

09/08/82

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
CLEVELAND ELECTRIC ILLUMINATING)	Docket Nos. 50-440 OL
COMPANY, <u>ET AL.</u>)	50-441 OL
(Perry Nuclear Power Plant,)	
Units 1 and 2))	

NRC STAFF FURTHER PARTIAL RESPONSE TO SECOND SET OF INTERROGATORIES TO NRC STAFF BY THE SUNFLOWER ALLIANCE

The following responses complete the NRC Staff's response to "Sunflower Alliance et al. Second Set of Interrogatories to Staff" (April 30, 1982), with the exception of responses to those interrogatories which we have referred to the Federal Emergency Management Agency or to the Staff's consultant on evacuation time studies. The responses to those interrogatories will be transmitted as soon as they are available. As directed by the Board, the Staff has discussed with counsel for Sunflower the nature of its objections. No narrowing of the interrogatories was achieved during that discussion, however, counsel indicated that Sunflower may seek to narrow the scope of its interrogatories in a subsequent set which it may file.

Prefatory Statement As To Interrogatories On Issue #6

Subsequent to issuance of the results of the Commission studies on ATWS in December 1978 (Volume 3, NUREG-0460, "Anticipated Transients Without Scram for Light Water Reactors,") and the industry's response to our request for generic analyses for ATWS, the staff presented their recommendations on plant modifications in Volume 4, NUREG-0460 (dated

DESIGNATED ORIGINAL

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March, 1980), to the Commission in September 1980. The Commission included in modified form some of the alternatives proposed by the staff, along with additional proposals for resolution of the ATWS issue in its proposed rule issued for comment in 1981. 46 Fed. Reg. 57520 (November 24, 1981): The Commission will determine through this rulemaking the required modifications to resolve anticipated transients without scram concerns as well as the required schedule for implementation of such modifications. Perry will be subject to the Commission's decision in this matter, and it would be premature to speculate at this time as to what specific plant modifications will be required. The staff has responded to Sunflower's interrogatories on ATWS in light of the publication of the Commission's proposed rule.

Interrogatory 1

Table 1, p. 11, of NUREG-0460, Vol. 4 lists various alternatives for ATWS plant modifications. Alternative 4A is to be implemented by all plants (other than early operating plants) by January 1, 1984 (p. 13, Vol. 4). However, NUREG-0460, Vol. 4, p. 54 contains the following statement: "Each plant for which conformance to Alternative 4A is deemed not practical because of constraints imposed by basic plant layout, diesel capacity, or completed seismically qualified structures, shall submit by December 31, 1980, the optimization study set forth in Section 2.4.1, including alternatives for achieving a level of safety equivalent to Alternative 4A. This alternative (sometimes called "Alternative 3 1/2" is intended for operating plants and those well along in construction. Duplicate plants at the same site may be modified identically, even if the second unit is not as far along in construction as to fall within this provision if the first unit qualifies."

- a) Explain the apparent contradiction between the statement on p. 13 and that on p. 54. Will or will not all plants (except early ones) be required to implement Alternative 4A by January 1, 1984?
- b) Define the phrase "level of safety equivalent to Alternative 4A." How is this degree of safety quantified or otherwise determined? What types of alternatives are there for achieving this level of safety?

c) Define the phrase "well along in construction," either by percent completion of the plant as a whole or by the completion of specific systems to structures within the plant. Specifically, how would this phrase be defined for the Perry Nuclear Power Plant?

d) Is the Perry Nuclear Power Plant, Unit 1, far enough along in construction, as defined above, to qualify for the consideration of "Alternative 3½"? If so, has the Applicant submitted the optimization study required? If so, produce this optimization study.

e) If the Perry Nuclear Plant, Units 1 or 2, was not far enough along in construction to qualify for Alternative 3½, is it the Staff's opinion that PNPP will be required to implement Alternative 4A in its entirety? When will this hardware be required to be installed? How is the Applicant's compliance to be insured?

f) If PNPP Unit 1 is far enough along in construction to qualify for Alternative 3½, will Unit 2 be permitted to be modified identically? Why has this provision (identical modification of duplicate same-site units) been included? Discuss why this provision will not degrade plant safety in the more easily modified second unit.

