NMC
Committed to Nuclear Excellence

Nuclear Management Company, LLC
Prairie Island Nuclear Generating Plant
1717 Wakonade Dr. East
Welch MN 55089

March 6, 2001

10 CFR Part 50
Section 50.90

U S Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

Supplement to License Amendment Request dated December 11, 2000
Conversion to Improved Technical Specifications (ITS)

By letter dated, December 11, 2000, Prairie Island submitted a License Amendment Request (LAR) to convert the current Technical Specifications (CTS) using the guidance of NUREG-1431, Revision 1 as amended by NRC and industry Technical Specification Task Force (TSTF) documents. This letter supplements the subject LAR.

The NRC Staff and Nuclear Management Company (NMC) representatives met on January 9, 2001 to discuss this LAR in general and Sections 3.3 and 3.8 in particular. In response to questions raised by the NRC in that meeting, the following information is provided:

1. NMC has confirmed that tests performed at Prairie Island Nuclear Generating Plant (PINGP) each refueling outage demonstrate that the safeguards bus tie-breakers between units open on an SI signal.

2. The timing of the load sequencers is tested in a monthly Surveillance Requirement (SR).

A001

3. Attachment 1 is a copy of the PINGP Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations, commonly referred to as the "PINGP Setpoint Methodology". This methodology is based on ISA Standard S67.04-1987 and the Two Loop Group Setpoint Methodology developed by Tenera, L. P.

4. Attachments 2 and 3 provide two examples of PINGP Reactor Protection Setpoint Calculations: SPCRP019, "Unit 1 Pressurizer High Pressure Reactor Trip", Rev. 0, and SPCRP029, "Unit 1 Power Range High Flux Reactor Trip High Setpoint", Rev. 0.

5. An Actuation Logic Test (ALT) SR is included in new PI ITS SR 3.3.4.2. The original PI ITS SR 3.3.4.2 has been renumbered as SR 3.3.4.3. These changes are included in the change pages provided in Attachment 4.

Attachment 4, Revision 1 Change Pages, corrects minor errors which have been identified in the subject submittal and incorporates the changes to Specification 3.3.4 and its associated Bases as discussed above. Changes to the Revision 1 pages have been sidelined on the right beside the line(s) which have been revised. Change Pages which are dated (any pages from Parts A, B, D, F, G or Cross-References) have a new date of 02/20/01. Change Pages which are not dated (any pages from Parts C and E) are marked as Revision 1 with a small textbox below the revision sideline which contains "R-1".

The December 11, 2000 submittal letter committed to have the calculations supporting the allowable values presented in ITS Section 3.3 completed in February 2001. Mr. T J Kim, NRC Project Manager was informed by telephone on February 27, 2001 that the calculations would not be completed in February 2001 and that the commitment date would be changed. By this letter, NMC is revising the Nuclear Regulatory Commission commitment as follows: **Allowable Value supporting calculations will be complete in April 2001.**

Revised Significant Hazards Determinations and Environmental Assessments have not been submitted since these evaluations, as presented in the original December 11, 2000 submittal, continue to bound the proposed license amendment as supplemented by this letter and its attachments.

NMC is notifying the State of Minnesota of this LAR by transmitting a copy of this letter and attachments to the designated State Official.

To the best of my knowledge and belief, the statements contained in this document are true and correct. In some respects these statements are not based on my personal knowledge, but on information furnished by other PINGP and NMC employees, contractor employees, and/or consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

In this letter NMC has revised a Nuclear Regulatory Commission commitment as indicated in bold lettering above. Please address any comments or questions regarding this matter to myself or Mr. Dale Vincent at 1-651-388-1121.

Joel P. Sorensen

Joel P. Sorensen
Site Vice President
Prairie Island Nuclear Generating Plant

C: Regional Administrator - Region III, NRC
Senior Resident Inspector, NRC
NRR Project Manager, NRC
James Bernstein, State of Minnesota
J E Silberg

Attachments:
Affidavit

1. Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations
2. Calculation SPCRP019, “Unit 1 Pressurizer High Pressure Reactor Trip”, Rev. 0
3. SPCRP029, “Unit 1 Power Range High Flux Reactor Trip High Setpoint”, Rev. 0
4. Revision 1 Change Pages

UNITED STATES NUCLEAR REGULATORY COMMISSION

NUCLEAR MANAGEMENT COMPANY, LLC

PRAIRIE ISLAND NUCLEAR GENERATING PLANT DOCKET NO. 50-282
50-306

REQUEST FOR AMENDMENT TO
OPERATING LICENSES DPR-42 & DPR-60

SUPPLEMENT TO LICENSE AMENDMENT REQUEST DATED DECEMBER 11, 2000
CONVERSION TO IMPROVED TECHNICAL SPECIFICATIONS (ITS)

By letter dated March 6, 2001, Nuclear Management Company, LLC, a Wisconsin corporation, is submitting additional information in support of the License Amendment Request originally submitted December 11, 2000.

This letter contains no restricted or other defense information.

NUCLEAR MANAGEMENT COMPANY, LLC

By Joel P. Sorensen

Joel P. Sorensen
Site Vice President
Prairie Island Nuclear Generating Plant

State of Minnesota

County of Goodhue

On this 6th day of March 2001 before me a notary public acting in said County, personally appeared Joel P. Sorensen, Site Vice President, Prairie Island Nuclear Generating Plant, and being first duly sworn acknowledged that he is authorized to execute this document on behalf of Nuclear Management Company, LLC, that he knows the contents thereof, and that to the best of his knowledge, information, and belief the statements made in it are true.

Marlys E. Davis

MARLYS E. DAVIS
NOTARY PUBLIC-MINNESOTA
My Commission Expires Jan. 31, 2005

ITS Submittal Copies

Recipient	Letter	NRC CD	NMC CD	Copy Att 1	Copy Att 2	Copy Att 3	Copy Att 4
NRC DCD	1			1	1	1	1
Tae Kim	1	2	1	3	3	3	3
NRC RIII	1	1		1	1	1	
NRC RI	1	1		1	1	1	
Bernstein	1		1	1	1	1	
Bruemmer	1		1	1	1	1	
Silberg	1		1	1	1	1	
Pearce	1		1	1	1	1	
Swigart	1		1	1	1	1	
Sandok	1		1	1	1	1	
Jantosik	1		1	1	1	1	
Northard	1		1	1	1	1	
D. Johnson	1		1	1	1	1	
Wadley	1						
D Hoffman	1		1	1	1	1	1
Alders	1		1	1	1	1	
Gadzala	1		1	1	1	1	
Webb	1		1	1	1	1	
Beach	1		1	1	1	1	
Breene	1						
Cook	1		1	1	1	1	
Cutter	1		1	1	1	1	
Goering	1		1	1	1	1	
Morris	1		1	1	1	1	
Schrock	1		1	1	1	1	
Werner	1						
Sorensen	1						
Albrecht	1		1	1	1	1	1
Amundson	1						
Silverberg	1						
Eckholt	1		1	1	1	1	
Kivi	1						
Leveille	1						
Vincent	1	1	1	1	1	1	2
Frost	1		1	1	1	1	2
Van Tassell	1			1	1	1	2
Hall	1			1	1	1	1
PITC							1
Eng Libr							1
Lic Libr							1
NL File	1			1	1	1	1
TS History	1			1	1	1	1
PI Records	1			1	1	1	1
Totals	40	5	24	34	34	34	19

Prairie Island Nuclear Generating Plant

Attachment 1

to

Supplement to License Amendment Request dated December 11, 2000
Conversion to Improved Technical Specifications (ITS)

Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

ENGINEERING MANUAL

ENGINEERING DESIGN STANDARD

for

INSTRUMENT SETPOINT/UNCERTAINTY CALCULATIONS

SECTION 3.3.4.1

Revision	Prepared By	Date	Reviewed	Date	Approved By	Date
0	[illegible]	10/30/95	[illegible]	11/2/95	[illegible]	11/2/95

INSTRUMENT SETPOINT/UNCERTAINTY CALCULATIONS

REVISION RECORD

Revision Number	Revision Description
0	Initial issue.

INSTRUMENT SETPOINT/UNCERTAINTY CALCULATIONS

INTRODUCTION

1.0 This engineering standard is prepared to establish a consistent methodology to be used in the preparation of accuracy calculations and, where applicable, subsequent setpoint determinations at the NSP Prairie Island Nuclear Generating Plant (PINGP). It also establishes definitions and relationships between safety and non-safety system process parameter limitations, and setpoints for actuation and control. The objective of this document is to provide an aid in design activities. This standard also provides references to more detailed guidance documents.

A. SCOPE OF APPLICABILITY

2.0 The scope of this document includes the determination of setpoints for both safety and non-safety related loops to include all those systems within the NSP PINGP power block (safety and non-safety related systems required to ensure the safe and reliable production of electrical power). Setpoints can be actual process control settings, process points of equipment actuation (commonly referred to as interlocks, permissive or trip setpoints), process points of initiation of an alarm or manual action, etc. In other words, any predetermined process value that requires an action to be initiated can be considered a setpoint.

Determination of response times (instrument, mechanical, hydraulic, thermo-hydraulic, etc.) is not included in the scope of this document. For safety-related applications, it is assumed that the accident and transient analyses includes all of these determinations. However, this assumption should be verified for each setpoint application.

The standard is not intended for electrical load study, breaker coordination, fuse coordination, motor-operated valve torque switches, spring cans, snubber setpoints, or process actuated safety relief valve setpoints. However the principles of this standard are applicable for assessing errors associated with these analysis, and may be used for the determination of these setpoints.

B. DEFINITIONS, ABBREVIATIONS, AND SYMBOLS

3.0 Definitions

- Loop - All instruments associated with a specific wired installation, this may include primary elements, transmitters, signal conditioners, indicators, bistables, switches, computer inputs, and other devices interconnected for signal transmission. The loop ends at the primary actuation device(s) (i.e. the actuation relay). A loop may contain several specific functions (i.e. indication, high level trip, low level trip, and computer point inputs).

- Loop Configuration -A section of a Loop required to perform a specific function (i.e. High Level Trip) Where a loop contains several functions each function is divided into a configuration. The Loop Configuration includes all components required to accomplish that specific function (i.e. indicate flow in the control room).

- String- A set of Loop Components, generally with a series signal progression, which may be calibrated with test signal(s) injected to the input of the first string device and monitored at the output of the last string device. Devices internal to the string may be individually checked and adjusted, however, final adjustment will be based upon the variation between the injected signal at the first device and the monitoring point at the final device. Strings will generally not include the transmitter or the bistable for Westinghouse plants.

- Additional Definitions are in accordance with References 5, 6 and 7

3.1 Abbreviations

Throughout the standard, mathematical expressions adhere to the following convention:

Elements of device uncertainty are indicated by lower case letters (a).

Elements of loop uncertainty are indicated by upper case letters (A).

All other abbreviations are in accordance with Reference 15.

