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150 North Wacker Drive, Chicago, IL 60606

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312/236-5701

November 30, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. B.J. Youngblood, Chief
Licensing Branch No.1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. William F. Colbert, General Supervisor
Nuclear Safety and Plan Engineering (342 NOC)
The Detroit Edison Company
Enrico Fermi-2 Nuclear Operations Center
64 North Dixie Highway
Newport, Michigan 48166

Subject: Conference Call Questions on 11/26/84
Independent Design Verification Program
Detroit Edison - Enricoi Fermi Unit 2
Docket #50-341

Reference: Cygna Letter 83021.056 dated October 19, 1984 to Mr. B.J. Youngblood of NRC and Mr. William F. Colbert of Detroit Edison

Dear Sirs:

On November 26, 1984, a telephone conference call occured between Messrs. John Gilray and M.D. Lynch of the NRC, Mr. O.K. Earle of Detroit Edison and Mr. D.A. Ferg of Cygna. The purpose of the telecon was to obtain clarifications in support of the on-going NRC review of Cygna's Fermi-2 Independent Design Verification Program (IDVP) Final Report. Specifically, questions asked by the NRC were a result of their review of the additional Section 8.0 material to the IDVP Final Report (transmitted by Reference 1).

Based on this call, Cygna agreed to document the points discussed and to revise Exhibit 8.2.2-1 and Section 8.2.1 by asssigning the valid design control observation to the root cause categories. In addition, the "SIGNIFICANCE" sections for Observations DC-01-08, DC-01-09 and DC-01-10 in Exhibit 8.2.1-1 on page 8.2-9 have been revised to reflect that these findings were found by Cygna to have an insignificant impact on the design and safety of Fermi-2.

As stated on page 8.2-2 of Section 8.2.1, Cygna developed the root cause summaries using previous information and documentation gathered during the course of the IDVP review. This information and documentation was also used to resolve the various observations and findings and prepare the IDVP Final Report including the supplemental Section 7.0. As such, none of the supplemental information contained in Section 7.0 is affected by Cygna's response to the NRC Enclosure Items contained in Exhibit 8.2.1-1. To develop the root

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cause, significance and extent implications of the ninety-five (95) valid observations, Cygna conducted no additional review within Detroit Edison's organization or their engineering sub-contractors. Exhibit 8.2.1-1 does represent an expansion of the IDVP since a determination of the individual root cause was not explicitly part of the original review commitments. The NRC Enclosure 2 and 3 items did however, require Cygna to review new design documents and to perform additional calculations. These documents and calculations are identified in the Cygna responses to the Enclosure 2 and 3 items in Sections 8.2.2.2 and 8.2.3.1 to 8.2.3.8, respectively.

Enclosed are the revised pages to Section 8.0 with an instruction sheet for inserting them into the IDVP Final Report for Fermi-2. Please contact me if you have any further questions or comments in this addition information.

Very truly yours,

David A. Ferg

David A. Ferg
Project Manager

DAF/lt
Enclosures (40 copies for NRC)
(20 copies for DECo)

cc: M.D. Lynch (NRC, NRR-DOL) with Enclosure (2 copies)
J.G. Keppler (NRC IE, Region III) with Enclosure (2 copies)
O.K. Earle (DECo) with Enclosure (1 copy)

INSTRUCTION SHEET

To insert the enclosed printed material into CYGNA's Independent Design Verification Program Final Report on Detroit Edison's Fermi-2 plan (Docket #50-341), perform the following steps:

a) Remove pages 8.2-5 and 8.2-6 (Revision 0)

b) Insert attached pages 8.2-5, 8.2-5a, 8.2-6 and 8.2-6a (Revision 1)

c) Remove pages 8.2-38 and 8.2-39 (Revision 0)

d) Insert attached pages 8.2-38, 8.2-38a and 8.2-39 (Revision 1)

e) Remove page 8.2-9 (Revision 0)

f) Insert attached pages 8.2-9 and 8.2-9a (Revision 1)

All of the observations assigned to Category A except Observations PI-01-11 and PS-01-03 received an expanded review by Cygna. Section 7.3, Exhibit 7-3 identifies to what extent the IDVP review was expanded. Observations PI-01-11 and PS-01-03 concerned the analysis of annulus pressurization (A/P) loads as a design requirement for Fermi-2. Since A/P loads were not originally considered by Cygna to be an actual design requirement on Fermi-2, the review was not expanded. Refer to Section 8.2.2 for further discussions concerning the A/P load issue. Observation EE-01-03 was by the nature of the observation expanded to review all safety-related loads which are sequenced on the diesel generator under accident conditions to ensure none would reduce the diesel generator voltage below 85%.

