

U.S. NUCLEAR REGULATORY COMMISSION
AUGMENTED INCIDENT RESPONSE TEAM

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Licensee: Cleveland Electric Illuminating Company
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Facility Name: Perry Nuclear Power Plant, Unit 1

Inspection At: Perry Site, Perry, Ohio

Inspection Conducted: February 1, thru 27, 1986

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1. Summary

The Perry Nuclear Power Plant (PNPP) operated by the Cleveland Electric Illuminating Company (CEI) is a two unit boiling water reactor plant located on Lake Erie in Lake County, Ohio, about 7 miles northeast of Painesville, Ohio. Each reactor is rated at about 3579 megawatts thermal. Unit 1 is essentially complete. Fuel for this unit is on site in the upper and lower level storage pools. On January 31, 1986, a number of testing, calibration, and work completion activities were being conducted in preparation for fuel load. Unit 2 is 40-45% complete. Essentially no construction work has been done on Unit 2 in the past year and the owner has not decided at this time when work will resume.

At about 11:47 am (EST) on January 31, 1986, the plant experienced an earthquake which was computed to be about 5.0 on the Richter scale by the U.S. Geological Survey at Golden, Colorado. The PNPP staff responded to the event in accordance with the Perry Emergency Plan in order to expedite notification of the NRC and off-site officials, to ensure personnel safety and to manage response personnel. The counties of Astabula, Geauga and Lake were notified by 12:24 pm and the NRC Operations Center was notified by 12:29 pm (EST). The NRC Resident Inspector was on-site at the time and went to the Control Room. The NRC's Region III office activated its Incident Response Center at 1:15 (EST) and established contact with the NRC Operations Center, the Perry resident inspectors, and the Perry Plant operators. By 2:25 (EST) based on preliminary walkdowns by plant personnel which showed little or no damage and in consultation with the NRC, the Perry Plant terminated the emergency declaration.

The NRC dispatched an Augmented Investigation Team (AIT) to the plant the following day. In the interim Cleveland Electric Illuminating Company agreed to conduct a review of the event to determine if the earthquake was within the Design Basis of the plant, to identify any damage, to ensure all equipment had returned to normal operating conditions, and to maintain all affected equipment in the "as found" condition until the NRC AIT could retrieve any evidence which would be needed to investigate this event. This agreement was documented in a Confirmatory Action Letter (CAL-RIII-86-01; Attachment 1).

The AIT made up of NRC Region III and Headquarters (NRR) representatives arrived at the Perry Plant at about 11:00 am (EST) on February 1, 1986. Based upon the initial meeting with Cleveland Electric representatives and their consultants, the team decided that the items of initial concern were the confirmation of CEI's findings based on plant walkdowns during the night that there was no significant damage to the plant and the review and the validation of the data captured by the plant's seismic instruments. The initial review indicated that the emergency response aspects of the event were adequate and a detailed review could be delayed especially since the plant, having no license, was not yet bound by NRC emergency response requirements.

The NRC team after an initial quick plant tour split into two groups to investigate the above two items of concern. One group reviewed the seismic data and over the next two days the other group reviewed the data gathered by the plant staff on their walkdowns, conducted independent walkdowns in

a number of selected areas, and re-inspected off-normal conditions identified during the plant staff's walkdowns to determine the validity of the plant staff's data. The NRC team concluded that the plant staff had been very conservative in the identification of off-normal conditions and that there was no significant damage to the plant. No damage to safety-related systems could be identified. In completely non-seismic structures the only clear indication of the earthquake was the shifting in position of piping associated with the fire suppression system. Other events reported by the plant staff indicate that a few objects fell over on desks, dust from ceiling tiles shook loose and a light fixture fell a few inches. New fuel and other radioactive materials on site were in storage and were not affected. Most of the off-normal conditions identified by the plant staff could not be distinguished from normal wear routinely associated with ordinary plant construction and operating activities. Many of these conditions were identified as existing prior to the event. The fine cracks in concrete observed in several areas of the plant had no structural significance. Some were known by the plant staff to have existed prior to the event and some, as observed by the NRC team, could be shown to have existed prior to the event based upon the cracks being covered in part by uncracked paint. Since fine hairline cracks with no structural significance normally occur when concrete cures, the NRC team found that there were no clear indications that the cracks had been caused by the earthquake.