C. TOPIC DISCUSSION

4.0 NSSS Vendor Supplied Setpoints

4.1 History

Westinghouse Prairie Island Nuclear Generating Plant Units 1 and 2 Precautions, Limitations, and Set Points For Nuclear Steam Supply Systems Revision 6 March 1976, established the design basis applicable to the trip setpoints, allowable values, and response time for the following trip functions:

Reactor Protection System (RPS)
Engineered Safety Features Actuation System (ESFAS)

The Westinghouse engineering calculation tabulates and combines instrument uncertainties with the safety analysis setpoints to produce trip setpoints and allowable values for the technical specifications.

4.2 Setpoint Revision

The Proprietary portion of the Westinghouse Setpoint Methodology assumes specific values for several parameters during the setpoint calculation and calibration of the instruments (i.e. Westinghouse assumes that the rack devices will be independently calibrated and at the completion of calibration the total rack will be "tuned" to be within +/- 0.5% of nominal). These values and assumptions must be reviewed and used, as appropriate, for any calculations generated using this Standard. Where a Westinghouse assumption is not supported by plant calibration practices, (i.e. Westinghouse assumes that all calibrations are performed using three passes of cardinal points to verify linearity and hystrisis) then the calculation should be performed using actual plant practices.

If a setpoint less conservative than the Westinghouse setpoint is calculated using this Standard, and will be implemented as the plant setpoint, follow up action is required to ensure that sufficient margin still exists in comparison with the plant Safety Analysis.

5.0 Safety Related Setpoints Data Retrieval

Developing a Set Point Calculation, whether performed using manual methods or using the NSP Instrument Information and Setpoint Control System (IISCS^{TM}) software, involves several steps.

5.1 Determine the Function to be Calculated

This defines the starting point for the calculation process. The user must determine the scope of the calculation. This may be based upon devices to be changed for plant modification, changes required due to process condition changes, or to provide basis for a plant setpoint. The calculation originator must determine which function is performed by the loop or device in question. This function has particular importance for technical specification or Regulatory Guide 1.97 devices since the function may be related to a plant commitment.

Where redundant loop calculations, are being performed it is recommended that all loops performing the same function be evaluated together. All the additional data for the loop instruments should be collected and then bounding calculations using the worst case information should be attempted. Where this bounding calculation provides unacceptable results then additional calculations would be executed for the redundant loops as necessary.

For typical information sources see Table 3-1 items 51, 6, 44, 39, 46 and item 22.

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Functions determined will be used to define configurations in the Loop Screen. This information may be held for later use on the Loop Screen, or if it is desired to fill out portions of the screens as the information is located the user may access the IISCS™software at this time and enter the function information. To access the loop screen select the NSP IISCS™icon. When the IISCS™main screen appears, select Login (a user name and password are required). If the Login is successful, select the TEMPORARY file level icon (double click on the left mouse button. The folders associated with the applicable data tables will be displayed. Select the LOOP folder. Select FILE, and NEW, this will allow the addition of a new record to the Loop data table. The Loop ID must be entered, and then each function determined will be entered in the configuration description text fields at the bottom of screen 1. When the information has been entered, select FILE and SAVE to write the information to the data table.

5.2 Determine times when the function is required. (i.e. post accident, normal operation, safe shutdown, etc)

Device or loop trip functions are normally only required for a limited amount of time in the post DBA or DBE environment. This function time may be based upon equipment operational requirements, or the operational mode of the plant. The time and duration that a specific protection function is required to operate will determine what level of environmental effects in the area must be factored into the setpoint calculation. A instrumentation Loop may perform several different functions for the calculation process each function should be identified as a specific configuration of instruments which are directly related to a single function. A single loop device may appear in several different configurations.

For typical information sources see Table 3-1 items 51, 6, 45, 15, 46 and item 1.

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Function time is entered as operating time on the Process/Setpoint screen during data table development. The Process/Setpoint screen is accessed in the same manner as the Loop screen discussed above, however this screen requires that a loop ID, configuration, process span analytical/process limit, and process direction as minimum prior to saving the record. Therefore the function time for each function should be reserved for later entry into the Process/Setpoint screen

5.3 Determine Process Conditions for all Modes When The Function is required

For all times that a loop or device is required to function, define the variations of the process. There may be substantial differences in process conditions at different points in plant operations and during design basis events. These differences will have a direct effect on the performance of the instruments. In several cases there is a band of process conditions during or after the accident. A nominal process condition should be selected in this case and the error band used as a process consideration error during the setpoint analysis.

For typical information sources see Table 3-1 items 6, 45, 15, 46, 1, 33 and item 28.

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The Process span, units and Process/Analytical Limit are required for the Process/Setpoint screen. Process conditions may also be required to determine head correction, static pressure effects, or to determine process condition errors. The Head Correction calculation module is accessed from the NSP IISCS™group. Selecting the Head Correction Icon will display a listing of current head correction calculations. The user may select an existing calculation for modification or create a new calculation. The Head Correction module requires a substantial set of information, including tap heights, tubing configurations, and specific gravity for both process and sensing line fluids. Process Condition errors (i.e. tank vortexing, density variations, etc.) are calculated external to the software, a value (in decimal percent of span) is entered in the Process Consideration Dependency screen. The Process Consideration Dependency screen is only accessible during the calculation preparation process. All data table information must be originated, reviewed, approved, and uploaded to the Master data table level prior to accessing the calculation process. Therefore Process errors must be reserved for later entry into the software program.

5.4 Determine the Limits For Function Operation

5.4.1 Safety Limit

From 10 CFR 50.36 "Safety limits for nuclear reactors are limits upon important process variables which are found to be necessary to reasonably protect the integrity of certain of the physical barriers which guard against the uncontrolled release of radioactivity. If any safety limit is exceeded, the reactor shall be shut down."

The safety limit is considered to be the ultimate limit which shall not be exceeded under any circumstances. To prevent exceeding the safety limit several lower limits are established.

For typical information sources see Table 3-1 item 10.

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Safety Limits are not entered into the software data table.

5.4.2 Analytical Limit

From ISA-S-67.04 "Limit of a measured or calculated variable established by the safety analysis to ensure that a safety limit is not exceeded." The Analytical limit will normally differ from the safety limit by a margin to account for loop time response, transient overshoot during the event, and modeling errors for the safety analysis model. These limits are derived from specific regulatory and design limitations or safety limits on nuclear fuel, piping systems integrity, and control of radioactive releases, The analyses, generally known as plant safety analysis or plant accident analyses, examine the performance for plant systems and variables under anticipated normal, transient, and accident conditions to ensure that plant safety limits can be maintained. The analysis establish specific limits and assumptions on plant design, operation, and maintenance, These limits and assumptions form the bases of the instrument setpoint determinations. Where it is available the analytical limit will be used as the starting point for the setpoint analysis.

For typical information sources see Table 3-1 item 10.

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Analytical Limits are entered into the Analytical/Process Limit field on the Process/Setpoint screen discussed above

5.4.3 Process Protection Limit

Non-safety related functions will not have a safety limit or analytical limit. In these cases the limit will be termed the process protection limit. This limit is based upon the process point where action must be taken to avoid damage to plant equipment.

For typical information sources see Table 3-1 items 14 and 25.

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Process Protection Limits are entered into the Analytical/Process Limit field on the Process/Setpoint screen discussed above..

5.4.3.1 Loop Response Time Requirements

Because the systems for the power plants are dynamic the process protection limit can not be used as the starting point for the setpoint calculation in all cases. Some consideration must be given for the time response of the system and the effect of this time delay on process conditions. Loop response time requirements are used to calculate a analytical process protection limit, which will then be used as the process limit for the setpoint calculation.

5.4.3.2 Line Pressure Loss and Head Effect

For flow and pressure protection loops similar considerations are necessary for line pressure loss and head effect. Line pressure and head effects are used to calculate a analytical process protection limit, which will then be used as the process limit for the setpoint calculation.

5.5 Determine Devices Which Perform The Defined Function (identify devices for each configuration, identify devices for all configurations in the Loop)

Several different devices may perform the same function (e.g. Reactor Vessel Level Indication), however, only a specific set of devices perform this function for Post Accident monitoring. Based upon the specific functions defined in section 4.2.1, identification the associated instruments. Each device in the loop involved in performing the function(s) must be identified.

For typical information sources see Table 3-1 items 20, 36, 51, 35, 54, 53, 56, 6 and 39.

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Device Instrument tag numbers must first exist in the Instrument data table, access to the instrument data table is controlled in the same manner as access to the Loop data table discussed previously. If the Instrument tag numbers identified do not already exist in the instrument data table, they must be added. The addition of an instrument tag number to the Instrument data table requires the EQ zone (i.e. plant location) and the device Manufacturer and model number. To use a EQ zone or manufacture/model number combination in the instrument data table, both must already exist in the appropriate validation data tables. If the tag numbers already exist in the instrument data table (on either the Temporary or Master Level) then the tag numbers can be inserted into the Loop data table, and the configurations can be defined by placing an x for each instrument in the appropriate configuration column.

5.5.1 Define Quality Level (Safety Related, Reg. Guide 1.97 or Non-safety Related) of Devices, and Determine Environmental Qualification Level and Considerations

Once the loop devices are defined the current quality level for the components should be determined, while this information is not critical for performing the setpoint calculation, it will assist in determining the source documents for the additional data collection efforts.

It is normally assumed that if the function performed by the loop devices is safety related then all the loop devices are safety related up to a qualified isolation device. This assumption requires validation by determining the specific qualification level for each device. If a non-safety related device is found performing a safety-related function then a determination must be made as to the proper corrective action.

For typical information sources see Table 3-1 items 45, 12, 11 and 6.

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>
> Device qualification information is entered into the seismic category, QA Elec., or QA mech. fields on the Instrument screen.

If other means are used to determine the safety category for a device, then the Equipment Qualification Master List (EQML) should be used to determine the equipment qualification level.

5.6 Evaluate Loop Configuration For Related Devices

5.6.1 Determine Interfaces, Permissive, and Interlocks

For some system operational conditions interlocks or permissive must first be cleared before trip function or component operation may occur. The accuracy of any associated permissive must be considered in the setpoint calculation where there is a direct interconnection.

For typical information sources see Table 3-1 items 19, 18, 20, 35, 54, 56, and 6.

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Interfaces, permissive or interlocks, may be used as different configurations on the loop screen, integrated into the loop, or performed as separate accuracy calculations and input as a process error in the Process Considerations Dependency screen. Access to each of these screens is discussed in other sections of this standard.

5.6.2 Determine Current Power Supply Conditions

Determine the power source for the loop components and if more than one power supply exists determine which loop devices are supplied from each source. Determine the feed for each of the power supplies if more than one exists. Determine the stability for the power supply. The stability for a power supply is defined by the variation in output for an established input condition.

For typical information sources see Table 3-1 items 19, 35, 54, 56, 55, 48 and 6.

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Power supply stability is entered into the PSS (volts) field on the Loop Dependency screen. This screen is only accessible during the actual performance of the calculation, therefore the PSS value should be reserved for input during the calculation process.

5.6.3 Determine Cable Lengths in Harsh Environments, and Cable Type

For loops which are required to function in a harsh (Steam, Radiation, or Temperature) environment, leakage current (IR) caused by insulation degradation may be a contributing factor to the overall accuracy of the loop. The IR term encompasses cable, terminal block, splice, penetration, and other component leakage current. Where the loop is only required to function under normal conditions or during only the first several seconds of an DBA then the cable leakage current effects can be ignored. Radiation Harsh only environments can also produce cable degradation and should be considered for determining cable length and type for current leakage.