All of the observations assigned to Category B except Observations DC-01-05, DC-01-12, DC-02-06, DC-02-07, DC-02-10, PS-01-04, PS-02-03 and ST-01-01 required an expanded review by Cygna. Again, Section 7.3, Exhibit 7-3 describes the scope expansion conducted by Cygna to resolve these Category B observations. To resolve Observation DC-01-05, all key design documents were reviewed by Cygna to ensure they had the proper QA level designation. A review of the personnel who acted as lead auditors since 1978 was performed to resolve Observation DC-01-12. Sargent & Lundy's internal audit program was reviewed in depth to determine that there was no design impact on Fermi-2 due to Observation DC-02-06. Observations DC-02-07 and DC-02-10 were resolved by requiring DECo to perform a complete as-built analysis for all flued-head anchor structures and Sargent & Lundy to review all Fermi-2 pipe stress

reports and request the field to verify that as-built pipe supports are reconciled with the stress report results. Observation PS-01-04 concerned the comparison of piping design loads for Operational Basis Earthquake (OBE) and Safe-Shutdown Earthquake (SSE) ground motion accelerations. As such, the observation did not require an expanded review because it inherently covers the seismic characteristics of the entire Fermi-2 site. Observation PS-02-03 concerned a check to ensure seismic movements were within the working range of spring hangers. Again, since the seismic movements were small ($<$1/10") in both the RHR Cooling and RHR Service Water Systems, no expansion in review scope was necessary since the two systems are representative of other plant systems. However, Cygna requested Detroit Edison to review the remaining spring hangers to verify adequacy. Finally, Observation ST-01-01 involved the use of design summary sheets to incorporate the structural design criteria into each structural calculation on the Fermi-2 project prior to 1981. Even though ST-01-01 was generic to all of S&L structural activities, it had no generic implications to the design process on Fermi-2 (refer to page 7.7-104 for further discussion).

Of the twenty-six (26) observations assigned to Category C, eleven (11) required an expanded review to determine to what extent, if any, each observation affected the Fermi-2 design. The scope expansions for Observations PI-01-03, PI-01-07, PI-01-08, PI-01-09, PI-03-05, PI-03-06, EQ-01-03, EQ-01-04, PS-00-04, ST-01-24 and ST-01-33 are described in Section 7.3, Exhibit 7-3.

Cygna determined that it was standard practice for GE to use a default value for stress indices of 1.0 on small branch connections. Consequently Observation PI-01-06 required a generic resolution involving GE pipe stress analysis techniques. For Observation PI-03-02, Cygna review all flued-heads to verify the omitted containment pressure stresses were negligible. Since thermal movements are small for both the RHR Cooling and RHR Service Water elements and since both systems were representative of other high temperature Fermi-2 systems, an expanded review for Observation PS-00-02 was not justified. In Observation PS-01-01, Cygna expanded the review until it was determined that GE had verified the shear lug design in the Class 1 pipe stress analyses. To resolve Observation DC-02-02, Cygna examined Sargent & Lundy's method for specifying the use of computer programs on the Fermi-2 project and checked this method to ensure the correct and proper programs were utilized in the design process. Review results were able to also demonstrate that Sargent & Lundy's method for calculating allowable loads on embedment plate stud bolts was sufficiently conservative to resolve Observation

ST-01-26. Observations ST-01-03, ST-01-05, ST-01-06, ST-01-09, ST-01-12, ST-01-13, ST-01-15, ST-01-16, and ST-01-19 are in the structural discipline and are unique only to the RHR Complex. Additional information associated with the resolution of Observations ST-01-03, ST-01-06, ST-01-09, ST-01-13, and ST-01-16 are provided in Cygna's responses to NRC Enclosure 3 Questions (refer to Section 8.2.3)