At the time of the event CEI had a large number of safety and non-safety systems in operation as part of its testing program. Of these, two non-safety items tripped on protective signals. These included the Unit 1 instrument air compressor and the auxiliary steam boiler. Neither unit was damaged. Relays on the Unit 1 main and auxiliary transformers tripped due to vibration. A leak (20-30 drops per minute) occurred on a flange in a potable hot water heater in the radwaste treatment system. This system is not safety related and does not contain radioactive water.

Instruments indicating suppression pool level showed a 1.5 inch increase in suppression pool level. The water level transmitters were found to be slightly out of calibration but not enough to account for the 1.5 inch increase. No real increase in water level was identified. The total nominal height of the water in the suppression pool is about 17 feet. The dislodging of trapped air in sensing lines is now believed to have been the cause of this change but this item remain open for further NRC review. Similar instruments elsewhere in the plant did not show similar behavior.

In order to increase the NRC's level of confidence, on February 5-7, four reactor engineer inspectors and their supervisor from the Region III office walked down all or part of 21 safety-related systems that were judged to be the most vulnerable to seismic acceleration due to location and system dimensions. No damage or significant movement that could be attributed to seismic activity was identified.

The plant had three different types of seismic monitoring instrumentation provided by two different vendors, Engdahl Enterprises and Kinemetrics, Inc. A number of instruments were in the process of being calibrated by one of the vendors at the time of the event. For these instruments,

manufactured by Engdahl, some had been calibrated the day prior to the earthquake, some had been calibrated as much as a year earlier and one was out-of-service due to calibration work in progress. The Kinometrics instruments were calibrated in December, 1985. Due to the importance of the data and the difference in the instruments, part of the NRC team followed the evaluation of the seismic instrument data by the plant staff and the instrument vendors. Preliminary data, available by February 2 and later submitted formally to the NRC on February 12 (Attachment 2), indicated the accelerations measured over a narrow range of frequencies (approximately 16-20 Hz and higher) at a few locations exceeded the acceleration expected at these locations for a design basis earthquake (Safe Shutdown Earthquake). Cleveland Electric Illuminating Company and its consultants believe that due to the short duration and low energy of the earthquake these exceedences were not significant from an engineering point of view and are not inconsistent with the seismic design basis of the plant. This issue has been assigned the Office of Nuclear Reactor Regulation for resolution. However, recognizing at an early stage the importance of this matter, the team carefully scrutinized all activities involving the seismic instruments to ensure the accuracy of the data. Subsequently in an amended CAL (Attachment 3) dated February 4, Cleveland Electric was permitted to resume all routine work activities but committed to notify the NRC of any activity involving the seismic monitoring instrumentation. Essential portions of the testing and recalibration work on these instruments was witnessed by NRC inspectors.

At this time the AIT believes the instruments were accurate within their design although some of the Engdahl data may be suspect because some instruments appear to have been disturbed by construction activities. However, even without these data the conclusion stated above is not changed. Sufficient validated seismic data exists to analyze the event.

In a letter dated March 12, 1986, all procedural restraints on equipment and instruments by the NRC were removed. The NRC concluded that essentially all data that could be obtained concerning this event was available.

