


Table of Contents

		<u>Page</u>
1.0	Scope of Work	3
2.0	Codes and Standards	4
3.0	Quality Assurance Requirements	4
4.0	Documentation Requirements	4
5.0	Equipment Requirements :	5
6.0	System Hardware Assembly	7
7.0	Software Programs	8
8.0	Calculations	10
9.0	Service Condition	10
10.0	Inspections and Tests	11
11.0	Shipping and Handling	11

Attachment Index Page and Attachments

 ELECTRICAL ENGINEERING DIVISION	SPECIFICATION FOR PEACH BOTTOM ATOMIC POWER STATION UNIT 2 AND 3 REACTOR WATER LEVEL PRESSURE COMPENSATION INSTRUMENTS	NO. EP-8653
		REV. NO. 1
		PAGE 2 OF 11

1.0 SCOPE OF WORK:

1.1 GENERAL:


NUREG 0737 "Clarification of TMI Action Plan Requirements", requires the ability to measure inadequate core cooling during transient reactor operating conditions including high drywell temperature transients. In a BWR reactor, reactor water level measurement is the measure of adequate core cooling.

At Peach Bottom APS, reactor water level is measured using differential pressure transmitters. Yarway temperature compensation columns are installed on two measurement reference water columns. These Yarway columns will be removed and the reference column piping will be rearranged to limit the reference column elevation drop in the drywell and limit the measurement errors caused by reference column flashing during high drywell temperature transients. In conjunction with the column rearrangement, Philadelphia Electric Company intends to further improve the reactor water level measurement system by providing pressure compensated reactor water level indication and ECCS logic input signals.

1.2 SCOPE OF WORK:

This specification includes the following work to be provided by the vendor:

- 1.2.1 All work required to design, build, test and deliver to Philadelphia Electric Company eight (8) Class 1E microprocessor instruments for pressure compensating reactor water level in accordance with this specification. Four (4) instruments will be installed on Unit 2 and four (4) instruments will be installed on Unit 3.
- 1.2.2 Supply all drawings and instruction manuals required to install, test, maintain and operate the supplied equipment.
- 1.2.3 Provide field services as required for assistance during installation and startup testing at Peach Bottom APS.
- 1.2.4 Certification and qualification documentation as required by this specification.
- 1.2.5 Provide a witnessed factory test with a Philadelphia Electric Company approved test procedure.

 ELECTRICAL ENGINEERING DIVISION	SPECIFICATION FOR PEACH BOTTOM ATOMIC POWER STATION UNIT 2 AND 3 REACTOR WATER LEVEL PRESSURE COMPENSATION INSTRUMENTS	NO. EP-8653
		REV. NO. 1
		PAGE 3 OF 11

1.3 INTERFACING ACTIVITIES PERFORMED BY OTHERS:

Philadelphia Electric Company will provide:

- 1.3.1 All site storage, installation and mounting of the provided equipment.
- 1.3.2 All field wiring and terminations.
- 1.3.3 All process transmitters and elements and installation of the transmitters and elements.
- 1.3.4 Startup testing coordination within Philadelphia Electric Company.

2.0 CODES AND STANDARDS:

The following codes and standards apply to the equipment and work included in this specification. These codes and standards are considered part of this specification.

IEEE 323 - 1984, "Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations", Section 8.6.

IEEE 279 - 1971, "Criteria for Protection Systems for Nuclear Power Generating Stations"

IEEE 344 - 1975, "Recommended Practices for Seismic Qualification of Class 1E Equipment for Power Generating Stations"

IEEE 384 - 1981, "Standard Criteria for Independence of Class 1E Equipment and Circuits"


ANSI/IEEE ANS 7-4.3.2 - 1982, "Application Criteria for Programmable Digital Computer Systems in Safety System of Nuclear Power Generating Stations"

3.0 QUALITY ASSURANCE REQUIREMENTS:

This work is considered nuclear safety related. Quality assurance requirements are contained in Attachment I. This attachment contains requirements for submittal of Certificate of Conformance, Vendor Deviation Requests, Qualification Test Reports and other Quality Assurance requirements.

4.0 DOCUMENTATION REQUIREMENTS:

- 4.1 Documentation requirements are contained in Attachment III.

 ELECTRICAL ENGINEERING DIVISION	SPECIFICATION FOR PEACH BOTTOM ATOMIC POWER STATION UNIT 2 AND 3 REACTOR WATER LEVEL PRESSURE COMPENSATION INSTRUMENTS	NO. EP-8653
		REV. NO. 1
		PAGE 4 OF 11

4.2 Drawings supplied by the vendor shall conform to the requirements of Attachment IX, EDSTD-1 Rev. 2, "Standard Specification for Drawings Furnished by Vendors to Philadelphia Electric Company." Final drawings shall be Mylar originals in accordance with paragraph 4.2.3.1 of EDSTD-1, Rev. 2.


5.0 EQUIPMENT REQUIREMENTS:

5.1 Eight (8) microprocessor pressure compensating instruments shall be supplied; four (4) for Unit 2 and four (4) for Unit 3. Philadelphia Electric Company shall supply two (2) 4 to 20 Ma. differential pressure level signals from two (2) transmitters and one (1) 4 to 20 Ma. reactor pressure signal from one transmitter as inputs for each compensating instrument; eight (8) level signals and four (4) pressure signals for each reactor. Each compensation instrument shall compensate the reactor level signals for the measurement effects of reactor pressure variations and shall output two (2) 4 to 20 Ma. signals in two (2) ranges of level indicating signals as specified in Table II. All analog outputs shall be electrically isolated. Standard IEEE 384 - 1981 "Standard Criteria for Independence of Class 1E Equipment and Circuits" shall apply. The general system arrangement is shown in Attachment VII, "System I/O" and Attachment VIII, "Instrument Elevations."