For typical information sources see Table 3-1 items 4, 30, 17, 3 and 6.

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Component Data and component resistance information are entered into the IR Calculation (Component Codes) screen. To access the IR Calculation screen select the NSP IISCS™icon. When the IISCS™main screen appears, select Login (a user name and password are required). If the Login is successful, select the MASTER file level icon (double click on the left mouse button). The folders associated with the applicable data tables will be displayed. Select the IR folder. When the IR screen is displayed select Component Codes and locate the component codes of interest (the component codes must exist on the MASTER data level prior to origination of an IR calculation). If the cable or component codes do not exist on the MASTER level, exit the IR screen and select the TEMPORARY data file level and determine if the codes exist on the TEMPORARY data file level. If the codes do not exist select FILE, and NEW, this will allow the addition of a new record to the Component Codes data table. The Component Code and associated resistance must be entered. When the information has been entered, select FILE and SAVE to write the information to the data table. Once the component codes have been originated, the records must be independently reviewed, approved, and uploaded to the MASTER data table level. With all component codes uploaded the IR effect can be calculated. The IR effect is based upon Loop ID and Configuration. The final value calculated will be copied into the IR error effects location in Process Considerations screen during calculation development.

5.7 Evaluate Process Related Effects

For normal operations the allowed variation of the process may result in significant changes in fluid conditions which can affect the accuracy of the measurement. Some examples of process effects are:

- Tank vortexing,
- Process density changes (thermal, pressure, chemical),
- Process pressure changes,
- Process temperature changes,
- Process/fluid velocity effects,
- Geometry changes due to thermal growth, structure deformation, material buildup,
- Downcomer or condensate subcooling effects,
- Reference leg heatup,
- Stratification,
- Capillary effects,
- Sensor tap location effects,
- Piping effects.

For typical information sources see Table 3-1 items 29, 43, 46, 1, 33, 28, 13, and 42.

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Calculations to determine the error associated with the process effects are performed outside of the IISCS™software. The errors determined are entered in the other PC fields on the Process Consideration Dependency screen during calculation development. The Process Considerations Dependency screen is only accessible during performance of the calculation.

5.8 Define Related Functions (i.e., Device Used for Trip and R.G. 1.97 Display)

An installed loop may be required to perform several functions (e.g. a pressurizer pressure transmitter and signal conditioner may be used to supply the analog signal for a trip bistable and to a post accident monitoring indicator and recorder). Since data is being collected for the one function at this time, it is productive to review all other loop functions. Each additional function should be identified as a separate configuration and a specific calculation performed for each configuration.

For typical information sources see Table 3-1 items 19, 18, 20, 36, 35, 54, 56, and 6.

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>
> Devices associated with related functions are added to the Loop screen device list and defined as different configurations. Specific calculations can then be performed for each loop configuration.

5.9 Determine Manufacturer and Model Numbers for all Devices Identified.

For each device in the loop determine the manufacturer, the specific manufacturer's model number and any special designations used by the manufacturer.

For typical information sources see Table 3-1 items 21, 51, 37, 38, 17 and 6.

> USING IISCS™
>
> The manufacturer and model number for each instrument must first exist in the instrument manufacturer and model number validation table. Access to the validation tables is discussed above. If the specific manufacturer and model number exist in the validation table then information may be copied from the validation list into the proper locations on the Instrument Screen. This filed associates the instrument data record with an associated vendor data record which is created in section 4.2.9.1 below.

5.9.1 Based upon the manufacturer and model number determine the following specifications as applicable:

- Accuracy

- Drift
- Temperature Effect
- Humidity Effect
- Radiation Effect
- Power Supply Effect
- Over Pressure Effect
- Static Pressure Effect
- Seismic Effect/Vibration Effect
- Determine Device Operational Range (Maximum Span Capability)
- Determine Input/Output Relationship for Each Device (Transfer Function)

For typical information sources see Table 3-1 items 50, 49, 51 and 6.

> USING IISCS™
>
> The manufacturer, model number and all error formulas are entered into the TEMPORARY data level Vendor screen if they do not already exist at either the MASTER or TEMPORARY data level. The Vendor screen is access in the same manner as the Loop screen discussed above. There are very specific data entry requirements for the formulas associated with the device error effects. Failure to follow formula format requirements exactly may result in an incorrect representation of the device error effects in the software generated calculation output. The formulas can consider both random and bias portions of device errors. A vendor data table is required for each unique manufacturer and model number, function combination. The function designator in the instrument data table and the vendor data table allow for

The Input/Output relationship will not be entered into the Vendor screen but will be used, along with specific calibration information, to develop device scaling in the MCDS screen.

5.10 Determine the Installed Location for each device.

Based upon the installed location Determine Environmental Conditions

Based upon the functional requirements defined above (i.e. normal only, LOCA, Post Accident etc.) determine the normal, abnormal, Accident, and Post Accident values for the following:

- Temperature
- Humidity
- Radiation
- Environmental Pressure variations

For typical information sources see Table 3-1 items 15, 32, 1 and 6.

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The Location screen is accessed from the IISCS™Main Screen after login, in the same manner as the Loop screen. Each unique plant location has a specific Location screen based upon the plant Equipment Qualification zones (subsets of EQ zones may also be used where a more device specific plant environment may be required). The environmental conditions, including the time base for the conditions are entered on sheets 2 through 5 of the Location screen (only the sheets necessary for the various events are required). Based upon the operational time for the function previously determined the software will evaluate the worst case environment and determine environmental based errors.

5.11 Determine Primary Element Errors

Based upon the installation, specific primary element errors may be introduced. One example of this is the up-stream and down-stream straight run requirements for flow orifices. Where the straight run requirements are not met the accuracy of the element requires adjustment.

For typical information sources see Table 3-1 items 17, 2, 9 & 47.

USING IISCS™

Calculations to determine the error associated with the primary element are performed outside of the IISCS™software. The errors determined are entered in the PMA field on the Process Consideration Dependency screen during calculation development. The Process Considerations Dependency screen is only accessible during performance of the calculation.

5.12 Determine Calibration Information

5.12.1 Determine Method of Calibration and M&TE Used (including accuracy of devices)

Determine the number, type and accuracy of M&TE devices used, this should also include the range or scale of each device used so than turn down effects can be evaluated. For a string calibration one or two devices are normally used at each end of the string. For device calibrations normally two test devices are used for each process device. The accuracy of the standard used to calibrate the test device and the procedure for calibration should also be collected.

For typical information sources see Table 3-1 items 6, 41, 5, 23 and 24.

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M&TE information is entered into the M&TE screen. The M&TE screen is accessed in the same manner as the Loop screen discussed above. If the M&TE manufacture, model number, and scale do not exist in the M&TE manufacturer model number validation data table they must be added. To add a new data record for M&TE select the TEMPORARY data file level and determine if the codes exist on the TEMPORARY data file level, select FILE, and NEW, this will allow the addition of a new record to the M&TE data table. With the cursor in the Manufacturer Name data entry point press the right mouse button or "F1" (function key 1). A list of allowable manufacturer/model number/scale combinations will be presented. Select the correct combination. Enter the required accuracy information (note that the overall M&TE accuracy is calculated by the software and not a user accessible field). When the information has been entered, select FILE and SAVE to write the information to the data table.

The method of calibration is used to determine calibration dependency, which is entered in the cal column of the Loop Dependence Screen. The Loop Dependence screen is only accessible during the performance of the setpoint calculation, therefore, this information is reserved until that time.

5.12.2 Determine Environmental Conditions Present During Calibration

If the components are shop calibrated determining the environmental conditions during calibration should be simple, however, since most devices are calibrated in the field an assumption for the room conditions will normally be required. The larger the differential between conditions during calibration and normal operating conditions, the larger the accuracy effects. It is conservative to assume a nominal room environment for calibration if specific conditions are not known. This nominal condition is then compared to the design maximum and minimum values for the room to determine the maximum change in environmental conditions from calibration to operation.

For typical information sources see Table 3-1 items 5, 8, and 41.6

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Calibration conditions for each device are used to evaluate the requirement for head correction, and static pressure correction. The calibration temperature and humidity define the base line conditions for evaluating temperature and humidity errors. The process calibration pressure for sensors is entered into the calib. static pressure column on the Loop Dependence screen during the process of developing the calculation. This value will be used as a base for calculating static pressure zero and span effects based upon the formulas entered in the Vendor screen. The Loop Dependence screen is only accessible during the performance of the setpoint calculation, therefore, this information is reserved until that time.

5.12.3 Determine Calibration Frequency

The frequency of calibration determines how much of the vendors drift allowance will be used as an allowance for the loop. If the loop has a monthly functional check, where the device is not reset (only checked and recalibrated if out of specification) then the functional check frequency should be used as the calibration frequency.

For typical information sources see Table 3-1 items 5, 6, 26, 41 and 44.

5.12.4 Determine Setting Tolerances

Review the calibration procedure to determine the setting allowance for the device or string calibration. String calibrated devices should have an overall setting tolerance for all devices in the string.

5.12.5 Determine Static Pressure and Head Correction

Both zero and span based effects for static pressure shift must either be included in the calibration procedure or considered in the calculation. Specific manufacturers (i.e. Rosemount) specify calibration requirements to correct for static pressure and high line pressure effects. The correction due to static head for pressure and flow instruments is normally off-set during calibration by a change in the calibrated span of the instrument (zero suppression, or elevation may also be used) as with static pressure effects where this off-set is not corrected by the calibration then the effect must be considered in the calculation. See Reference 15 for information required for Static Pressure, High Line Pressure and Head Correction calculations.

5.12.6 Determine Device Calibration Span

The actual calibrated span for the instrument may affect the instrument errors, for Range based errors the turndown ratio of Range/Calibrated Span is used as an error multiplier.

5.12.7 Determine Device Scaling (cardinal points)

Device scaling cardinal points (input values) may be specified for ease of adjustment or reading of M&TE components, these cardinal points should be maintained.

For typical information sources see Table 3-1 items 5, 27 and 41.

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The Master Calibration Data Sheet (MCDS) screen is the storage location for calibration information. The Instrument ID must exist in at either the MASTER or TEMPORARY data level. To access the MCDS screen select the NSP IISCS™icon. When the IISCS™main screen appears, select Login (a user name and password are required). If the Login is successful, select the TEMPORARY file level icon (double click on the left mouse button). The folders associated with the applicable data tables will be displayed. Select the MCDS folder. When the MCDS screen is displayed select FILE, and NEW, this will allow the addition of a new record to the MCDS data table. With the cursor on the Unit Number field press the right mouse button, a listing of Instrument IDs will be displayed. Select the Instrument ID by double clicking the left mouse button on the desired ID. The remaining sections of the MCDS data record can then be completed. The calibration interval, setting tolerance, readability, transfer function, and cardinal points information will be used to complete the MCDS data record. When the information has been entered, select FILE and SAVE to write the information to the data table.

