UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Appeal Board

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

AFFIDAVIT OF ROBERT A. STRATMAN

County of Lake)
: ss:
State of Ohio)

Robert A. Stratman, being duly sworn, deposes and says as follows:

1. I, Robert A. Stratman, am General Supervisor, Operations Section, Perry Plant Operations Department, The Cleveland Electric Illuminating Company. My business address is 10 Center Road, Perry, Ohio 44081.

2. As General Supervisor, Operations Section, I am responsible for the supervision of the operation of Perry Nuclear Power Plant, Unit 1. This responsibility includes supervision of all plant operators and all systems involved in the operation of the plant. As a part of the recovery organization established following the January 31, 1986 earthquake, I was responsible for determining the plant status and whether plant structures and components had suffered damage. A statement of

my professional qualifications is attached to this Affidavit as Exhibit "A".

3. The purpose of this Affidavit is to describe the results of the extensive plant walkdowns and inspections that were performed by Perry Plant personnel in response to the January 31, 1986 earthquake. I have personal knowledge of the matters set forth in this Affidavit and believe the information set forth herein to be true and correct.

PLANT STATUS

4. Prior to the earthquake that occurred on January 31, 1986, numerous testing, calibration, and work completion activities were being conducted in preparation for fuel load of Perry Nuclear Power Plant, Unit 1. One major activity was preparation for the Division II diesel generator response time testing. As part of this work, all of the safety related components powered from the Division II diesel were energized and in standby readiness. Table 1 is a list of these components. All of this equipment behaved normally through the event; that is, there were no spurious starts or alarms. Preparations were also underway to move the startup sources. This work had not yet begun when the seismic event occurred. The sources were never actually moved, and remained stored in the upper pools.

5. In support of the ongoing test and surveillance activities, a significant number of systems were in operation. In addition, numerous other systems were energized and in the standby mode. Lists of the specific safety and non-safety sys-

tems energized or operating prior to and during the earthquake are included as Tables 2 and 3. All of the operating safety-related systems continued to operate through the event. None of the safety-related systems in the standby mode experienced any spurious initiations.

6. As noted in Table 3, a large number of non-safety systems were operating or in the standby mode, and maintained their status throughout the event. Two non-safety items tripped on protective signals as intended by their design. These were the Unit 1 instrument air compressor, which tripped on high vibration, and the auxiliary steam boiler, which tripped due to actuation of one of its protective circuits. The instrument air compressor is a centrifugal machine that operates at greater than 40,000 rpm and as part of its protective devices has a very sensitive vibration switch. The auxiliary steam boiler has several protective circuits of which one tripped during the earthquake. The boiler was successfully restarted after the event.

7. The only other non-safety items of equipment that tripped during the earthquake were the Unit 1 main and auxiliary transformers, which tripped due to the closing of the generator protection relays. These relays although open at the time of the seismic event, were not connected to voltage. After the event, the transformers remained in a deenergized state consistent with the design of the generator's protection logic. The loads automatically transferred to the startup transformer per the design. Laboratory testing of these relays since the event

has confirmed that the presence of voltage on the relays significantly increases the force required to close these relays. Had the voltage been supplied to these relays, they would not have closed during the event. This is substantiated by the fact that other similar open relays with voltage applied did not close during the seismic event.

8. An 1-1/2 inch increase in suppression pool level at the time of the earthquake, indicated by the water level transmitters, has been investigated. A detailed investigation has concluded that the indicated increase was caused when air trapped in the two sensing lines serving the water level transmitters was discharged due to the earthquake. Air apparently became entrapped in the lines when the suppression pool was refilled in early January. The procedure for refilling the sensing lines will be revised to ensure proper filling of these lines any time they are drained. In addition, vents will be installed to facilitate proper filling and thus prevent air from being trapped in the future.

9. Immediately following the event, the plant operators performed initial surveys of the plant. Areas visually inspected included the Transformer Yard, lower elevations of the Turbine, Auxiliary, Intermediate and Radwaste Buildings, as well as the Control Complex, Turbine Power Complex, Heater Bay, Water Treatment Building, and all levels of the Reactor Building. The reports back to the Control Room indicated that the areas were found in satisfactory condition with no major damage. In addition, the Senior Operations Coordinator and I

made a specific survey of below grade areas. We found no unusual or abnormal conditions. Further steps taken to assess and evaluate the status of the plant included additional walkdowns by teams of plant maintenance personnel dispatched from the Operations Support Center.

PLANT IMPACT ASSESSMENT

10. As part of CEI's response to the earthquake, a team of approximately 65 engineers and technicians was organized on the evening of January 31 to perform systematic and thorough walkdowns of all plant areas. These walkdowns were performed using drawings of each area and checklists of components to inspect for any abnormal conditions. These included such items as piping, hangers, snubbers, valves, pumps, instrumentation and other components. The results of these walkdowns were recorded and compiled into a list of approximately 480 observations, many of which were later determined to be preexisting conditions. None of the observations involved structural damage to the plant or equipment. The 480 observations are typified by minor hairline cracks in concrete, burned out light bulbs and leaking valve or piping flanges, all of which are normal and expected conditions that would be identified in any comprehensive walkdown without the occurrence of a seismic event.