Observation/ PFR No.	Description	Reference Page
DC-01-06	**Root Cause:** An incomplete review of the subject specification since the revision did not have a P.E. certification. This was a random occurrence and appeared to be simply an oversight on behalf of Detroit Edison Engineering. **Extent:** No generic implications	7.7-31
DC-01-07	**Root Cause:** Not applicable since observation was invalid.	7.7-32
DC-01-08 PFR-01	**Root Cause:** A lack of documented evidence that the Detroit Edison QA program with respect to internal audits was being effectively implemented. **Significance:** Without adequate assurance that the design control program was being effectively implemented, the quality and integrity of the Fermi-2 design could have been called into question. A comprehensive review indicated all elements of the design control program were evaluated during the course of the project. **Extent:** Generic implications for the entire plant to the extent the design process could have been of questionable quality and a lax internal audit system might never have identified the extent of any weaknesses. The review results indicated the design process was not adversely affected.	7.7-33
DC-01-09 PFR-02	**Root Cause:** A lack of management attention and follow-up in reviewing audit results and taking appropriate action to correct the deficiencies. **Significance:** The Fermi-2 design could have been adversely or unnecessarily impacted without timely and proper corrective action on design control audit findings. Positive management actions have been taken to resolve all outstanding open audit findings and surveillance items. **Extent:** Generic implications for the entire plant to the extent the design process could have been of questionable quality due to a continued lack of corrective action on internal audit and surveillance findings. The review results indicated the design process was not aversely affected.	7.7-34

Observation/ PFR No.	Description	Reference Page
DC-01-10 PFR-03	**Root Cause:** A lack of documented evidence that the Detroit Edison QA program with respect to contractor and vendor audits was being effectively implemented. Also, an audit schedule of A/E's which appeared too infrequently for continuous monitoring of supplier QA program implementation. **Significance:** Basically, it is Detroit Edison's responsibility to perform frequent audits of architect/engineers and engineering consultants. They should maintain adequate documentation of checklists and audit findings to provide added assurances that design control programs are being effectively maintained and implemented. Subsequent review of engineering suppliers disclosed DECo performed the necessary audits to assure the effective implementation of their design control programs. **Extent:** Generic implications to the extent the design information and design control process from A/E organizations to Fermi-2 could have been of questionable quality and an insufficient, infrequent vendor audit system might not have identified a weakness. The review results indicated the design process was not adversely affected.	7.7-35

EXHIBIT 8.2.1-2
ROOT CAUSE CLASSIFICATIONS

Category	Observation	Comments
A	DC-01-01	See Section 7.3, Exhibit 7-3
	PI-01-11	Annulus pressurization piping loads
	PI-02-02	See Section 7.3, Exhibit 7-3
	PI-03-04	See Section 7.3, Exhibit 7-3
	PS-00-01	See Section 7.3, Exhibit 7-3
	PS-01-03	Annulus pressuriazation support loads
	PS-03-01	See Section 7.3, Exhibit 7-3
	PS-03-02	See Section 7.3, Exhibit 7-3
	ST-01-02	See Section 7.3, Exhibit 7-3
	EE-01-03	FSAR requirement on minimum motor starting voltage
B	DC-01-05	QA level designations
	DC-01-08	See Section 7.3, Exhibit 7-3
	DC-01-09	See Section 7.3, Exhibit 7-3
	DC-01-10	See Section 7.3, Exhibit 7-3
	DC-01-12	Lead auditor qualifications
	DC-02-06	SRL internal audit files
	DC-02-07	Field design change requests
	DC-02-10	As-built field verification
	PI-01-12	See Section 7.3, Exhibit 7-3
	PI-02-03	See Section 7.3, Exhibit 7-3
	PI-03-01	See Section 7.3, Exhibit 7-3
	PS-01-04	Design specification revision required
	PS-02-03	Spring hanger seismic movements
	ST-01-01	S & L structural design criteria
	ST-01-30	See Section 7.3, Exhibit 7-3
	ST-01-31	Concrete voids and exposed rebar
C	DC-01-03	See Section 7.3, Exhibit 7-3
	DC-02-02	Computer program user requirements
	PI-01-03	See Section 7.3, Exhibit 7-3
	PI-01-06	Branch connection stress
	PI-01-07	See Section 7.3, Exhibit 7-3
	PI-01-08	See Section 7.3, Exhibit 7-3
	PI-01-09	See Section 7.3, Exhibit 7-3
	PI-03-02	Flued-head load cases indices
	PI-03-05	See Section 7.3, Exhibit 7-3
	PI-03-06	See Section 7.3, Exhibit 7-3
	EQ-01-03	See Section 7.3, Exhibit 7-3
	EQ-01-04	See Section 7.3, Exhibit 7-3
	PS-00-02	RHR pipng thermal movements
	PS-00-04	See Section 7.3, Exhibit 7-3
	PS-01-01	Shear lugs for Class I piping

EXHIBIT 8.2.1-2 (cont'd)
ROOT CAUSE CLASSIFICATIONS

Category	Observation	Comments
C (cont'd)	PS-02-04	Use of OBE vs. DBE loads
	ST-01-03	RHR Complex design soil loading
	ST-01-05	Cooling tower frame analysis model
	ST-01-06	Basement reinforcing steel placement
	ST-01-09	Foundation wall rebar placement
	ST-01-12	Missing foundation walls loads
	ST-01-13	Reinforcing steel in beams