5.2 The four (4) instruments for each unit shall be installed such that each compensation instrument is in one (1) of the four (4) ECCS input channels. The four (4) channels shall be grouped into two (2) electrical divisions of two (2) channels for separation purposes. Channels designated A and C shall form one division and channels designated B and D shall form the second division.

5.3 The level transmitters shall input 4 to 20 Ma. signals representing level ranges of +60 to -165 inches and +60 to -325 inches. The pressure transmitters shall input 4 to 20 Ma. signals representing pressure of 0 to 1200 PSIG.

5.4 Each compensation instrument shall sense the two level transmitter signals with overlapping ranges, automatically select the signal with the proper range for the current level and/or pressure, calculate the compensated level based on the current reactor pressure signal and provide properly scaled output level indication signals and contact output states. Note that the fuel zone transmitter signal includes the differential pressure effects of jet pump flow. The jet pumps are tripped at -48 inches level.

 ELECTRICAL ENGINEERING DIVISION	SPECIFICATION FOR PEACH BOTTOM ATOMIC POWER STATION UNIT 2 AND 3 REACTOR WATER LEVEL PRESSURE COMPENSATION INSTRUMENTS	NO. EP-8653
		REV. NO. 1
		PAGE 5 OF 11

- 5.5 The pressure compensation instrument error shall be less than $\pm 1.0\%$ full scale of the level over the full level range of -325 to +60 inches and pressure range of 0 to 1200 PSIG. This error limit includes compensation instrument repeatability, hysteresis conformity and nonlinearity. It includes the effects of ambient temperature and instrument I/O error. This accuracy requirement is only for pressure effects; errors to other process effects are not included in this accuracy requirement.
- 5.6 Eighteen (18) logic outputs shall be supplied from each instrument as listed in Attachment V, Table I. All logic outputs shall provide electrical isolation. Standard IEEE 384 - 1981 "Standard Criteria for Independence of Class 1E Equipment and Circuits" shall apply. Two outputs plus the alarm output in Table I interface with non-Class 1E circuits.
- 5.7 One (1) alarm output contact for annunciation of instrument trouble shall be supplied from each compensation instrument. This contact shall close on diagnostic failure detection, as specified in paragraphs 7.6 and 7.8, or failure of either redundant power supply. This output contact shall be electrically isolated. The alarm system is non-Class 1E.
- 5.8 Each compensation instrument shall operate independently of all the other compensation instruments. A failure in one instrument shall not affect the operation of the other instruments nor shall the outputs of the other instruments be affected.
- 5.9 All eight (8) compensation instruments shall be identical, complete and include all specified inputs and outputs. The instruments shall be interchangeable with one another and require no changes in field wiring, panel mounting, programming or calibrating for the interchange.
- 5.10 The vendor shall supply redundant power supplies for each compensation instrument division (See Paragraph 5.2). Philadelphia Electric Company shall provide one (1) 120 volt 60 Hertz ($\pm 10\%$ and ± 0.5 Hertz) and one (1) 125 volt dc nominal (105 volts to 140 volts dc.) feed for each instrument division: two (2) 120 volt ac. and two (2) 125 volt dc. feeds for each reactor unit. The vendor shall supply the necessary power supplies to convert both of these voltages to the voltages required by the vendor's equipment and for power (+24 volt dc.) for the Philadelphia Electric supplied input transmitters. Rosemount model 1153 transmitters are used. Power to each of the transmitters shall be separately fused. The vendor shall arrange the power supplies such that the normal feed shall be the 120 volt ac. feed and backup feed shall be the 125 volt dc. feed. The operation of the compensation instruments shall not be interrupted or otherwise

 <p>ELECTRICAL ENGINEERING DIVISION</p>	<p>SPECIFICATION FOR PEACH BOTTOM ATOMIC POWER STATION UNIT 2 AND 3 REACTOR WATER LEVEL PRESSURE COMPENSATION INSTRUMENTS</p>	NO. EP-8653
		REV. NO. 1
		PAGE 6 OF 11

affected by the loss of either power supply individually. Properly sized fuses shall be provided to isolate each compensation instrument in case of electrical overloads or faults and for maintenance.

5.11 Contact outputs shall be rated for a minimum of 125 volts dc. at 1/2 ampere. Outputs as specified in Attachment V, Table I shall be supplied. A minimum of three spare contact outputs shall be provided for each compensation instrument. These spare contacts shall be fully wired, active and programmed.

5.12 Analog outputs of 4 to 20 Ma. shall be supplied as specified in Attachment VI, Table II. These outputs shall be capable of accurately driving loads of 50 to 500 ohms.

6.0 SYSTEM HARDWARE ASSEMBLY:


6.1 Each pair of compensation instruments forming one electrical division shall be mounted in a seismically qualified free standing panel.

6.2 Buchanan Model NQB-102, NQB-104, NQB-106 and NQB-112 terminal strips or Philadelphia Electric Company approved equivalent strips or direct connection to approved card connections shall be supplied for field wiring terminations within the supplied panels. Provisions shall be included for cable entry through the top of the panels. Space shall be provided to route the field wiring to the terminal strips and provisions shall be provided to firmly attach the field wiring to the panel during installation. All terminal strips and equipment shall be mounted a minimum of 12 inches above the bottom of the panel.


6.3 The mounting arrangement of the two (2) compensation instruments within each panel shall provide physical separation between the two channels for ease of field wiring and equipment identification. All equipment and internal wiring shall be clearly and permanently marked and identified. The panels shall be enclosed on all sides with indicators and switches used for operation easily accessed. The rear of the panel shall have a hinged door. The panels shall be equipped with end panels that comply with IEEE 279-1971 and IEEE 384-1981 for separation between the supplied panels and existing adjacent panels.

