

PROCEDURE FOR
VERIFICATION OF INDIAN POINT #2
CONTROL ROOM AND SIMULATOR PHYSICAL FIDELITY
AND EVALUATION OF DIFFERENCES FOR IMPACT ON TRAINING

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VERIFICATION OF INDIAN POINT #2
CONTROL ROOM AND SIMULATOR PHYSICAL FIDELITY
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1. PURPOSE

The purpose of this procedure is to describe the process and controls that will be used to identify current "As-Built" status of the Indian Point Control Room and the differences in the facility and equipment of the Control Room and Simulator and evaluate the impact of those differences on training.

2. SCOPE

This verification procedure applies to all of the physical attributes and characteristics of both Control Room (CR) and Simulator Control Room (SCR). This shall include the rooms, and their contents and the details of each. The verification effort will be continued to the area depicted in Figure 1.

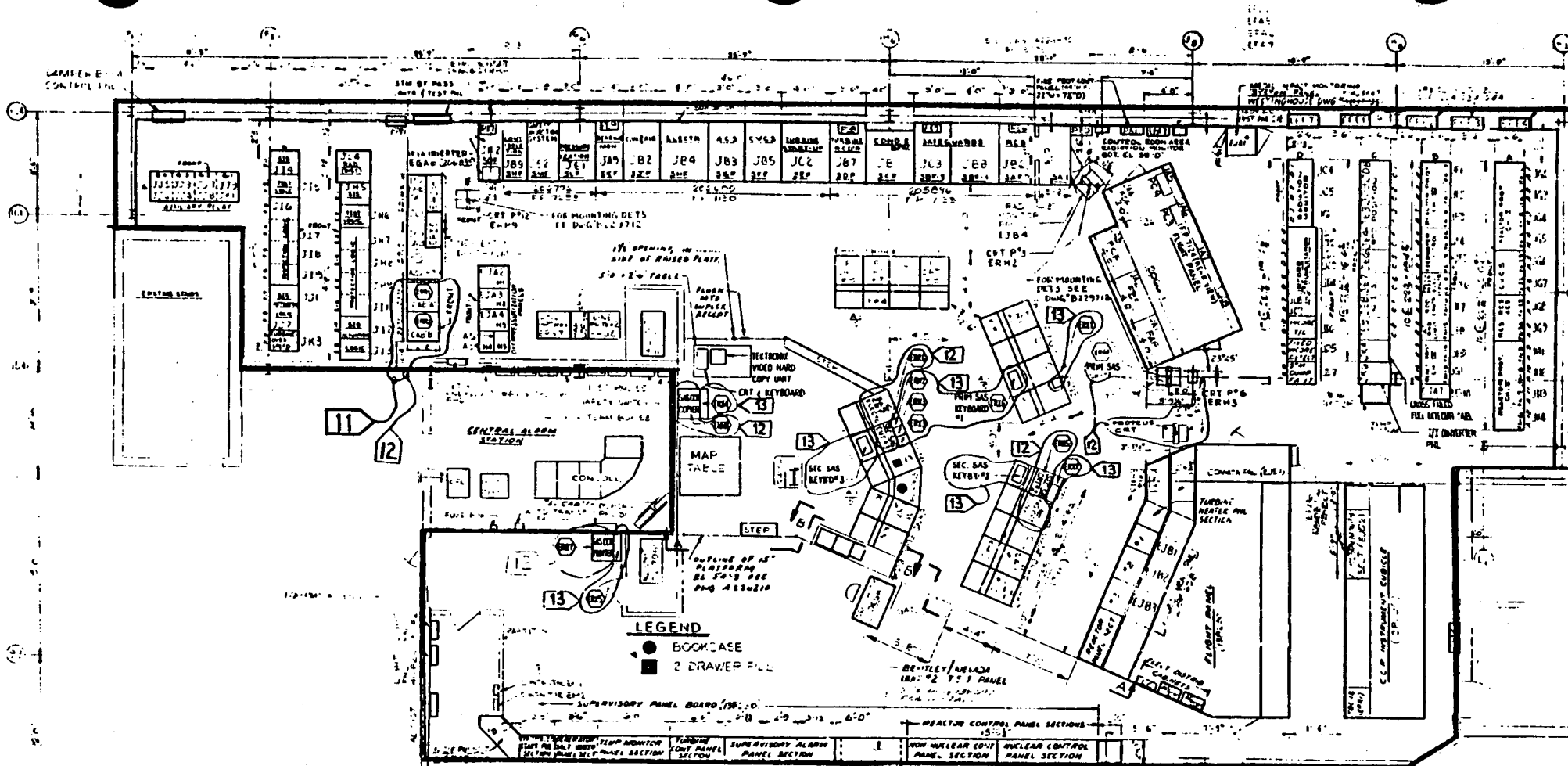
3. PROCEDURE

3.1 General

The procedure describes how the "As-Built" state of the CR will be inspected and documented the use of that baseline information to inspect the SCR and identify and document differences and the evaluation of the difference for training impact. The basic tenant is that the Control Room configuration is the baseline for any comparison.

3.2 Preparation

- a. The inspector shall gather together information which describes in detail the current configuration of the CR and SCR. This information shall include Control Room and Simulator drawings, panel drawings, instrument drawings, nameplate drawings and color photographs, color videotapes, etc. One set or copy shall be clean and a second shall be marked up for record purposes. On a specially created data sheet for reference documents (Appendix A) list the name, number, and dates of all documents used to perform the reviews and inspections. Individual photographs should be coded and listed with the date that photos were taken and a brief description of their content.



Not Included are:

- o Security Monitoring Room
- o Watch Supervisor's Office
- o Kitchen
- o Bath & Locker Rooms
- o Area behind the Unit 1 Supervisory Panels

EVALUATION BOUNDARY
From Drawing A209812-13

FIGURE 1

VERIFICATION OF INDIAN POINT #2
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- b. Either color photographs or videotapes shall be taken of the CR and SCR. They shall be taken in such a manner as to make a one for one detailed comparison of each facility. As they are made available for the CR and SCR they shall be compared and differences identified on data sheets. These data sheets shall note such detailed attributes and characteristic difference as:

Dimensions
Color
Location
Like Device
Label Nomenclature
Units of Measure
Scale Range
Mimic/Demarcations
Size

3.3 Inspection

3.3.1 General

The Control Room configuration state shall be the baseline for the final state of the Simulator. The focus here should be to develop an up-to-date set of drawings of the Control Room that may then be used to inspect the Simulator. Using as a baseline the marked up drawings of the CR, an inspection of first the CR and then the SCR, shall be conducted. These inspections shall be done systematically and shall be done first by attribute and then characteristic. This step is to identify and document differences between the Control Room and the Simulator in the location, device type, or labeling of displays, controls, and other equipment in the Control Room and Simulator. The procedure applies to all items in the SCR except the instructor console. As differences are identified which require that the drawing be marked up, the differences are to be circled, coded, initialed and dated and recorded on the appropriate data sheets.