11. In the inspections that were conducted following the earthquake, plant personnel were instructed to document all unusual or abnormal conditions. Those conducting the inspections

did not attempt to determine whether the conditions were the result of the earthquake; instead, discrepant conditions regardless of potential cause were documented to insure that the status of the plant following the earthquake would be fully documented for subsequent evaluation by Engineering. Each of the observed discrepant conditions was subsequently evaluated by Engineering to determine whether the condition was caused by the earthquake or whether rework or repair was required. The engineering evaluation of the items concluded that 77% were preexisting conditions, and that only two minor items could be directly attributable to the earthquake. The remainder, approximately 100 items, have been classified as indeterminate, i.e., it could not be definitively established that the condition existed prior to the earthquake. About 25% of the approximately 480 items will need rework or repair. (See Exhibit B). These will be processed in accordance with a special procedure instituted in response to the earthquake.

12. A number of other inspections were also performed to determine the earthquake's effect, if any, on specific plant structures and conditions. A site survey was performed to assess any impact of the earthquake on the site environs, and in particular on the shoreline bluff. No evidence of any earthquake impacts could be found.

13. A survey of settlement monitoring points was undertaken to determine if the earthquake had any effect on building settlement. Monitoring points at various locations around the

perimeter of the plant buildings are surveyed on a monthly basis to monitor building settlement. The results of the surveys were that the recorded movements were consistent with those measured in the past, including the amount of change from prior surveys and the absolute elevations. For example, a comparison of the Reactor Building reading after the earthquake with that of February 1985, shows that the two readings were identical. Thus, it is concluded that the earthquake had no impact on building settlement. (See Exhibit B).

14. A walkdown of Unit 1 Cooling Tower was performed to determine whether any damage had resulted from the earthquake. The areas inspected included the basin walls, tower columns and footers, internal support columns, baffle system, discharge pipe and veil. While all inspections were done from ground level, any significant cracks in the veil would have been readily apparent since they would have been saturated by the previous day's rain. No structural damage was found in any area of the cooling tower. Water was observed seeping through the north and south vertical joints where the basin flume wall and pump house flume wall meet. Seepage at this joint has been noted in the past and stopped by the application of mastic material. (See Exhibit B).

15. As part of the design program for the plant, seismic clearance criteria were established to assure that a seismic event would not cause any impact on a safety system either by causing swaying or by impact from a non-safety item. Instances

of these criteria not being met are termed Seismic Clearance Violations (SCV's). SCV's are forwarded to Engineering for evaluation to determine whether repair is required. At the time of the earthquake, there were 29 SCV's that had been dispositioned for repair, where the repair had not yet been completed. Following the earthquake, inspectors were directed to reinspect these SCV's to determine whether the seismic event affected the SCV condition. These inspections found neither damage nor dimensional change. (See Exhibit B).

16. As previously noted, the plant systems, both safety related and non-safety related, operated properly during and following the seismic event. Recognizing the sensitivity of electrical components to high frequency response, a detailed engineering study was undertaken to identify the number and types of electrical equipment that were energized during the earthquake. The components included motors, transformers, relays, switchgear breakers, switches, batteries, contacts, valve operators, chargers/inverters, meters, recorders, and transmitters. A wide variety of suppliers was represented. More than 70 separate systems were involved. The study showed that over 47,000 electrical components were energized and experienced no adverse effects in terms of spurious system actuation. (See Exhibit B).

17. On February 2, 1986, the Division II diesel generator response time test that was in preparation at the time of the earthquake (see Paragraph 4 above) was performed. The Division

II diesel operated properly and all equipment powered by that diesel operated as designed. The significant number of electrical and mechanical components included in this test, including pumps, valves, motors, relays, switches, etc., further demonstrates that the January 31 earthquake had no adverse impact on safety systems.

18. Based on all of these evaluations, inspections and tests, it is my conclusion that the plant structures and equipment were essentially unaffected by the January 31, 1986 earthquake. The large number of safety and non-safety related systems which were operating or energized at the time of the seismic event responded in accordance with their design. Extensive plant walkdowns and inspections revealed no structural or equipment damage. I therefore conclude that the plant's seismic design was adequate to handle the January 31 earthquake.

Robert A. Stratman

Subscribed and sworn to before me
this 24th day of February, 1986.

Jane E Mott
Notary Public

My Commission Expires:

JANE E. MOTT
Notary Public, State of Ohio
My Commission Expires February 20, 1990
(Recorded in Lake County)

Exhibit "A"

Name: Robert A. Stratman, General Supervisor, Operations Section, Perry Plant Operations Department

Formal Education and Training:

Bachelor of Science Degree in Physics, Ohio State University, 1971
Master of Business Administration Degree in Finance, University of New Haven, 1981
Master of Science in Mechanical Engeineering, Cleveland State University, 1985
Five-Week Perry Nuclear Plant Technology (GE), 1980
Nine-Week Operator Training Course, Perry Simulator (GE), 1980 (SRO Certification)
Five-Week Station Nuclear Engineering (GE), 1982

Experience:

1980 - Present: The Cleveland Electric Illuminating Company

Joined CEI as Operations Engineer. Initially assigned to assist the Operations Section General Supervisor. In 1982, assigned to develop the Plant Emergency Instructions.