Response

The Staff objects to this interrogatory for the reasons set forth in our Prefatory Statement to the extent that the interrogatory seeks explanation or definition of terms that are no longer relevant to Issue #6 in light of the Commission's proposed rule to. To the extent the interrogatory is relevant to that Issue, the Staff provides the following response.

NUREG-0460, Vol. 4 was published in March 1980 for comment. At that time Perry was at an early stage of construction. "Alternative 3½" or alternate-3 was proposed for operating plants and other plants close to operation in 1980. Hence "Alternative 3½" was not intended to be applicable to plants such as PNPP, which was at an early stage of construction. Prior to the proposed rulemaking, the staff's preferred alternative for PNPP was alternative 4A.

Interrogatory 3

Where does the PNPP design presently stand in regard to the alternatives listed in NUREG-0460, Vol. 4? E.g., does current plant design implement Alternative 2A, 3A, or 4A?

Response

PNPP is not specifically being required to meet any of the alternatives listed in NUREG-0460, Vol. 4. However, once the ATWS rule is promulgated, PNPP will be required to comply with the rule. The Applicants are committed to interim modifications (Recirc. pump trip, ATWS procedures and operator training) and, in addition, they are discussing with the staff further improvements to upgrade the plants' ATWS design (such as improved standby liquid control system, additional sensors and an alternate control rod insertion capability). See letter dated August 13, 1982 from Dalwyn R. Davidson (CEI) to A. Schwencer (NRC) (copy attached).

Interrogatory 4

What constitutes scram failure in a BWR/6 such as Perry? E.g., describe the combination of the following failures which will result in the loss of control of reactivity and failure to attain hot shutdown: Insufficient rod insertion speed, percent of length withdrawn which results in failure, number and location of failed rods which results in scram failure.

Response

The staff objects to this interrogatory as it is not relevant to Issue #6.

Interrogatory 5

Describe in detail, along with their frequency of occurrence for each year of plant operation, any and all transients capable of initiating reactor scram in a BWR/6.

Response

The staff objects to this interrogatory as it is not relevant to Issue #6.

Interrogatory 6

Describe all scram system failure, including common-mode failures, capable of producing ATWS in a BWR/6.

Response

The staff objects to this interrogatory as it is not relevant to Issue #6.

Interrogatory 7

For each of the transients listed in #5 above (and for any transient not listed in the response to #5 but included in Table A.2, Vol. 4 of NUREG-0460), perform a time-domain analysis, specific to the Perry Plant, assuming that control rod scram does not occur, but that the recirculation pump trip does function and the SLCS, as presently designed, is manually operated. Assume all plant system to be as currently described in the FSAR. Included in the analysis any and all plant systems and functions affected by ATWS and any consequences thereof, including but not limited to core integrity, containment integrity, suppression pool effects, reactor internals, ECCS functions, dilution of SLCS boron by ECCS, power oscillations, and offsite radiation doses to the public. Present the analysis in this manner: The transient begins at $t=0$; list time of occurrence for each major action or consequence during the ATWS (e.g., RPT, SLCS activation, containment isolation, and maximum values of the following parameters to be presented graphically) until such time as either the reactor is brought into cold shutdown or core melting occurs. List all assumptions made for operator actions. Present the following parameters graphically as a function of time (use appropriate units and scales): neutron flux, power levels, RPV pressure, suppression pool temperature, containment pressure, steamline pressure, water level in RPV, heat flux, and fuel cladding temperature and radiation doses to public at site boundary, 5 mile radius, 10 mile,

and 50 mile radius. Also perform the analysis as described above for the following conditions:

- 1) As above, only with automatic SLCS.
- 2) Full implementation of Alternative 4A.

Response

The staff objects to this interrogatory to the extent not limited to Issue #6. The staff further states that it has not performed a "time-domain analysis" specific to PNPP and objects to having to perform such an analysis for the purpose of responding to this interrogatory.

Interrogatory 8

How many transients occurred in each of the years 1978, 1979 and 1980?

Response

The staff objects to this interrogatory as it is not relevant to Issue #6.