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3.3.2 Facility Inspection

Using the latest CR drawings, an inspection shall be made of the Control Room. Determine if items of furniture similar to the following are present and shown correctly on the CR drawings. Record differences on the drawings.

- a. Panel presence, location
- b. Communications equipment
- c. Desks
- d. Desk-top or free-standing display/control units including CRTs
- e. Process computer controls
- f. Process computer printers
- g. SPDS consoles
- h. Lockers or racks for drawings or procedures
- i. Key locker or rack
- j. Emergency lighting units
- k. Room dimensions (+/- 6") and shape when appropriate

If additional furniture is present, it should be indicated on the drawing and given an identity code. The description of the differences should be recorded on a separate data sheet.

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3.3.3 Panel Configuration Inspection

Using the marked up set of CR reference drawings, each panel in the CR shall be inspected. At this point details may be observed which previously were not discernible or defined on drawings, photographs, or videotapes. Each component (control or display including status lights and annunciators) shall be inspected for the following:

- a. Presence
- b. Location
- c. Same kind of devices
- d. Units of measure sameness
- e. Scale range sameness
- f. Labels identical
- g. Other markings identical
- h. Dimensions (+/- 1/8" when appropriate)

For each panel, compare the mimic and demarcation lines. If the lines are not identical, obtain a copy of the control room drawing of the affected panel, and add any lines that appear and/or hatch out () any lines that do not appear in the Control Room. Note that there are differences on the reference drawings and identify the type differences on the data sheet (Appendix E).

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3.3.4 Simulator Configuration Inspection

Finally, using the set of marked up CR drawings for the facility and panels inspect the Simulator. Identify differences, note and code them on the drawing. Then enter into the data sheet (Appendix F) for the coded item the description of the differences. For each component (control or display, including status lights and annunciators) on the marked up Control Room drawing, locate the corresponding component in the simulator and fill out the data sheet per the instructions in Appendix F.

3.3.5 CRT Display comparison

If the Control Room incorporates one or more CRT displays, the units should be identified as to location, labeling, etc, as was done with other displays. In addition, the similarity of the display to the corresponding display in the Control Room should be verified as described in Appendix G.

3.3.6 Inspection Process Validation

When the verification effort is extensive, it is appropriate to apply Quality Controls to confirm the validity of the results. This should be done using a new set of drawings and the inspection process described in Section 3.2.1 through 3.2.5 repeated as follows:

- o Facility - A spot check of at least 10 items
- o CR Panels - Three separate panels shall be checked, e.g., supervisory, flight, Foxboro
- o Simulator - A comparison against the CR Facility spot check and the three CR panels checked.

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3.3.6 Continued

If two errors are discovered in any one attribute or characteristic a second like sample shall be taken. If one error occurs at this second inspection then that attribute or characteristic shall be completely reinspected.

3.4 Evaluation of Simulator/Control Room Differences

Once differences have been identified, they should be evaluated for their potential impact on training. This review should be conducted by the Training Department and Simulator Staff with support from Operations and Engineering as deemed necessary. Based on the results of the evaluation a Corrective Action Service Request (CASR) or Deficiency Report (DR) will be initiated.

- 3.4.1 Each discrepancy shall be reviewed and a determination made as to whether it has training impact. If there is doubt it shall be so indicated. Once completed, the results of the review should be published to NP Training, Simulator Staff, NPG-Operations and Engineering for comment. It may be necessary to conduct a formal review for those items in doubt.

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3.4.3 Based on the above evaluation, Training must decide whether corrective action is desirable.

- a. If no action is required, enter "No Action" below the assessed impact on the data sheet with a short statement of the reason.
- b. If corrective action is judged necessary, a CSAR should be issued. It may be judged that compensatory action should also be taken, this shall be noted on Data Sheet.

3.5 Reports

3.5.1 Each time an inspection is performed, the data is to be added to the appropriate data sheet. When the data sheet is completed, it shall be signed and dated by the person performing the inspection and completing the data sheet. If less than the entire data sheet is used, it shall be processed as above. Only the unused lines shall be stricken through.

3.5.2 A file shall be set up to collect all information used to perform the inspections and all completed data sheets.

3.5.3 As the inspection program progresses interim reports of findings will be issued to the Program Manager, the Manager NPQA and others as needed. A final report shall be issued documenting the inspection results and the data validation results.

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3.5.4 The results of the evaluation shall be documented and a file set up to capture them as records.

3.6 If drawings are found incorrect when compared to the field condition, then those differences shall be reported to Engineering and tracked with an OIR.

4.0 RESPONSIBILITIES

Program Manager-Simulator

- o Approval of this procedure
- o The implementation of this procedure

Project QA Manager

- o Maintaining this procedure
- o Coordinating or accomplishing the implementation of this procedure
- o Validation of the inspection process
- o Drafting interim and final reports

NP Training Department

- o Evaluation of differences for impact on training

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5.0 REFERENCES

1. ANSI/ANS 3.5 - 1985 - "American National Standard Nuclear Power Plant Simulators for Use in Operation Training"
2. INPO 86-026 - "Guideline for Simulator Training"
3. EPRI RP2-054-2 - "Simulator Qualification Plan" Draft Report - November 1985

6.0 APPENDICES

- A. Reference Data Cataloging
- B. Drawing Comparison
- C. Photograph or Videotape Comparison
- D. Facility Inspection
- E. Panel Configuration Inspection
- F. Simulator Configuration Inspection
- G. CRT Display Comparison
- H. Evaluation of Simulator/Control Room Differences

REFERENCE DATA CATALOGING

The data sheets included herein are to be used to develop and document the reference document base which will be used in the Control Room and Simulator inspections. It is extremely important that this information be cataloged and defined as it will become the basis for the validity of the inspections.

The attached data sheets are samples of those which shall be used in the actual process. As sheets are created they shall be recorded in the Master Index (Appendix H).

The coding of the Drawings, Specifications and Photographs shall be as follows:

D/ = Drawings

S/ = Specifications

P/ = Photographs

D R A W I N G S U S E D

[illegible]

VERIFICATION OF
CONTROL ROOM AND SIMULATOR FIDELITY
REFERENCE SPECIFICATIONS USED

[illegible]

P H O T O S U S E D

[illegible]

VIDEOTAPES USED

[illegible]

PHOTOGRAPH OR VIDEOTAPE COMPARISON

Code the photographs or videotapes of the Control Room or the Simulator as follows:

The prefix: P/C Control Room
 P/S Simulator
 V/C Control Room
 V/S Simulator

The suffix: AA, AB through ZY, ZZ

Compare the photographs of the Simulator to the Control Room (CR). If differences are found, mark them on the CR set of photos and also mark up the CR drawings and record the differences on the drawing data sheet from Appendix B.