2. Initial Perry Nuclear Power Plant Response

Title 10, Code of Federal Regulations, Part 50.54(q) requires a licensee authorized to possess and/or operate a nuclear power reactor to follow and maintain in effect an emergency plan. Since the Perry Nuclear Power Plant is not yet licensed and there is no fuel in the reactor, the above requirement does not apply. However, in preparation for licensing, emergency plans, emergency implementing procedures and off-normal instructions were in place. The Shift Supervisor responded to the event by following Off-Normal Instructions ONI-D51 "Earthquake (Unit 1)" and the PNPP Emergency Plan as directed by this procedure. The following summarizes the emergency actions in chronological sequence:

<u>Time (EST)</u>	<u>Event</u>
11:47	Earthquake occurs.
12:01	Plant Emergency Alarm sounds.
12:06	Shift Supervisor declares precautionary Site Area Emergency, makes evacuation announcement.
12:16	Begin notification of CEI emergency personnel.
12:25	Astabula County notified. Geauga County notified. Lake County notified.
12:29	NRC Operations Center notified.
12:32	Perry Operational Support Center activated.
12:35	Technical Support Center activated.
12:40	State of Ohio notified.
13:02	Site Area Emergency downgraded to alert.
13:03-13:15	Notification of downgrading to alert made to Counties, State, Coast Guard and NRC.
13:41	INPO contacted.
14:20	NRC-Bethesda and Region III concur on termination of emergency.
14:25	Emergency Event Terminated.
14:31-14:42	Notification of Emergency Event termination made to Counties, State, Coast Guard and NRC.
15:31	Deactivated Technical Support Center.
16:30	Set up recovery organization.

The team's initial impression, based on the participation of some members in the activation of the NRC incident response organization during the event, was that the plant staff's response was prudent and overall satisfactory. A decision was made to have the emergency plan implementation examined more closely by a Region III Emergency Preparedness Inspector. This was done on February 5 and 6, and reported in IE Inspection Report Number 50-440/86004; 50-441/86002. This report identifies a number of problems many of which were caused by the peculiar preoperational status of the plant. The overall response was judged to be adequate.

With respect to the off-normal procedures, the control room staff responded as required. They received initial indication that the Operating Basis Earthquake (OBE) acceleration limits had been exceeded by use of the Triaxial Response Spectrum Recorder, Instrument No. D51-R160, that has an indicator in the control room. The instrument itself is located on the reactor building foundation mat in the intermediate building at

elevation 574'-11". Initial walkdowns were conducted as required. The recording devices on the seismic measurement instruments were recovered as required. The appropriate surveillances were conducted on the accelerographs as required. All activities conducted by the plant staff at this stage appeared appropriate.

3. Plant Conditions Subsequent to Earthquake

The information presented in this section is based on a review of the Perry Plant walkdown checklists and results; the summary presented in CEI's "Seismic Event Evaluation Report" transmitted to Mr. Harold Denton in a letter dated February 12, 1986; statements made to the NRC at the February 11, 1986, public meeting at the Perry Plant; interviews with the Perry Plant engineering and operations staff, control room staff, and plant management; review of plant staff evaluations of condition reports; and visual observation by the AIT staff during their walkdowns.

a. Visual Inspection by Perry Plant Staff

In the initial several hours after the earthquake visual inspections were performed by plant personnel. Areas inspected included Turbine Building, Auxiliary Building, Intermediate Building, transformer yard, Control Complex, Service Water and Emergency Service Water pump house, suppression pool and the cooling towers and basins. Later in the evening a team of approximately 65 engineers and technicians performed systematic walkdowns of all plant areas. These walkdowns identified approximately 480 potential off-normal conditions none of which involved significant structural damage or major equipment malfunctions. Cleveland Electric's engineering evaluation concluded that 77% were preexisting conditions, two minor items were attributable to the earthquake and the remainder were indeterminate, i.e., it could not be definitely established that the conditions existed prior to the earthquake. These items included hairline cracks in concrete, burned out light bulbs, dents in sheet metal surfaces, damaged ceiling tile, putty coming out of cracks, and non-safety piping that had shifted in place. The items concluded to have been earthquake caused were the trip of the main transformer breaker and a non-safety water heater flange which was found to be dripping water (about 20-30 drops per minute). This is a potable water system and would never contain radioactive steam or water even during operation of the plant. Tests conducted by Cleveland Electric indicated that the trip of the generator protection relays on the main transformer system would not have occurred if they had been energized. During this event they had been deenergized due to testing. Two non-safety pieces of equipment tripped when their protective systems actuated. These were the Unit 1 instrument air compressor which tripped on high vibration. When instrument air pressure dropped to 100 pounds, a back-up air compressor started. The Unit 1 air compressor was later restarted with no problems identified. The auxiliary steam boiler tripped apparently on an abnormal change in water level caused by splashing or waves induced by the earthquake. It was also restarted with no apparent problems.