Interrogatory 9

Does PNPP have the recirculation pump trip initiated by high pressure? What other conditions can initiate the RPT? Explain how this feature mitigates the consequences of ATW; about what % negative reactivity does the RPT contribute? When was (or will be) the RPT feature installed?

Response

The staff objects to this interrogatory as it is not relevant to Issue #6.

Interrogatory 12

Have the code verification test for BWRs described on p. B-3 of Vol. 4, NUREG-0460 been performed? If not, why not, and when will they be performed? If so, what were the results of these tests?

Response

The staff objects to this interrogatory as it is not relevant to Issue #6.

Interrogatory 13

Describe the effects of power oscillations, such as are described on p. A-67, Vol. 4, NUREG-0460, on fuel and containment integrity and any other affected system at PNPP.

Response

The staff objects to this interrogatory as it is not relevant to Issue #6.

Interrogatory 14

Give a cost estimate for the installation of an automated standby liquid control system at PNPP, Units 1 and 2: provide documentation to support this estimate. Include in the estimate any necessary modifications to other systems, e.g., addition of sufficient diesel generator capacity. Also give a cost estimate for the complete implementation of Alternative 4A as described in Vol. 4 of NUREG-0460.

Response

The Staff has not performed, and has no plans to perform, a cost estimate for the implementation of automatic initiation equipment and circuitry at PNPP. The staff objects to having to perform such a cost estimate for purposes of responding to this interrogatory.

Interrogatory 18

Perform a value/impact analysis, like that in NUREG-0460, specific to PNPP for: (1) the automation of the SLCS (2) complete implementation of Alternative 4A. Both modifications are assumed to be made during construction on both Units 1 and 2.

Response

The staff objects to this interrogatory to the extent it is not limited to Issue #6. The staff states that it has not performed a value/impact analysis of the automation of the SLCS and objects to having to perform this analysis for the purpose of responding to this interrogatory.

Interrogatories on Issue #4

Interrogatory 19

Section 6.3.1.1.2 of the PNPP FSAR states that, as a minimum, the following equipment shall make up the ECCS:

- 1 High Pressure Core Spray
- 1 Low Pressure Core Spray
- 3 Low Pressure Coolant Injection Loops
- 1 Automatic Depressurization System

Does the Emergency Core Cooling System at Perry have any other systems above and beyond these minimum requirements?

Response

The Staff objects to this interrogatory as it is not relevant to Issue #4.

Interrogatory 20

The applicant's FSAR states (Sections 1.5.1.1, 3.9.2.4) that Perry is the prototype 238 size BWR/6 plant. Describe in detail any special more stringent testing requirements for prototype plants, especially those pertaining to the ECCS.

Response

The ECCS for Perry is not prototypical (i.e., an original design or model after which other such systems are formed). Therefore, the staff has not applied any special testing requirements as part of its review of the Perry ECCS. The staff objects to this interrogatory to the extent it relates to PNPP systems other than the ECCS.

Interrogatory 21

In the opinion of the staff, has the ECCS evaluation model for General Electric 238 size BWR/6 met all the criteria of 10 CFR 50.46 and Appendix K of Part 50? If not, specify what parts of the evaluation model do not comply.

Response

The Staff objects to this interrogatory as it is not relevant to Issue #4.

Interrogatory 30

In the opinion of the staff, is the ADS entirely sufficient and functional in all its expected operational modes?

Response

The Staff objects to this interrogatory as not being relevant to Issue #4.

Interrogatories on Issue #1

Interrogatory 33

Demonstrate and discuss how emergency response facilities meet each and every criterion listed in NUREG-0814; answer all questions therein. (Emergency response facilities include the control room, Technical Support Center, Operational Support Center and Emergency Operations Facility).

Response

The Staff objects to this interrogatory to the extent that the criteria listed in NUREG-0814 are not related to the capability of the Applicants to perform their responsibilities with respect to offsite emergency evacuation, which is the subject of Issue #1. The Staff offers the following response with respect to those matters in NUREG-0814 related to Issue #1.

Once the Applicants have submitted a detailed description of the emergency response facilities the Staff will review that information against the standards in the NRC's regulations. The Staff's review of the emergency response facilities for compliance with the applicable regulations will be set forth in a Supplement to the Safety Evaluation Report.