5.12.8 Determine Historical Information (As-Found, As-Left)

Historical information should only be collected where vendor information is not adequate to perform the calculation, or where historical information may provide additional margin (if required). Generally a statistical evaluation of plant specific drift will result in a decrease in the Total Loop Error, resulting in the calculated setpoint being closer to the Analytical/Process limit.

For typical information sources see Table 3-1 items 5, and 7.

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Historical information can be statistically analyzed to define a plant specific drift value. This plant specific drift value is used to replace the vendor drift value in the Vendor data record. The Drift Flag field on the Vendor screen will also be changed from a V for vendor specified drift to a P for plant specific drift. Changing the Drift Flag filed will allow the developer of the Uncertainty/Setpoint calculation to replace some standard instrument errors with the Plant specific drift value. This replacement must be based upon justification of the calibration method.

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At this point if performing a calculation using the IISCS™software, the users manual should be consulted for review, approval and uploading of data table information and performing Uncertainty or Setpoint calculations. If performing a manual calculation proceed to section 3.0 to determine the various error values.

TABLE 2-1
TYPICAL SOURCES OF DATA

No.	Source	Information	Notes
1	Accident or Reload analysis	Safety Limits, Analytical Limits, assumed errors	
2	ASME Fluid Meters	Process conditions, PEA, PMA	
3	Cable qualification report.	Cable resistance data	
4	Cable and raceway control drawing	Cable location and length	
5	Calibration Shop records, procedures, calibration cards, or discussion	As-Found/ As-Left data, scaling function, setting tolerance, Static Pressure correction, head correction, M&TE	
6	Champs	Various	
7	Completed Surveillance Procedures	As-Found/ As-Left data, setting tolerance, head correction, static pressure effect	
8	Corporate or plant standards for device calibration	Methods of calibration, M&TE selection criteria	
9	Crane Technical Paper 410	Process parameters, mechanical formulas	
10	Design basis information flow chart	Reference document list based on device function	2
11	Design Change Packages	Revised instrument, process, or environment	

INSTRUMENT SETPOINT/UNCERTAINTY CALCULATIONS

No.	Source	Information	NOTES
12	Device Purchase Specifications	Performance requirements, qualification status	
13	Emergency Operating Procedure Background documents	Basis for equipment operation, required operating time, operating environment	
14	Electrical Design Documents	Process limits, power supply stability, operating voltage	3
15	Equipment Qualification background documents	Room environments, room accident conditions, radiation analysis points	
16	Equipment Qualification Test Reports	Specific performance in tested configuration	1
17	Field Walkdown	Installation configuration, additional process considerations due to installation configuration, environmental conditions	
18	Functional Block Diagrams	Instrument position functional path	
19	Interconnecting Wiring Diagrams, Point to point wiring diagrams	Instrument position, current flow, detailed installation	
20	Loop drawings	Signal flow	
22	Logic diagrams	Signal flow	
23	M&TE Laboratory	M&TE accuracy, standard accuracy, standard scales, M&TE scales	
24	M&TE Vendor Specifications	M&TE accuracy, standard accuracy, standard scales, M&TE scales	
25	Mechanical Design Calculations	Operational limits, process limits, protection limits	3 6

INSTRUMENT SETPOINT/UNCERTAINTY CALCULATIONS

No.	Source	Information	Notes
26	Maintenance Tracking System	Calibration history, calibration frequency	
27	Maintenance History Cards	Calibration history, calibration frequency	
28	Operating and Emergency Operating Procedures	Process normal and maximum parameters, expected operating times	
29	Operators Logs	Process normal and transient parameters	
30	Construction cable pull cards	Cable length, area routing, conduit condition (sealed, wrapped)	
31	Plant Seismic Design analysis	Seismic response spectra for given locations.	
32	Plant Monitoring Programs	Area/room temperature, humidity, pressure	
33	Plant System Design Basis Documents	Process operating limits, design basis accident requirements, applicable codes and standards	
34	Plant System Design documents	Process piping ratings, pressure, flow, temperature	
36	Protection System Logic drawings	Signal flow, alarms, trips, indications	
37	Purchase Specification	Installation requirements, operational requirements, performance specifications	
38	Inspection reports		
38a	Receiving QA documents	QA status, qualification status	

INSTRUMENT SETPOINT/UNCERTAINTY CALCULATIONS

No.	Source	Information	Notes
39	Regulatory Guide 1.97 Plant Response	Devices used for post accident indication, operational requirements	6
40	SQUG documents	Seismic qualification status	
41	Surveillance Procedures	Scaling, input span, output span, head correction, static pressure correction, transfer function	
42	System Design Limits	Operation, accident maximum operating conditions	
43	System Definitions	Process operating limits, design basis accident requirements, applicable codes and standards	
44	Technical Specification Requirements and Basis	Required setpoints, analytical limits, allowable values, basis for operation	
45	Equipment Qualification Master List	Qualification status	
46	USAR	Operational requirements, codes and standards, NRC commitments	6
47	Various Engineering Texts	Various information	
48	Vendor Information Data Sheets	Performance specifications, operational restrictions	5 7
49	Vendor Product Sheets	Performance specifications, operational restrictions	5 7
50	Vendor Technical Manuals	Performance specifications, operational restrictions, calibration methods, special instructions	5 7

INSTRUMENT SETPOINT/UNCERTAINTY CALCULATIONS

No.	Source	Information	Notes
51	Westinghouse Precautions, Limitations, and Set Points For Nuclear Steam Supply Systems	Setpoints, allowable values, assumed error, Primary Element Accuracy, Process Measurement Accuracy	4
52	Westinghouse Reactor Protection and Process Control System Wiring Diagrams	Instrument position, current flow, detailed installation	
53	Westinghouse TOPS documents	Revised Errors, basis for Safety Analysis	
54	Westinghouse Functional Loop Diagrams	Instrument position, current flow, detailed installation	
55	Westinghouse Product Information Sheets	Performance specifications, operational restrictions, calibration methods, special instructions	
56	Westinghouse Reactor Protection and Process Control System Wiring Diagrams	Instrument position, current flow, detailed installation	
57			

NOTES:

1. When using equipment qualification reports, the sample size is generally limited, therefore, care must be taken in the assigning of any probability or confidence levels to the data.

2. See Appendix 1 for the Design Basis Information flow chart.

3. The process protection limit will normally be found in the mechanical or electrical design limits for the process components (i.e., pump or motor design limits for NPSH, or minimum operating voltages, respectively).

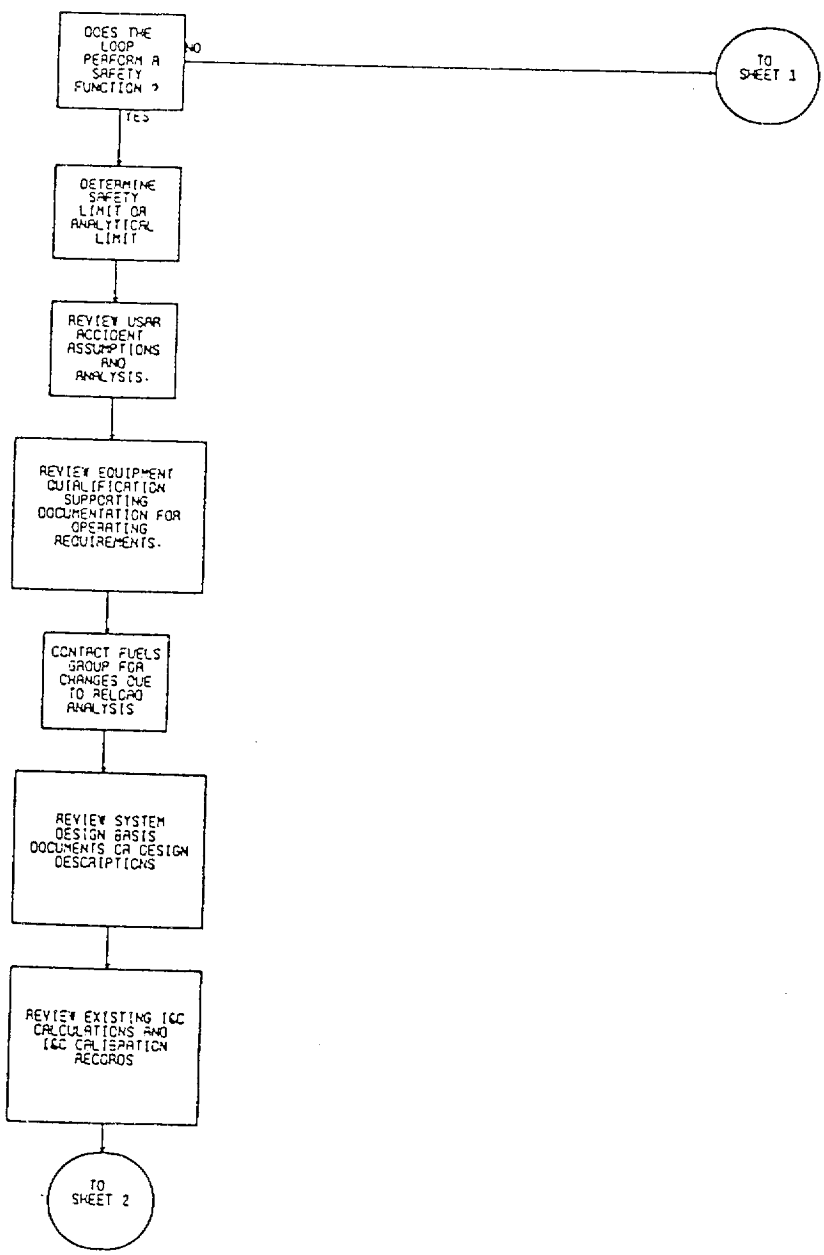
4. Westinghouse PLS Document (care should be used when referencing the PLS for design information since the values provided may be limits of assumed error for the accident analysis and not actual device performance values).

5. Where vendor information is not available some basic assumptions may be made, or the as-found as-left information from previous calibrations may be used in-place of vendor information. Where assumptions are made for accuracy effects, a program should be established to validate these assumptions and the calculations containing these assumptions tracked until they are validated. Where accident accuracy information is not available for a device required to function in a harsh environment, an equipment qualification problem may exist, the person in charge of the Equipment Qualification program should be notified.

