-17-01b). The applicant's actions relative to this Duke finding will be reviewed by Region III under that item of noncompliance.

l. Loose Wiring Terminations

The Duke team identified nine loose terminations and one broken terminal lug during the assessment. Duke recommended that "Due to the number of loose wiring terminations found during the assessment, an inspection of a comprehensive sample of safety system terminations in all types of electrical equipment installations should be undertaken to determine the degree of what appears to be a generic problem and the action required for correction." This is an unresolved item (341/84-21-09).

m. Document Errors

The Duke team identified several deficiencies in the design documents associated with Fermi 2 hardware. Typical problems identified by Duke included the following:

(1) Drawings not as built.

(2) Confusing drawing details.

(3) Conflicting information on drawings.

(4) Excessive time to incorporate design changes.

Duke made several recommendations related to the above deficiencies in their final report, including recommendation Nos. 1, 2, 4, and 17. In addition to the above, initial review of Duke findings by DECo revealed that several Duke findings were actually a result of DECo drafting errors. These matters indicate potential deficiencies in the applicant's quality program which require additional review by Region III. This is an unresolved item (341/84-21-10).

n. Miscellaneous Duke Findings

Duke identified numerous deficiencies in addition to those specifically discussed above which were of lesser significance. Typical examples include housekeeping deficiencies, loose or missing hardware, construction related damage (arc strikes and gouges), and etc. These additional deficiencies require review and corrective action by the

applicant. In order to provide assurance that those additional findings will be adequately treated by the applicant, Region III will perform a random sample inspection of those additional items when the applicant identifies that all required actions are complete. This is an open item (341/84-21-11).

9. Independent Inspection Effort

During the conduct of the Duke assessment, three matters were reviewed by the NRC observer which required additional information from the applicant in order to ascertain their acceptability.

a. Primary Containment Coatings

Duke CAT-1 assessor concern #33 identified that DECo Design Change Notice (DCN) No. 10474 changed the drywell coating specification to state, "Piping, mechanical equipment, snubbers, and damaged coating on supports and hangers shall not be touched up or repaired." The Duke concern was that this DCN was not consistent with standard practice for areas requiring QA level 1 coatings.

The inspector reviewed the as-built status of the drywell coatings and found the following deficiencies:

(1) Some areas of the drywell, sacrificial shield, and reactor pedestal were previously coated but the coatings had sustained construction-related damage.

(2) Some areas of the sacrificial shield had never been coated but appeared to be covered with a thin layer of laquer paint which was, in some cases, peeling.

(3) Some areas of the sacrificial shield, internal structural steel, and piping and pipe supports inside the drywell were not coated but were covered with mill scale.

(4) Some areas of the sacrificial shield, internal structural steel, and piping and pipe supports inside the drywell were already rusting.

(5) Vaneaxial fans installed in the drywell were coated with a thick (approx. 19 mils) coat of commercial enamel paint which was chipped and flaking in spots.

(6) Some localized areas in the torus (below the water line) were uncoated where test instrumentation had been installed.

A review of the Fermi 2 Final Safety Analysis Report (FSAR), Chapter 6, and Table 6.2-8 revealed that the as-built coatings were not consistent with the FSAR description. In particular, the inspector was concerned that the mill scale present might flake off resulting in a potential to clog ECCS strainers located in the torus. In addition, the presence of other unqualified coatings inside containment had not been addressed by the applicant.

This matter was discussed between the NRC observer, the Senior Resident Inspector, the NRR licensing project manager, and an NRR license reviewer in a teleconference on June 21, 1984.

In a subsequent meeting with DECo on June 21, 1984, DECo presented their plans for repair of QA level 1 coatings. Those plans are included as Attachment 3. Those plans did not address the presence of mill scale and other unqualified coatings inside containment.

Subsequent discussion between the applicant and NRR, Division of Licensing, resulted in an applicant commitment to address the presence of mill scale and other unqualified coatings inside containment. This is an unresolved item (50-341/84-21-03).

b. High Pressure Coolant Injection (HPCI) Room Cooler Capacity

During CAT assessment of Engineered Safety Features (ESF) room coolers, the NRC observer noted that the Core Spray System room cooler assessed had approximately one-half the heat removal capacity of the HPCI room cooler but the HPCI room cooler appeared to have a larger heat load. The inspector requested that DECo provide calculations justifying the sizing of the cooler.

Review of DECo calculation DC #162, sheet 6A of 95 dated 7/9/73 revealed the following deficiencies:

(1) The control rod drive hydraulic pumps and the torus water management pumps were not included in the calculation although there was no assurance that they would not be running when the HPCI cooler was required to perform its safety function.

(2) The calculation underestimated the actual size of the fan coil unit motor by more than 50%.