Interrogatory 34

NCRP Report No. 55 at pp. 16-17 indicates that engineered safeguards at reactors may reduce the release of radioiodine during a nuclear accident. For each safeguard listed therein (and below), describe the system, if any, that will be in place at PNPP, explain how the system works to reduce iodine release, and indicate how efficient said system is at reducing radioiodine levels.

(1) various methods for condensing the radioiodine-bearing steam that would be released to the reactor building.

(2) enclosing the reactor in a sealed containment structure.

(3) recirculating the contained atmosphere through absorbents and filters that remove radioiodines.

(4) operation of sprays containing chemicals capable of absorbing the radioiodines and reducing their concentration in the atmosphere of the containment building.

Response

The staff objects to this interrogatory as not relevant to Issue #1.

Interrogatory 35

Explain how the plume exposure pathway EPZ depicted in Figure II-2 of Appendix D of Appendix 13A of FSAR was derived. Explain precisely how each and every one of the following factors was considered in the determination of the extent of the plume exposure EPZ; demography, including permanent and seasonal residents and transients; meteorology; topography; land use characteristics; release height; boundaries; release time and energy characteristics; release height; radionuclide content of release, including release fractions; plume dispersion, including plume rise; deposition velocity; dose-effects; sheltering and shielding; radiation treatment; breathing rates; time of year of release.

Response

It was the responsibility of the Applicants and State and local agencies to develop the plume exposure pathway EPZ. The Staff is not, therefore, able to state how "each and every one" of the factors listed in the interrogatory was considered by the Applicants and appropriate agencies. The Staff is, however, able to provide the following general response.

The plume exposure pathway EPZ depicted in Figure II-2 of Appendix D of the FSAR is briefly discussed in Section 2.3 of the Emergency Plan (Appendix 13A) and consists of the area within 10 mile radius. The EPZ is not "derived" as such, but is based on regulatory requirements specified in 10 C.F.R. 50.33(g) which states:

If the application is for an operating license for a nuclear power reactor, the applicant shall submit radiological emergency response plans of State and local governmental entities in the United States that are wholly or partially within the plume exposure pathway Emergency Planning Zone (EPZ), as well as the plans of State governments wholly or partially within the ingestion pathway EPZ. Generally, the plume exposure pathway EPZ for nuclear power reactors shall

consist of an area about 10 miles (16 km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to the local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries.

A further explanation and description is given in NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," Section III.B.

FEMA, in its evaluation, will determine the appropriate boundaries of the EPZ based on the factors specified in the regulation. The results of this evaluation will be provided in a future supplement to the SER.

Interrogatory 36

Does Staff agree with this EPZ area?

Response

The Staff has not yet formulated its position on the adequacy of the plume exposure pathway EPZ, and is awaiting the FEMA evaluation on this matter. The Staff's position will be presented in a future supplement to the SER.

Interrogatory 37

Describe in detail the methods and standards by which the evacuation time estimates contained in Tables V-4 and V-5 in Appendix D of Appendix 13A of FSAR were evaluated.

Response

The evacuation time estimates reported in the FSAR are being evaluated in accordance with the various elements set forth in Appendix 4 to NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Readiness in Support of Nuclear Power Plants." These considerations include: (a) an accounting for permanent, transient, and special facility populations in the plume exposure EPZ; (b) an indication of the traffic analysis method and the method of arriving at road capacities; (c) consideration of a range of evacuation scenarios generally representative of normal though adverse evacuation conditions; (d) consideration of confirmation of evacuation; (e) identification of critical links and need for traffic control; and (f) use of methodology and traffic flow modeling techniques for various time estimates, consistent with the guidance of NUREG-0654/FEMA-REP-1, Appendix 4. Background information on this subject can be found in NUREG/CR-1745 (BHARC-401/80-017), "Analysis of Techniques for Estimating Evacuation Times for Emergency Planning Zones." The results of the staff's evaluation will be reported in a future supplement to the SER.