6.4 The overall dimensions of the panels shall be the minimum required to house the equipment with adequate space for field wiring. The preferred maximum dimensions are 24 inches wide, 30 inches deep. The maximum height is 60 inches.


6.5 The base of the panels shall be constructed to provide provisions to bolt or weld the panel to steel channels embedded in the concrete floor. The channels are C5X6.7 spaced 1 foot 10 inch centers.

 ELECTRICAL ENGINEERING DIVISION	SPECIFICATION FOR PEACH BOTTOM ATOMIC POWER STATION UNIT 2 AND 3 REACTOR WATER LEVEL PRESSURE COMPENSATION INSTRUMENTS	NO. EP-8653
		REV. NO. 1
		PAGE 7 OF 11

- 6.6 The panels shall be finished and painted. The finish shall be in accordance with the vendor's standard specification. The preferred color is "Eye Rest Green" switchboard lacquer, PE Code #199-41124 manufactured by Camden Paint and Lacquer Co., Cherry Hill, N. J. Code #10-1366
- 6.7 Non-flammable materials shall be used wherever possible.
- 6.8 A connection point for connecting the panel to station ground shall be provided.
- 6.9 A separate system ground connection shall be provided.
- 6.10 DELETED
- 6.11 All circuit boards shall be conformally coated to protect the boards from oxidation and short circuits caused by condensation. This requirement also applies to circuit boards in the power supplies. This equipment will be located in a room that is fire protected by an automatic Cardox system. The room is subject to fire initiated and inadvertent flooding with Cardox. The conformal coating is expected to protect the circuit boards from the effects of condensation of water vapor and carbonic acid and enhance the probability of system operation during and after a Cardox flooding. This requirement applies to the Unit 3 equipment. The vendor is to quote a replacement set of conformally coated circuit boards for the Unit 2 equipment.
- 7.0 SOFTWARE PROGRAMS:
- 7.1 All programs supplied or used by the compensation instruments shall be developed and validated in accordance with standard ANSI/IEEE 7-4.3.2 1982, "Application Criteria for Programmable Digital Computer Systems in Safety Systems of Nuclear Power Generating Stations."
- 7.2 The vendor shall supply all software programs necessary to perform the functions described in this specification. The software shall be complete, functional and verified.
- 7.3 All software programs shall be stored within each compensation instrument and shall not be lost on loss of all power. The operation of the instrument shall not depend on software not stored within the instrument.
- 7.4 The program cycle time shall be less than one-quarter (1/4) second. All inputs and all outputs shall be sampled and updated within the one-quarter (1/4) second update time.

 PHILADELPHIA <small>Electric</small> SERVICE <small>INC.</small> ELECTRIC COMPANY ELECTRICAL ENGINEERING DIVISION	SPECIFICATION FOR PEACH BOTTOM ATOMIC POWER STATION UNIT 2 AND 3 REACTOR WATER LEVEL PRESSURE COMPENSATION INSTRUMENTS	NO. EP-8653
		REV. NO. 1
		PAGE 8 OF 11

- 7.5 Each compensation instrument shall be programmed to automatically restart after power-down and subsequent power-up.
- 7.6 Diagnostics and tests.
- 7.6.1 Each compensation instrument shall include resident self-diagnostic programs and associated hardware to check the operation of the instrument. Failures detected by these diagnostics shall close the alarm output contact. These diagnostics shall monitor the instrument from the input analog-to-digital converter to the output circuits.
- 7.6.2 The diagnostic routines shall check the instrument on a time cycle commensurate with reliability of the instrument. The diagnostic cycle time shall be approved by the Philadelphia Electric Company.
- 7.7.1 The instruments shall be testable to confirm the operation of the compensation instruments from the transmitter input terminals to the contact output and analog output terminals. These tests shall include applying varying 4 to 20 MA signals to the level and pressure inputs and measuring the analog output levels and contact output states. This test shall prove the operation of the instrument including analog accuracy and contact output actuations and setpoints. The water level shall be displayed while testing is in progress to determine when the output contacts actuate.
- 7.7.2 The vendor shall provide the necessary hardware to perform the test without disconnecting any permanent wiring. All test connections shall be accessible.
- 7.7.3 The vendor shall supply any special hardware and software necessary to accurately test the compensation instruments.
- 7.7.4 DELETED
- 7.8 Each compensation instrument shall check the transmitter input signals for transmitter failure. Sensed failure shall closed the alarm output contact. (See Paragraph 5.7).
- 7.9 The vendor shall supply a complete listing and description of all software necessary to understand the operation of the instrument. The listing and description shall contain sufficient detail, notations and explanations to allow other programmers to understand the software operation.
- 7.10 The software shall include provisions for on-site input of contact output setpoints to allow occasional changes in the setpoints. These on-site settings shall be retained on loss of all power to the compensation instrument.

 ELECTRICAL ENGINEERING DIVISION	SPECIFICATION FOR PEACH BOTTOM ATOMIC POWER STATION UNIT 2 AND 3 REACTOR WATER LEVEL PRESSURE COMPENSATION INSTRUMENTS	NO. EP-8453
		REV. NO. 1
		PAGE 9 OF 14

7.11 The software shall include provision for on-site input of the reactor building temperature to manually bias the level measurement for the measurement effects of seasonal changes in reactor building temperature. These on site settings shall be retained on loss of all power to the compensation instrument.

8.0 CALCULATIONS:

8.1 The vendor shall calculate the required differential pressure instrument calibrations based on the elevations provided in Attachment VIII, "Instrument Elevations" and as required by the vendors pressure compensation calculation. The level transmitters are Rosemount 1153DP and the normal environmental conditions for the instrument sensing lines are:

Reactor Building Temperature	75 Deg. F
Drywell Temperature	135 Deg. F

8.2 The vendor shall document the pressure compensation calculation used in the compensation instrument programs and include the documentation in the instruction manuals.