In December, 1982 assumed position as General Supervisor, Nuclear Services Section with responsibility for developing and maintaining a qualified permanent plant security force and for all plant administrative and general maintenance support services.

In October, 1984 assumed position as General Supervising Engineer, Radiation Protection Section with responsibility for directing all activities of the Health Physics and Chemistry Units including the development of the Radiation Protection and Chemistry Programs for the Perry Plant. Reported to the Technical Superintendent, Perry Plant Technical Department.

In September, 1985, was named General Supervising Engineer, Nuclear Design and Analysis Section. As such, is responsible for the technical support on various licensing, start-up, and preoperational requirements. The Section assumes engineering responsibility for all systems turned over to Operations. Reported to the Manager, Nuclear Engineering Department.

In January, 1986, became General Supervisor, Operations Section, with responsibility for supervising all operations personnel.

1977 - 1980: Northeast Utilities

Engineer at Millstone Nuclear Plant. Responsibilities included evaluation of plant systems, the design, procurement and implementation of modifications to plant systems and conformance to code and regulatory requirements. Supervised refueling and unscheduled outages, and managed the test of the plant's reactor containment systems. Also served as a member of the Plant Operations Review Committee.

1971 - 1976: U.S. Navy

Officer - Qualified as Engineering Officer of the Watch and qualified Engineer of a naval nuclear powered propulsion plant - duties included Electronics Material Officer, Main Propulsion Assistant, Radiation Controls Officer and Submarine Qualifications Officer

Professional Membership:

Registered Professional Engineer - State of Ohio

TABLE 1

SAFETY RELATED COMPONENTS POWERED BY DIVISION II EMERGENCY DIESEL GENERATOR

1. 1E21-C002B, RHR Pump B
2. 1E12-C002C, RHR Pump C
3. 1E12-F042B, LPCI B Injection Valve
4. 1E12-F042C, LPCI C Injection Valve
5. M25-F250B, Control Room HVAC B Exhaust Damper
6. M25-F255B, Control Room HVAC B Relief Damper
7. M25-F010B, Control Room HVAC Outboard Supply Damper
8. M25-F020B, Control Room HVAC Inboard Supply Damper
9. M25-F263B, Control Room HVAC B Return Line Isolation Damper
10. 1C11-C001B, Control Rod Drive Pump B
11. C41-C002B, Standby Liquid Control Transfer Pump B
12. 1E12-F011B, RHR B Heat Exchanger Dump Valve
13. 1E12-F021, RHR C Test Valve to Suppression Pool
14. 1E12-F024B, RHR B Test Valve to Suppression Pool
15. 1E12-F026B, Steam Condensing B Shutoff to RCIC
16. 1E12-F027B, RHR B to Containment Shutoff
17. 1E12-F046B, RHR B Heat Exchanger Bypass Valve
18. 1E12-F051B, RHR B Steam Pressure Reducing Valve
19. 1E12-F052B, RHR B Heat Exchanger Steam Shutoff
20. 1E12-F065B, RHR B Heat Exchanger to RCIC Control Valve
21. 1E12-F087B, Steam Bypass Around Pressure Control Valve to RHR B Heat Exchanger
22. G41-F285, Fuel Pool Cooling and Cleanup Filter/Demineralizer Inboard Inlet Valve
23. G41-F290, Fuel Pool Cooling and Cleanup Filter/Demineralizer Inboard Outlet Valve