P H O T O G R A P H C O M P A R I S O N
D A T A S H E E T

APPENDIX C

PAGE ____ OF ____

CONTROL ROOM: REFERENCE DOCUMENT NO.	COMPONENT DESCRIPTION	PANEL	CODE	DESCRIPTION OF DIFFERENCE	ENTERED BY	DATE
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FACILITY INSPECTION

Using the Facility Inspection set of marked up CR drawings for the facility, inspect the Control Room. Identify differences, note and code them on the drawing. Then enter into the data sheet for the coded item the description of the differences for each component (control or display, including status lights and annunciators in the Control Room) and answer the following questions:

- a. Is an analogous component present? If not, enter the component name and number in the "Component" column of the data sheet and enter "Absent" in the "Cat" column.
- b. Is the component in an analogous location? If not, record the component name and number and enter "LOC" in the "Cat" column, and a brief description of the difference in the "Description of Difference" column. In these descriptions the initial phrase should always describe the location in the Control Room.
- c. Is the component the same kind of item? If not, enter "Device" in the "Cat" column, and a brief description of the difference in the "Description" column.
- d. For any components that appear in the Control Room that do not appear in the Control Room drawings, enter "Extra" in the "Cat" column.
- e. For each component for which the answer to all of the above questions is "yes", place a check mark next to the component on the data sheet to document that it has been reviewed, and proceed to the next component.

FACILITY INSPECTION DATA SHEET

APPENDIX D

PAGE ____ OF ____

CONTROL ROOM: REFERENCE DOCUMENT NO.	COMPONENT DESCRIPTION	PANEL	CODE	DESCRIPTION OF DIFFERENCE	ENTERED BY	DATE
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PANEL CONFIGURATION INSPECTION

Using a set of marked up CR drawings for the facility, inspect the Control Room. Identify differences, note and code them on the drawing. Then enter into the data sheet for the coded item the description of the difference for each component (control or display, including status lights and annunciators in the Control Room) and answer the following questions:

- a. Is this component present on the board? If not, enter the component name and number in the "Component" column of the data sheet and enter "Absent" in the "Cat" column.
- b. Is the component in an analogous location? If not, record the component name and number and enter "LOC" in the "Cat" column, and a brief description of the difference in the "Description of Difference" column. In these descriptions the initial phrase should always describe the location in the Control Room.
- c. Is the component the same kind of device? If not, enter "Device" in the "Cat" column, and a brief description of the difference in the "Description" column.
- d. For instruments, do the Control Room components display the same quantities as shown on the drawings? (e.g., GPM, LB/HR)? If not, enter "Units" in the "CAT" column, and an appropriate description.
- e. For instruments, are the scales in the Control Room components have similar range to those on the drawing? If not, enter "SCALE" in the "Cat" column and record the difference in the "Description" column (e.g., "100-250 gpm vice 0-200 GPM").
- f. For all components including annunciator tiles and status lights, are the labels identical to those in the Control Room drawings? If not, enter "Label" in the "Cat" column and a verbatim description of the two labels in the "Description" column.

PANEL CONFIGURATION INSPECTION (Continued)

- g. For all components, are other markings such as limit marks, or color-coded operating bands, identical? If not enter "Marking" in the "Cat" column and a description of the difference (e.g., "limit marks at 75 and 150 vice no markings").
- h. For any components on the drawings that do not appear in the Control Room, enter "Extra" in the "Cat" column.
- i. For each component for which the answer to all of the above questions is "yes", place a checkmark next to the component on the data sheet to document that it has been reviewed, and proceed to the next component.

PAGE _____ OF _____

PANEL CONFIGURATION DATA SHEET

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SIMULATOR CONFIGURATION INSPECTION

Using all of data collected in Appendix B through E, complete one set of final marked up Control Room drawings. Using this final set of marked up CR drawings for the facility and panels, inspect the Simulator. Identify differences, note and code them on the drawing. Then enter into the data sheet for the coded item the description of the differences. For each component (control or display, including status lights and annunciators) in the Control Room, locate the corresponding component in the Simulator and answer the following questions:

- a. Is the facility physically the same as the CR?
- b. Are the panels and other furniture present?
- c. Is an analogous component present on the Simulator board? If not, enter the component name and number in the "Component" column of the data sheet and enter "Absent" in the "Cat" column.
- d. Is the component in an analogous location on the Simulator panel? If not, record the component name and number and enter "LOC" in the "Cat" column, and a brief description of the difference in the "Description of Difference" column (e.g., "second meter in middle row vice second meter in top row"). In these descriptions the initial phrase should always describe the location in the Control Room, and the "vice" phrase the location in the Simulator.
- e. Is the Simulator component the same kind of device as the Control Room component? If not, enter "Device" in the "Cat" column, and a brief description of the difference in the "Description" column (e.g., "keylock vice J-handle switch"; "GEMAC vice Foxboro controller").

SIMULATOR CONFIGURATION INSPECTION (Continued)

- f. For instruments, do the Simulator and Control Room components display the same quantities (e.g., GPM, LB/HR? If not, enter "Units" in the "Cat" column, and an appropriate description.
- g. For instruments, do the scales of Simulator and Control Room components have similar range? If not, enter "SCALE" in the "Cat" column and record the difference in the "Description" column (e.g., "100-250 gpm vice 0-200 gpm").
- h. For all components, including annunciator tiles and status lights, are the labels in the Simulator identical to those in the Control Room? If not, enter "Label" in the "Cat" column and a verbatim description of the two labels in the "Description" column.
- i. For all components, are other markings, such as limit marks, or color-coded operating bands, identical? If not, enter "Marking" in the "Cat" column and a description of the difference (e.g., "limit marks at 75 and 150 vice no markings").
- j. For any components on the Simulator panels that do not appear in the Control Room, enter "Extra" in the "Cat" column.
- k. For each component for which the answer to all of the above questions is "yes", place a check mark next to the component on the data sheet to document that it has been reviewed, and proceed to the next component.

SIMULATOR CONFIGURATION DATA SHEET

APPENDIX F

PAGE ____ OF ____

CONTROL ROOM REFERENCE DOCUMENT NO.	COMPONENT DESCRIPTION	PANEL	CODE	DESCRIPTION OF DIFFERENCE	ENTERED BY	DATE
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CRT DISPLAY COMPARISON

If the Control Room incorporates one or more CRT displays, the units should be identified as to location, labeling, etc., as was done with other displays. In addition, the similarity of the display to the corresponding display in the Control Room should be verified by answering the following questions:

- a. Is the same information presented?
- b. Is the information formatted in the same way (e.g., digital readouts, bar charts, trend plots)?
- c. Is the information presented in the same location on the screen?
- d. (For color CRTs only) Are the colors of corresponding display elements the same?

If the answer to any of the above questions is no, enter the component name and number of the CRT unit in the "Component" column of Form A-3.1., "DSP" in the "Cat" column, and a description of the differences noted in the "Description of Difference" column.

If the CRT unit is capable of producing a variety of displays on demand, each display should be evaluated. Displays which are available in the Control Room but not in the Simulator, should be listed in the "Description of Difference" column of the data sheet.