Immediately after the earthquake a step increase of approximately one and one half inches was observed on both the Suppression Pool wide and narrow range level recorders. The plant staff investigated this event and documented their analysis in a Condition Report Event Investigation CR-86-0106 (Attachment 4). They eliminated a number of potential causes: namely, potential seismic damage to the Rosemount differential pressure transmitters, installation of the

level transmitters, calibration procedure or technique and recorder pen sticking. They concluded that the most likely cause was air entrapment in the variable sensing lines due to inadequate filling and venting after the recent suppression pool outage. The plant staff has proposed corrective actions to ensure adequate sensing line filling and venting. This item remains open pending completion of corrective actions and further review by an NRC instrument specialist (440/86005-01).

A civil engineering survey of settlement monitor points was conducted on February 5 to determine if the position of buildings had been affected by the earthquake. The maximum change was observed in Reactor Building Number 1 which was a change of 1/16 of an inch in elevation since January 15. However structural settlement changes occur due to a number of causes and the Reactor Building on February 5, 1986, was at the exact same elevation as on February 15, 1985.

b. Initial AIT Damage Assessment

The NRC AIT, in order to assess the possible damage to the Perry Plant caused by the earthquake, reviewed the PNPP's instruction for responding to this off-normal event "Earthquake"; the checklists used by the licensee for their walkdowns; CEI walkdown results; and performed general walkdowns to determine if any damage had occurred.

The team reviewed CEI's instruction ONI-D51, "Earthquakes", for responding to this off-normal seismic event. This procedure although determined to be adequate, did not formally contain a generic damage assessment checklist or a controlled record form to record the walkdown results. The PNPP used an informal checklist and radiological survey sheets (maps of plant areas) to evaluate the plant areas and to record the results. This method and control was acceptable to the NRC. The PNPP subsequently developed and issued a temporary instruction GTI-0003, Identifying and Evaluating January 31, 1986, Suspected Earthquake Damage, to control all work activities as a result of the walkdowns and for any ongoing maintenance activities. PNPP plans to incorporate a generic walkdown checklist and a walkdown record form into instruction ONI-D51 which will enhance this instruction for future application.

The team reviewed the plant staff's walkdown checklists and all walkdown results; both were found to be adequate. The team reinspected a number of areas walked down by the plant staff. The team verified PNPP's findings to conservative. Almost all of the identified items were attributed to normal plant operating problems and construction damage.

The team upon arrival on site performed a general plant tour and did not observe any damage attributable to the earthquake. The team subsequently toured the following plant areas and buildings and performed general walkdowns in order to make a preliminary assessment of damage to the plant:

- Rad Waste Building
- Auxiliary Building
- Containment Building and Drywell
- Turbine Power Complex
- Control Complex
- Turbine Power Complex
- Off-Gas Building
- Turbine Building
- Feedwater Heater Bays
- Water Treatment Building
- Emergency Service Water Pump House
- Circulating Water Pump House

During these tours/walkdowns the team inspected for items such as damage, distortion, impact, deformation, looseness and cracking. The team generally inspected piping, HVAC and electrical systems including components, equipment foundations, attachments, walls and floors. The inspection revealed no plant damage conclusively attributable to the earthquake. The team did not find any piping systems in safety related buildings where the earthquake had caused any notable movement. The team did observe that the fire protection systems in the Water Treatment Building and in the Circulating Water Pump House (both non-safety related) had moved as was evidenced by misaligned pipe supports and chipped paint. These systems are very flexibly supported and therefore the noted conditions may have been caused by plant workers not the earthquake. In any case there was no damage to these two systems.