9.0 SERVICE CONDITIONS:

9.1 SEISMIC:

The compensation instruments shall be qualified to operate before, during and after a design bases event. The seismic accelerations are:

Required Horizontal Acceleration (OBE/UPSET):	1.1 g ZPA
Required Vertical Acceleration (OBE/UPSET):	0.74 g ZPA
Required Horizontal Acceleration (SSE/worst case)	2.64 g ZPA
Required Vertical Acceleration (SSE/worst case)	1.76 g ZPA

Qualification test/analysis shall be over a frequency range of 1 Hz. to 33 Hz. Qualification, test/analysis and documentation shall be in conformance with IEEE 344-1975.

9.2 ENVIRONMENTAL:

The equipment will be installed and operated in the plant cable spreading room. This area is a mild environment with the following



ELECTRICAL
ENGINEERING
DIVISION

SPECIFICATION FOR
PEACH BOTTOM ATOMIC POWER STATION
UNIT 2 AND 3
REACTOR WATER LEVEL
PRESSURE COMPENSATION INSTRUMENTS

NO.

EP-8653

REV. NO.

1

PAGE 10 OF 11

environmental conditions. The equipment shall be designed to operate in this environment.

	<u>Min/Max/Normal</u>	<u>Accident</u>
Temperature (Deg.F)	70/120/75	N/A
Pressure (PSIG)	-0.01/0/0	N/A
Relative Humidity (%)	10/90/50	N/A
Radiation Rads/Gamma	300 TID	N/A

Equipment environmental qualification shall be documented in accordance with IEEE 323, 1984, section 8.6.

10.0 INSPECTIONS AND TESTS:

10.1 The vendor shall at a mutually agreed time, schedule a Philadelphia Electric Company witnessed factory acceptance test and shall submit an acceptance test procedure for Philadelphia Electric Company approval at least 30 days in advance of the scheduled test date.

11.0 SHIPPING AND HANDLING:

11.1 If special precautions exist, the vendor shall provide a handling and storage procedure detailing the special precautions to be taken during handling and storage.

11.2 The vendor shall provide assembly instructions and diagrams if the equipment is shipped unassembled.

JWC/ds
EP-8653



ELECTRICAL
ENGINEERING
DIVISION

SPECIFICATION FOR
PEACH BOTTOM ATOMIC POWER STATION
UNIT 2 AND 3
REACTOR WATER LEVEL
PRESSURE COMPENSATION INSTRUMENTS

NO.	EP-8653
REV. NO.	1
PAGE	11 OF 11

ATTACHMENT INDEX PAGE
M-20677 Rev. 3/86

PHILADELPHIA ELECTRIC COMPANY
REQUIRED QUALITY ASSURANCE ATTACHMENTS

Purchase Order No.
EE 276305

Date
8-14-86

Prepared By
J. W. Cornell

The attachments listed below that have boxes marked with "x" contain requirements of this purchase order and are attached hereto.

- | | |
|--|---|
| <input checked="" type="checkbox"/> ATTACHMENT I | Quality Assurance Requirements |
| <input checked="" type="checkbox"/> ATTACHMENT II | Certificate of Conformance |
| <input checked="" type="checkbox"/> ATTACHMENT III | Data / Records Requirements |
| <input checked="" type="checkbox"/> ATTACHMENT <u>IV</u> | Vendor Deviation Request
(Exhibit 3.5-1) |
| <input checked="" type="checkbox"/> ATTACHMENT <u>V</u> | Table I, Contact Outputs |
| <input checked="" type="checkbox"/> ATTACHMENT <u>VI</u> | Table II, Analog Outputs |
| <input checked="" type="checkbox"/> ATTACHMENT <u>VII</u> | System I/O |
| <input checked="" type="checkbox"/> ATTACHMENT <u>VIII</u> | Instrument Elevations |
| <input checked="" type="checkbox"/> ATTACHMENT <u>IX</u> | EDSTD-1 Rev. 2 |

For PECO use
Prelim. Requisition # _____

PHILADELPHIA ELECTRIC COMPANY
QUALITY ASSURANCE REQUIREMENTS FOR PURCHASE
OF NUCLEAR SAFETY RELATED ITEMS

FOR PECO USE
 PRELIM. REQUISITION # _____

SUGGESTED VENDOR

P. O. NO.
 EE 276305

DATE
 8-14-86

PREPARED BY
 J. W. Cornell

Only those boxes on this page marked with an "X" are requirements of this purchase order.

- A. Replacement item(s) shall be manufactured and supplied as an identical replacement or spare to the original item(s) supplied in accordance with the technical requirements of;
 _____ Purchase Order No. _____
 with special attention given to the following sections of the original specification and revision number _____. If the item ordered is now manufactured and supplied with materials or parts different from those originally supplied under the above specifications; the supplier shall provide documentation of the change in materials and a certificate of conformance for the replacement materials or parts. If the material cannot be classified as equal to those materials originally supplied, the supplier shall notify Philadelphia Electric Company of the nonconformance in accordance with paragraph M on Page 2 of this attachment.
- B. Item(s) shall be manufactured and supplied in accordance with a quality assurance program approved for the original equipment purchased.
- C. Item(s) shall be manufactured and supplied in accordance with the specifications, codes, standards and quality assurance requirements as specified in this purchase order.
- D. Material shall conform to the description contained in manufacturer's instructions, drawings, or catalogs, for part numbers of the item(s).
- E. The FOXBORO COMPANY Quality Assurance Program / Manual Rev. No. C, dated 9/14/84 shall be applied to the item(s) and / or service(s) covered by this procurement or Purchase Order.
- F. Services shall be performed and executed under the control of the Philadelphia Electric Company Quality Assurance Program, and implementing procedures.
- G. The material covered herein, including the certificate of conformance and quality assurance documentation required must come directly from the manufacturer. All correspondence, Quality Assurance Documentation, and certificates of conformance must be marked with the Philadelphia Electric Company purchase order number to allow traceability of material.
- H. Other Special Instructions (as applicable) _____