Controls for interacting with the CRT (changing displays, entering data, etc.) should be evaluated for location, labeling, etc., as would any other controls in the Simulator. In addition, the way in which the controls work should be checked to determine if it is the same as in the Control Room (e.g., sequences of control actions required to change displays, character strings input as commands or for data identification, etc.), and any differences recorded on the data sheet.

C R T D I S P L A Y C O N F I G U R A T I O N
D A T A S H E E T

CONTROL ROOM: REFERENCE DOCUMENT NO.	COMPONENT DESCRIPTION	PANEL	CODE	DESCRIPTION OF DIFFERENCE	ENTERED BY	DATE
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EVALUATION OF
TRAINING IMPACT OF SIMULATOR/CONTROL ROOM DIFFERENCES

Table 1 on the next page presents the potential training impact of Simulator/Control Room differences recorded for each type of component. The table describes possible training impact. If there is significant impact, then transfer of training from the Simulator to on-the-job performance in the Control Room may be required.

These ratings are based on the assumption that the Simulator training has been the primary source of familiarization and practice using the component.

Table 2 presents other considerations to be used when determining the training impact.

DIFFERENCES	ITEMS (TYPICAL)	CABINETS	DESKS	ANNUNCIATORS	METERS	RECORDERS	STATUS LIGHTS	SWITCHES	CONTROLLERS	MIMICS/ DEMARICATION LINES
1.	Absent in Simulator	N	N	L	L	L	L	L	L	N
2.	Location Different									
	a. Different panel/sub panel*	-	-	L	L	L	L	L	L	-
	b. Different local group	-	-	P	P	P	P	P	P	-
	c. Transposition w/similar	-	-	N	L	L	L	L	L	-
3.	Device Different									
	a. Same operation, diff. scale	-	-	N	N	N	N	N	N	-
	b. Different operation	-	-	-	-	-	-	P	L	-
4.	Units									
	a. Different quantities	P	P	-	L	L	-	-	L	-
	b. Progression of markings	-	-	-	N	N	-	-	N	-
5.	Scale									
	a. Different scaling (linear vs log)	-	-	-	P	P	-	-	P	-
	b. Range not cover values**	-	-	-	L	L	-	-	L	-
	c. Range covers values	-	-	-	N	N	-	-	N	-
6.	Labels									
	a. ID numbers wrong	-	-	L	L	L	L	L	L	-
	b. Inconsistent, confusing	-	-	L	L	L	L	L	L	-
	c. Inconsistent, not confusing	-	-	N	N	N	N	N	N	-
	d. Location vis-a-vis component	-	-	-	N	N	P	P	N	P
7.	Markings (limit marks, demarkations)									
	a. Absent	-	-	-	N	N	-	N	N	N
	b. Extra	-	-	-	N	N	-	N	N	P
	c. Incorrect	-	-	-	L	L	-	L	L	L

* Sub Panel = Annunciator or status light panel, or area set off by color coding or demarcation lines

** Values anticipated are outside the range of the instrument in the Simulator, but not in the Control Room instrumentation.

L = Significant

P = Possibly Significant

N = Not Significant

I M P A C T E V A L U A T I O N

T A B L E 2

APPENDIX H
PAGE 3 OF 4

USED IN PROCEDURES FOR:

NORMAL OPERATION

START UP

EMERGENCY

FREQUENCY OF USE IN OPERATIONS:

EVERY DAY

WEEKLY

QUARTERLY

SEMI-ANNUALLY

ANNUALLY

INCLUSION IN SCENARIOS:

1 SCENARIOS

2-3 SCENARIOS

3 OR MORE SCENARIOS

PORTION OF SCENARIOS:

MAJOR

MINOR

ERROR IMPACT:

EQUIPMENT UNAVAILABLE FOR TRAINING

REGULATORY VIOLATION

PLANT TRIP

SAFETY JEOPARDIZED

EQUIPMENT DAMAGE

APPENDIX H
PAGE ____ OF ____

EVALUATED BY _____

REVIEWED BY _____

ATTACHMENT E2-C

**Figures 1-1 & 1-2 (Hardware Scope)
from
Specification for the IP2 Replacement Simulator**

**Figure 1-1
Control Room Layout Comparison
of
Existing to New Simulator**

**Figure 1-2
New Simulator
Control Room Layout
Scope of Simulation**

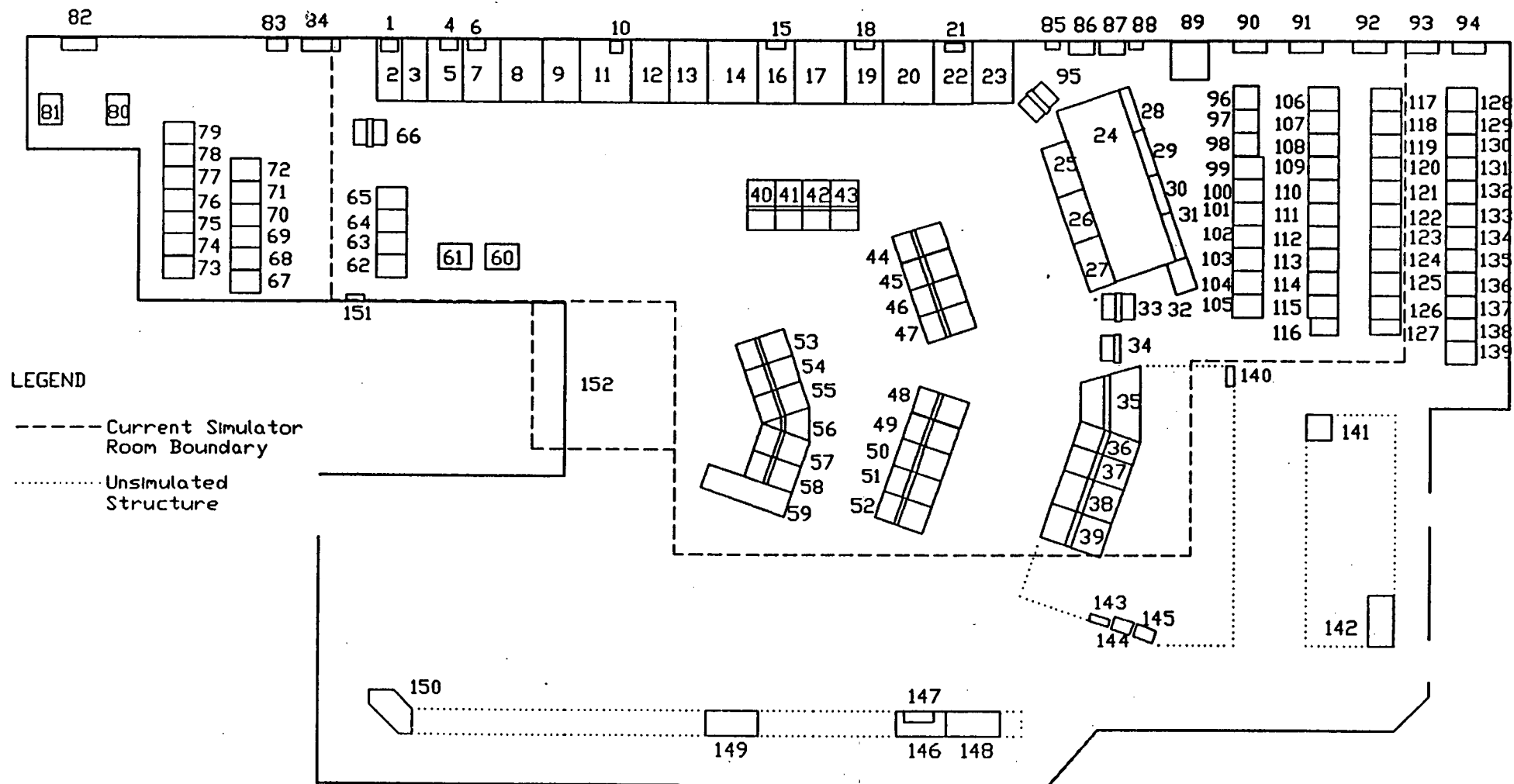


Fig. 1-1 Indian Point Unit 2 Simulated Control Room Layout

FIGURE 1-2

CONTROL ROOM LAYOUT - SCOPE OF SIMULATION

As stated previously in Section 1, all panels, components, benchboards, consoles, cabinets, etc, identified herein shall be fully simulated both physically and functionally, and interfaced with accurate simulation modeling. Unless the layout drawing (figure 1-1) has indicated "unsimulated structure" or the below listed items have indicated some limit to the scope of physical simulation, all items listed below shall be fully functionally simulated (floor to ceiling, front, rear and sides; and where licensed operators open covers, cabinet doors, panel covers or access plates to perform observations or operations, this access and those components within shall be fully functionally simulated. Sellers are encouraged to provide a more refined panel by panel scope in their Proposal.

As an explanation of figure 1-1 several points must be made. The dark solid line boundary is the actual plant control room boundary as defined in plant drawing A209812-15. The dotted line in the figure is the current simulator room boundary. The "unsimulated structure" identified in the figure is not intended to be within the scope of this Upgrade. In the cases of items 140, 143, 144, and 145, they are currently mounted on structure which will not be simulated. The location and mounting of these four items by the Seller will be provided by Con Edison prior to Design Data Freeze. The items which are numbered on figure 1-1 are all within the scope of this Upgrade (with the exception of 152 which is a locator number for the Instructor Station Room). It shall be a design requirement of the Seller to accommodate (in wiring runs, and I/O design and layout) the locating of the "in scope" items both in their actual plant locations, as shown on figure 1-1 or within the current simulator room boundary. While it will be the Seller's responsibility to accomplish this design feature, Con Edison will be pleased to discuss its studies relative to where and how all items within the Upgrade scope might fit within the existing Simulator room boundary. The Seller shall advise Con Edison, in the Proposal, as to the impact of this possible relocation of equipment relative to initial cost, delivery schedule, maintenance, training and certifiability.

The below list is provided as a cross reference in equating the item numbers on figure 1-1 to the component identifiers or names in the plant. A majority of the below listed panel identifiers were derived from Consolidated Edison plant drawing number A209812-15 in its 2-16-88 revision state. Remarks are provided where necessary in defining the scope. When use below the term "mockup" shall mean a physical representation of a panel and all of the exterior devices and controls so as to be a non-functional copy of that panel in the plant. The use below of the term "mockup as a blank panel" shall mean to provide the panel as an appropriately sized, shaped and colored unit as it is in the plant, with no instrumentation or controls on the exterior.

FIGURE 1-1 # PLANT ID

REMARKS

1	PX7	Breaker panel inside SOF.
2	SOF	
3	SNF	
4	LIFT DISCONNECTS PANEL	Inside SLF.

5	SMF	
6	PE9	Inside SKF.
7	SLF	
8	SKF	
9	SJF	
10	TRANSFER SWITCH	Inside SHF.
11	SHF	
12	SGF	
13	SFF	
14	SEF	
15	PE8	Inside SDF.
16	SDF	
17	SCF	
18	PE7	Inside SBF-2.
19	SBF-2	
20	SBF-1	
21	PE6	Inside SAF.
22	SAF	
23	SA-1	
24	FLIGHT PANEL	No internal simulation.
25	FCF	
26	FBF	
27	FAF	

Note: Items 28 through 31 below shall have fifty percent of their panel mounted relays fully functional, with the remainder mockup only. Con Edison will select the functional relays during Design Data collection.

28	JA5 & PC4
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29	JA6 & PC3	
30	JA7	
31	JA8	
32	PROTECTION RELAYS	Relays are to be functional.
33	PROTEUS CRT	Overhead mounting included in Upgrade scope.
34	SAS CRT	NOT in Upgrade Scope.
35	LEFT WING OF FLIGHT PANEL	Unit 1 components mockup only.
36	same as 35 above	same as 35 above.
37	EJB1	same as 35 above.
38	EJB2	Note: Sump monitors and controls are included in the functional scope and will respond appropriately to plant operations and malfunctions. Unit 1 components same as in 35 above.
39	EJB3	same as 35 above.
40	PROTEUS	
41	PROTEUS	
42	COMMUNICATIONS	Communications equipment on this panel shall be supplied as BFE to be installed by the Seller after site acceptance. All other items on this panel are within the scope of simulation.
43	PROTEUS	
44	PROTEUS	
45	COMMUNICATIONS	Communications equipment on this panel shall be supplied as BFE to be installed by the Seller after site acceptance. All other items on this panel are within the scope of simulation.
46	SAS	Any SAS equipment in this panel is to be installed by Con Edison, Seller's design will accommodate such

		installation after final acceptance, including power requirements. All non-SAS parts of this cabinet are within the Upgrade scope.
47	DRMS	
48	SAS	Any SAS equipment in this panel is to be installed by Con Edison, Seller's design will accommodate such installation after final acceptance, including power requirements. All non-SAS parts of this cabinet are within the Upgrade scope.
49	COMMUNICATIONS	Communications equipment on this panel shall be supplied as BFE to be installed by the Seller after site acceptance. All other items on this panel are within the scope of simulation.
50	COMMUNICATIONS	Communications equipment on this panel shall be supplied as BFE to be installed by the Seller after site acceptance. All other items on this panel are within the scope of simulation.
51	PROTEUS	
52	PROTEUS	
53	mockup panel	Seller shall provide for internal storage space.
54	SAS	Any SAS equipment in this panel is to be installed by Con Edison, Seller's design will accommodate such installation after final acceptance, including power requirements. All non-SAS parts of this cabinet are within the Upgrade scope.
55	COMMUNICATIONS	Communications equipment on this panel shall be supplied as BFE to be installed by the Seller after site acceptance. All other items on this panel are within the scope of simulation.