Loose grout was observed by inspectors around a pedestal supporting one end of a feedwater heater. The inspectors believed this was caused by thermal expansion of the heater pressing against grout that had been applied around the edge of the steel base plate. A formal analysis by CEI reached the same conclusion and stated the grout had been applied too high. Other feedwater heaters in the area did not show the same phenomena because the grout was properly applied. These feedwater heaters are not part of a safety system. The grout that had loosened did not provide structural support.

The plant conditions observed by the team were typical of what one would expect to find at any power plant, nuclear or fossil, that is in operation or near operation. That is, minor leaks, an occasional broken gauge glass, scrapes, dents and chipped paint would be expected. Most of the identified damage was attributable to construction activities. The cracks in the concrete structures were typical of any massive concrete structure. No unusual or large cracks were identified, all cracks could have existed prior to the earthquake, no cracks were identified as being earthquake related. None of the cracks identified and observed were structurally significant. The initial AIT inspection supported the findings of the inspection conducted by the PNPP staff.

c. NRC Systems Walkdown - February 5-7

In order to increase the NRC's confidence level in direct NRC observations a detailed inspection of selected safety-related piping and associated mechanical and electrical support systems was conducted. Systems were selected based on safety significance, location in areas of highest acceleration, and dimensions judged to be most vulnerable to vibration.

(1) The scope of the walkdown and visual inspection included:

- (a) Assessment of the general condition of the systems and components selected for inspection to determine whether there was visible evidence of damage or significant movement as a result of seismic activity.
- (b) Examination for bent or deformed pipe support structures or components.
- (c) Inspection for loose anchor bolts or cracked concrete associated with anchor bolts and embed plates.
- (d) Inspection for signs of significant movement such as damaged pipe insulation and scraped or cracked paint at support location.
- (e) Examination of pipe snubbers and spring cans for changes in initial settings.
- (f) Examination of the exterior and interior of electrical and control panels for cracks in frames, termination integrity, instrument damage, and glass breakage.
- (g) Inspection of components for misalignment, foundation cracks, and fluid leakages.
- (h) Inspection for movement and cracks in battery racks, and batteries, leaking cell jars.

(2) The inspection team selected all or portions of the following safety-related systems/components for the walkdown and visual inspection:

- (a) High Pressure Core Spray system
- (b) Low Pressure Core Spray system
- (c) Automatic Depressurization System
- (d) MSIV Leakoff system
- (e) Main Steam line piping
- (f) Residual Heat Removal systems

- (g) Shutdown Cooling system
- (h) Standby Liquid Control system
- (i) Control Rod Drive Hydraulic system
- (j) Hydrogen Recombiners
- (k) Division 1, 2, 3 batteries, battery racks and battery chargers
- (l) 125 vdc distribution panels
- (m) Remote shutdown panels
- (n) Inverter cabinets
- (o) RCIC suction and discharge piping
- (p) Feedwater piping
- (q) Safety-related HVAC duct, hangers and air handlers
- (r) ERIS/PAS panels
- (s) 480 vac load centers
- (t) Drywall in equipment/switchgear rooms (for cracks)
- (u) Cable trays, conduits and their support structures

In addition to the safety-related systems the inspectors examined nonsafety-related systems that shared common areas with the safety-related systems above and in the intermediate and turbine buildings.

No damage or significant movement that could be attributed to seismic activity was identified during the walkdown or the detailed visual inspections.

4. Seismic Instrument Response to Earthquake

Cleveland Electric Illuminating Company in its "Seismic Event Evaluation Report" (hereinafter called CEI Seismic Report) presents a detailed description of the earthquake event, an analysis of the plant seismic design and its conclusions. The appendices to the report presents a description of the seismic instruments, their location in the plant and the data obtained from these instruments. The responsibility for the NRC evaluation of the seismic consequences of this earthquake in regard to the design basis is being performed by the Office of Nuclear Reactor Regulation and is not part of this report. The AIT concentrated on ensuring that the data from these instruments was preserved and validated to the maximum extent possible.