EXHIBIT 8.2.1-2 (cont'd)
ROOT CAUSE CLASSIFICATIONS

Category	Observation	Comments
C (cont'd)	ST-01-15	Shear wall overturning moments
	ST-01-16	Foundation wall design moments
	ST-01-19	Reservoir water effects
	ST-01-24	See Section 7.3, Exhibit 7-3
	ST-01-26	Stud allowable load calculations
	ST-01-33	See Section 7.3, Exhibit 7-3
D	PI-01-01	Long vs short radius elbows
	PI-01-02	Orientation of restraints S810 & G16
	PI-01-10	Shear lug input load error
	PI-02-01	Branch intensification factors
	PI-02-04	Restraint G01 geometry
	PI-02-05	Long vs short radius elbows
	PI-02-06	Lubrite plates in stanchions
	PS-01-05	Weld size error
	PS-02-02	Penetration sleeve gaps
	PS-02-05	Hanger E11-2189-007 internal brace
	PS-02-06	See Section 7.3, Exhibit 7-3
	ST-01-10	Cooling tower slab load definition
	ST-01-28	Inconsistent section
	ST-01-32	Cantilevered slab loading
	EE-01-02	Conduit size drawing discrepency
E	DC-01-06	Missing PE certification
	DC-01-11	RHR Mechanical Design Document update
	DC-02-01	Seismic analysis report references
	DC-02-03	See Section 7.3, Exhibit 7-3
	DC-02-04	S & L design review schedule
	DC-02-05	S & L pipe support design calculations
	DC-02-09	See Section 7.3, Exhibit 7-3
	DC-03-01	Responsible engineer's signature
	DC-03-02	Receipt acknowledgement of drawings
	DC-03-03	Seismic report comment resolution
	DC-03-04	Filing of dispositioned DCN's
	PI-01-04	Snubber suppporting frame stiffness
	PI-01-05	Incorrect valve body weights
	EQ-01-02	Valve axial cyclic stresses
	PS-02-01	Support E11-2184-G01 gap size
	ST-01-04	RHR Complex thermal gradients
	ST-01-07	Cooling tower thermal gradients
	ST-01-08	Cooling tower slab thermal gradients
	ST-01-14	Shear loads on deep beam walls
	ST-01-18	Bedrock pressure grouting
	ST-01-20	Cooling tower seismic loadings
	ST-01-21	Cooling tower slab seismic loadings
	ST-01-23	DBE vs. OBE seismic design spectra
	ST-01-29	Bedrock pressure grouting
	EE-01-01	Circuit breaker interrupting rating

All of the observations assigned to Category A except Observations PI-01-11 and PS-01-03 received an expanded review by Cygna. Section 7.3, Exhibit 7-3 identifies to what extent the IDVP review was expanded. Observations PI-01-11 and PS-01-03 concerned the analysis of annulus pressurization (A/P) loads as a design requirement for Fermi-2. Since A/P loads were not originally considered by Cygna to be an actual design requirement on Fermi-2, the review was not expanded. Refer to Section 8.2.2 for further discussions concerning the A/P load issue. Observation EE-01-03 was by the nature of the observation expanded to review all safety-related loads which are sequenced on the diesel generator under accident conditions to ensure none would reduce the diesel generator voltage below 85%.

All of the observations assigned to Category B except Observations DC-01-05, DC-01-12, DC-02-06, DC-02-07, DC-02-10, PS-01-04, PS-02-03 and ST-01-01 required an expanded review by Cygna. Again, Section 7.3, Exhibit 7-3 describes the scope expansion conducted by Cygna to resolve these Category B observations. To resolve Observation DC-01-05, all key design documents were reviewed by Cygna to ensure they had the proper QA level designation. A review of the personnel who acted as lead auditors since 1978 was performed to resolve Observation DC-01-12. Sargent & Lundy's internal audit program was reviewed in depth to determine that there was no design impact on Fermi-2 due to Observation DC-02-06. Observations DC-02-07 and DC-02-10 were resolved by requiring DECo to perform a complete as-built analysis for all flued-head anchor structures and Sargent & Lundy to review all Fermi-2 pipe stress