56 mockup panel

57 mockup panel

This is to be the location of the one of the Engineer Workstations. This workstation shall be mounted in such a way that it can easily be covered or stored from view during training and exam sessions.

58 COMMUNICATIONS

Communications equipment on this panel shall be supplied as BFE to be installed by the Seller after site acceptance. All other items on this panel are within the scope of simulation.

59 mockup panel

No functional components.

60 PROTEUS PRINTER

61 PROTEUS PRINTER

62 EJA5 & EJA6

63 EJA4

64 EJA3

65 EJA2

66 PROTEUS CRT

Overhead mounting included in Upgrade scope.

67 JI3

68 JI2

69 I11

70 JH9

71 JH8

72 JH7

73 JK3

74 JJ2

75 JJ1

76	J19	
77	J18	
78	J17	
79	J16	
80	JJ9 & JK1	Auxiliary relay cabinet with limited simulation to support controlroom procedures. Seller shall define the functional components and scope of simulation in the Proposal.
81	JJ5 & JJ6	Auxiliary relay cabinet with limited simulation to support controlroom procedures. Seller shall define the functional components and scope of simulation in the Proposal.
82	DAMPER BY PASS CONTROL PANEL	
83	EPB1	
84	STM BY PASS CONTROL & TEST PANEL	
85	RF01	
86	PA1	
87	EPA7	
88	EFC2, EFA5, EFA6, EFA7	Fire indicator panels.
89	EJA1	
90	EPE7	
91	EPE1	
92	EPE2	
93	EPE3	
94	EPE4	
95	PROTEUS CRT	Overhead mounting included.
96	JC4	In addition to full scope simulation of the external functions, these drawers shall be stimulated so as to allow all

internal functions and adjustments to be performed.

97	JC5	Mockup as a blank panel only.
98	JC6	Mockup as a blank panel only.
99	JD2 & 3	
100	JD1 & 9	
101	JD4	
102	JC7 & 8	
103	JD6	
104	JD5	
105	JD7	

Note: All Foxboro controllers inside this cabinet is to be to be in the scope of the Upgrade.

Note: In items 106 through 109 there will be full simulation except for the test and calibration features which are to be mocked up.

106	JD8	
107	JD9	
108	JE3	
109	JE4	
110	JE6	
111	JE7	
112	JE8	
113	JE9	
114	JK4	
115	JK6	
116	TEST CABINET	Mockup as blank cabinet only.
117	JF1	
118	JF2	

119	JF3
120	JF4
121	JF5
123	JF6
124	JF7
125	JF8
126	JG1
127	EJA7
128	JG2
129	JG3
130	JG4
131	JG5
132	JG6
133	JG7
134	JG8
135	JG9
136	JH1
137	JH2
138	JH3
139	JH4
140	RECORDERS

The two recorders mounted on the unsimulated portion of the rear of the Flight Panel are in scope and will require the Seller to mount these items in a Con Edison approved structure. Their eventual location shall be determined during Design Data collection. Recommendations are encouraged in the Seller's Proposal.

141	GT-2
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Located in the plant's C.C.R. Instrument Cubicle.

Fig. 1-2

142	ELECTRICAL DIST. PANEL	Located in the plant's C.C.R. Instrument Cubicle.
143	DC DIST. CABINET	Located in the plant's Flight Panel, this cabinet will require the Seller to provide a Con Edison approved mounting structure. Location of this panel shall be provided by Con Edison during Design Data collection.
144	AC & DC DIST. CABINETS	Located in the plant's Flight Panel, these cabinets will require the Seller to provide a Con Edison approved mounting structure. Location of these panels shall be provided by Con Edison during Design Data collection.
145	AC & DC DIST. CABINETS	Located in the plant's Flight Panel, these cabinets will require the Seller to provide a Con Edison approved mounting structure. Location of these panels shall be provided by Con Edison during Design Data collection.
146	GENERATOR MONITORING PANEL	
147	GENERATOR ALARM PANEL	Located above Generator Monitoring panel.
148	LOVEJOY FEED PUMP CONTROL PANEL	
149	TURBINE MONITORING PANEL	
150	GT-1	
151	LIGHTING PANEL # 220	
152	This is the location of the Instructor Station room. Seller's shall be responsible for designing the Instructor Station Console and components to fit within this room. The design shall account for ease of entry and exit, maintenance, and clear observation of the simulated control room.	

Note: The Remote Instructor Station (see Section 18 of the Technical Specification) shall be a mobile unit mounted on casters. This unit shall obtain its power and communicate with the Simulation Computer/Instructor System via a single 25 foot umbilical cord. This cord shall have appropriate quick disconnect features which when connected or disconnected during real time simulation (and the associated start up or shutdown of the remote station) do not cause any disruption to the real time operation of the simulator. Outlets for connection of the Remote Instructor Station shall be located in an accessible

yet unobtrusive location on the exteriors of the following panels (by item number): 2, 14, 23, 35, 43, 52, 96, and 127.

ATTACHMENT E2-D

**Data Sheets
from the
Review of Plant Procedures
[used in determination of scope of simulation]**

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE PROCEDURE:	SYSTEM NAME:
POP 1.1	REACTOR COOLANT SYSTEM
SOP 1.2	REACTOR COOLANT DRAIN TANK
POP 1.1	REACTOR COOLANT PUMPS
POP 1.1	REACTOR COOLANT PUMP SEALS
POP 1.3; SOP 1.3	REACTOR COOLANT PUMP OIL SYSTEM
SOP 1.3	REACTOR COOLANT PUMP NOISE MONITORING
SOP 1.3	REACTOR COOLANT PUMP VIBRATION MONITOR
SOP 1.3	RCP TEMP. MONITOR (BEARING, MOTOR)
SOP 1.2	REACTOR COOLANT LEVEL INDICATION SYSTEM
POP 1.1	STEAM GENERATORS
POP 1.1	STEAM GENERATOR SAFETIES AND ATMOS. RELIEFS
A 27.1.9	STEAM GENERATOR ATMOS. RELIEF IA/N-2 SUPPLY
POP 1.1	STEAM GENERATOR NITROGEN SPARGING
POP 1.1	PRESSURIZER
E-0	PRESSURIZER SAFETIES/PORV's
E-0	ACOUSTIC MONITORING SYSTEM
POP 1.1; SOP 3.3	N-2 SUPPLY TO PRESSURIZER
ECA-3.3	N-2 SUPPLY TO PORV'S
A 28.5, 6, 7, 8	PRESSURIZER PRESSURE/LEVEL CONTROL
SOP 1.2; E-0	PRESSURIZER RELIEF TANK
POP 1.1	PRESSURIZER RELIEF TANK QUENCH SYSTEM
POP 1.1	PRESSURIZER RELIEF TANK DRAIN
POP 1.1	OVERPRESSURIZATION (OPS) SYSTEM
POP 1.1	REACTOR CORE
POP 1.1	REACTOR VESSEL FLANGE LEAK DETECTION SYSTEM

