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Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
License Renewal Application RAIs (TAC No. MA8054)

Gentlemen:

By letters dated April 17, 2000 (1CNA040004), and April 25, 2000 (1CNA040006), the NRC requested additional information concerning the Arkansas Nuclear One, Unit 1 (ANO-1) License Renewal Application (LRA). Attached are the requests for additional information (RAIs) pertaining to the Environmental Qualification (EQ) Section 4.4 of the ANO-1 LRA. Should you have any further questions, please contact me.

Very truly yours,

Jimmy D. Vandergrift
Director, Nuclear Safety Assurance

JDV/nbm
Attachment

A001

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Request for Additional Information Regarding ANO-1 LRA EQ Section 4.4
Dated April 17, 2000 (1CNA040004) and April 25, 2000 (1CNA040006)

4.4-1 The discussion on Thermal Considerations on page 4-21 of the ANO-1 LRA states that "Temperature monitoring can be utilized to confirm lower than design temperatures exist in these [auxiliary building] areas, and on that basis, extend qualified lives into the license renewal period." It goes on to state "These [reactor building] temperature values have been refined by the collection of additional operating temperature data." The refined temperature data are utilized in the LRA to project the service life of various qualified equipment to the end of the period of extended operation.

Provide a summary description explaining how the refined temperature data were determined for each of the buildings addressed (i.e., the reactor building, the auxiliary building, the turbine building, and the alternate diesel building). The discussion should include the following:

a. the instrumentation and procedures used to obtain the refined temperature data,

A plant modification installed a temporary temperature monitoring system for the ANO-1 reactor building, and data was collected from 1989 to 1996. This system included temperature elements that monitored 21 different area ambient temperatures (various elevations and azimuths) and 11 different EQ equipment surface temperatures. The temperature element measurements were accessed via remote computer, modems, and recorders.

Small self-contained temperature data loggers were initially installed in the ANO-1 reactor building in 1993 and are still currently in use. They contain an onboard battery for power and have a built-in temperature probe and computer memory to store the temperature data. In addition, these devices have the capability to measure remote temperatures by using a temperature probe connected to the data logger through lead wires that can be up to 90 feet long. These devices can be programmed to store data on a specific interval, and they have the memory capacity to store data over a complete fuel cycle.

In May 1989, EQ walkdowns were performed to determine EQ equipment surface temperatures in the auxiliary building and the associated general area temperatures. These were measurements taken at a single point in time with a hand held digital thermometer and the results are documented in the EQ files. In August/September 1997, an environmental walkdown was performed which included documenting area temperatures and any hot spots in several different buildings including the auxiliary building. These measurements were also taken at a single point in time with a hand-held digital thermometer or infrared camera. The methodology and results are also documented in an onsite engineering report. Additional information is also discussed in RAI response 4.4-2(c).

There is no EQ equipment located in the turbine or alternate diesel building; therefore, there has been no EQ related temperature monitoring in these areas.

b. the measurement location and the measures taken to ensure that the temperature data obtained are representative of the service environment in which the equipment being evaluated are installed,

For the reactor building, see the attached five figures. These figures provide the measurement locations of the different devices used in the ANO-1 reactor building. Prior to installation of the self-contained data loggers, EQ personnel identified locations of the EQ equipment on drawings and then chose locations for the temperature devices close to EQ equipment. As can be seen on the figures, many of the temperature measurement devices are located on, next to, or within close proximity to the EQ equipment.

For the auxiliary building, the efforts of May 1989 involved measurements taken of equipment surface temperatures and the areas of the auxiliary building containing EQ equipment. The efforts of August/September 1997 involved measurements of the general areas (rooms) of several buildings including the auxiliary building and any hot spots within those areas, such as equipment hotter than the surrounding area.

c. the frequency of the measurements and how seasonal variations were accounted for,

For the reactor building temporary temperature monitoring system, measurements were taken most normal working days. Almost 900 different date data records were logged for each of the area ambient and equipment surface temperature data points over the seven years the system was used. For the reactor building, self-contained data logger measurements were taken virtually continuously. The data loggers read temperatures continuously and stored the data on a user programmed frequency. In most cases these were setup to store a data record every 30 minutes. The process of storing this data long-term in the engineering report results in only retaining the maximum daily value. That is if the data logger is setup to store temperature values every 30 minutes, then there would be 48 records every day, and in processing the data, only the highest value every day would be saved and recorded in the engineering report.

Seasonal variations are accounted for by avoiding use of the average temperature values. Instead, the engineering report that stores the data, presents it graphically, calculates the average temperature of the data and determines what is termed an overall operating temperature. This overall operating temperature is generally several degrees above the average temperature value and is visually selected so that most data points fall on or below this value.

For the auxiliary building, temperature measurements were taken in May 1989 and August/September 1997, a single point in time for each occurrence. Seasonal variations are accounted for in that these measurements were taken during relatively warm months of the year for ANO. As a general rule, 105°F is used in the auxiliary building EQ equipment analyses; however, the walkdowns identified areas and/or equipment that was either cooler or hotter. EQ equipment in the auxiliary building in the cooler areas has not been re-analyzed given the limited amount of data. However, EQ equipment in the hotter areas has been analyzed at the higher temperature.

d. the plant operating status during measurements and how variations in operating status were accounted for,

For the temporary temperature monitoring system, data was recorded during various plant states. Since these values were obtained by an individual initiating computer call-up software, the data is somewhat random in nature. For the self-contained data loggers, the data recorded covers virtually every day and most plant states, (the only interruption being during the downloading process spanning at most, a few days during refueling outages). Therefore, variations in plant status are accounted for between these two systems in the reactor building.

For the walkdowns in the auxiliary building in May 1989 and August/September 1997 measurements were taken at single points in time. The plant was operating at the time. With the plant operating, this would provide for conservative area temperatures, especially with systems generating heat, for example, main feedwater and main steam.

e. the measures taken to identify hot-spots and the measures taken to account for them in the re-analysis, and

For the reactor building, the temporary temperature measuring devices were located in expected hot areas, such as inside the D-rings of containment (where the reactor coolant pumps, steam generators, and pressurizer are located). Equipment surface temperatures (temporary monitoring system) have been recorded on equipment with a high potential of being hotter than others (e.g., reactor coolant system (RCS) hot leg resistance temperature devices, RCS high point vent valves, and power operated relief block valve). In addition, several of the self-contained temperature data loggers have been moved to new locations from one cycle to the next in order to help identify hot spots. As noted in RAI response 4.4.1(f), some equipment continues to be evaluated at the higher temperatures.