24. 1M15-C001B, Annulus Exhaust Gas Treatment Fan B

25. 1M15-D001B, Annulus Exhaust Gas Treatment B Electric Heater Coil

26. M23-C001B, Motor Control Center Switchgear & Battery Rooms HVAC Supply Fan B

27. M23-C002B, Motor Control Center Switchgear & Battery Rooms HVAC Return Fan B

28. M23-F010B, Motor Control Center Switchgear & Battery Rooms Supply Damper B

29. M24-C001B, Battery Room Exhaust Fan B

30. M24-F011B, Motor Control Center Switchgear & Battery Rooms Exhaust Damper B

31. M24-F051B, Control Room Exhaust Damper B

32. M24-F065B, Motor Control Center Switchgear & Battery Rooms Recirculation Damper B

33. M25-C001B, Control Room HVAC Supply Fan B

34. M25-C002B, Control Room HVAC Return Fan B

35. M26-C001B, Control Room Emergency Recirculation Fan B

36. M26-D001B, Control Room Emergency Recirculation Electric Heater B Control

37. M26-F040B, Control Room Emergency Recirculation Damper B

38. M28-B001B, Emergency Closed Cooling Cooling Fan B

39. 1M39-B001B, RHR B Pump Room Cooling Fan

40. 1M39-B002, RHR C Pump Room Cooling Fan

41. 1M43-C001B, Division 2 Diesel Generator Room Supply Fan 1B

42. 1M43-C002B, Division 2 Diesel Generator Room Supply Fan 2B

43. 1M43-F070B & F071B, Division 2 Diesel Generator Room Exhaust Louvers

44. 1M43-F080B & F081B, Division 2 Diesel Generator Room Exhaust Louvers

45. 1M51-F090, Combustible Gas Drywell Purge Inboard Isolation Valve

46. P41-C001B, Service Water Pump B

47. 1P42-C001B, Emergency Closed Cooling Pump B

48. P42-F150B, Emergency Closed Cooling to Control Complex Chiller B Bypass Valve

49. P42-F290, Nuclear Closed Cooling to Control Complex Chiller Valve

50. P42-F295B, Nuclear Closed Cooling to Control Room Chiller B Inlet Valve

51. P42-F300B, Emergency Closed Cooling to Control Complex Chiller B Inlet Valve

52. P42-F325B, Nuclear Closed Cooling to Control Complex Chiller B Outlet Valve

53. P42-F330B, Emergency Closed Cooling to Control Complex Chiller B Outlet Valve

54. P42-F380A, Nuclear Closed Cooling to Fuel Pool Cooling & Cleanup Heat Exchanger A Inlet Valve

55. P42-F380B, Nuclear Closed Cooling to Fuel Pool Cooling & Cleanup Heat Exchanger B Inlet Valve

56. P42-F390A, Nuclear Closed Cooling to Fuel Pool Cooling & Cleanup Heat Exchanger A Outlet Valve

57. P42-F390B, Nuclear Closed Cooling to Fuel Pool Cooling & Cleanup Heat Exchanger B Outlet Valve

58. P43-C001B, Nuclear Closed Cooling Pump B

59. 1P43-F215, Nuclear Closed Cooling Containment Return Inboard Isolation

60. 1P43-F400, Nuclear Closed Cooling Drywell Return Inboard Drywell Isolation

61. 1P43-C001B, Emergency Service Water Pump B

62. 1P45-F014B, RHR B Heat Exchanger Emergency Service Water Inlet Valve

63. 1P45-F068B, RHR B Heat Exchanger Emergency Service Water Outlet Valve

64. 1P45-F130B, Emergency Service Water Pump B Discharge Valve

65. P47-B001B, Control Complex Chilled Water Chiller B

66. P47-C001B, Control Complex Chilled Water Chilled Water Pump B

67. P49-C002B, Emergency Service Water Screen Wash Pump (Division 2)

68. P49-D001B, Emergency Service Water Screen Wash Screen (Division 2)

69. P49-D003B, Emergency Service Water Screen Wash Strainer (Division 2)

70. 1R25-S043 & S047, Division 2 Space Heaters Distribution Panels

71. 1R25-S045, Division 2 Space Heaters Distribution Panel

72. EH1214, BUS EH12 Isolating Breaker

TABLE 2

SAFETY RELATED SYSTEMS
ENERGIZED DURING THE SEISMIC EVENT
OF JANUARY 31, 1986

SYSTEM	DESCRIPTION
C11	Control Rod Drive
C41	Standby Liquid Control
C71	Reactor Protection System
D17	Plant Radiation Monitors
E12	Residual Heat Removal
E21	Low Pressure Core Spray
E22	High Pressure Core Sray
G41	Fuel Pool Cooling and Cleanup
M15	Annulus Exhaust Gas Treatment
M23	MCC, Switchgear, & Misc. Area HVAC
M24	Battery Room Exhaust
M25	Control Room HVAC
M26	Control Room Emergency Recirculation
M32	ESW Pumphouse Ventilation
M40	Fuel Handling Building Ventilation
M43	Diesel Building Ventilation
P11	Condensate Transfer and Storage
P22	Mixed Bed Demineralizer
P41	Service Water
P42	Emergency Closed Cooling
P43	Nuclear Closed Cooling
P45	Emergency Service Water
P47	Control Complex Chill Water
P49	ESW Screen Wash
P52	Instrument Air
P54	Fire Protection
C95	Emergency Response Information System
P51	Service Air
R14	110 VAC Vital Inverters
R22	Metalclad Switchgear
R23	480 V Load Centers
R24	Motor Control Centers
R25	Distribution Panels - 120, 208 & 480 volts
R42	D. C. System
R43	Standby Diesel Generator (SDG)
R45	SDG Fuel Oil
R46	SDG Jacket Water Coolant
R47	SDG Lube Oil
R61	Main Control Room Annunciator

TABLE 3

NON-SAFETY RELATED SYSTEMS
ENERGIZED DURING THE SEISMIC EVENT
OF JANUARY 3 , 1986

SYSTEM	DESCRIPTION
F42	Fuel Transfer Equipment
G33	Reactor Water Cleanup
M11	Containment Vessel Cooling
M13	Drywell Cooling
M21	Controlled Access HVAC
M27	Computer Room HVAC
M35	Turbine Building Cooling & Ventilation
M36	Off-Gas Building Exhaust
M41	Heater Bay Ventilation
M45	Circulating Water Pump House Ventilation
N21	Condensate
N23	Condensate Filtration
N24	Condensate Demineralizers
N32	Turbine Control (EHC)
N71	Circulating Water
P20	Water Treatment
P21	Two Bed Demineralizer
P44	Turbine Building Closed Cooling
P55	Building Heating
P61	Auxiliary Steam
P62	Auxiliary Boiler Fuel Oil
P72	Plant Underdrain
C91	Process Computer
C94	Health Physic Computer
P56	Security
R11	Station Transformers
R15	Technical Support Center UPS
R36	Heat Tracing & Anti Freeze Protection
R44	SDG Starting Air
R51	Intra Plant Communications
R52	Maintenance & Calibration
R53	Exclusion Area Paging System
R57	Radio & In-Plant Antenna System
R71	Lighting
S11	Power Transformers
S41	Step Up Station