M-20651
Rev. 12/83
Doctype 073

PHILADELPHIA ELECTRIC COMPANY

CERTIFICATE OF CONFORMANCE

For PECO use
Prelim. Requisition # _____

Station: PBAPS LGS
Unit: 1 2 3
Mod. No. 1457

We certify that the listed equipment and required documentation for same meet the requirements of the purchase order and applicable specifications:

P.O. No.: <u>EE 276305</u>	REV/DATE
SPECIFICATION: <u>EP-8653</u>	REV/DATE <u>10-10-86</u>
SUPPLIER:	
ADDRESS:	
DESCRIPTION OF EQUIPMENT:	

IDENTIFICATION:

A. PURCHASE ORDER ITEM Nos.:	
B. SUPPLIER'S EQUIPMENT/PART/SERIAL /DATE CODE/LOT Nos.: (if any)	
C. MODEL Nos.:	
D. TAG Nos.: (if any)	
PECO APPROVED NON-CONFORMANCES: (if any)	
<input type="checkbox"/> NONE	<input type="checkbox"/> Supplier to transmit to: Location shown in *Ship To* block on Purchase Order. <input checked="" type="checkbox"/> Designer in Charge Design Services Section Philadelphia Electric Co. 2301 Market Street, N3-2 Philadelphia, Pa. 19101
SIGNATURE (Supplier QA/QC Representative)	
TITLE	
DATE	

DATA / RECORD REQUIREMENTS FOR PURCHASE ORDER
 A-20679 Rev'd. 8/84

Specification or Preliminary Requisition Number EP-8653
 (PECO Use Only)

Purchase Order No. EE 276305

CODES FOR COLUMNS 1 THROUGH 4

Column 1 - Time of submittal
 F - prior to fabrication
 S - prior to shipment
 C - certified copy with shipment
 U - prior to use

Column 2 - Purpose of submittal
 A - for approval
 R - for record

Column 3 - Number of copies required
 Column 4 - Purchase order item number

DATA / RECORD REQUIREMENTS	1	2	3	4	DATA / RECORD REQUIREMENTS	1	2	3	4				
Certificate of Conformance	C	A	1	1	Certified Materials Test Reports								
QA and/or QC Program					Certificate of Compliance								
Unpriced copy of Purchase Order to Subsuppliers					Delta Ferrite Content								
Vendor Deviation Requests (as required)	F	A	1	1	Weld Filler Metal Certification								
					Radiographs								
Certification of Personnel Qualification Per:					Magnetic Particle Test Results								
Special Handling and Storage Instructions (as required)	S	R	1	1	Liquid Penetrant Test Results								
Instructions for Erection or Installation, Operation and Maintenance	S	R	1	1	Ultrasonic Test Results								
Shipping Preparation Procedures					Eddy Current Test Results								
Qualified welding procedures					Stress relief temperature charts								
Weld filler metal control procedures					Certified performance data and test reports								
Cleaning procedures					Hydrostatic Test Results								
Non-destructive examination and test procedures					Critical dimension checks								
Bending and heat treatment procedures					Impact test results								
Manufacturers QC, inspection and test procedures					Electrical test results								
Acceptance test procedures	✓	U	A	1	1	Acceptance test results	✓	C	A	1	1		
Environmental Qualification Test Procedures	✓	C	A	3	1	Environmental Qualification Test Reports	✓	C	A	3	1		
Seismic Qualification Test Procedures	✓	C	A	3	1	Seismic Qualification Test Reports	✓	C	A	3	1		
Shop Detail Drawings					Material Certifications - chemical and mechanical properties								
Outline dimensions and foundation requirements	✓	C	A	6	1	Code certificates, inspection and test reports							
Wiring Diagrams		C	A	6	1	Certified Analysis of Marking Materials & Tapes for use of Stainless Steel							
Control Logic Diagrams													
Cross Section with parts list					Cure Date								
Instruction manuals		C	A	12	1	Repair Reports							
List of recommended spare parts		S	R	12	1	Estimated Shelf life							
					PARA. 8.1 & 8.2 Calculations					SS	A	3	1

VENDOR: Documentation shall be identifiable to PECO Purchase Order including date and item number on Purchase Order.
 All documentation shall be legible and reproducible.

VENDOR DEVIATION REQUEST (VDR)

HL-20676 REV. 8/83

FOR PECO USE

PRELIM. REQUISITION

FOR VENDOR USE

VDR NO.

DATE SUBMITTED

NOTE: THE REVERSE SIDE OF THIS FORM CONTAINS THE INSTRUCTIONS FOR ITS PREPARATION AND USE. ITEMS MARKED WITH AN ASTERISK (*) ARE FOR PECO ENTRIES ONLY.

VDR NO.