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE PROCEDURE:	SYSTEM NAME:
ES-0.3	REACTOR VESSEL LEVEL INDICATION SYSTEM (RVLIS)
FR-C.1	REACTOR VESSEL HEAD VENT SYSTEM
SOP 1.3	METAL IMPACT MONITORING
POP 1.1	CHEMICAL & VOLUME CONTROL SYS
POP 1.1	VOLUME CONTROL TANK
SOP 1.2	VOLUME CONTROL TANK BYPASS SYSTEM
POP 3.3	VOLUME CONT. TK. COVER GAS SUPPLY
POP 1.1	LETDOWN
POP 1.1; A 12.1	LETDOWN PURIFICATION (DEMINs, FILTERS)
	LETDOWN HEAT EXCHANGERS
	EXCESS LETDOWN (INC. HX)
SOP 1.2	CVCS HOLDUP TANK
POP 1.1	CHARGING
A 27.1.9	CHARGING PUMP SPEED CONTROL
POP 1.1	SEAL INJECTION
	ALTERNATE SEAL INJECTION
	SEAL RETURN (INC. HXs)
POP 3.1	BORIC ACID SYSTEM
POP 3.1	BORIC ACID TANKS
POP 3.1	BORIC ACID PUMPS
POP 3.1	BORIC ACID BLENDER
	PRIMARY CHEMICAL ADDITION
POP 1.1	COMPONENT COOLING LOOP
POP 3.3	COMPONENT COOLING SURGE TANK
POP 3.3	COMPONENT COOLING PUMPS

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE
PROCEDURE :

SYSTEM NAME :

A 27.1.9	CITY WATER/PRIMARY WATER CCW B/U TO COMPONENTS
POP 1.1, SOP 4.2.1	RESIDUAL HEAT REMOVAL LOOP
SOP 1.2	RHR PURIFICATION LOOP/PUMP
POP 3.3	RESIDUAL HEAT REMOVAL PUMPS
POP 3.3	RESIDUAL HEAT REMOVAL HEAT EXCHANGERS
A 4.3	SPENT FUEL COOLING LOOP
SOP 1.2	LIQUID WASTE DISPOSAL SYSTEM
SOP 1.2	WASTE HOLD-UP TANK
SOP 1.2.1	GASEOUS WASTE DISPOSAL SYSTEM
SOP 1.2.2	GAS ANALYZER
	SPENT RESIN STORAGE TANK
POP 1.3	PRIMARY MAKE-UP WATER SYSTEM
POP 1.3	PRIMARY WATER STORAGE TANK
SOP 4.1.2	PRIMARY WATER STORAGE TANK MAKE-UP SYSTEM
A 1.2	STEAM GENERATOR BLOWDOWN SYSTEM
A 1.2	STEAM GENERATOR BLOWDOWN SAMPLING SYSTEM
	SECONDARY PLANT CHEMISTRY CONTROL
POP 1.1	PRIMARY SAMPLING SYSTEM
A 12.1	GROSS FAILED FUEL DETECTION
E-0	SAFEGUARDS ACTUATION/SAFEGUARDS SEQUENCE
E-0	PHASE A/PHASE B ISOLATION
E-0	2 IS TRUE INDICATION
E-0	FEEDWATER ISOLATION
E-0	SAFETY INJECTION SYSTEM
POP 1.1, SOP 4.2.1	SAFETY INJECTION PUMPS

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE PROCEDURE :	SYSTEM NAME :
SOP 1.2	REFUELING WATER STORAGE TANK
POP 1.1	LOW HEAD ACCUMULATORS
SOP 1.7	ACCUMULATOR TOPPING SYSTEM
FR-C.1	ACCUMULATOR NITROGEN SUPPLY/VENT
POP 1.1, SOP 4.2.1	RECIRCULATION SYSTEM (INC. SUMPS AND PUMPS)
E-0	CONTAINMENT SPRAY SYSTEM
E-0	SPRAY ADDITIVE TANK
POP 1.1	CONT. COOLING & FILTRATION
SOP 10.6.2	CONTAINMENT IODINE FAN & FILTER
POP 1.1	CONTROL ROD COOLING FANS
POP 1.1	FAN COOLER UNITS
E-0	ISOLATION VALVE SEAL WATER SYS
SOP 10.6.2	WELD CHANNEL & CONT. PRESS SYS
POP 3.3, A 1.2 SOP 10.6.2	CONTAINMENT BUILDING PRESSURE, TEMPERATURE, ACTIVITY, HUMIDITY
SOP 10.6.2	CONTAINMENT BUILDING HYDROGEN/OXYGEN MONITORS
SOP 10.9.1	HYDROGEN RECOMBINER SYSTEM
SOP 1.7	CONTAINMENT SUMP
POP 1.2; SOP 10.6.2	AIR LOCKS
E-0	CONTAINMENT ISOLATION SYSTEM
POP 1.1	HOT PENETRATION COOLING SYSTEM
SOP 10.9.2	POST ACC HYDROGEN CONTROL & VENTING SYSTEMS
POP 3.3	CONTAINMENT PURGE
SOP 10.6.2	CONTAINMENT PRESSURE RELIEF
E-0; A 1.7	PAB VENTILATION SYSTEM (INC. ENVIRONMENT)

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE
PROCEDURE:

SYSTEM NAME:

POP 1.1	CABLE TUNNEL VENTILATION
	CONVENTIONAL VENTILATION (INC. ENVIRONMENT)
A 17.0.2	FUEL STORAGE BUILDING VENTILATION
E-0	CONTROL ROOM VENTILATION
E-0; A 12.1	AREA RADIATION MONITORS
SOP 10.6.2	UNDER REACTOR GAMMA ALARM
SOP 10.6.2	PROCESS RADIATION MONITORS
POP 1.2	EXCORE NUCLEAR INSTRUMENTATION
SOP 10.6.2	MOVABLE INCORE FLUX DETECTOR SYS
POP 1.1	INCORE THERMOCOUPLE SYSTEM
	INCORE FIXED NEUTRON FLUX DETECTOR SYS
POP 1.2, POP 2.1	ROD CONTROL SYSTEM
POP 1.2, POP 2.1; E-0	ROD POSITION INDICATION SYSTEM
POP 2.1	ROD INSERTION LIMIT COMPUTER
	FUEL & CORE COMP HANDLING SYS
	FUEL TRANSFER SYSTEM
POP 1.1	MAIN STEAM HEADER
POP 1.1	STEAM TRAPS
POP 1.3, POP 3.1	CONDENSER STEAM DUMP
POP 1.3	MS SUPPLY TO SJAE, GS, MBFP TURBINES
POP 1.3	CYLINDER HEATING STEAM
POP 1.3	CROSS-OVER/CROSS-UNDER STEAM
POP 1.3	LOW PRESSURE STEAM DUMPS
POP 1.3, POP 3.1	MOISTURE SEPARATOR-REHEATERS
POP 1.3	EXTRACTION STEAM SYSTEM (INC NON RET. VLVS)