EXHIBIT "B"

APPENDIX

RESULTS OF SPECIFIC INSPECTIONS

EVALUATION OF WALKDOWN ITEMS
PLANT SETTLEMENT READINGS
SEISMIC CLEARANCE WALKDOWN
COOLING TOWER WALKDOWN
REVIEW OF ENERGIZED CIRCUITS

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

G-2
REV. 1-82

MEMORANDUM

☐ I no longer wish to receive this material.

TO F. R. Stead ROOM E270 FROM K. R. Pech DATE 11-Feb-86
PHONE 5246 ROOM W220
SUBJECT Evaluation of Walkdown Items

As a result of the plant walkdowns conducted the evening of 1/31/86, Perry Plant Technical Department prepared a list of the observations of the inspection teams. These observations were given the title Earthquake Inspection Team Items or EITI's. The list of EITI's was then forwarded to Engineering for determination of whether the item was a result of the earthquake and whether or not the item needed to be repaired. The assessment of the need for repair and the documentation of that decision whether on a Non-Conformance Report or a Work Request was done in accordance with POP-1501.

The evaluation of all 473 items was completed this afternoon, and the final summary of determinations is presented in the attached table. Each item was placed in one of three categories with respect to its relationship to the earthquake.

1. Caused by the earthquake

2. Indeterminate

3. Not caused by the earthquake

As shown in the summary, 375 items were determined not to be caused by the earthquake, 96 to be indeterminate, and 2 to be caused by the earthquake. With respect to the latter two items, one was the trip of the main transformer, noted in the walkdown of electrical bus L10. The second was a non-safety heater exchanger drain valve that was found dripping water during the walkdown and was reported to be closed and not dripping prior to the earthquake.

In addition each item was categorized as to its final disposition using the procedures contained in POP-1501. Through this process, 330 items were determined to require no repair, 119 to be repaired via a Work Request and 24 items were determined to require dispositioning via a Non-Conformance Report. Of the 24 NR's, 20 are anticipated to be use-as-is and the remainder constitute cosmetic repairs to concrete and drywall walls.

By copy of this memo, the Engineering evaluation of the EITI's is being issued to the Perry Plant Technical Department for preparation of approiate documentation and inclusion in their Condition Report.

KRP:jg

EITI LIST EVALUATION SUMMARY

13:15 2/11/86

DISCIPLINE	TOTAL	C	I	N	NR	WR	NA
ELECTRICAL	35	1	22	12	0	25	10
I & C	18	0	10	8	0	15	3
MECHANICAL	83	1	29	53	2	53	28
PIPING	23	0	18	5	2	10	11
STRUCTURAL	314	0	17	297	20	16	278
TOTAL	473	2	96	375	24	119	330

C = Caused by Earthquake
I = Indeterminate
N = Not Caused by Earthquake
N/A = No Action Required

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

G-2
REV. 1-82

MEMORANDUM

☐ I no longer wish to receive this material.

TO K. Pech ROOM W210 FROM M.R. Kritzer DATE 2-6-86
PHONE 6460 ROOM TQ6
SUBJECT PLANT SETTLEMENT READINGS

Per our discussion, plant settlement readings were taken on February 5, 1986 (Attached). No significant difference in the building elevation before and after the seismic event was observed. The maximum change occurred in the Reactor Building #1. This change was only a minus (-)0.006 of a foot or 1/16 of an inch. The maximum growth was +0.003 of a foot or 1/32 of an inch, which occurred in the Radwaste Building.

A review of settlement readings taken last February 15, 1985, revealed that the Reactor Building #1 was at the same elevation as it is today.

The minute changes in plant elevation can be expected due to structural growth as a result of weather.

cc: E. Riley
J. Eppich
C. Angstadt
T. Keaveney
S. Dodeja
302.MRK

.RRETT & ASSOC. REG. ENGINEERS & SURVEYORS — PERRY NUCLEAR POWER PLANT, PERRY, OHIO.