For the auxiliary building, taking equipment surface temperature readings and area ambient readings in May 1989 and during the walkdowns in August/September 1997 an infrared camera was used to specifically identify if there were hot spots in the room. As noted in RAI response 4.4.1(c), EQ equipment has been evaluated at the higher temperature, if located in a hotter area.

f. how re-insulating the RCS and adding a new cooling unit (as discussed in Section 3.7.2.1) affected the temperatures in the reactor building and measures taken to account for the higher temperatures prior to re-insulating.

Also discuss future actions to ensure that these temperatures will carry forth throughout the period of extended operation.

These actions reduced the reactor building temperatures by 20°F or more. EQ equipment qualified lives were re-evaluated in 1987, as necessary, using the higher temperatures determined at that time. With the significant amount of operating temperature data obtained since the late 1980s and the equipment replacements made, some EQ equipment temperatures have been conservatively lowered. Other equipment continues to be evaluated at the higher temperatures, while other equipment utilizes multiple temperatures (e.g., pre-1990 and post-1990 temperatures).

Currently operations logs temperatures from four different data points in the ANO-1 reactor building. The procedure specifies a maximum value for each data point and if exceeded, operations is instructed to initiate a condition report (corrective action process). This supports commitments made from the 1987 elevated temperature event (see RAI response 4.4.2).

4.4-2 Section 4.4 of the ANO-1 LRA states that "If excess conservatism exists in the original qualified life determination, then reanalysis could be performed to extend the qualified life." However, the LRA does not address whether there have been any major plant modifications or events at ANO-1 of sufficient duration to have changed the temperature and radiation values that were used in the underlying assumptions in the EQ calculations, and whether the conservatism in the EQ equipment qualification analyses are sufficient to absorb environmental changes occurring due to plant modification and events. Also, the ANO-1 LRA does not address the controls used to monitor changes in plant environmental conditions to periodically validate the environmental data used in re-analyses. Provide additional information on the following:

a. Have there been any major plant modifications or events at ANO-1 of sufficient duration to have changed the temperature and radiation values that were used in the underlying assumptions in the EQ calculations?

ANO-1 was one of several plants cited in NRC IEN 89-30 having experienced elevated temperatures in the plant. For ANO-1, the reactor building experienced the elevated temperatures. This event was identified and the conditions were evaluated in 1987, including revising EQ analyses (see RAI response 4.4.1(f)). In an effort to reduce the reactor building temperatures, larger chilled water pumps, an additional chiller, and an additional air-handling unit were installed. These major plant modifications reduced the reactor building operating temperatures. Plant

modifications or initiatives are controlled by process procedures that include determining impact on EQ analyses. There have been no major plant modifications or events at ANO-1 that have changed the radiation values used in the EQ analyses.

b. Is the conservatism in the EQ equipment qualification analyses sufficient to absorb environmental changes occurring due to plant modification and events?

EQ equipment qualification analyses utilize either a design-based temperature value or actual operating temperature value. Both of these values have been shown to be conservative through temperature monitoring (discussed in RAI response 4.4.1). In addition, the plant modification process includes consideration of a modification's impact on plant environmental conditions and the EQ Program. Plant modifications that would result in increased temperatures would require incorporation into the EQ analyses. ANO's condition reporting and corrective action process is relied upon to identify events with impact on plant environmental conditions and evaluates their impact to the EQ Program.

c. What are the specific controls used to monitor changes in plant environmental conditions to periodically validate the environmental data used in re-analyses?

Controls used to monitor changes in plant environmental conditions involve operations' temperature monitoring in the reactor building (discussed in RAI response 4.4.1(f)). For areas of the auxiliary building, normal operator rounds, personnel performing routine maintenance work, and periodic engineering walkdowns and inspections are relied upon to identify changes to normal operating temperature conditions that might exceed the design value of 105°F.

4.4-3 The ANO-1 LRA does not address refurbishment of EQ electrical equipment as an option for extending qualified life. Provide additional information on whether refurbishment is an option that will be used to extend qualified life, and, if so, what procedures and controls will be used to ensure that the qualification status of the equipment is preserved.

Refurbishment is an option at ANO-1. EQ equipment that is in need of refurbishment is refurbished in place or is replaced with new equipment or previously refurbished equipment taken out of storage. In some cases, equipment that has been removed may be placed back in storage after it has been refurbished. Refurbishment is a process that preserves the qualification status of equipment and is typically accomplished by replacing items such as gaskets, seals, and wires that have a limited life. The EQ documentation identifies limited-life replacement parts for specific equipment, manufacturers, and models. The replacement option discussed for several equipment types would effectively involve refurbishment. There are specific subcomponents (parts) that would require replacement (e.g., 4.4.49 TEC Valve Flow Monitoring System or 4.4.50 TEC Reactor Vessel Level Monitoring System) during the renewal period.

4.4-4 Section 4.4.18 of the application on General Atomic Radiation Detectors is based on option (i) of 10CFR Part 54.21(c)(1) to demonstrate that the analyses remain valid for the period of extended operation.

Please provide a summary of the thermal and radiation analyses used to illustrate the basis upon which the qualified life remains valid for the period of extended operation. Include a description of the materials of construction, and a comparison of design specifications with actual service conditions.

The detector assemblies including their connectors are constructed of metal, ceramic, quartz cloth insulation, and Rexolite. These are inorganic materials, except for Rexolite, and not susceptible to thermal or radiation age degradation. The Rexolite is used in the connectors as a locator during assembly and has no required function after assembly. Therefore, as stated in the ANO-1 LRA Section 4.4.18.4, the EQ aging analyses remain valid for the period of extended operation.

4.4-5 The following sections of the application are based on option (ii) of 10CFR Part 54.21(c)(1) to demonstrate that the analyses have been projected to the end of the period of extended operation.