Interrogatory 40

Has the Staff or Applicant (or anyone on their behalf or to their knowledge) conducted any generic or site-specific consequence analysis for (or having relevance to) releases from PNPP equivalent to the BWR-1 to BWR-4 releases defined in WASH-1400? If so, set forth in detail the methodology, assumptions, and results of any such study, including calculations of early fatalities, delayed fatalities, early injuries, delayed injuries, developmental or genetic birth defects, and land and water contamination. If not, by whom was the decision made that such a

study was unnecessary and what were the reasons for that decision? What process was followed in reaching that decision?

Response

The Staff objects to this interrogatory as not relevant to Issue #1.

Interrogatory 41

Has the Staff or Applicant (or anyone on their behalf or to their knowledge) conducted any generic or site-specific accident consequence analysis for accidents with containment failure modes such that the radioactive releases exceed those set forth in the design basis accident assessment described in Chapter 15 of the PNPP FSAR? If so, answer Interrogatory #40, specific to any such study.

Response

The Staff objects to this interrogatory as not relevant to Issue #1.

Interrogatory 42

In the Staff's opinion, is it possible to evacuate safely the total permanent, seasonal, and transient populations within each of the following areas at any time of day or any time of year? Describe in detail any assumptions made and indicate how your response would differ if that assumption were changed. Disclose any assumptions made with respect to an acceptable level of risk to the evacuating population.

- (a) The area designated as the plume exposure pathway EPZ for PNPP in the FSAR.
- (b) The area which the Staff believes should constitute the plume exposure EPZ for PNPP.
- (c) The circular zone surrounding PNPP having a 20-mile radius.
- (d) The Mentor Headlands area.
- (e) The entire City of Mentor.

Response

The objective of onsite and offsite emergency plans is to take the emergency response measures best calculated to minimize the radiological impact should an accident occur. At any site, early health effects could

result from some severe accident sequences even with emergency preparedness in place which meets the Commission regulations.

Interrogatory 43

In the Staff's opinion, would there ever be a need to order protective actions in any area outside of the plume exposure pathway EPZ proposed by the Applicant in the FSAR? If so, describe the circumstances therein, the areas so affected and the nature of any such protective actions.

Response

Under certain severe accident assumptions, it might be necessary to take protective actions beyond the 10 mile plume exposure pathway EPZ. This possibility was discussed in the development of the EPZ distances in NUREG-0396 and NUREG-0654. It was concluded, however, that the planning undertaken with respect to the plume exposure EPZ would provide a basis for expansion of the emergency response effort. The nature of such protective measures is likely to be sheltering during plume passage followed by relocation of individuals from any contaminated area under the "footprint" of the plume.

Interrogatory 47

Describe in detail any design modifications which would be made to PNPP, Units 1 and 2 to reduce the early and/or delayed fatalities and/or health effects associated with accidents. Specify the type of accident(s), the consequences of which each such modification would reduce, and estimate, for each modification, the extent of reduction for each of the following effects: early fatalities, delayed fatalities, early injuries, delayed injuries, and developmental or genetic birth defects.

Response

The Staff objects to this interrogatory as not relevant to Issue #1.

Interrogatory 48

In the Staff's opinion, what constitutes an acceptable level of risk to the public surrounding PNPP in the event of an accident? Specifically, what is the uppermost number of each of the following health effects which is acceptable: early fatalities, delayed fatalities, early injuries, delayed injuries, and developmental or genetic birth defects? If your answer varies depending on the type of accident which occurs, provide answers with respect to releases at PNPP equivalent to the BWR-1 to BWR-4 releases defined in WASH-1400.

Response

The Commission has no established level of acceptable risk. In each safety decision reached by the Commission there must be a finding that there is reasonable assurance that there will be no undue public risk, and this finding basically is founded on compliance with all of the Commission's applicable rules and regulations as set forth in Chapter 10 of the Code of Federal Regulations.

Although there is no established level of acceptable public risk, the Commission is currently considering a draft policy statement on qualitative safety goals and quantitative numerical guidelines for accidents at nuclear power plants. 47 Fed. Reg. 7023 (February 17, 1982). The numerical guidelines proposed for public comment are expressed as a percentage (0.1%) of the mortality risks faced by the public attributable to accidents and to cancer resulting from all other causes. As currently framed, these numerical guidelines would not be safety limits that must be achieved: they would be design objectives which should be met, if reasonable to do so.