The Perry Plant has three different types of seismic monitoring instruments. These include the Kinometrics Model SMA-3 strong motion triaxial time history accelerograph of which there are two; the Engdahl PSR 1200-H/V response spectrum recorder of which there are four and the Engdahl PAR 400 peak accelerograph of which there are three. One of the Engdahl PAR 400's was out of service at the time of the earthquake because it was being recalibrated. The location and detailed description of these instruments are accurately described in the CEI Seismic Report.

a. Kinematic Instruments

The Kinometrics Model SMA-3 strong motion triaxial time-history accelerograph detects and records three mutually perpendicular components of acceleration over the entire duration of the earthquake onto cassette magnetic tape. Power to the unit is supplied by internal rechargeable batteries which are kept in a charged state by 120 V AC line power. Two instruments of this type were used and were located on the Reactor Building Foundation Mat at an elevation of approximately 575 feet and on the Reactor Building Containment Vessel at an elevation of approximately 686 feet.

Both instruments were last calibrated on December 1, 1985. Immediately after the event and in accordance with the Earthquake off-normal instruction, a technician conducted a surveillance test of the instruments and replaced the magnetic cassette tapes. A representative from the vendor of this instrument was on-site on February 1. The vendor's representative made paper trace transcriptions of the magnetic tapes for the NRC representatives. Copies of these are in NRR and Region III files. A copy was also provided in CEI's seismic report. In response to questions raised concerning the natural frequency of vibration of the metal supports on which the instruments were mounted, the vendor's representative conducted a "ring" test of the support at the 575 foot level. The support was tapped lightly with a screw driver and with an individual's ring. A damped wave was observed with a frequency too high to measure (above 100 Hz). This eliminated any question that resonance of the mounting plate could have influenced the readings on this instrument. The amplification was also turned up on the instrument to look for noise sources that might have influenced the readings. None were observed.

These tests were witnessed by the NRC. Both Kinemetrics instruments were recalibrated between February 4 and 7 by CEI personnel under the supervision of the vendor's representative. An NRC inspector observed essential steps in the calibration process. The recalibration showed both instruments to be accurate within the vendor's tolerances.

A preliminary report on the measurements of the seismic motion during the earthquake was sent directly to the NRC by the vendor (Attachment 4). The data presented in the CEI Seismic Report matches that sent directly to the NRC. The AIT believes the data for the Kinemetrics instruments presented in the CEI Seismic Report to be within the accuracy of the instruments.

b. Engdahl Instruments

The Perry Plant had two types of Engdahl instruments. Four Engdahl PSR 1200 - H/V response spectrum recorders were used. They are mechanical passive devices and require no other power source. Two were located on the Auxiliary Building Foundation Mat at an elevation of approximately 568 feet, one was located on the Reactor Building Foundation Mat at an elevation of approximately 575 feet and one on the Reactor Building Inside Drywell Platform at an elevation of approximately 630 feet. This last instrument was last calibrated on January 30, 1986, the day before the event. The other three were last calibrated during January 1985.

Another type of instrument used was the Engdahl PAR 400 peak accelerograph. There are three of these instruments installed. This instrument is also a totally passive mechanical device. One instrument was located on the Auxiliary Building Foundation Mat at an elevation of approximately 568 feet and a second on the Reactor Recirculation Pump at the elevation of approximately 605 feet. The first instrument was calibrated on January 30, 1986. The second instrument was last calibrated on December 5, 1985. A third instrument was out of service and was being calibrated at the time of the event.