*DATE RECEIVED

1. VENDOR

NAME: _____ ADDRESS _____ CITY & STATE _____ ZIP _____

2. VENDOR ORDER No.

3. VENDOR'S PART No.

4. VENDOR'S PART NAME

5. DATE DEVIATION DETERMINED

6. PREVIOUS VDR (No. & DATE)

7. PECO P.O. No.

EE 276305

8. PECO PART No.

9. PECO PART NAME

10. PECO INSPECTOR NOTIFIED

11. PECO ENG. NOTIFIED

12. QTY. OR SER. No.

13. DEVIATION DESCRIPTION (ATTACH EXTRA SHEETS, PHOTOGRAPHS, SKETCHES, ETC. AS NECESSARY)

14. VENDOR'S PROPOSED DISPOSITION CLASSIFICATION:

ACCEPT AS IS

REPAIR

MODIFY REQUIREMENT

15. PROPOSED DISPOSITION AND TECHNICAL JUSTIFICATION:

16. ASSOCIATED VENDOR DOCUMENT CHANGE (S):

17. COST EFFECT

18. VENDOR AUTHORIZED REPRESENTATIVE

SIGNATURE: _____ TITLE: _____

NAME: _____ DATE: _____

*19. PECO ENGINEERING ACTION:

ENGINEERING FOLLOW-UP:

DRAWING CHANGE OTHER

SPECIFICATION/REQUIREMENT CHANGE

ACCEPTED REJECTED REJECTED-RESUBMIT

DISCIPLINE OR SUPPLIERS AFFECTED

*20. PECO DISPOSITION STATEMENT INCLUDING JUSTIFICATION (ATTACH EXTRA SHEETS, SKETCHES, ETC. AS NECESSARY)

*21. PECO ENGINEERING APPROVAL

DATE

VERIFICATION SIGNATURE

DATE

RESP. ENG. _____

BR. HD. _____

E.I.C. _____

22. VENDOR _____

*23. PECO INSP. _____

Table I
Contact Outputs

<u>Contact No.</u>	<u>Class</u>	<u>Function (Channel)</u>	<u>Normal Contact</u>	<u>Trip Contact</u>	<u>Process Action</u>	<u>Technical Specification</u>
1	1E	RCIC trip (A & B)	OPEN	CLOSE	INCREASE	+ 45 IN.
1	1E	HPCI trip (C & D)	OPEN	CLOSE	INCREASE	+ 45 IN.
2	1E	HPCI initiate	OPEN	CLOSE	DECREASE	- 48 IN.
3	1E	RCIC initiate	OPEN	CLOSE	DECREASE	- 48 IN.
4	1E	RHR/CORE SPRAY initiate	OPEN	CLOSE	DECREASE	-160 IN.
5	1E	ADS initiate	OPEN	CLOSE	DECREASE	- 48 IN.
6	1E	RHR VALVE permit (A & B)	CLOSED	OPEN	INCREASE	-226 IN.
6	1E	spare (C & D)				
7	1E	RHR/CORE SPRAY valve permit	OPEN	CLOSE	DECREASE	+450 PSIG
8	1E	close RECIRC. VALVE permit	OPEN	CLOSE	DECREASE	+225 PSIG
9	1E	ADS Bypass timer (A & C)	OPEN	CLOSE	DECREASE	-160 PSIG
9	1E	spare (B & D)				
10	1E	spare				
11	1E	spare				
12	1E	spare				
13	1E	spare				
14	1E	spare				
15	1E	spare				
16	1E	spare				
17	non-1E	ARI* & recirc. pump trip			INCREASE	+1107 PSIG
18	non-1E	ARI* & recirc. pump trip			DECREASE	- 48 IN.
19	non-1E	Alarm			--	--
20	non-1E	Alarm			--	--

* ARI = alternate rod insertion

Table II
Analog Outputs

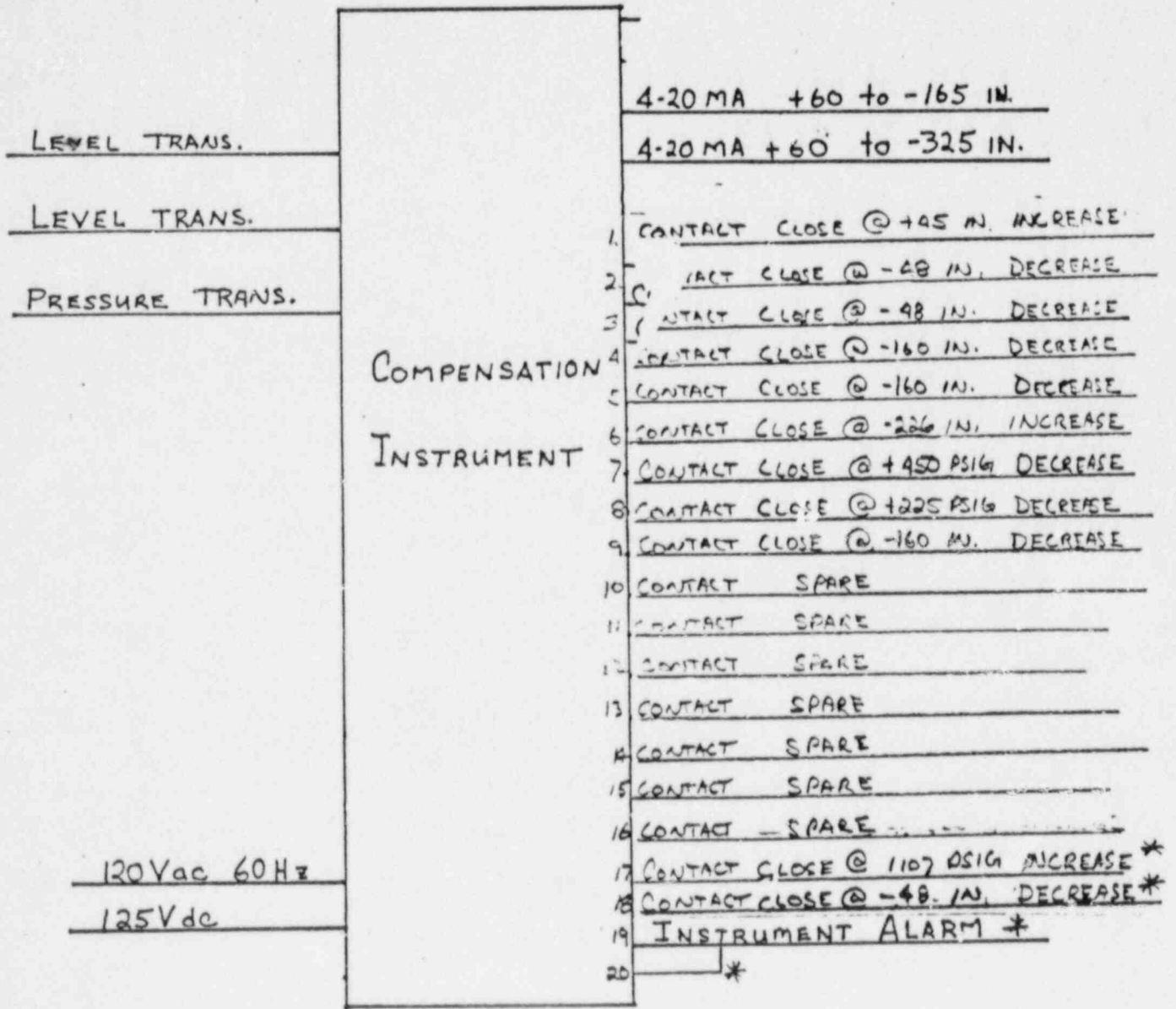
Output	Signal	Scale
1	4-20 MA	+60 to -165 in.
2	4-20 MA	+60 to -325 in.