reports and request the field to verify that as-built pipe supports are reconciled with the stress report results. Observation PS-01-04 concerned the comparison of piping design loads for Operational Basis Earthquake (OBE) and Safe-Shutdown Earthquake (SSE) ground motion accelerations. As such, the observation did not require an expanded review because it inherently covers the seismic characteristics of the entire Fermi-2 site. Observation PS-02-03 concerned a check to ensure seismic movements were within the working range of spring hangers. Again, since the seismic movements were small ($<$1/10") in both the RHR Cooling and RHR Service Water Systems, no expansion in review scope was necessary since the two systems are representative of other plant systems. However, Cygna requested Detroit Edison to review the remaining spring hangers to verify adequacy. Finally, Observation ST-01-01 involved the use of design summary sheets to incorporate the structural design criteria into each structural calculation on the Fermi-2 project prior to 1981. Even though ST-01-01 was generic to all of S&L structural activities, it had no generic implications to the design process on Fermi-2 (refer to page 7.7-104 for further discussion).

Of the twenty-six (26) observations assigned to Category C, eleven (11) required an expanded review to determine to what extent, if any, each observation affected the Fermi-2 design. The scope expansions for Observations PI-01-03, PI-01-07, PI-01-08, PI-01-09, PI-03-05, PI-03-06, EQ-01-03, EQ-01-04, PS-00-04, ST-01-24 and ST-01-33 are described in Section 7.3, Exhibit 7-3.

Cygna determined that it was standard practice for GE to use a default value for stress indices of 1.0 on small branch connections. Consequently Observation PI-01-06 required a generic resolution involving GE pipe stress analysis techniques. For Observation PI-03-02, Cygna review all flued-heads to verify the omitted containment pressure stresses were negligible. Since thermal movements are small for both the RHR Cooling and RHR Service Water elements and since both systems were representative of other high temperature Fermi-2 systems, an expanded review for Observation PS-00-02 was not justified. In Observation PS-01-01, Cygna expanded the review until it was determined that GE had verified the shear lug design in the Class 1 pipe stress analyses. To resolve Observation DC-02-02, Cygna examined Sargent & Lundy's method for specifying the use of computer programs on the Fermi-2 project and checked this method to ensure the correct and proper programs were utilized in the design process. Review results were able to also demonstrate that Sargent & Lundy's method for calculating allowable loads on embedment plate stud bolts was sufficiently conservative to resolve Observation

ST-01-26. Observations ST-01-03, ST-01-05, ST-01-06, ST-01-09, ST-01-12, ST-01-13, ST-01-15, ST-01-16, and ST-01-19 are in the structural discipline and are unique only to the RHR Complex. Additional information associated with the resolution of Observations ST-01-03, ST-01-06, ST-01-09, ST-01-13, and ST-01-16 are provided in Cygna's responses to NRC Enclosure 3 Questions (refer to Section 8.2.3)

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	PS-03-01	See Section 7.3, Exhibit 7-3
	PS-03-02	See Section 7.3, Exhibit 7-3
	ST-01-02	See Section 7.3, Exhibit 7-3
	EE-01-03	FSAR requirement on minimum motor starting voltage
B	DC-01-05	QA level designations
	DC-01-08	See Section 7.3, Exhibit 7-3
	DC-01-09	See Section 7.3, Exhibit 7-3
	DC-01-10	See Section 7.3, Exhibit 7-3
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	PI-03-01	See Section 7.3, Exhibit 7-3
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	PI-01-08	See Section 7.3, Exhibit 7-3
	PI-01-09	See Section 7.3, Exhibit 7-3
	PI-03-02	Flued-head load cases indices
	PI-03-05	See Section 7.3, Exhibit 7-3
	PI-03-06	See Section 7.3, Exhibit 7-3
	EQ-01-03	See Section 7.3, Exhibit 7-3
	EQ-01-04	See Section 7.3, Exhibit 7-3
	PS-00-02	RHR pipng thermal movements
	PS-00-04	See Section 7.3, Exhibit 7-3
	PS-01-01	Shear lugs [illegible] lass I piping

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	PI-02-05	Long vs short radius elbows
	PI-02-06	Lubrite plates in stanchions
	PS-01-05	Weld size error
	PS-02-02	Penetration sleeve gaps
	PS-02-05	Hanger E11-2189-007 internal brace
	PS-02-06	See Section 7.3, Exhibit 7-3
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	DC-01-11	RHR Mechanical Design Document update
	DC-02-01	Seismic analysis report references
	DC-02-03	See Section 7.3, Exhibit 7-3
	DC-02-04	S & L design review schedule
	DC-02-05	S & L pipe support design calculations
	DC-02-09	See Section 7.3, Exhibit 7-3
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	ST-01-04	RHR Complex thermal gradients
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	ST-01-18	Bedrock pressure grouting
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