The Engdahl response spectrum recorder (D51-R160-VR) on the Reactor Building Foundation Mat at elevation 575 contains in addition to the mechanical recording devices of the normal instrument, limit switches that actuate indicators and alarms in the control room. Amber indicators indicate accelerations are at or above 0.7 OBE and red indicators indicate OBE. There are three banks of indicators, one for each axis and each bank has 12 pairs of indicator lights each corresponding to a portion of the vibration frequency spectrum. During this event indicators at the high frequency end above 16 Hz were illuminated. Red and amber lights corresponding to OBE were illuminated at 20.2 Hz in the North-South and East-West horizontal direction and at 25.4 Hz in the North-South horizontal direction. This was the first indication the plant had that OBE might have been exceeded. In addition an amber light was lit at 16 Hz in the North-South horizontal direction.

Although the Perry Plant staff read the recording plates from these instruments, the vendor was also requested to read the plates. Some plates showed signs that some of the instruments might have been struck while construction activities were in progress. In addition, some instruments were used by technicians during training for practice in replacing the recording plates. Cleveland Electric was in the process of replacing the plates and recalibrating the instruments when the earthquake occurred.

Mr. Paul Engdahl, President of Engdahl Enterprises, was at the site on February 1-3 to read the recording plates. Attachment 5, a report from the NRC seismic experts on the AIT, includes data obtained by the AIT during this period for a number of these instruments. A comparison of this data with the data presented in Appendix B of the CEI Seismic Report appears to be in agreement. As can be seen the floor acceleration spectra derived from the data, the OBE and SSE appear to have been exceeded in some cases at high frequencies (above 16 Hz).

The recalibration of the Engdahl instruments, which was performed between February 11 and 19, was inspected by the NRC. The as-found calibration of two of the four response spectrum recorders was completely within tolerances. These were instrument number D51-R170 on the Reactor Building 630' platform and D51-R190 on the Auxiliary Building Foundation Mat in the RCIC Pump Room. Instrument number D51-R180 in the Auxiliary Building Foundation Mat in the HPCS Pump Room was found to have vertical reed #5 out of specification with respect to sensitivity. This has little significance since no vertical motion portion of this instrument was out of service. Instrument number D51-R160 located on the Reactor Building Foundation Mat had 4 of its 36 reeds out of specification with respect to damping. These include Vertical Reed #6, Horizontal Reeds (E-W), #2 and 9 and Horizontal Reed (N-S) #9. In spite of these out of specification conditions, most of the data from the instrument is acceptable. Furthermore instrument number D51-N101, a Kinematics/SMA-3, was located close by and provided off setting data for this instrument. Of the three peak shock records, D51-R120, located on the Reactor Recirculation Pump was found to have sensitivities that were out of specification. Overall data recovery from the Engdahl instruments was good.

c. Conclusion

Based on their observations the AIT believes that the data presented in the CEI Seismic Report accurately represent the measurements made by the seismic instruments in place during the earthquake on January 31, 1986. The Cleveland Electric Illuminating Company took reasonable steps to preserve and validate the data. Interpretation of the data will be performed by the NRC's Office of Nuclear Reactor Regulation.

5. Confirmatory Action Letters

A Confirmatory Action Letter from James G. Keppler, Regional Administrator, Region III, to Murry R. Edelman, Vice President, Nuclear, Cleveland Electric Illuminating Company, was issued January 31, 1986 as noted in Paragraph 1. The line items of the Confirmatory Action Letter and status of CEI's implementation are as follows:

- a. Conduct a thorough review to determine if the earthquake was within the Design Basis of the plant (FSAR).

(Closed for purpose of Region III) CEI in a report, dated February 12, 1986, presented its argument that the earthquake does not call into question the design basis of the plant. Review of the report and the presentation of a Safety Evaluation Report on this matter has been assigned to NRR. Any further questions and resolutions of this issue will be from NRR. Therefore in respect to the Region III CAL this matter is closed.

- b. Identify any damage as a result of this seismic event; determine if that level of damage was as expected.

(Closed) Identified damage was minor. With the exception of an open item in this report we have no further concerns in this area. This open item is considered to be minor issue.

- c. Determine that all equipment, including snubbers, that actuated during this event returned to normal operating conditions/positions; identify any abnormalities.