4.4.1 Allis Chalmers Motors ★
4.4.2 Anaconda Instrumentation Cable, FR-EP Insulation
4.4.3 Anaconda Control and Power Cable, EP Insulation
4.4.4 Anaconda EPR Insulated Instrumentation, Control/Power Cable ★
4.4.8 Buchanan Terminal Blocks, Outside Reactor Building
4.4.9 Buchanan Terminal Blocks, Inside Reactor Building ★
4.4.10 Conax Thermocouples ★
4.4.11 Conax Resistance Temperature Detectors ★
4.4.12 Conax Multipin Connector
4.4.13 Conax Electrical Penetration Assemblies ★
4.4.14 Conax Electrical Connection Seal Assembly
4.4.15 Conax Electrical Feedthrough Adapters
4.4.16 Eaton Flame Retardant Ethylene Propylene Diene Monomer Insulated Cable
4.4.17 Gems De Laval Level Sensors
4.4.19 General Electric Terminal Blocks
4.4.21 Limitorque Motor Operated Valve Actuators; Alternating Current/inside Reactor Building (most applications) ★
4.4.22 Limitorque Motor Operated Valve Actuators; Alternating Current/Outside Reactor Building
4.4.23 Limitorque Motor Operated Valve Actuators; Direct Current/Outside Reactor Building
4.4.26 NAMCO EA-740 Limit Switches with NAMCO Connectors
4.4.27 NAMCO EA-740 Limit Switches

4.4.28 NAMCO Quick Connectors
4.4.29 Okonite 5 kV Power Cable with EPR Insulation and an Okolon Jacket
4.4.30 Okonite 2 kV Power and Control Cable with Okonite or Okoguard Insulation and Okoprene or Okolon Jackets
4.4.31 Okonite 600V Power Cable with Okonite Insulation and an Okolon Jacket (most applications) ★
4.4.32 Okonite 600V Power Cable with FMR Insulation (most applications)
4.4.33 Okonite T-95 and No. 35 Splicing Tapes (most applications)
4.4.34 Raychem 600V Flamtrol XLPE Cable
4.4.35 Raychem Cable Splice and Jacket Repair Tape (type NJRT) ★
4.4.36 Raychem Cable Splices (types WCSF-N, NPK, NMCK, ANK, etc.)
4.4.37 Reliance Electric, Electric Motors
4.4.38 Rockbestos Coaxial Cable (most applications) ★
4.4.39 Rockbestos Firewall III Irradiation Cross-Linked Polyethylene Cable
4.4.40 Rockbestos Firezone R Silicone Rubber High Temperature Cable (some applications) ★
4.4.41 Rockbestos Firewall III Chemically Cross-Linked Polyethylene Cable
4.4.44 Rotork Motor Operated Valve Actuators, Model NA1
4.4.45 Target Rock Solenoid Operated Valves (Report 2375)
4.4.47 Target Rock Modulating Solenoid Operated Valves (Report 3414)
4.4.48 Target Rock Solenoid Operated Valves (Reports 2375 and 1827) ★
4.4.49 TEC Valve Flow Monitoring System (some subcomponents)
4.4.50 TEC Reactor Vessel Level Monitoring System (some subcomponents)
4.4.51 Weed Resistance Temperature Detectors
4.4.52 Dow-Corning 3145 Silicone Sealant
4.4.55 Westinghouse Motors, Models TBFC and SBDP ★
4.4.56 Babcock & Wilcox Core Exit Thermocouples (pin half connector with mineral-insulated cable)
4.4.57 Gamma Metrics Neutron Detectors and Cable Assemblies (organic cable)
4.4.58 Brand Rex Cross-Linked Polyethylene Coaxial Cable ★
4.4.59 Brand Rex Cross-Linked Polyethylene Power and Control Cable
4.4.60 NDT International Acoustic Sensor, Connector and cable
4.4.61 American Insulated Wire 600V Instrumentation Cable
4.4.62 American Insulated Wire 600V Power and Control Cable
4.4.63 AMP Pre-insulated Butt Splices
4.4.64 EGS Quick Disconnect Electrical Connectors (except connector o-rings)
4.4.65 EGS Grayboot Electrical Connectors
4.4.67 Valcor Model V526-5961-1 Solenoid Operated Valve
4.4.68 General Cable Corporation 5 kV Power Cable

Provide analyses for the items marked with an asterisk (★) to illustrate the basis upon which the analyses were projected to the end of the period of extended operation. Each analysis should include a discussion on the analytical methods used and why they are applicable, the data collection and reduction methods used, the underlying assumptions, the acceptance criteria, and the corrective actions if the

acceptance criteria are not met. In addition, please provide a list of all equipment for which an activation energy different from that in the current qualification basis documents was used in the reanalysis, along with the justification for using a different value.

The ANO subject matter expert met with the NRC staff on May 23, 2000, as documented in meeting summary dated June 13, 2000 (1CNA060005). The analyses for the requested items were discussed and made available for review at this meeting. Clarifications to Sections 4.4.48.2, 4.4.48.4, and 4.4.55.2 of the ANO-1 LRA are provided as follows:

4.4.48.2 Thermal Considerations
The EQ documentation shows that the valves are qualified for greater than 60 years at 180°F. Most applications are at, or below, 180°F. Applications at temperatures above 180°F have been evaluated separately and replacements are identified as a normal part of the ANO EQ process.

4.4.48.4 Conclusion
The Target Rock solenoid operated valve EQ aging analyses have been projected to the end of the period of extended operation for most applications while others have scheduled replacements prior to exceeding their qualified life. Therefore, the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

4.4.55.2 Thermal Considerations
The EQ documentation shows that these Westinghouse motors are qualified for 78,840 hours of operation at their maximum operating temperature of 120°C. During plant operation, the motors do not run (i.e., only run during surveillances). Between the surveillances and a conservative one-year post-accident operating time (8,760 hours), a conservative total run-time would be 18,000 hours. This is significantly less than the 78,840 hours for which the motor is qualified and would conservatively allow it to extend through the license renewal period. The motors are qualified for greater than 60 years, accounting for runtime and non-runtime.

4.4-6 The following sections of the application are based on option (iii) of 10CFR Part 54.21(c)(1) to demonstrate that the effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

4.4.5 ASCO Solenoid Valves, Outside Reactor Building (some applications)
4.4.6 ASCO Solenoid Valves, Inside Reactor Building
4.4.7 Boston Insulated Wire, Instrumentation, Control, and Power Cable
4.4.20 ITT/General Controls Electro-hydraulic Actuators
4.4.21 Limitorque Motor Operated Valve Actuators; Alternating Current/inside Reactor Building (some applications)
4.4.24 NAMCO EA-170 Limit Switches
4.4.25 NAMCO EA-180 Limit Switches