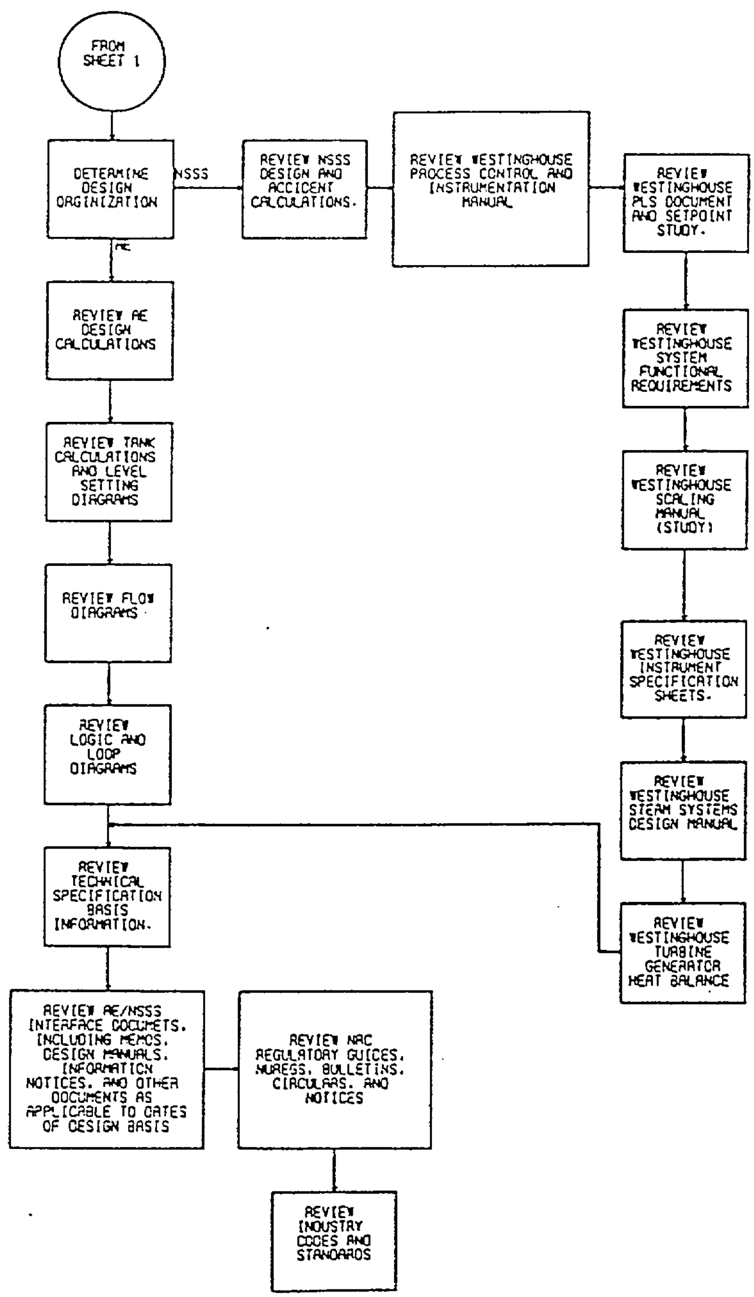
6. For non-safety related functions, the operational time will normally be based upon the equipment being protected. The operational times for these devices are specified in their design documents.

7. The absence of information in a specific report does not indicate that a given effect for an instrument does not exist. The lack of information given in the vendor document may be reason to limit the application of a given instrument. As an example if a vendor does not specify a value for drift, do not assume that the instrument is perfect, but review the as found and as left data from previous calibrations to determine a viable and justifiable drift value.