(3) The calculation assumed no degradation of the cooler capacity over the life of the unit, either as a result of internal corrosion or of external fouling. Duke CAT-1 concern #190 had previously identified that no filters or trash screens had been provided in the design of ESF room coolers and that the cooling coils reviewed were heavily soiled.

(4) The calculation assumed that the steam power equipment installed in the room (i.e., piping, valves, throttle assembly, and turbine casing) would not leak.

The inspector requested that DECo either justify items (1) - (4) above or modify the calculations appropriately.

On August 13, 1984, the applicant provided the following information relative to the above request:

- DECo calculation DC 2884 dated August 2, 1984, reperformed the original calculation and included additional loads identified by the NRC observer and the applicant. The results indicated that excess capacity for the HPCI room cooler was greatly reduced but was still adequate for the application.

- The applicant indicated that plans are underway to provide for routine preventive maintenance and inspection of ESF room coolers to assure that their cooling capacity is not degraded due to dust or debris accumulation. Internal corrosion was not expected to be a problem since the system uses demineralized water.

- Steam leaks from the turbine, piping, and equipment will be minimal since all packing and glands are or will be provided with leak off piping which drains to the turbine barometic condenser.

This information provided a satisfactory response to the NRC observer's concern.

c. Main Steam Line (MSL) Radiation Monitor Detector Placement

During observation of the Duke assessment of the MSL Radiation Monitoring System, the inspector noted that the MSL Radiation Monitor detectors were all located in close proximity to the two inboard main steam lines and at a relatively large distance from the two outboard main steam lines. General Electric (GE) Specification 22A4211 requires that the detectors be arranged such that each detector views all four steam lines with approximately the same viewing area.

This matter was brought to the attention of the applicant who documented the condition on Nonconformance Report (NCR) No. 84-0982. The disposition of that NCR, which was concurred in by GE, was "accept-as-is" based on an engineering evaluation of the as-built condition of the detectors.

The inspector had no further questions regarding the location of the MSL monitor detectors.

No items of noncompliance or deviations were identified.

10. Unresolved Items

Unresolved items are matters about which more information is required in order to determine whether they are acceptable items or items of noncompliance. Unresolved items disclosed during the inspection are discussed in Paragraphs 8.b, 8.d, 8.e, 8.i, 8.j, 8.l, 8.m and 9.a.

11. Open Items

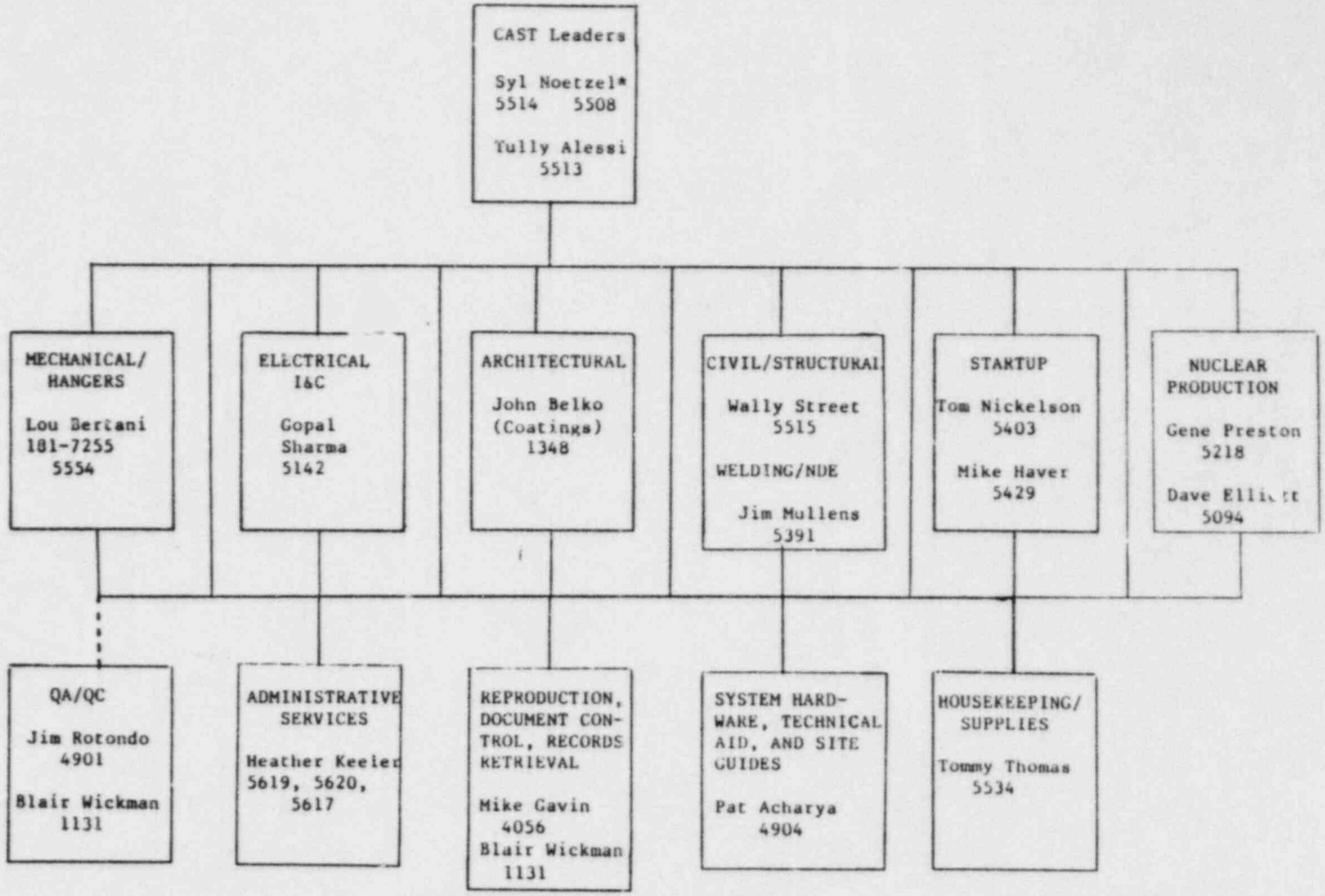
Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Paragraph 8.f, 8.g, 8.h, and 8.n.