4.4.26 NAMCO EA-740 Limit Switches with NAMCO Connectors
4.4.31 Okonite 600V Power Cable with Okonite Insulation and an Okolon Jacket (some applications)
4.4.32 Okonite 600V Power Cable with FMR Insulation (some applications)
4.4.33 Okonite T-95 and No. 35 Splicing Tapes (some applications)
4.4.38 Rockbestos Coaxial Cable (some applications)
4.4.40 Rockbestos Firezone R Silicone Rubber High Temperature Cable (some applications)
4.4.42 Rosemount Model 1153 Series D Pressure Transmitters
4.4.43 Rosemount Model 1154 Pressure Transmitters
4.4.46 Target Rock Solenoid Operated Valves (Reports 2375 and 3996)
4.4.49 TEC Valve Flow Monitoring System (some subcomponents)
4.4.50 TEC Reactor Vessel Level Monitoring System (some subcomponents)
4.4.53 Westinghouse Hydrogen Recombiners
4.4.54 Westinghouse Motors, Model ABDP
4.4.56 Babcock & Wilcox Core Exit Thermocouple (except the pin half connector with the mineral-insulated cable)
4.4.57 Gamma Metrics Neutron Detectors and Cable Assemblies (except organic cable)
4.4.64 EGS Quick Disconnect Electrical Connectors (connector o-rings)
4.4.66 Valvor Model V526-5683 Solenoid Operated Valve

For one representative sample of each type of component (i.e., cable, connector, instrument transmitter, etc.), please provide the following information for the option chosen:

<u>Replacement</u> - Describe the activities for replacement of equipment qualified to 10CFR50.49 and any sound reasons to the contrary (Regulatory Guide 1.89, Rev. 1) that will be used for replacement equipment.

<u>Refurbishment</u> - Describe the activities that will result in the equipment being returned to its original (like new) qualified condition.

<u>Reanalysis</u> - Provide the analytical methods, data collection and reduction methods, underlying assumptions, acceptance criteria, corrective actions if the acceptance criteria are not met, and the period of time prior to the end of qualified life when reanalysis will be completed.

<u>4.4.6 ASCO Solenoid Valves, Inside Reactor Building</u>

Replacement is the current option for specific applications of this equipment. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement.

4.4.25 NAMCO EA-180 Limit Switches

Replacement is the current option for specific applications of this equipment. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement.

4.4.31 Okonite 600V Power Cable with Okonite Insulation and an Okolon Jacket (some applications)

Replacement or reanalysis is the current option for specific applications of this equipment. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement. If reanalysis is performed, it would entail the following:

- Analytical Methods - The thermal reanalysis would be based on Arrhenius methodology.

- Data Collection and Reduction Methods - The primary method used for reanalysis is reducing excess conservatisms in the equipment service temperatures. Temperature data used in a reanalysis is obtained from actual temperature measurements in the area around the equipment being reanalyzed (temperature monitoring is discussed in more detail in RAI response 4.4.1).

- Underlying Assumptions - The major plant modifications or events at ANO of sufficient duration that may have changed the temperature values are appropriately reflected in the analysis (e.g. using two different temperatures for aging, pre-1990 and post-1990). Conservatisms in the EQ equipment qualification analyses would be sufficient to absorb environmental changes occurring due to plant events.

- Acceptance Criteria and Corrective Actions - The acceptance criterion associated with the reanalysis of a qualified life is the documented confirmation that the equipment is qualified for some period beyond the previously existing qualified life. Corrective action is not applicable to reanalysis of a qualified life calculation.

4.4.43 Rosemount Model 1154 Pressure Transmitters

Replacement is the current option for specific applications of this equipment. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management

system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement.

4.4.50 TEC Reactor Vessel Level Monitoring System (some subcomponents)
Replacement or reanalysis is the current option for specific subcomponents of this system. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement. If reanalysis is performed, it would entail the same process as discussed above for Okonite 600V power cable with Okonite insulation and an Okolon jacket.

4.4.53 Westinghouse Hydrogen Recombiners
Replacement or reanalysis is the current option for specific subcomponents of this equipment. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement. If reanalysis is performed, it would entail the same process as discussed above for Okonite 600V power cable with Okonite insulation and an Okolon jacket.

4.4.54 Westinghouse Motors, Model ABDP
Replacement or reanalysis is the current option for specific applications of this equipment. The existing equipment is qualified to NRC IEB 79-01B requirements so upgrading/sound reasons to the contrary would apply, if the option used is equipment replacement (which sound reasons to the contrary that could be applied, if any, have not been determined at this time, since the replacement option may not be used). Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement. If reanalysis is performed, it would entail the same process as discussed above for Okonite 600V power cable with Okonite insulation and an Okolon jacket.

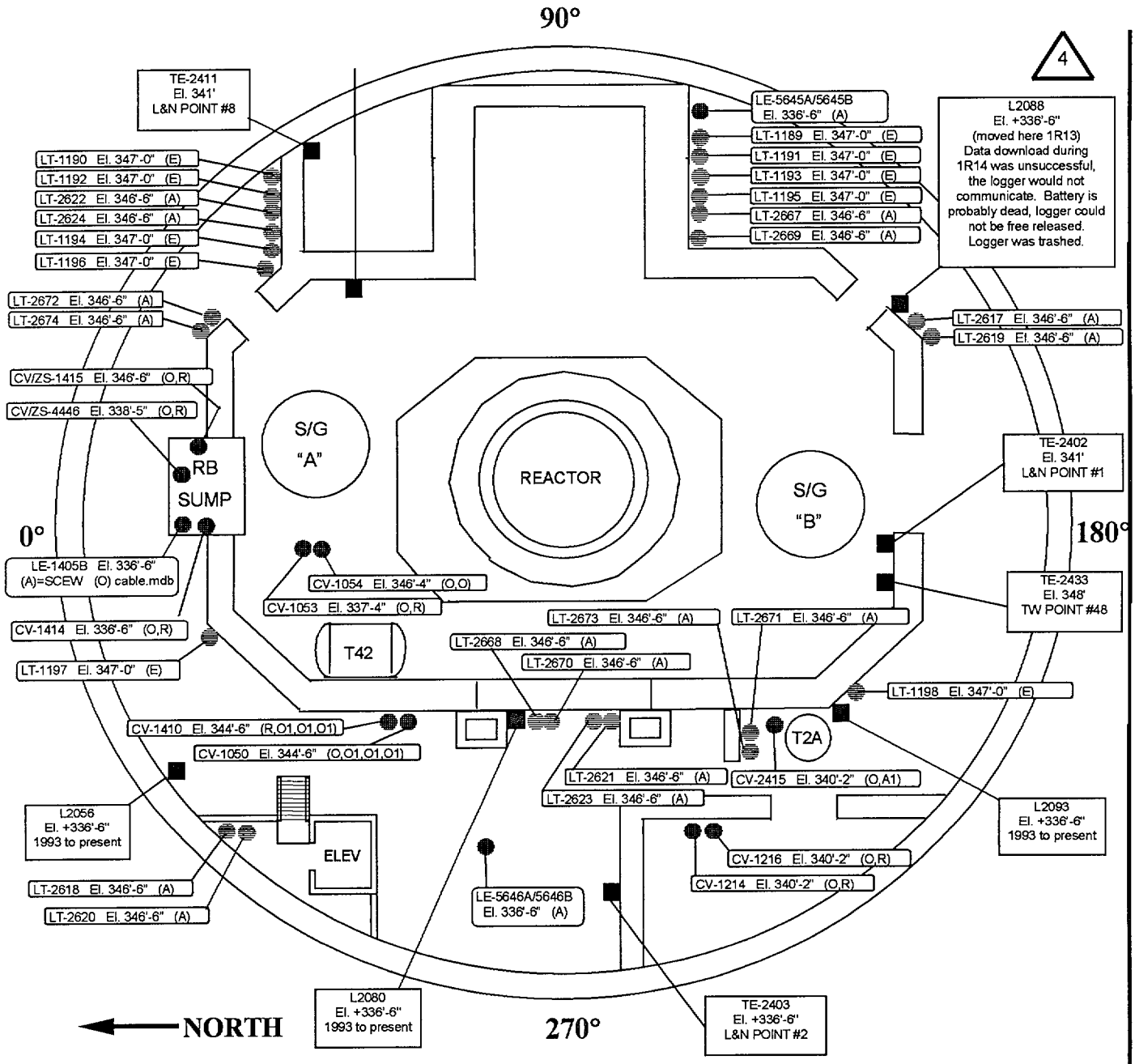
4.4.56 Babcock & Wilcox Core Exit Thermocouple (except the pin half connector with the mineral-insulated cable)
Replacement or reanalysis is the current option for specific applications of this equipment. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to

exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement. If reanalysis is performed, it would entail the same process as discussed above for Okonite 600V power cable with Okonite insulation and an Okolon jacket.

4.4.57 Gamma Metrics Neutron Detectors and Cable Assemblies (except organic cable)
Replacement or reanalysis is the current option for specific applications of this equipment. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement. If reanalysis is performed, it would entail the same process as discussed above for Okonite 600V power cable with Okonite insulation and an Okolon jacket.

4.4.64 EGS Quick Disconnect Electrical Connectors (connector o-rings)
Replacement or reanalysis is the current option for specific applications of this equipment. The existing equipment is already qualified to 10CFR50.49 requirements so upgrading/sound reasons to the contrary do not apply. Engineering provides EQ replacement requirements to maintenance. Maintenance generates a task in the computerized work management system to track the replacement's due date. Prior to exceeding the EQ life, a work package is initiated and implemented to perform and document the replacement. If reanalysis is performed, it would entail the same process as discussed above for Okonite 600V power cable with Okonite insulation and an Okolon jacket.

Unit 1 Reactor Building, Elev. 336'-6"



Cable Codes Used ( )	Cable to End Device
A =Anaconda FR-EP	O =Okonite/Okoprene/Okoprene
A1=Anaconda EP	O1=Okonite/Okoprene
A2=AIW	O2=Okonite/Okolon
B =BIW Bostrad 7 CSPE	O3=Okonite FMR/Okolon
B1=Brand Rex XLPE/Hypalon	R =Rockbestos Firewall III Irradiation XLPE
E =Eaton FR-EPDM	R1=Rockbestos RSS
	R2=Rockbestos Firezone "R"

Cable References Used

1. EIC's CIS Cable.txt
2. EIC's CISCABLE Cable.mdb
3. EIC's CISCABLE PDMS.mdb
4. Engr. Report 95-R-0009-01
5. EQ File MISC EQ Item 87
6. EIC's EQ-INSIDE.xls

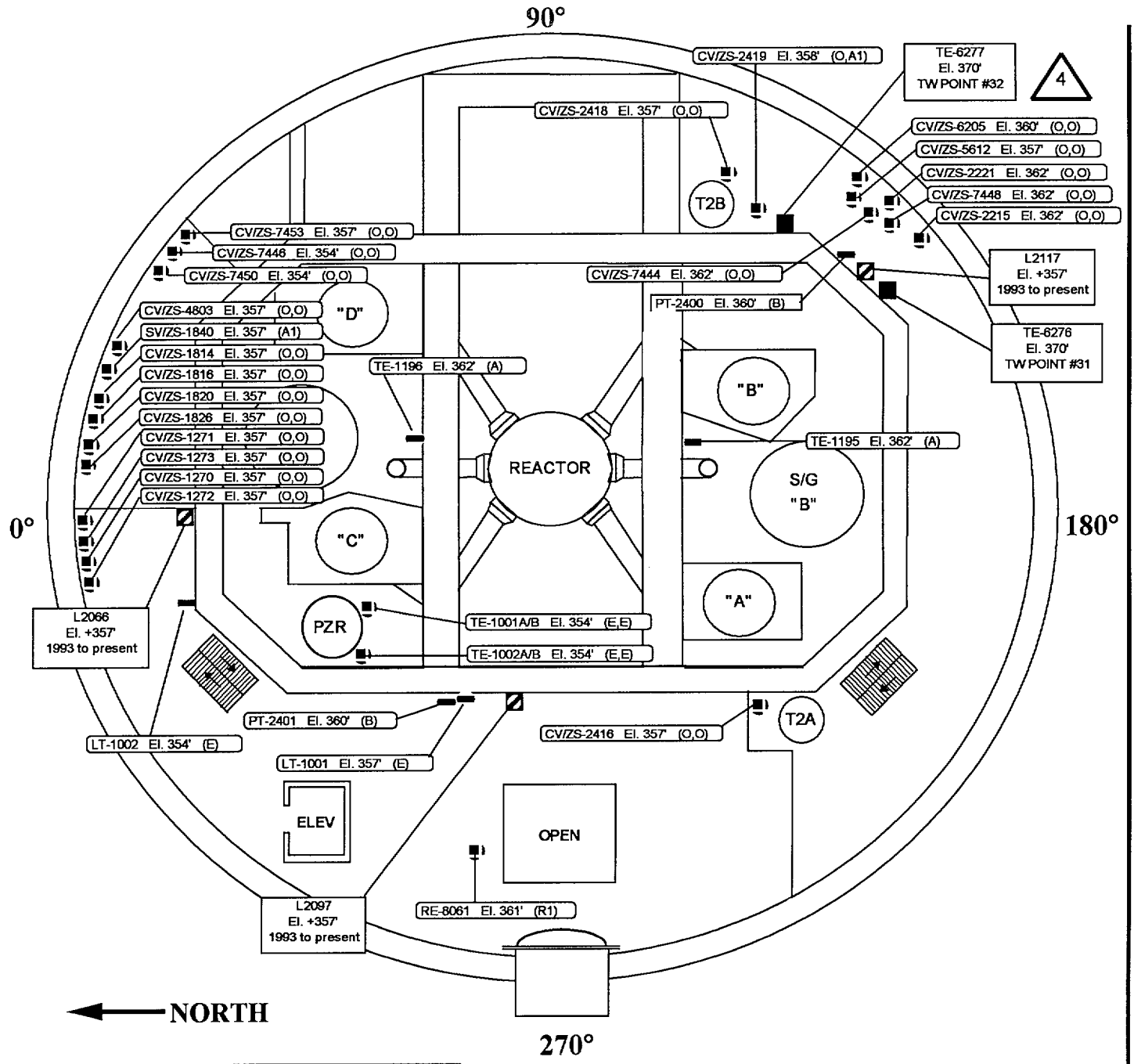
■ — EXISTING TEMP. MONITOR (DCP 87-1097)