SKETCH OF: PLANT SETTLEMENTS

DATE: (M) | SCALE: | FIELD BOOK:

DISC # \ DATE	1/16/86	2/5/86				
1-F	625.406	625.402				
2-D	624.339	624.333				
3-D	624.363	624.359				
4-F	626.391	626.386				
5-D	624.540	624.538				
6-D	622.105	622.108				
7-C	621.300	621.298				
[illegible] 8	624.458	624.459				
SP-9	624.924	624.921				
SP-10	624.450	624.453				
SP-11	624.491	624.487				
Junction Quadrant						
DISC # \ DATE						
1-F						
2-D						
3-D						
4-F						
5-D						
6-D						
7-C						
SP-8						
SP-9						
SP-10						
SP-11						

GARRETT & ASSOC. REG. ENGINEERS & SURVEYORS — PERRY NUCLEAR POWER PLANT, PERRY, OHIO

SKETCH OF: PLANT SETTLEMENTS | FIELD BOOK:

DATE: (M) | SCALE:

PT \ DATE	AUG 20, 1985	SEPT. 25, 1985	OCT. 18, 1985	NOV. 14, 1985	DEC. 17, 1985	JAN. 16, 86		
1·F	625.402	625.410	625.411	625.413	625.404	625.406		
2·D	624.341	624.342	624.340	624.345	624.338	624.339		
3·D	624.358	624.361	624.365	624.366	624.362	624.363		
4·F	626.388	626.390	626.390	626.387	626.388	626.391		
5·D	624.538	624.541	624.544	624.548	624.540	624.540		
6·D	622.106	622.106	622.104	622.103	622.106	622.105		
7·C	621.303	621.301	621.304	621.300	621.292	621.300		
PT \ DATE								
1·F								
2·D								
3·D								
4·F								
5·D								
6·D								
7·C								
PT \ DATE								
1·F								
2·D								
3·D								
4·F								
5·D								
6·D								
7·C								

GARRETT & ASSOC. REG. ENGINEERS & SURVEYORS — PERRY NUCLEAR POWER PLANT, PERRY, OHIO.

SKETCH OF: PLANT SETTLEMENTS — SCALE: — FIELD BOOK:

DATE: (E)

PT.	SEPT 27,83	OCT 27, 1983	NOV. 22,83	DEC 21 83	Jan. 5, 1984	FEB 10, 84	MAR. 24, 84	
1-F	625.396	625.395	625.402	625.407	625.405	625.406	625.401	
2-D	624.332	624.329	624.335	624.333	624.334	BLOCKED	624.331	
3-D	624.372	624.365	624.365	624.363	624.361	624.362	624.361	
4-F	626.389	626.384	626.388	626.388	626.385	626.391	626.381	
5-D	624.543	624.547	624.547	624.549	624.550	624.546	624.542	
6-D	622.101	622.098	622.096	622.101	622.093	622.101	622.099	
7-C	621.295	621.295	621.294	621.303	621.295	621.290	621.281	

PT.	APRIL 28,84	MAY 29, 84	JUNE 26, 1984	JULY 10, 84	AUG. 21, 84	SEPT 14, 84	OCT 10, 84	NOV. 23, 84
1-F	625.397	625.401	625.400	625.402	625.405	625.403	625.406	625.402
2-D	624.335	624.334	624.337	624.336	624.338	624.341	624.339	624.333
3-D	624.365	624.365	624.369	624.368	624.369	624.370	624.366	624.363
4-F	626.385	626.383	626.394	626.390	626.389	626.393	626.391	626.391
5-D	624.537	624.544	624.545	624.546	624.552	624.553	624.550	624.535
6-D	622.102	622.102	622.105	622.108	622.106	622.106	622.103	622.094
7-C	621.287	621.291	621.300	621.298	621.298	621.301	621.300	621.297

PT.	[illegible]	1/10/85	2/15/85	3/22/85	4/12/85	5/15/85	6/25/85	7/9/85
1-F	[illegible].405	625.403	625.406	625.401	625.403	625.396	625.398	625.398
2-D	624.335	624.334	624.333	624.341	624.343	624.336	624.333	624.330
3-D	624.362	624.358	624.361	624.359	624.360	624.360	624.357	624.364
4-F	626.391	626.389	626.389	626.380	626.382	626.384	626.381	626.384
5-D	[illegible]46	624.542	624.544	624.547	624.543	624.542	624.541	624.543
6-D	622.096	622.094	622.105	622.103	622.106	622.100	622.101	622.108
7-C	[illegible]17	621.296	621.292	621.297	621.297	621.297	621.306	621.299

GARRETT & ASSOC. CIVIL ENGINEERS SURVEYORS — PERRY NUCLEAR POWER PLANT, PERRY, OHIO.

SKETCH OF

FIELD BOOK

SCALE

DATE

PERRY TOWER PLANT FOUNDATION SETTLEMENT CHART

MARK NO	DEC 18, 78	JAN 22	FEB 29	MARCH 30	MAY 6, 1979	MAY 1977	JULY 10, 79	SEPT 10, 79	OCT 5, 79	OCT
1-E	625.286	625.274	625.270	625.270	625.270					
1-F	NEW DISC →			625.393	625.397	625.395	625.406	625.399	625.410	625.416
2-D	624.351	624.336	624.331	624.332	624.336	624.337	624.343	624.342	624.352	624.346
3-D	624.423	624.403	624.388	624.394	624.401	624.397	624.398	624.395	624.403	624.396
4-C	596.003	COVERED		596.007	COVERED	COVERED	COVERED			
4-D	REVISED READING →	604.626	604.626	604.626	604.620	COVERED	"			
4-B	COVERED →			596.947	COVERED	COVERED	"			
5-C	603.615	603.607	COVERED	603.605	TEMPORARILY COVERED	COVERED	"			
5-D				NEW DISC →	624.561	624.551	624.548	624.548	624.551	624.554
6-C	619.025	COVERED →								
6-D	NEW DISC →			622.086	622.088	622.096	622.085	622.091	622.112 NEW MARK	622.109
7-A	COVERED →				COVERED	COVERED				
7-B	NEW MARK →			616.733	616.735	616.732	616.737	616.729	616.725	(1) 621.310
4-E	NEW →				620.464	620.465	620.462		NEW	
4-F							626.412	626.409	626.407	626.405