Interrogatory 51

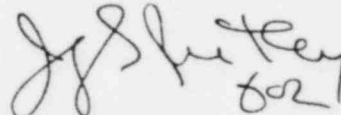
Why has the Applicant not submitted separate evacuation time estimates for evacuating special facilities, as required by NUREG-0654, Appendix 4?

Response

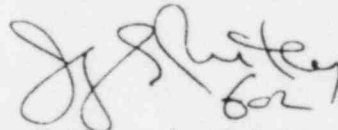
The Applicant has provided such estimates in Table V-4 on page 35 of Appendix D and on page 41 and 42 under "Time Estimates - Transportation Dependent Evacuation."

The undersigned NRC Staff counsel are responsible for the objections interposed in this response.

Respectfully submitted,



Stephen H. Lewis
Counsel for NRC Staff



Nathene A. Wright
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 8th day of September 1982

09/08/82

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NUCLEAR REGULATORY COMMISSION

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AFFIDAVIT OF GEORGE THOMAS

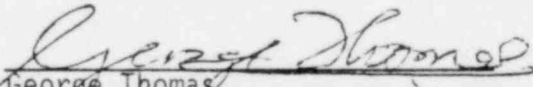
I, George Thomas, being duly sworn, state as follows:

1. I am a nuclear engineer in the Division of Systems Integration, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

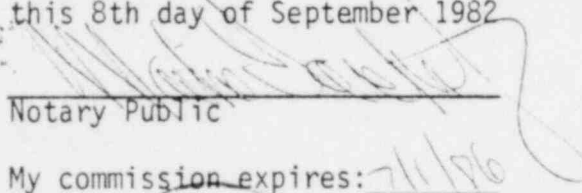
2. I am the NRC staff member responsible for the responses to Interrogatory Nos. 1, 3, 14, 18, and 20 of "Sunflower Alliance Inc., et al. Second Set of Interrogatories to the Staff" dated April 30, 1982.

3. These responses are true and accurate to the best of my knowledge and belief.

Respectfully submitted,


George Thomas

Sworn and subscribed before me
this 8th day of September 1982


Notary Public

My commission expires: 7/1/86



09/08/82

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AFFIDAVIT OF FALK KANTOR

I, Falk Kantor, being duly sworn, state as follows:

1. I am a Senior Emergency Preparedness Analyst in the Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission.
2. I am the NRC staff member responsible for the responses to Interrogatory Nos. 33, 35, 36, 37, 42, 43 and 51 of "Sunflower Alliance Inc., et al. Second Set of Interrogatories to the Staff" dated April 30, 1982.
3. These responses are true and accurate to the best of my knowledge and belief.

Respectfully submitted,

Falk Kantor

 Falk Kantor

Sworn and subscribed before me
this 8th day of September 1982

[Signature]

 Notary Public

My commission expires: 7/1/83



09/08/82

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AFFIDAVIT OF MALCOLM L. ERNST

I, Malcolm L. Ernst, being duly sworn, state as follows:

1. I am the Assistant Director for Technology, Division of Safety Technology, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

2. I am the NRC staff member responsible for the response to Interrogatory No. 48 of "Sunflower Alliance Inc., et al. Second Set of Interrogatories to the Staff" dated April 30, 1982.


3. This response is true and accurate to the best of my knowledge and belief.

Respectfully submitted,



 Malcolm L. Ernst

Sworn and subscribed before me
this 8th day of September 1982



 Notary Public

My commission expires: 7/1/86



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)

CLEVELAND ELECTRIC ILLUMINATING)
COMPANY, ET AL.)

(Perry Nuclear Power Plant,)
Units 1 and 2))

Docket Nos. 50-440 OL
50-441 OL

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF FURTHER PARTIAL RESPONSE TO SECOND SET OF INTERROGATORIES TO NRC STAFF BY THE SUNFLOWER ALLIANCE" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or, as indicated by an asterisk through deposit in the Nuclear Regulatory Commission's internal mail system, this 8th day of September 1982:

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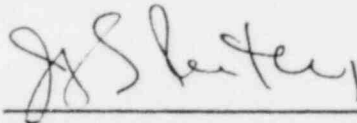
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