■ — TEMP. DATA LOGGER (NED INSTALLED)

● — EQ ITEMS w/SHORT QL (<40 ys.)

● — EQ ITEMS w/LONG QL (>40 rs. +)

Unit 1 Reactor Building, Elev. 357'-0"



Cable Codes Used ( )	Cable to End Device
A =Anaconda FR-EP	O =Okonite/Okoprene/Okoprene
A1=Anaconda EP	O1=Okonite/Okoprene
A2=AIW	O2=Okonite/Okolon
B =BIW Bostrad 7 CSPE	O3=Okonite FMR/Okolon
B1=Brand Rex XLPE/Hypalon	R =Rockbestos Firewall III Irradiation XLPE
E =Eaton FR-EPDM	R1=Rockbestos RSS
	R2=Rockbestos Firezone "R"

Cable References Used

1. EIC's CIS Cable.txt
2. EIC's CISCABLE Cable.mdb
3. EIC's CISCABLE PDMS.mdb
4. Engr. Report 95-R-0009-01
5. EQ File MISC EQ Item 87
6. EIC's EQ-INSIDE.xls

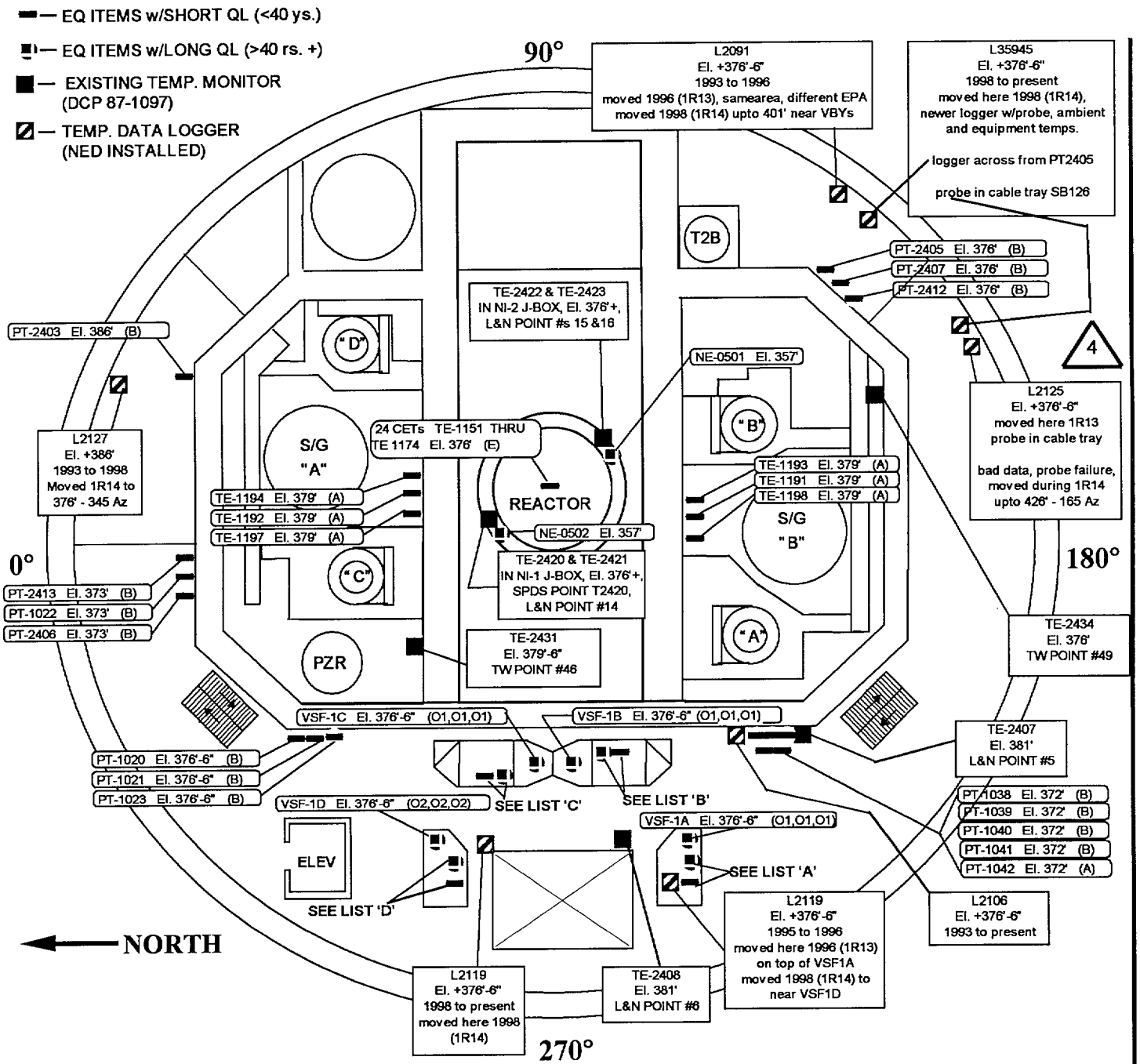
■ — EXISTING TEMP. MONITOR (DCP 87-1097)

▨ — TEMP. DATA LOGGER (NED INSTALLED)

▬ — EQ ITEMS w/SHORT QL (<40 ys.)