SYSTEM I/O

INPUTS

OUTPUTS

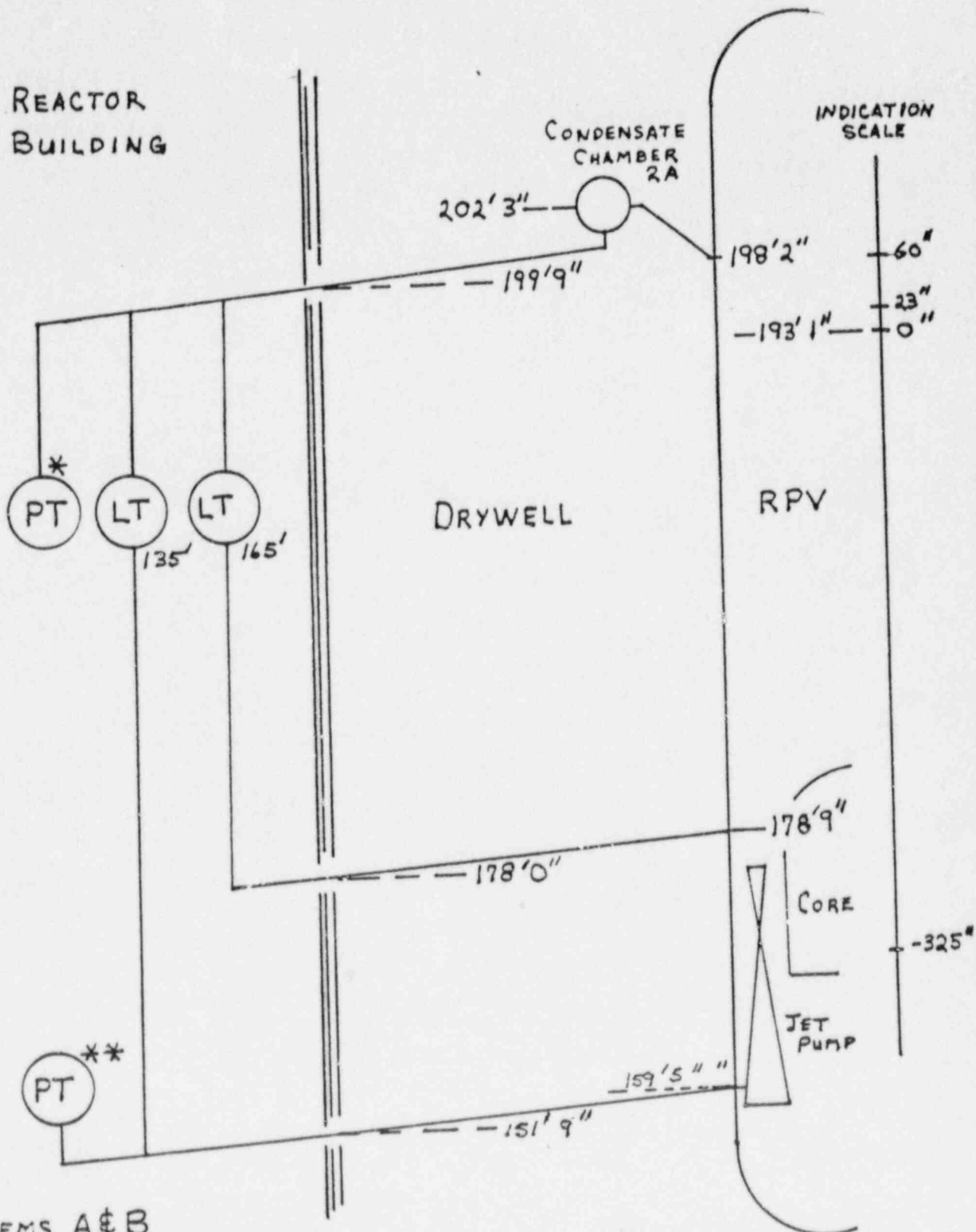


* NON-CLASS 1E

ATTACHMENT VII

REV. 10/10/86
 7/31/86
 4/2/87
 JWC

MEASUREMENT ELEVATIONS



* SYSTEMS A & B
 ** SYSTEMS C & D

ATTACHMENT VIII

REV. 10/10/86
 7/31/86
 JWC

Standard Specification For
Drawings Furnished By Vendors To
Philadelphia Electric Company



ENGINEERING
DESIGN DIV.