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE
PROCEDURE :

SYSTEM NAME :

POP 1.3	HEATER VENTS AND DRAINS
POP 1.3	HEATER DRAIN TANK AND PUMPS
POP 1.3	CONDENSATE SYSTEM
POP 3.1	SALINITY/CHLORIDE MONITORING
POP 1.3, POP 3.1	DRAINS COLLECTING TANK
POP 1.3	EXCESS CONDENSATE & COND. MAKE-UP
A 20.2*	HOTWELL DUMP & CONDENSATE TRANSFER
POP 1.3	CONDENSER AIR REMOVAL
A 1.2	AIR EJECTOR EXHAUST TO CONTAINMENT
POP 1.3, POP 3.1	VACUUM BREAKERS
POP 1.3	MAIN TURBINE GLAND SEALING
POP 1.3, POP 3.1	TURBINE SUPERVISORY
POP 1.3	SEC. PLANT TEMP. RECORDER
	VALVE GLAND VACUUM SEALING
POP 1.3	MAIN FEEDWATER SYSTEM
POPs 1.3, 2.1, 3.1	STEAM GENERATOR LEVEL CONTROL
A 27.1.9	STEAM GENERATOR REMOTE LEVEL INDICATION
POP 1.3	MAIN BOILER FEED PUMP SEAL WATER INJECTION
E-0	CONDENSATE STORAGE TANK
E-1	CONDENSATE STORAGE TANK B/U CITY WATER SUPPLY
POP 1.3	MAIN BOILER FEED PUMP TURBINE
POP 1.3	MBFP GOVERNOR AND CONTROL OIL SYSTEMS
POP 1.3	MAIN BOILER FEED PUMP DRIP TANK
POP 1.1	AUXILIARY FEEDWATER SYSTEM
A 27.1.9	TURBINE DRIVEN ABFP STEAM SUPPLY

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE PROCEDURE:	SYSTEM NAME:
A 27.1.9	TURBINE DRIVEN ABFP SPEED CONTROL
A 27.1.9	AUXILIARY FEED REG. VALVE 1A/N-2 SUPPLY
A 27.1.9	AUXILIARY FEED PUMP ROOM VENT./ENVIRONMENT
	INTAKE STRUCTURE
	CHLORINATION SYSTEM
SOP 23.1	TRAVELING SCREENS (AND FIXED SCREENS)
	BY-PASS GATES
POP 1.3, POP 1.1	CIRCULATING WATER SYSTEM
SOP 23.1	CWP VIBRATION TEMPERATURE MONITORING SYSTEM
SOP 23.1	CWP SEAL/LUBE WATER SYSTEM
POP 2.1	CIRCULATING WATER TEMP. MONITORING
SOP 23.1	WATER BOX PRIMING
OP 23.2	DE-ICING LOOP & PRIMING SYSTEM
SOP 23.1	VARIABLE WEIR
SOP 23.1	DISCHARGE CANAL
POP 3.1; SOP 23.1	UNIT #3 OUTFALL GATES
SOP 23.1	UNIT #1/UNIT #3 CIRCULATING WATER SYSTEMS
POP 2.1	HUDSON RIVER
A 24.1; E-0	SERVICE WATER SYSTEM
A 24.1; E-0	SERVICE WATER PUMPS/STRAINERS
A 24.1	INSTRU AIR CLOSED COOLING SYS
A 24.1	CONVEN PLANT CLOSED COOLING SYS
A 24.1	SECONDARY SAMPLING
POP 1.3	MAIN TURBINE
POP 1.3	MAIN TURBINE DRAINS

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE
PROCEDURE:

SYSTEM NAME:

POP 1.3	MAIN TURBINE TURNING GEAR
POP 1.3	LUBE OIL SYSTEM
POP 1.3	EXHAUST HOOD SPRAYS
SOP 2.1	GENERATOR COOLING
	CARBON DIOXIDE GAS SYSTEM
POP 1.3	HYDROGEN GAS SYSTEM
POP 1.3	SEAL OIL SYSTEM
POPs 1.3, 2.1	MAIN GENERATOR
POP 2.1	GENERATOR CORE MONITOR
POPs 1.3, 2.1	ELECTRICAL SYSTEM (EXCITER)
POP 2.1	GENERATOR COOLING SYSTEM
POPs 1.3, 3.1	ISO-PHASE BUS DUCT COOLING
POP 1.3	22 KV SYSTEM
POP 1.3	345 KV SYSTEM
POP 1.3	6.9 KV SYSTEM
POP 1.3	138 KV SYSTEM
POPs 1.3, 3.2; SOP 1.3	UNIT AUX./STATION AUX. XFORMERS/TAP CHANGERS
A 27.1.9	13.8 KV SYSTEM
POP 1.3	480 V SYSTEM
E-0	120 VAC DISTRIBUTION
A 27.1.9; E-0	120 VDC DISTRIBUTION
E-0	EMERGENCY DIESELS
A 27.1.9	GAS TURBINES
E-0	OVERALL UNIT PROTECTION SYSTEMS
	CENTRAL CONTROL ROOM ANNUNCIATORS

DETERMINATION OF INDIAN POINT #2
PLANT SYSTEMS REQUIRED FOR SIMULATION

FORM 1

SYSTEMS LIST

REFERENCE
PROCEDURE :

SYSTEM NAME :

	REMOTE ANNUNCIATOR PANELS
POP 1.1	BISTABLE TRIP/TRIP STATUS
SOP 23.1	AUXILIARY STEAM
E-0	INSTRUMENT AIR
E-0	STATION AIR
	CHEMICAL FEED
SOP 1.13	CITY WATER HEADER
SOP 7.7	FIRE MAIN HEADER
SOP 7.7	FIRE DETECTION/ALARM
SOP 26.2	NITRO HYDROGEN CO2 & OXY. SUPP TO MTC
SOP 30.1	BORIC ACID HEAT TRACE
SOP 23.1, SOP 7.7	ADDED HEAT TRACE FOR CCR ADDED HEAT TRACE FOR CCR ADDED HEAT TRACE FOR CCR
SOP 23.1	INTAKE STRUCTURE HEAT TRACE
A27.1.9	ALTERNATE SAFE SHUTDOWN POWER SUPPLY SYSTEM
A27.1.9	ALTERNATE SAFE SHUTDOWN PARAMETER IND. PANEL
SOP 23.1	OUTSIDE ENVIRONMENT
SOP 10.6.2	CONTAINMENT VIDEO MONITORING
SOP 1.2	CCR COMMUNICATIONS SYSTEMS
POP 2.1	PLANT PROCESS COMPUTER (PROTEUS)
	SAFETY ASSESSMENT SYSTEM COMPUTER (SAS)
EPD	ENVIRONMENTAL MONITORING (MIDAS/PASQUILL)

ATTACHMENT E2-E

**Test Procedure Scope
from the
Replacement Simulator Contract Documentation**

**New Simulator [Master Index]
Reference Section 14.0, page 45 of 61**