MARK NO	OCT 31, 1979	NOV 19, 1979	JAN 21, 1980	MAR 22, 1980	APR 23, 1980	JUNE 23, 1980	AUG 12, 1980	SEPT 19, 1980	OCT 22, 1980	DEC 15, 1980	JAN 21, 1981
1-F	625.418	625.413	625.402	625.414	625.415	625.419	625.407	625.392	625.390	625.400	625.385
2-D	624.346	624.349	624.339	624.353	624.350	624.354	624.344	624.336	624.338	624.336	624.326
3-D	624.396	624.391	624.382	624.386	624.388	624.400	624.385	624.372	Blocked	624.370	624.362
1-F	626.405	626.409	626.370	626.403	626.407	626.409	626.397	626.387	626.390	626.414	626.379
5-D	624.554	624.551	624.543	624.547	624.549	624.549	624.546	624.534	624.552	624.548	624.541
6-D	622.109	622.104	622.099	622.098	622.100	622.101	622.099	622.108	622.095	622.104	622.091
7-C	621.300	621.300	621.303	621.288 (621.296) RECHECKED	621.308	621.311	621.310 WALL	621.314 WALL	621.309 WALL	621.303	621.301 ±0.1 ON

GARRETT & ASSOC. ENG. TUNNELERS SURVEYORS PERRY NUCLEAR POWER PLANT PERRY, OHIO.

SKETCH OF [illegible]

FIELD BOOK

SCALE

DATE

POINT \ DATE	FEB 9, 1981	[illegible]	APRIL 15 1981	MAY 22 1981	July 2, 1981	[illegible]	AUG 11, 1981	SEPT 3 1981	OCT. 21, 1981	NOV 27, [illegible]
1-F	625.395	625.395	625.394	625.395	625.392	[illegible]	625.387	625.396	625.396	625.391
2-D	624.332	624.325	624.325	624.327	624.332	[illegible]	624.335	624.337	624.330	624.335
3-D	BLOCKED	624.366	624.365	624.366	624.370	[illegible]	624.369	624.375	624.367	624.367
4-F	626.390	626.390	626.384	626.388	626.390	[illegible]	626.391	626.389	626.387	626.388
5-D	624.547	624.521	624.543	624.541	624.538	[illegible]	624.540	624.540	624.547	624.546
6-D	622.096	622.096	622.100	622.099	622.096	[illegible]	622.095	622.103	622.094	622.093
7-C	621.306 WALL	621.312 WALL	621.310 WALL	621.311 WALL	621.314 WALL	[illegible]	621.315 WALL	621.318 WALL	621.289* MON.	621.290

POINT \ DATE	JAN 5 1982	JAN 15 1982	FEB 19 82	MAR. 11, 1982	APRIL 26 82	MAY 7 1982	JUNE 22 1982	July 23, 1982	8-25-82	9-82	10-21-82
1-F	625.393	625.390	625.390	625.394	625.392	625.394	625.391	625.390	625.394	625.398	625.398
2-D	624.329	624.325	624.322	BLOCKED	624.328	624.333	624.329	624.331	624.330	624.335	624.335
3-D	624.365	624.362	624.358	624.361	624.366	624.365	624.358	BLOCKED	BLOCKED	BLOCKED	BLOCKED
4-F	626.385	626.381	626.368	626.384	626.384	626.383	626.374	626.381	626.383	626.385	626.385
5-D	624.545	624.543	624.540	624.539	624.541	624.538	624.541	624.541	624.544	624.532	624.538
6-D	622.092	622.095	622.096	622.096	622.095	622.096	622.098	622.099	622.098	622.097	622.097
7-C	621.281	621.276	621.276	621.289	621.284	621.289	621.282	621.289	621.290	621.290	621.294

POINT \ DATE	NOV 30. 82	DEC. 8, 1982	JAN 25, 1983	FEB 16, 83	MAR 28, 1983	APR 20, 83	MAY 10, 83	MAY 24. 83	JUNE 23, 83	July 21, 1983	AUG 24 83
1-F	625.395	625.392	625.392	625.399	625.406	625.401	625.407	625.393	625.399	625.403	625.399
2-D	624.334	624.328	624.331	624.328	624.333	624.330	624.337	624.321	624.333	624.339	624.332
3-D	BLOCKED	BLOCKED	BLOCKED	624.367	624.367	624.361	624.368	624.356	624.363	624.374	624.367
4-F	626.387	626.374	626.379	626.382	626.385	626.380	626.394	626.380	626.383	626.394	626.388
5-D	624.539	624.542	624.537	624.539	624.543	624.536	624.535		624.543	624.541	624.542
6-D	622.097	622.101	622.097	622.097	622.101	622.096	622.098		622.100	622.104	622.101
7-C	621.288	621.296	621.288	621.294	621.291	621.286	621.288		621.295	621.289	621.296