▮ — EQ ITEMS w/LONG QL (>40 rs. +)

Unit 1 Reactor Building, Elev. 376'-6"



Cable Codes Used ( )	Cable to End Device
A =Anaconda FR-EP	O =Okonite/Okoprene/Okoprene
A1=Anaconda EP	O1=Okonite/Okoprene
A2=AIW	O2=Okonite/Okolon
B =BIW Bostrad 7 CSPE	O3=Okonite FMR/Okolon
B1=Brand Rex XLPE/Hypalon	R =Rockbestos Firewall III Irradiation XLPE
E =Eaton FR-EPDM	R1=Rockbestos RSS
	R2=Rockbestos Firezone "R"

Cable References Used

1. EIC's CIS Cable.txt
2. EIC's CISCABLE Cable.mdb
3. EIC's CISCABLE PDMS.mdb
4. Engr. Report 95-R-0009-01
5. EQ File MISC EQ Item 87
6. EIC's EQ-INSIDE.xls

LIST 'A'

CV/ZS-7470 El. 376' (O,O)
SV/ZS-7410 El. 376' (O)
ZS-7408 El. 376' (O)
ZS-7409 El. 376' (O,O)
ZS-7420-1 El. 376' (O)
ZS-7420-2 El. 376' (O,O)

LIST 'B'

CV/ZS-7471 El. 376' (O,O)
SV/ZS-7411 El. 376' (O)
ZS-7406 El. 376' (O)
ZS-7407 El. 376' (O,O)
ZS-7421-1 El. 376' (O)
ZS-7421-2 El. 376' (O,O)

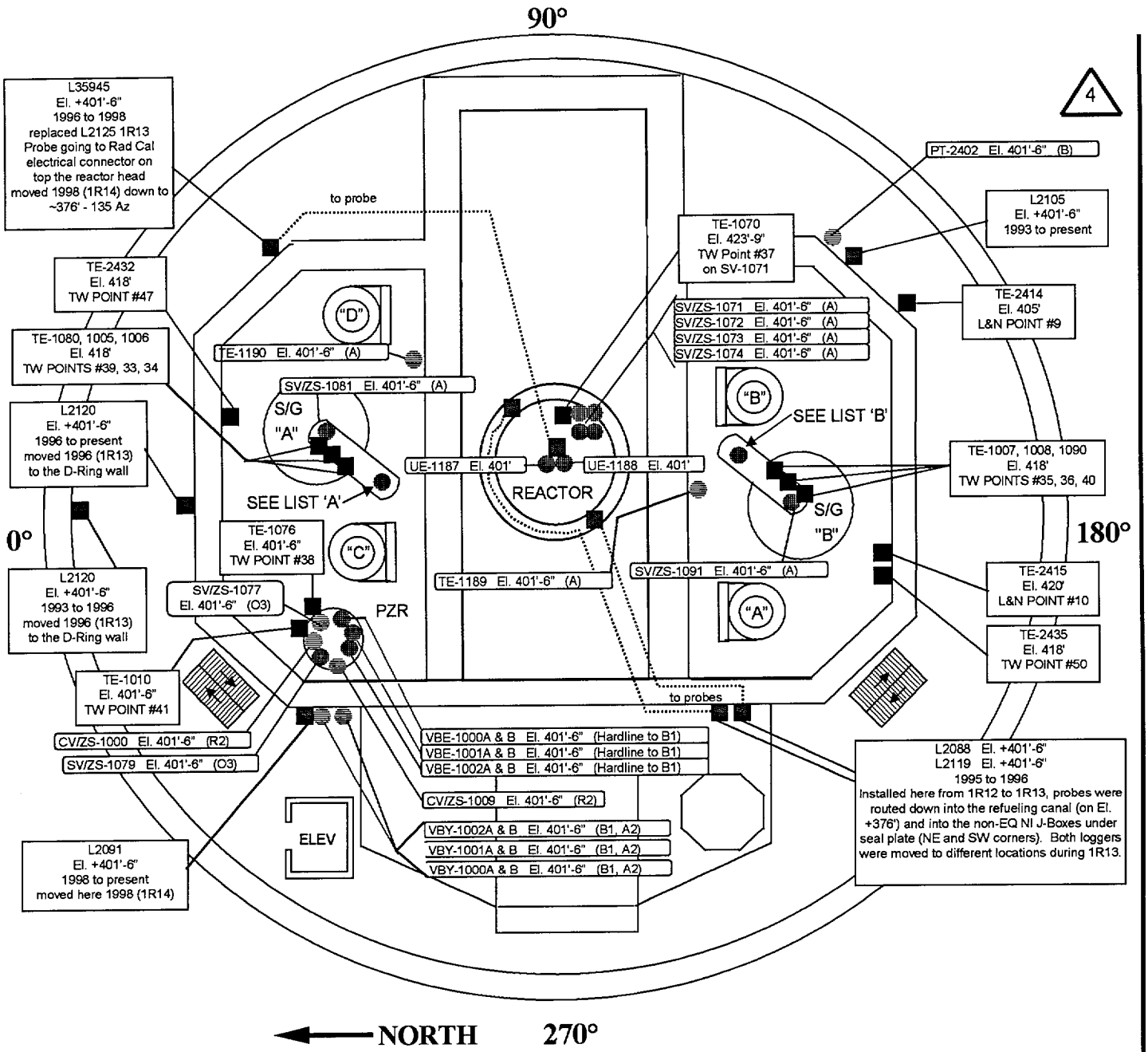
LIST 'C'

CV/ZS-7472 El. 376' (O,O)
SV/ZS-7412 El. 376' (O)
ZS-7424 El. 376' (O)
ZS-7425 El. 376' (O,O)
ZS-7422-1 El. 376' (O)
ZS-7422-2 El. 376' (O,O)

LIST 'D'

CV/ZS-7473 El. 376' (O,O)
SV/ZS-7413 El. 376' (O)
ZS-7426 El. 376' (O)
ZS-7427 El. 376' (O,O)
ZS-7423-1 El. 376' (O)
ZS-7423-2 El. 376' (O,O)

Unit 1 Reactor Building, Elev. 401'-6"