Standard Specification For
Drawings Furnished by Vendors To
Philadelphia Electric Company

NO. EDSTD-1

REV. NO. 2

PAGE 1 OF 5

REV. NO.	DATE		PREPARED BY SIGNATURE DATE	APPROVED BY DESIGNERS-IN-CHARGE		APPROVED BY CHIEF DESIGN ENGINEER		REMARKS
	ISSUED	PLACE IN EFFECT		SIGNATURE	DATE	SIGNATURE	DATE	
0	5/7/80	5/7/80	R. King 4/7/80	J. L. H. ... 4/1/80 R. J. ... 4/2/80 J. F. ... 4/2/80	J. W. ... 5/20/80			
1	7/11/80	7/11/80	E. King 7/11/80	J. L. H. ... 7/11/80 R. J. ... 7/14/80 J. F. ... 7/15/80	J. W. ... 7/15/80		Minor editorial change. Changed wording in par. 3.3	
2	3/25/82	3/25/82	E. P. ... 3/25/82	R. D. ... 3/25/82 J. F. ... 3/25/82 J. L. ... 4/2/82	J. W. ... 3/24/82		Added: Par. 2.5 & 5.2 Changed wording in par. 4.1.1.4 & 4.2.3.4	



Standard Specification For
Drawings Furnished By Vendors To
Philadelphia Electric Company

NO. EDSTD-1
REV. NO. 2
PAGE 2 OF 5

1.0

SCOPE

Vendor shall furnish for Power Company approval and record, all drawings and diagrams, certified to be correct, which are necessary for installation, operation, maintenance (including trouble-shooting and testing), and modification as required. All requirements of this standard specification shall be met unless specifically waived by Power Company in a purchase order, specification or other document.

2.0

CONDITIONS

2.1

This specification of drawing and diagram requirements is to be fulfilled before rendering final invoices. Failure of vendor to comply with drawing and diagram requirements may result in order cancellation in the case of initial drawings and diagrams, or final payment being withheld in the case of final drawings and diagrams.

2.2

This specification applies with equal force to all drawings and diagrams furnished by sub contractors and vendors supplying equipment to the Vendor.

2.3

As it deems necessary, the Power Company may send representatives to the office of the vendor, his sub-contractors, and vendors to examine drawings and diagrams during the design and drafting phase to insure conformance with this specification.

2.4

Power Company shall be allowed two weeks for return of approval drawings and diagrams, and any additional time required by Power Company may be added to the time from notification of award required by Vendor for delivery of the equipment.

2.5

Power Company shall have the option of obtaining from the vendor, via a separate request for quotation, computerized program formats and magnetic tapes used in the generation of his drawings and diagrams.

2.6

Any exceptions taken to this standard specification shall be clearly stated in the vendor's proposal and accepted by Power Company in writing.

2.7

Upon final submittal or at the time of records turnover, all drawings and diagrams shall become the property of the Power Company.

3.0


DRAWING QUALITY

3.1

All drawings and diagrams shall be in accordance with the latest applicable sections of the American National Standard (formerly USA Standard) Drafting Manual, ANSI-Y14, and paragraphs 3.2, 3.3 and 3.4 below except as specifically waived by the Power Company.

3.2

All delineations and lettering shall be such that when the drawings and diagrams are photographed for filing on 35mm film, in accordance with current Department of Defense (D.O.D.) specifications MIL-M-9868, completely legible prints with an enlargement of 15 times can be readily produced from the 35mm film.

 <p>ENGINEERING DESIGN DIV.</p>	<p>Standard Specification For Drawings Furnished by Vendors To Philadelphia Electric Company</p>	NO. EDSTD-1
		REV. NO. 2
		PAGE 3 OF 5

- 3.3 In order to insure compliance with the requirements specified in Section 3.2, it is recommended that the minimum size of letters and figures should be one-eighth inch high and not more than ten letters or figures to the inch. It is further recommended that the minimum spacing between lines of letters of figures shall be one sixteenth inch. Upper case lettering is required, except where distinction is needed for letter symbol for units, such as mW for milliwatt and MW for megawatt.
- 3.4 Each drawing and diagram shall show, adjacent to title block, the Power Company equipment title, manufacturers' serial number, Power Company purchase order number and any other unique information that would assist in location or re-ordering of equipment or parts.

4.0 DRAWING SUBMITTALS

- 4.1 Initial drawings for comment or approval.
- 4.1.1 Submit only one of the following:
- 4.1.1.1 Ten full size black line prints of each drawing, or
- 4.1.1.2 A full size sepia reproducible from which completely legible contact prints can be readily produced by commercially available means, or
- 4.1.1.3 A 35mm microfilm copy mounted on an aperture card from which completely legible prints with an enlargement ratio of 15:1 can be made, or
- 4.1.1.4 For original drawings that measure 8½" X 11", a completely legible Xerox or equivalent black-on-white copy.
- 4.2 Final drawings (including drawings for record purposes for which approval is not required.)
- 4.2.1 Final drawings shall be submitted in a rolled form. Folded drawings will not be acceptable.
- 4.2.2 The final drawing(s) and its transmittal letter shall explicitly state that the drawing(s) are final, as built, certified by the supplier to be correct, and suitable for microfilming by the Power Company in accordance with paragraph 3.2.
- 4.2.3 Submit only one of the following:
- 4.2.3.1 The original Mylar (if available at no additional cost), or
- 4.2.3.2 The original Vellum (if available at no additional cost), or
- 4.2.3.3 A full size black-on-white vellum (translucent paper) reproducible made from the original drawing furnished as part of the contract, or
- 4.2.3.4 For original drawings that measure 8½" X 11", a completely legible Xerox or equivalent black-on-white copy with Power Company approval and with the exception of wiring diagrams and panel arrangements which must be submitted as per paragraph 4.2.3.1 through 4.2.3.3



ENGINEERING
DESIGN DIV.

Standard Specification For
Drawings Furnished by Vendors To
Philadelphia Electric Company

NO. EDSTD-1

REV. NO. 2

PAGE 4 OF 5