PERRY NUCLEAR POWER PLANT
FOUNDATION SETTLEMENT CHART CONTINUED BY GARRETT &
SHEET NO. 3-6

MARK NO.	FEB. 16, 78	MARCH 13, 78	APRIL 7, 1978 WILL BE CLEAR NEXT MONTH	MAY 9, 1978 NOT CLEAR	MAY 25, 78	JUNE 15, 78	JULY 20, 78	JULY 31, 78	AUG. 19, 78	AUG 28, 78	SEPT 21, 78	
1-B	COVERED	COVERED			595.625	COVERED	HOT CLEAR	COVERED	COVERED			
2-D PER	624.362	NOT ABLE TO READ	624.360	624.355	624.360	624.360	624.348	624.358	624.359		624.360	624.35
3-B	599.046	599.041	599.040	599.044	599.052	RAISED 5' TO 604.096	604.047	604.033	604.041			
4-B	596.940	596.938	596.939	596.940	COVERED	COVERED	COVERED	COVERED	COVERED			
5	COVERED	COVERED	COVERED	COVERED	COVERED	COVERED	COVERED	"	"			
6-B	602.188	602.190	602.191	602.195	602.188	602.118	602.200	602.197	602.210			
7	NOT ABLE TO READ	NOT ABLE TO READ NEW POINT SET ON WALL	NOT ABLE TO READ APRIL 1978	NOT ABLE TO READ	COVERED UNDER GAS	COVERED	COVERED	COVERED	COVERED			
5-A			591.524	COVERED	COVERED	COVERED	COVERED	"	"			
2-C		600.144			600.146	COVERED	COVERED	"	"			
1-C			NEW	593.517	593.514	593.517	COVERED	"	"			
B				598.805	598.794	COVERED	COVERED	"	"			
1-D					NEW 614.207	COVERED	COVERED	"	"		614.291	614.295
3-C					623.514	623.507	623.506	"	"			
4-C					596.018	COVERED	COVERED	595.997	595.999			596.007
7-A	MARK	ON WALL	15' W. OF SE COR		NEW 563.143	562.123	562.113	COVERED				563.100
3-D					PERMANENT DISC SET		REACTOR N#2 (270°)			INITIAL 624.425	624.422	624.411
4-D											NEW →	604.625
1-E											NEW →	625.292
3-C											NEW →	619.028
4-C											NEW →	603.600
												SEE NOTE A

PERRY NUCLEAR POWER PLANT

FOUNDATION SETTLEMENT CHART CONTINUED BY GARRETT & ASSOCIATES INCORPORATED

SHEET NO 2

NO	JULY 8, 77	July 15 77	JULY 21 77	July 29	8/5/77	AUG 11 77	AUG 19, 77	AUG 29, 1977	SEPT, 14, 77	SEPT 26, 77	OCT 12 77	
1A	582.090	582.093	582.092	582.095	582.095	582.087	582.092	582.091	COVERED	—	—	
1B	595.619	595.619	595.622	595.625	595.619	595.615	595.624	595.620	595.620	595.619	595.622	595.6
2	572.984	572.983	COVERED			572.979	572.984	COVERED	—	—	—	—
2A	578.334	578.333	578.335	COVERED		—	COVERED	COVERED	—	—	—	—
2B	589.980	BUMPED	589 981	589.981	589.984	589.978		589.982	589.981	COVERED	—	—
3	572.982	572.982	572.984	572.987	BUMPED	572.986	572.990	572.989	572.987	COVERED	—	—
1	585.491	585.493	585.494	585.493	585.493	585.493	585.493	585.493	585.495	585.494	585.496	585.498
	572.906	572.904	572.906	572.905	572.904	572.904	572.906	572.899	572.903	572.898	572.891	572.891
A	587.473	587.476	587.478	587.481	587.476	587.477	587.478	587.475	587.474	587.477	587.474	587.469
3A	—					590.267	590.267	590 265	590.266	590.262	590.270	590.265
2-C	NEW MARK								600.146	600 144	600 149	—
2-D =	BRASS DISC								SEPT 28 77 624.359	624.361	624.360	624.365

	NOV. 17, 77	DEC 2, 77	DEC 19, 77	DEC 29, 77	JAN 20, 78	FEB 16, 78
• 1-B	CANNOT BE FOUND	COVERED	COVERED	COVERED	COVERED	—
• 2-D	624.358	624.358	624361	624.362	624.358	624.362
3-A	COVERED	—	—	—	—	—
• 4-A	COVERED BY REPAIR	—	—	—	—	—
• 5	COVERED	COVERED	COVERED	COVERED	COVERED	—
• 6-A	587.470		587 490	587.960	587.496	587 496
• 7-B	596.943	596.942	596 938	596.940	596.940	596.940
• C	600.142	—	600 143	600.155	600 155	—
•	602 183	602 180	602 188	602 194	602.190	602.188
	571.045	571.048	571.042	599.044	599.049	599.046

CONTINUED ON SHEET "5-C"