12. Exit Meeting

The NRC observer met with applicant representatives (denoted in Paragraph 1) throughout the assessment and at the conclusion of the assessment on August 13, 1984. The NRC observer discussed the scope and the followup items resulting from the Duke assessment. The applicant acknowledged the followup items and the observer's independent inspection findings.

Attachments: As stated

CONSTRUCTION ASSESSMENT SUPPORT TEAM



*Contract Administrator

06/15/84

Attachment 1

DUKE POWER COMPANY
CONSTRUCTION ASSESSMENT TEAM (CAT)

Team Leader: J. R. Wells

Civil, Structural, Pipe Supports, Cable Tray Supports, and HVAC Supports

Ass't Team Leader:
R. A. Morgan
R. L. Medlin
G. Fortenberry
W. G. Robinson
D. H. Llewellyn
L. C. Arnold
J. L. Moore

Electrical and Electrical Instrumentation

Ass't Team Leader:
B. M. Rice
C. C. Tompkins
R. S. Hulen
M. L. Shelby
G. D. Chronister
J. M. Hoover

Mechanical, Welding, NDE

Ass't Team Leader:
R. L. Williams
J. C. Sigmon
T. R. Bowen
M. H. Linderman
J. E. Cavender

Attachment 2

SCOPE OF QAI PAINTING

1. Surfaces that require coating to satisfy licensing commitments. Bare or uncoated surfaces will be touched up as per following table:

ITEM	COATING SYSTEM	SPECIFICATION
° Interior suface of Drywell	CZ11	Original 3071-9 Rework 3071-316
° Interior surface of Torus	Plasite 7155	Original 3071-156
° Interior surface of Drywell-Torus Vent Lines	CZ11 Plasite 7156 Plasite 7155	Original 3071-156
° Exterior surface of Sacrificial Shield Wall	CZ11	Original 3071-129 Rework 3071-316
° Concrete surfaces in Drywell	Ameron 110AA Ameron 66	Original 3071-55 Rework 3071-317

Surfaces that will be coated and/or repaired as possible but are not Licensing Commitments:

ITEM	COATING	SPECIFICATION Orig.	Repair
Drywell Structural Steel	CZ11	3071-129	3071-316
Secondary Steel	"	"	"
Walks, Platforms, Handrails, etc.	"		"
Conduit Support Structural Members	"		"
Cable Tray Structural Members	"		"
HVAC Hanger Structu.al Members	"		"
Pipe Hanger Structural Members	"		"
Whip Restraint Structural Members	Bare or CZ		"

TOUCHUP-REPAIR CRITERIA

Identify previously uncoated or bare concrete or carbon steel surfaces by visual inspection.

However, working parts of any machinery or equipment, equipment nameplates, identification numbers, filters, stainless steel, galvanized surfaces, aluminum, lighting equipment and accessories and previously finished and accepted coated surfaces are not to be coated.

3. The following previously coated surfaces will not be repaired:

Conduits
Cable Trays
HVAC Ducts
Pumps 4 Motors
Panels 4 Racks
Penetration Assemblies
Valves 4 Operators