(Closed) Two non-safety items, the Unit 1 instrument air compressor and auxiliary steam boiler, tripped on protective signals as designed. They were restarted successfully. The generator protective relays that tripped the main and auxiliary transformers remained in their tripped state as designed. Loads were transferred to the startup transformer. No other changes of state due to the earthquake could be identified.

- d. Identify any actions required to complete licensing of the plant related to this event.

(Closed) Any further action needed to license the plant as a result of this event will be determined by NRR after they review CEI's Seismic Report.

For the purposes of Region III this item is closed.

- e. Maintain all affected equipment in the "as found" condition. Therefore, take no action such as removing, repairing or replacing equipment which would destroy or cause to be lost, any evidence which would be needed to investigate this event. Routine maintenance may be performed provided that no information related to the event is altered or destroyed.

(Closed) Based on the initial observations of the AIT and review of CEI's walkdown reports this item was modified by issuance of CAL-RIII-86-01A.

- f. Submit a formal report of your findings and conclusions to the NRC Region III Office within 30 days.

(Closed) CEI completed and submitted this formal report which was transmitted by letter dated February 12, 1986, to Mr. Harold R. Denton, Director, NRR. Region III received from CEI a copy of the report.

A second Confirmatory Action Letter from James G. Keppler to Murry R. Edelman was issued on February 4, 1986. The line items of the Confirmatory Action Letter and status are as follows:

- a. Maintain all seismic instrumentation in the "as found" condition. Take no action such as removing, repairing, calibrating or replacing instrumentation which would destroy or cause to be lost, any evidence which would be needed to investigate the event. Maintenance, surveillance and calibration will be performed only with the prior concurrence of NRC Region III management.

(Closed) All data retrieval including post event tests and calibration is complete. There is no further need to restrict the use of these instruments.

- b. Resume all other activities including work, such as, but not limited to, maintenance, training, surveillance, operations and calibrations under the following conditions:

1. All off normal conditions identified during these activities will be documented in accordance with CEI's programs and procedures.
2. Off normal conditions will be evaluated to determine if they were potentially earthquake related.
3. Equipment identified in an off normal condition will be maintained "as found" until evaluated. Equipment determined to be potentially earthquake affected will be maintained in an "as found" condition until released by the NRC.
4. The NRC will be notified of all off normal potentially earthquake related conditions within 24 hours.

(Open) This item will be addressed in the Resident Inspector's Report (50-440/86006).

- c. Develop special procedures to implement Item 2.

(Closed) CEI developed procedure OM19A:GTI-0003 which met this requirement.

6. Persons Contacted

Major Cleveland Electric Company representatives contacted were as follows:

M. R. Edelman, Vice President, Nuclear Group
A. Kaplan, Vice President, Nuclear Operations Division
C. M. Shuster, Manager, Nuclear Quality Assurance Department
F. R. Stead, Manager, Nuclear Engineering Department
R. L. Farrell, Manager, Perry Project Services Department
J. J. Waldron, Manager, Perry Plant Technical Department
M. D. Lyster, Manager, Perry Plant Operations Department
S. F. Kensicki, Technical Superintendent, Perry Plant Technical Department
R. A. Stratman, General Supervisor, Operations Section.

In addition to the above a large number of CEI and Perry Plant supervisors and employees were contacted and provided information used in this report.

A number of CEI contractor and vendor representatives were also contacted as follows:

P. E. Engdahl, President, Engdahl Enterprises
G. Siegel, Field Operations Supervisor, Kinnemetrics
R. Alley, Project Structural Engineer, Gilbert Commonwealth, Inc.
C. Chen, Gilbert Commonwealth, Inc.
E. N. Levine, Seismologist, Weston Geophysical
G. Leblanc, Seismologist, Weston Geophysical

7. Open Items

Open items are matters which have been discussed with the applicant, which will be reviewed further by the NRC, and which may involved some action on the part of the NRC or applicant or both. An open tem disclosed during this inspection is disclosed in Paragraph 3a.