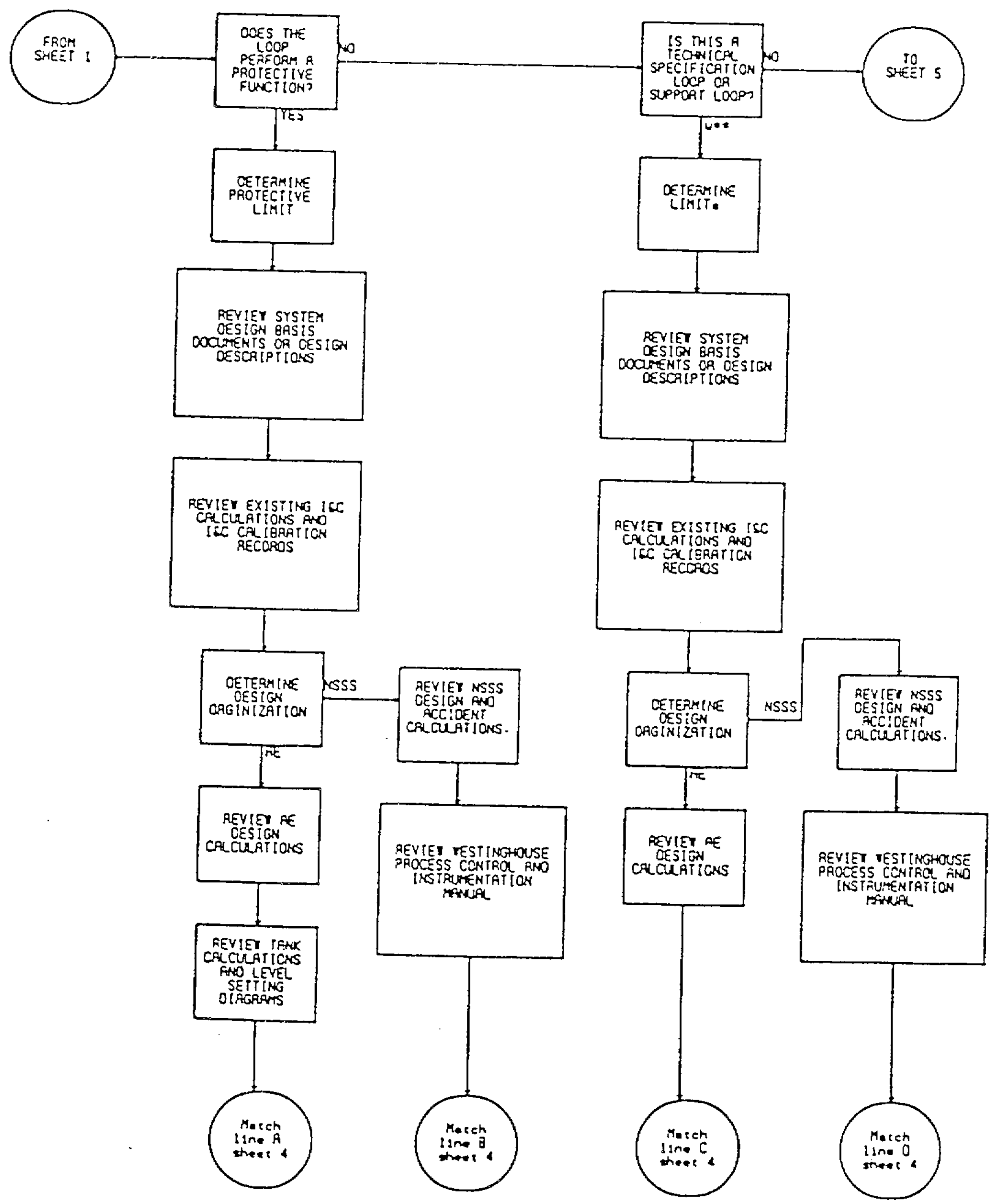
APPENDIX 1
DESIGN BASIS DATA FLOW CHART
PAGE 1 OF 5



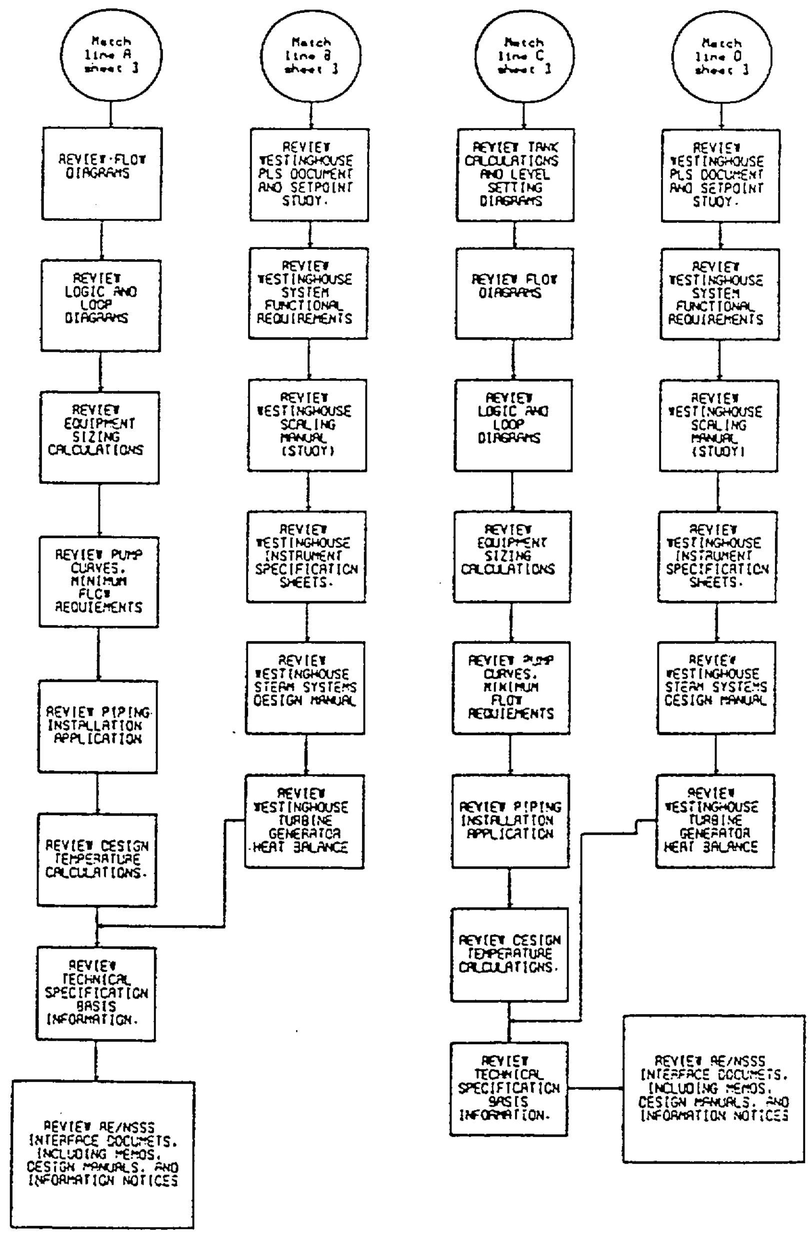
APPENDIX 1
DESIGN BASIS DATA FLOW CHART
PAGE 2 OF 5



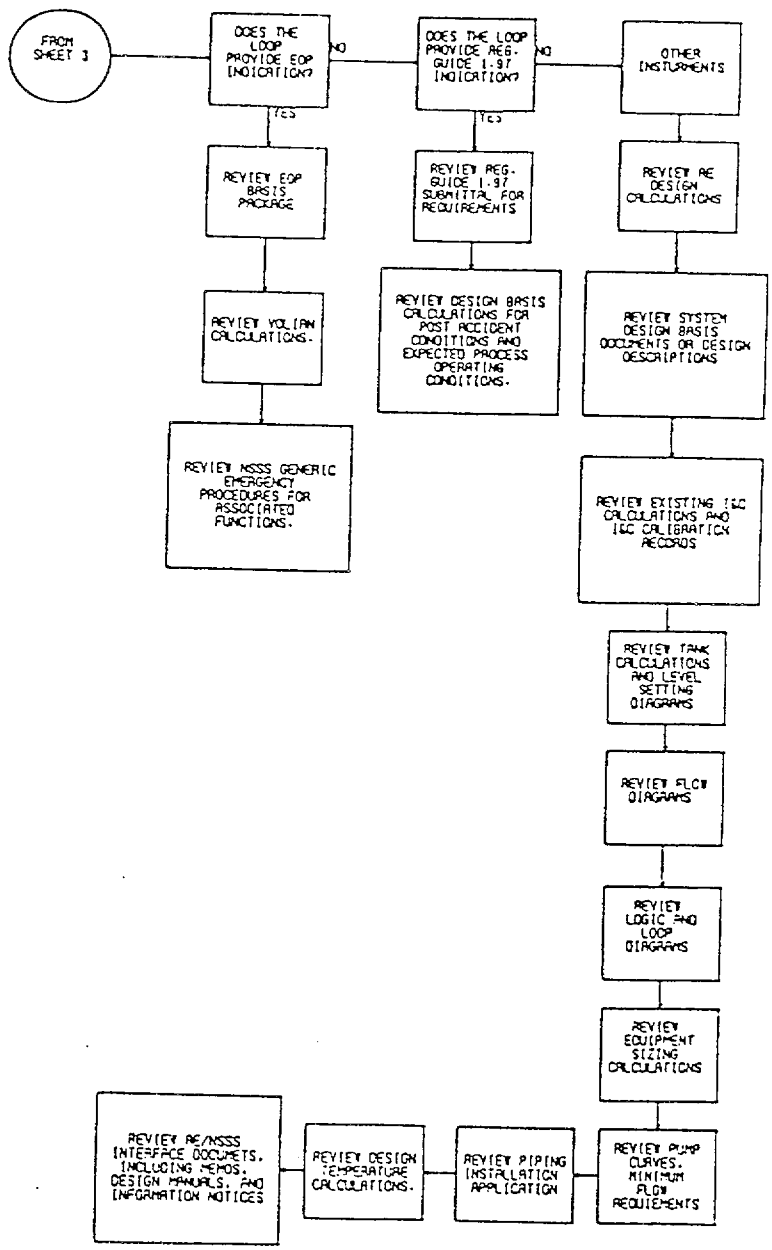
APPENDIX 1
DESIGN BASIS DATA FLOW CHART
PAGE 3 OF 5



APPENDIX 1
DESIGN BASIS DATA FLOW CHART
PAGE 4 OF 5



APPENDIX 1
DESIGN BASIS DATA FLOW CHART
PAGE 5 OF 5



6.0 ERROR DETERMINATION AND COMBINATION METHODOLOGY

The methodology presented here identifies currently known sources of instrument uncertainty and presents a method for combining these uncertainties which, while conservative in nature, is not unnecessarily restrictive with respect to plant operations. This Standard does not attempt to determine the maximum loop error, rather the objective is to determine the uncertainty that can reasonably be expected given a set of conditions.

Determination of loop uncertainty on the basis of "Straight Sum" assumes that all uncertainties occur at the same time, at their maximum values, and all in the same direction (+/-). In other words, the uncertainties are non-random. While this method provides almost 100% assurance that the derived uncertainty is conservative it is likely that these setpoints would be set too close to the normal operating ranges of plant processes. Use of "Square-Root-Sum-of-the-Squares" (SRSS), assumes that the elements of uncertainty are free to vary in both direction and magnitude. Stated another way, the elements of uncertainty are random.

The methodology presented here is a combination of Straight Sum and SRSS. The random elements of uncertainty are combined by SRSS, and any non-random uncertainties (bias) are added algebraically (straight-sum) to the SRSS result

The final form of the loop uncertainty expression is determined by characterizing each element of uncertainty as either:

Random, and Independent,
Random and Dependent, or
Non-Random

Examples provided in Reference 15 demonstrate dependencies between device errors when defining a specific loop allowance. It should be noted that the Standard considers any errors which are random and normally distributed as independent of all other random, normally distributed errors for all conditions.

This Standard does not assume any statistical characteristics for the elements of uncertainty other than that they are either random, normally distributed or non-random. The uncertainty estimate resulting from combining the random terms by SRSS will reflect the least conservative statistical characteristics of the included terms. In other words, if all the terms except one are 3-sigma (99 % confidence) values and that one is a 2-sigma (95 % confidence) value, then the uncertainty estimate will be a 2-sigma value. For conservatism, it may be assumed that published vendor specifications are 2-sigma values unless specific information is available to indicate otherwise. The individual preparing an uncertainty calculation may elect to adjust the performance specifications of various loop components by equating the statistical confidence established by vendors (sigma values). To reduce the sigma level of an error the equation is as follows:

(desired sigma/ documented sigma)(uncertainty) or to convert a 3-sigma value of .25% of span to a 2-sigma value (2/3)(0.25%) = 0.1667% span.

While these techniques are appropriate and can result in a reduction of loop uncertainty, a discussion of the mathematical basis for these techniques is not within the scope of this document. References 19 through 26 in the ISA 67.04 Part II document (Reference 6) provide techniques for statistical manipulation of instrument information.

The individual performing the calculation shall ensure that conditions assumed (i.e., values used for device uncertainty and the manner in which the elements of device and loop uncertainty are combined) are consistent with the instrumentation as installed. As shown in reference 15, this methodology is sensitive to changes in the values assumed for elements of device uncertainty and the manner in which terms are combined.

The following sections of this procedure establish a set of rules which are conservative. As shown in reference 15, departures from the recommended combination of terms can have a significant impact on the calculated value of the instrument setpoint. Deviation from the methodology should only be made following careful consideration of the effects. The basic expression of this methodology is:

$$Z = + (w^2 + (x + y)^2)^{1/2} + v$$

where: w, x, and y are random uncertainties

x and y are dependent uncertainties

w and (x + y) are independent uncertainties

v is non-random uncertainty (bias)

Z is the total allowance

6.1 Characteristics Of Terms

As explained in the previous section, this methodology is based on a thorough understanding of the elements of instrument uncertainty, their inherent characteristics and how these elements interact due to outside influences. Determination as to whether terms are random or non-random and dependent or independent affects the final form of the equation. Reference 15 provides a discussion of Random, Non-Random, Dependent, and Independent terms.

6.1.1 General Rules

These general rules apply to all calculations and shall be followed except where a different interpretation is required. Whenever a calculation deviates from one of the general rules, a written justification shall be provided in the calculation.

6.1.1.1 All elements of device uncertainty (discussed below in Section 6.2) are independent of each other. This assumes that these elements are random, normally distributed errors. Since this results in the least conservative method of error combination, assuming that elements of uncertainty are dependent only requires documentation and not justification.

6.1.1.2 Drift, M&TE and setting tolerance allowances must consider the method of calibration described in station procedures. If the individual loop instruments are calibrated as discrete components then device drift (d), M&TE (m) and setting tolerance (v) are independent when determining drift (D), M&TE (M) and setting tolerance (V) allowance.

If on the other hand, procedures dictate a loop or string calibration then those loop instruments calibrated together are considered dependent when determining drift (D), M&TE (M) and setting tolerance (V) allowance. This assumption is only valid where the errors are not random and normally distributed. Where the errors are random, and normally distributed, the loop instruments will be considered independent when determining drift (D), M&TE (M) and setting Tolerance (V) allowances.

6.1.1.3 Where the device errors are not random, normally distributed within the elements of loop uncertainty, device uncertainties subjected to the same outside influences (temperature, power, seismic, calibration, etc.) are treated as dependent terms. Subjected to the same outside influence shall mean that the influence is caused by a single Design Basis Event, and that the magnitude and time basis for the influence are the same.

6.1.1.4 Insulation Resistance (IR) shall be considered Non-Random (i.e. as a bias) and calculated at the point of interest for the loop or for the loop bounding condition.

6.1.1.5 All elements of device uncertainty are to be calculated in terms of percent calibrated span (% CS) of device output. All calculations should be performed in decimal percent of span without units. Conversions for process or engineering units may be added for clarity, however, they are not required.

6.1.1.6 Turn down ratio: Due to the specific design characteristics of some devices, performance is influenced when using the device at less than it's full range capability. Manufacturers typically indicate some errors as percent of full scale, range, or full span. Using the device at less than its full range capability results in a "turn down" error multiplier for certain performance characteristics. For the setpoint methodology, the turn down ratio converts range based errors to span based errors to provide consistency in error combination.

6.1.1.7 A multiplier of 1.25 shall be used whenever instrument calibration period (t_c) is considered by the methodology. The multiplier is included to account for a 25% allowance associated with all surveillance periods specified by the Technical Specifications Section 4.0 Surveillance Requirements, based upon this same section the limitation for refueling interval calibrations will not exceed two years. Where the calibration for the instruments is not defined by the Technical Specifications, the calculation originator is responsible for determining the correct calibration period and any required tolerance to this period.

6.1.1.8 As stated previously, the methodology describes the sources of instrument and loop uncertainty in terms of Loop span which corresponds to the calibrated input span of the transmitter. This convention is valid for all loop devices with analog inputs. It is invalid for loop devices with digital inputs (e.g., trip coils, logic circuits, etc.) since these devices are calibrated (setpoint adjustment) at only one (1) point. Therefore no span can be associated with the device (See definitions). For the purposes of this methodology, the nominal setpoint of a digital input device will be used wherever calibrated span is required. And the instrument's maximum setpoint capability shall be used wherever maximum span or range is required.

6.1.1.9 For SRSS combinations any values which are less than 0.1 times the largest numerical value under the radical can be ignored with no significant effect on the calculation results.

6.2 Elements Of Device Uncertainty

The following elements of uncertainty are instrument based and must be performed for each device defined in the functional loop. Throughout this section, the formulas used imply that the vendor performance specifications are linear. Vendor performance characteristics are presented in this manner strictly for convenience. In actuality, the performance specification may take virtually any form (i.e., linear, exponential or stepped functions). The preparer of the calculation must determine the form of the performance specification and use the proper formula for that form.

As an example, the equation for temperature effects follows:

$$t_{(n)} = (n-c)\ (vte)/(cs)$$
$$t_{(a)} = (a-n)\ (vte)/(cs)$$

where:
- a = maximum accident temperature
- n = maximum normal temperature
- c = calibration temperature
- vte = vendor's temperature effects expression
- cs = instrument calibrated span

The term vte is assumed to be an expression such as 1.2 % per 100 degrees change (this implies a change of .012 times the calibrated span per degree change or 1.2%/100) this would then result in the units canceling and would provide a unit-less percent of span value to be included in the remaining calculations. However, if the vendor specifies 1.2 % for a change between 20 and 60 degrees, then the change is not a linear condition (for a 20 or a 60 degree change the accuracy change is 1.2%). For this condition the (n-c) term in the first equation is meaningless, and should be dropped.

NOTE: The calculation preparer is expected to ensure that the instrument is not installed in an area where the temperature change would be greater than 60 degrees.

Although it is required that the preparer of an uncertainty calculation consider each category of uncertainty addressed in this section, not every uncertainty will be applicable to every instrument, and need not be included in the final calculation. However, the preparer should provide some justification for any uncertainties which are not included in the calculation. Additional notes, precautions, and examples are provided in Reference 15.

The following sources of instrument uncertainty are to be considered:

6.2.1 Accuracy (a) Appendix 2 Flow Chart Block G8

Accuracy cannot be adjusted or otherwise affected by the act of instrument calibration. Rather, it is a performance specification which the instrument is tested against during calibration to determine condition of the instrument.