Cable Codes Used ( )	Cable to End Device
A =Anaconda FR-EP	O =Okonite/Okoprene/Okoprene
A1=Anaconda EP	O1=Okonite/Okoprene
A2=AIW	O2=Okonite/Okolon
B =BIW Bostrad 7 CSPE	O3=Okonite FMR/Okolon
B1=Brand Rex XLPE/Hypalon	R =Rockbestos Firewall III Irradiation XLPE
E =Eaton FR-EPDM	R1=Rockbestos RSS
	R2=Rockbestos Firezone "R"

Cable References Used

1. EIC's CIS Cable.txt
2. EIC's CISCABLE Cable.mdb
3. EIC's CISCABLE PDMS.mdb
4. Engr. Report 95-R-0009-01
5. EQ File MISC EQ Item 87
6. EIC's EQ-INSIDE.xls

LIST 'A'

- SV/ZS-1082 El. 401'-6" (A)
- SV/ZS-1083 El. 401'-6" (A)
- SV/ZS-1084 El. 401'-6" (A)
- TE-1111 El. 401'-6" (E)
- TE-1112 El. 401'-6" (E)

LIST 'B'

- SV/ZS-1092 El. 401'-6" (A)
- SV/ZS-1093 El. 401'-6" (A)
- SV/ZS-1094 El. 401'-6" (A)
- TE-1139 El. 401'-6" (A)
- TE-1140 El. 401'-6" (A)

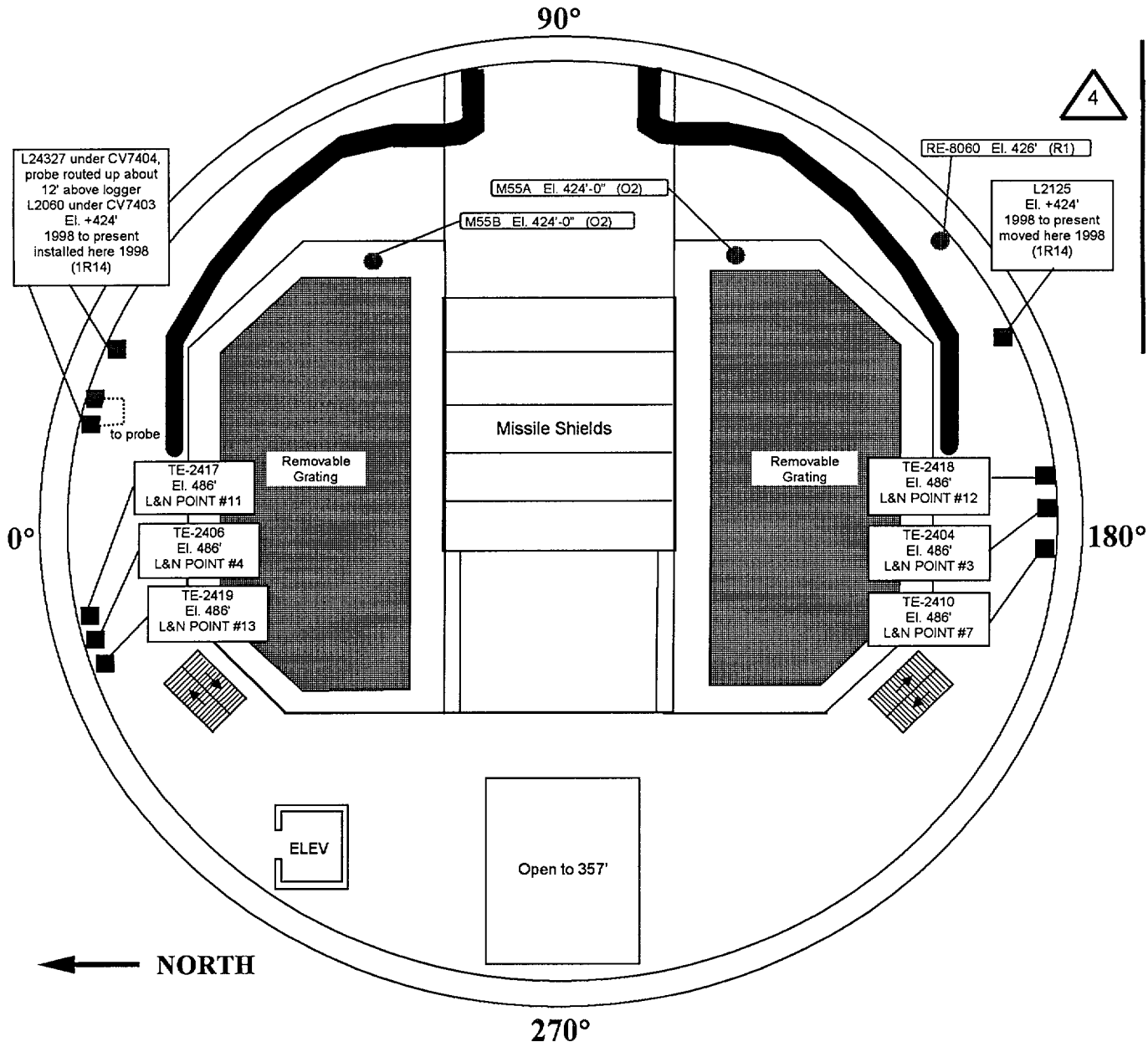
■ — EXISTING TEMP. MONITOR (DCP 87-1097)

■ — TEMP. DATA LOGGER (NED INSTALLED)

● — EQ ITEMS w/SHORT QL (<40 ys.)

● — EQ ITEMS w/LONG QL (>40 rs. +)

Unit 1 Reactor Building, Elev. 424'-0"



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Cable Codes Used ( ) Cable to End Device

A =Anaconda FR-EP
A1=Anaconda EP
A2=AIW
B =BIW Bostrad 7 CSPE
B1=Brand Rex XLPE/Hypalon
E =Eaton FR-EPDM

O =Okonite/Okoprene/Okoprene
O1=Okonite/Okoprene
O2=Okonite/Okolon
O3=Okonite FMR/Okolon
R =Rockbestos Firewall III Irradiation XLPE
R1=Rockbestos RSS
R2=Rockbestos Firezone "R"

Cable References Used

1. EIC's CIS Cable.txt
2. EIC's CISCABLE Cable.mdb
3. EIC's CISCABLE PDMS.mdb
4. Engr. Report 95-R-0009-01
5. EQ File MISC EQ Item 87
6. EIC's EQ-INSIDE.xls

■ — EXISTING TEMP. MONITOR (DCP 87-1097)

■ — TEMP. DATA LOGGER (NED INSTALLED)

● — EQ ITEMS w/SHORT QL (<40 ys.)

● — EQ ITEMS w/LONG QL (>40 rs. +)