Inclusion of any terms missing from the vendor's stated accuracy shall be as follows:

$$a = (va^2 + h^2 + l^2 + r^2 + db^2)^{1/2}$$

where:
- va = vendor's stated accuracy
- h = hysteresis
- l = linearity
- r = repeatability
- db = dead band

Examples and amplifying notes are provided in Reference 15.

6.2.1.1 Primary Element Accuracy (pe) Flow Chart Step G16

The accuracy of the device (e.g., flow element) between the process variable being measured and the sensor input must be accounted for in the determination of setpoints. This is the stated accuracy of the flow element, venturi or other process measurement device. This accuracy must be converted to the process span for the sensor to allow inclusion with other loop errors. This accuracy does not include process measurement effects, which are addressed elsewhere.

6.2.1.2 Drift (d) Appendix 2 Flow Chart Block I8

Drift is specified by the instrument manufacturer based on testing under laboratory conditions. Where drift is not defined by the vendor or the vendor specification is not acceptable, drift may be determined by evaluating the difference in the as-left and as-found conditions between calibrations.

The period of drift applied to an instrument for the purpose of this methodology is dependent on the calibration period of the instrument. In many cases, the period for which drift has been specified does not agree with the calibration period of the instrument. To adjust drift to match the calibration period of an instrument, the following equation may be applied where drift is considered to be a linear condition over the entire period between calibrations:

$$d = (1.25 * tc/td)\ (vd)/(cs)$$

where:
- vd = vendor's drift specification
- td = vendor's time period for which drift specification is valid.
- tc = instrument calibration period (months)
- cs = instrument calibrated span
- 1.25 = maximum allowance on time requirements in technical specifications.

Where drift can be demonstrated to be random and independent from drift period to drift period the following equation may be used to extend the manufacturers specified drift term to the calibration term:

$$d = (1.25*\{tc/td\}^{1/2})\ (vd)/(cs)$$

where: all terms are as previously defined.

6.2.1.3 M&TE (m) Appendix 2 Flow Chart Block A12

The inaccuracy introduced into the calibration process due to the accuracy of the test instruments and the accuracy of the second level standards used to compare these test instruments to the measurement standards of the National Institute of Standards and Technology (NIST), formerly NBS. Where the errors for the test instrument and the calibration standard are random and normally distributed, the errors will be considered as independent. Where it cannot be shown that these errors are random and normally distributed, they will be considered dependent.

Combination of these individual terms shall be accomplished as follows for independent errors:

$$m = (a + c)^2 + (a_2 + c_2)^2 \ldots (a_n + c_n)^2$$
$$a_n = a(ti/li)$$
$$c_n = c(ti/li)$$

where:
- a = accuracy of the test instrument
- c = closeness of the test instrument to NBS
- ti = calibrated span of test instrument
- li = calibrated span of loop instrument

6.2.1.4 Setting Tolerance (v) Appendix 2 Flow Chart Block I9

The inaccuracy introduced into the calibration process due to the procedural allowances given to the technician during instrument calibration. Tolerances given on the adjustment of the input test signal and adjustment of the loop device to match the desired output must be considered as dependent since they have an additive effect. This tolerance would include readability for input or output devices. Generally a tolerance is only given for the output setting of the process device in these cases the input tolerance is zero. Setting tolerance is determined as follows:

$$v = i + o$$

where: i = the tolerance of the test input adjustment
o = the tolerance on loop device's output adjustment

6.2.1.5 Power Supply Effects (p) Appendix 2 Flow Chart Block M8

The changes in a loop instrument's input/output relationship due to loop Power Supply Stability (pss).

$$p = (pss)\,(vpe)/(cs)$$

where: pss = Power Supply Stability
vpe = vendor's power supply effect expression
cs = instrument calibrated span

Power Supply Stability refers to the variation in the loop's power supply voltage under design conditions of supply voltage, ambient environment conditions, power supply accuracy, regulation and drift.

6.2.1.6 Temperature Effects (t) Appendix 2 Flow Chart Blocks E2 and K8

The change in a loop instrument's input/output relationship due to variations of ambient temperature in the loop instrument's environment.

Non-accident and accident temperature effects are considered separately. Non-accident temperature effects ($t_{(n)}$) deal with only the effects in changes of temperature from calibration to the normal maximum or minimum temperature (whichever provides the greater delta) for a given environment. The normal maximum or minimum temperature is defined as the design temperature limits for a given room unless specific operational conditions are measured and recorded.

Accident temperature effects ($t_{(a)}$) address the temperature effects from the normal maximum temperature or calibration temperature, where the normal minimum temperature was used to establish the normal temperature effect, to the postulated temperature during an accident. Accident temperature effects need not be considered for temperature levels which occur after the loop's required function has occurred in the accident scenario.

Normal and accident temperature effects are determined by multiplying the change in temperature and the instrument vendor's expression for temperature effect.

$t_{(n)}$ = (n-c) (vte)/(cs) or = (c-m) (vte)/(cs) whichever provides the greatest delta temperature

$t_{(a)}$ = (a-n) (vte)/(cs) or = (a-c) (vte)/(cs) where the area minimum temperature was used to determine the normal temperature effect

where:
a = maximum accident temperature
n = maximum normal temperature
c = calibration temperature
m = minimum normal temperature
vte = vendor's temperature effects expression (test reports may also be evaluated, where available, to determine the device temperature effects)
cs = instrument calibrated span

6.2.1.7 Humidity Effects (h) Appendix 2 Flow Chart Blocks E2 and K8

The change in a loop instrument's input/output relationship due to variations of ambient humidity in the loop instrument's environment.

Non-accident and accident humidity effects are considered separately. Non-accident humidity effects ($h_{(n)}$) deal with only the effects due to changes of humidity from calibration to the normal maximum for a given environment.

Accident humidity effects ($h_{(a)}$) deal with the humidity effects from the normal maximum humidity to the postulated humidity during an accident. Accident humidity effects need not be considered for humidity levels which occur after the loop's required function in the accident scenario.

Normal and accident humidity effects are determined by multiplying the change in humidity and the vendor's expression for humidity effect.

$h_{(n)} = (n\text{-}c)\ (vhe)/(cs)$
$h_{(a)} = (a\text{-}n)\ (vhe)/(cs)$

where:
a = maximum accident humidity
n = maximum normal humidity
c = calibration humidity
vhe = vendor's humidity effects expression
cs = instrument calibrated span

NOTE: Most modern instrumentation (i.e., no organic material) do not display any effect due to exposure to high humidity. There is however an increased heat transfer due to high humidity that the environmental testing should address.

6.2.1.8 Radiation Effects (r) Appendix 2 Flow Chart Blocks E2 and K8

This methodology assumes that the effects on non-accident radiation dosages (characterized by low dose rates), although non-reversible, can be eliminated by calibration. In fact, these normal radiation effects are not distinguishable from the effects of drift.

Non-accident and accident radiation effects are considered separately. Non-accident radiation effects ($r_{(n)}$) deal with only the effects of the radiation dosage received during the calibration period at normal radiation dose rates.

Accident radiation effects ($r_{(a)}$) deal with the effects of the postulated total integrated dose due to the accident. Accident radiation effects need not be considered for total integrated dose levels greater than those which occur after the loop's required function in the accident scenario. Based upon the Equipment Qualification requirements stated in NUREG 0588 and Regulatory Guide 1.89, electronic devices are not expected to be affected by Total Integrated doses below 1,000 Rads, Therefore, for any device with a TID below this value radiation effects may be ignored.

Normal and accident radiation effects are determined by multiplying the radiation dose received and the instrument vendor's expression for radiation effect, when the vendor defines the radiation effect as a linear relationship.

$r_{(n)} = 1.25\ (t_c)\ (n)\ (vre)/(cs)$

$r_{(a)} = (a)\ (t_r)\ (vre)/(cs)$

where:

a	=	accident radiation dose rate
n	=	normal radiation dose rate
t_c	=	calibration period (hours)
t_r	=	time following accident that instrument function is required (hours)
vre	=	vendor's radiation effect expression
cs	=	instruments calibrated span
1.25	=	maximum allowance on time requirements in technical specifications.

NOTES:

1. $(n)(1.25)(t_c)$ may be replaced by a predetermined normal Total Integrated Dose (TID)

2. $(a)(t_r)$ may be replaced by a predetermined accident TID.

3. Where historical as-found to as-left differences are used to determine drift, the normal radiation effect can be set to zero with the justification provided in the calculation stating "the normal radiation effect is included in the drift value determined".

   Where the device radiation effect is given as a step change (i.e., $0 < TID < 10$ MRads, effect is 4.5% of device span) the normal radiation dose and accident dose should be added together prior to multiplying with the vendor expression and the normal radiation effect expression should be dropped from the equation. The following formulas are provided for determining the normal and accident radiation effects when the vendor effect is defined as a step change relationship. For Normal radiation exposure the value 1.25 (t_c) (n) is calculated to determine which section of the step is used that section of the step is then inserted in the following formula:

$r_{(n)} = (vre)/(cs)$

For Accident radiation the value for (a) (t_r)+ 1.25 (tc) (n) is calculated and used to define the appropriate step the step is then inserted into the following formula.

$r_{(a)} = (vre)/(cs)$

where: all values are as previously defined.

The same notes apply for the step change equations also.

6.2.1.9 Seismic or Vibration Effect(s) Appendix 2 Flow Chart Block H1

Determination of seismic or vibration effects must consider the actual response due to the instrument location (building and elevation). If the instrument is not rigidly mounted, then the seismic characteristics of the instruments mounting must also be included.

Seismic or vibration effects are determined based on the instrument vendor's expression for the effect and the response spectrum at the instrument's location. The following discussion assumes that the device is rigidly mounted. Where this is not the case, or where vibration is involved, an evaluation of the actual frequency and motion must be performed to determine the effect on the seismic response.

$s = (vse)\ (sre)/(cs)$

where:
- vse = vendor's seismic or vibration response expression
- cs = instrument calibrated span
- sre = seismic response envelope

6.2.1.10 Static Pressure Effect (spe) Appendix 2 Flow Chart Block G13

The change in the input/output relationship of a loop instrument due to calibrating the instrument at a static pressure other than the pressure at which it normally operates. Static pressure effect need only be considered for devices in direct contact with process. Additionally, only differential pressure instruments are affected by this phenomena. The preparer is cautioned that both the zero based and the span based effects must be included in either the calibration process or the setpoint calculation.

Static pressure effect may be determined by multiplying the vendor's expression and the change in static pressure.

$spez = (vspez)\ (n\text{-}c)/(cs)$
$spes = (vspes)\ (n\text{-}c)/(cs)$
$spe_{dp} = (spez + spes)$
$spe_{in} = (spez^2 + spes^2)^{1/2}$

where:
- spe_{in} = independent static pressure effects
- spe_{dp} = dependent static pressure effects
- vspez = vendor's SPE expression for zero based errors
- vspes = vendor's SPE expression for span based errors
- n = normal maximum operating pressure
- c = instrument static calibration pressure
- cs = instrument calibrated span

Another type of pressure effect is the Span Shift Bias as discussed below.

Transmitters that are calibrated with the low side at ambient pressure but used in a high line pressure application, require a calibration correction to compensate for the effect increased static pressure will have on the device. If the zero is elevated or suppressed, the zero adjustment should also be corrected.

Correction factors are typically expressed in percent of differential pressure input at end points. The calculation preparer must verify the appropriate correction factor for the range code and verify if the calibration process includes this span correction. It is important to note that this error must be taken as a straight bias positive to the total loop error in the calculation if the field compensation cannot be verified through instrument scaling documents / standard calibration procedures.

6.2.1.11 Modeling Error (ce) Appendix 2 Flow Chart Block R8

Calculation model errors (ce) result from the use of a mathematical model to calculate a variable from measured process variables. These errors may be non-linear over various portions the process range. For example, a differential pressure device is used for flow measurement, with a functional relationship as follows:

$\text{Flow}=(C')(h^{1/2})$

Where:	Flow	=	measured flow as ratio of maximum flow.
	h	=	measured differential head
	C'	=	constant

The flow error is given by:

$f=(C')\text{delta } h \text{ (FE } h \text{ error)}/\ 2(F)^{1/2}$

The flow error is proportional to the FE error by a constant and function that is the inverse of the flow itself. Since the error is non-linear, the user calculates the error for various flow rates of interest. The calculated error will not be applied as a percent of span (i.e. a span of 1000 gpm with an error at 100 gpm of 25 GPM is not equivalent to .025% of span but to 25% of the setpoint.

"The Application of Statistical Methods in Evaluating the Accuracy of ANALOG Instruments and Systems" by Zalkind, C.S., and F.G. Shinskey (The Foxboro Company) provides the mathematical relationships for determining the effects of non-linear devices on the measured process variable error. It should be noted that other models may also accurately represent this effect.

Whenever modeling errors are to be considered, the errors for the loop components prior to the non-linear device are combined to a single random error value and associated Bias terms for each input to the non-linear device. These Errors will then be propagated using the appropriate equations. Once errors are defined on the output of the non-linear device the TLU equations may be used to combine these errors with the remaining linear device errors. Equations and methods of calculating Model Errors are provided in Reference 15.

6.2.1.12 Over Pressure Effect (ope) Appendix 2 Flow Chart Block G13

The change in the input/output relationship of a loop instrument due to operation of that instrument in excess on its design pressure. Over pressure effect need not be considered for any devices other than those in direct contact with process.

Over pressure effect may be determined by multiplying the vendor's expression and the over pressure condition.

ope = (vope) (pmop-idp)/(cs)

where:
- vope = vendor's over pressure expression
- pmop = process maximum operating pressure
- idp = instrument design pressure
- cs = instrument calibrated span

6.2.2 Other Sources Of Uncertainty

The methodology considers three (3) other sources of uncertainty which are not due to instrumentation but do effect the loop's uncertainty.

6.2.2.1 Process Considerations (pc) Appendix 2 Flow Chart Block G13

Process considerations deal with the physical changes which occur to the plant's process systems due to normal and accident conditions. Process Measurement Errors are defined by any deviation from the assumed "ideal" process condition. The person performing the setpoint must understand the conditions of the process during calibration, operation (both normal and abnormal) and shutdown. Some Examples of Process Measurement Error include:

- Tank vortexing,
- Process density changes (thermal, pressure, chemical),
- Process pressure changes,
- Process temperature changes,
- Process/fluid velocity effects,
- Geometry changes due to thermal growth, structure deformation, material buildup,
- Downcomer or condensate subcooling effects,
- Reference leg heatup,
- Stratification,
- Capillary effects,
- Piping or tap location effects.

Process considerations may be independent or dependent with respect to other process considerations or other sources of loop uncertainty (i.e., temperature effect). Due to the complex nature of the process systems associated with a nuclear facility it is not possible to provide a definitive list of sources.

Rather, this section only attempts to make the reader aware of the existence of such phenomena and how to treat the effects once they have been identified and evaluated.

6.2.2.2 Insulation Resistance (ir) Appendix 2 Flow Chart Block C12

The effects of leakage current or ir on an instrument loop's performance is a function of the amount of current leakage in the loop's current carrying components. Leakage currents are caused by decreases in the insulation resistance of dielectric materials used in cable, splices, terminal blocks, penetrations, seal assemblies, etc., due to the effects of high temperatures and/or moisture from LOCAs, HELBs or MSLBs. See Appendix G of Reference 15 for one method of calculating ir effects.

6.2.2.3 Aging (g)

Aging refers to the gradual changes which take place in the materials used in instrument construction due to exposure to heat, humidity, radiation and pressure. Virtually all materials found in plant instrument undergo an aging process which affects the physical properties that the instrument design is based on.

This methodology assumes that any device incapable of passing calibration or one which has a history of poor performance will be removed from service. Any long-term aging effects will be compensated for in the normal device calibration cycle over the installed, service life of the instrument.

6.2.3 Error Allowances

Once the individual device errors have been determined the errors are grouped to provide allowances for each error type. Errors which are independent between instruments are combined using the Sum of the Squares method. As an example the Accuracy Allowance is determined as follows:

Sum of the squares of the independent loop instrument accuracies (a).

$$A = a_1^2 + a_2^2 + \ldots a_n^2$$

where: a_n = the accuracy of the n^{th} device

Where errors are not random, normally distributed and show some dependent relationship between instruments, the errors for the dependent instruments will be combined as a straight sum. This combination will create an error term which is independent from the other error terms. The new independent error term will then be combined with the remaining independent error terms using the Sum of the Squares technique. The following example using drift demonstrates this error allowance combination method.

Multiple loop devices calibrated together (i.e., string calibration) are considered dependent for drift, M&TE and setting tolerance, however only the string setting tolerance and string M&TE values are used in the calculation.

$$D = (d_1 + d_2 + d_3)^2 + d_4^2 + \ldots d_n^2$$

where: $(d_1 + d_2 + d_3)$ = the drift components for the string calibrated devices (dependent)

$d_4^2 + \ldots d_n^2$ = the drift components for the independent devices

When combining environmental terms (temperature, humidity and radiation) the manner in which the individual errors were determined must be considered. Since we evaluate normal and accident effects separately, when determining Accident TLUs these terms must be combined. The following temperature example demonstrates this combination.

Sum of the squares of the temperature effects of all independent temperature environments.

Normal: $T_{(n)} = t_{(n)1}^2 + t_{(n)2}^2 + \ldots t_{(n)n}^2$

Accident: $T_{(a)} = t_{(a)1}^2 + t_{(a)2}^2 + \ldots t_{(a)n}^2$

where: $t_{(n)n}$ or $t_{(a)n}$ = the sum of the temperature effects for all devices defined to be dependent due to environmental considerations for accident (a) or normal (n) environmental conditions, or the temperature effects for the n^{th} device.

T = the sum of the squares of the independent accident or normal temperature effects.

Multiple loop devices subjected to the same temperature environment, where the temperature effects for both devices are not random normally distributed errors, are considered dependent with respect to temperature effects. For such devices, their individual temperature effects must be combined algebraically (straight sum) to determine the temperature effect for that particular environment.

Normal: $t_{(n)n} = (t_{(n)1} + t_{(n)2})^2$

Accident: $t_{(a)n} = (t_{(n)1} + t_{(a)1} + t_{(n)2} + t_{(a)2})$

where: devices 1 and 2 are subjected to the same normal (n) and accident (a) environment, where evidence demonstrates that the device effects are dependent or does not prove that the device effects are independent.

NOTE: In the above equation for $t_{(a)n}$, it appears as though normal and accident temperature effects are treated as dependent terms. This is due to the way in which the values for accident and normal temperature effects are calculated on the device level, the terms become additive. In other words, the full temperature effect is the sum of the calculated normal and accident values.

Unless special circumstances dictate otherwise, devices which are considered as dependent with respect to temperature effect shall also be considered dependent for humidity effects.

Under certain conditions, various effects (temperature as an example (t)) and process considerations (pc) should be considered as dependent terms. If variations in ambient temperature in the vicinity of a device cause physical or process changes which introduce random errors in addition to the temperature effects of the device, then process considerations (pc) and temperature effects (t) must be considered to be dependent.

Normal: $t_{(n)n}^2 = (t_{(n)1} + t_{(n)2} + pc)^2$

Accident: $t_{(a)n}^2 = (t_{(n)1} + t_{(a)1} + t_{(n)2} + t_{(a)2} + pc)^2$

where: 1 and 2 are devices subjected to the same normal (n) and accident (a) environment which also effects the process measurement (pc).

Non-random process considerations (pc) and the bias portions of any other errors are simply added (or subtracted depending on the nature of the uncertainty) to the result of the SRSS computation.

$$TLE = + (A + D + M + V + P + T + H + R + S)^{1/2} + PC$$

or

$$TLE = - (A + D + M + V + P + T + H + R + S)^{1/2} - PC$$

where : TLE = Total Loop Error

NOTE: Offsetting process concerns are not allowed unless it can be demonstrated that the concerns occur at the same time and due to the same stimuli.

6.2.3.1 Non-normal Environmental Allowance (DBA vs. DBE) (or Safe Shutdown Earthquake vs. Design Basis Accident)

Since the NSP PINGP design basis does not consider coincident DBE and any DBA to be a creditable event, the methodology considers only the event having the larger effect. Determination as to which effect (DBE or DBA) is larger will be accomplished as follows:

DBE effect $= S^{1/2}$

DBE with non-seismic

HVAC effect $= (S + T_a + H_a)^{1/2}$

DBA effect $= (T_{(a)} + H_{(a)} + R_{(a)} + PC)^{1/2}$

where: S, R_a, H_a, PC and T_a are as previously defined

Vendors also provide values for different combinations of events. For High Energy Line break some vendors supply a Steam/ Pressure/ Temperature effect, it is the originators responsibility to ensure that these effects are properly applied.

6.2.3.2 Normal vs. Accident Conditions

In the previous sections of this methodology instructions were provided for determining the accident and non-accident effects of temperature, humidity and radiation on the installed instrumentation loops. The sections which follow make no distinction as to whether the terms T, H and R are accident or non-accident values. It is the responsibility of the individual preparing the calculation to ensure the correct application of terms.

6.2.3.3 Setpoint Determination

Setpoint determination is dependent on values established by analyses which are beyond the scope of the setpoint methodology. Specifically, "Safety Limit" (SL) and "Analytical Limit" (AL) were established during the design of the facility. The values of these terms can be found in a number of places, including the USAR and Technical Specifications, and calculations performed by mechanical, electrical or nuclear engineering disciplines.

It is assumed by this methodology that the Safety Limit and Analytical Limit account for all process related phenomena associated with accident, transient, and normal operating conditions.

Additionally, it is assumed that the Analytical Limit represents the true process parameter value which plant corrective action is initiated in the accident analysis. (No margin is assumed on this value by the setpoint methodology.) Finally, it is assumed that the accident analysis includes the response times (instrument, mechanical, thermo-hydraulic etc.) either above the Safety Limit or between the Safety Limit and the Analytical Limit.

The purpose of these assumptions is to establish the validity of the Analytical Limit. If any of these assumptions are suspect, then additional analysis is required to "adjust" the Analytical Limit accordingly. As will be seen in the following paragraphs, the Analytical Limit forms the basis for all values which are determined by this methodology.

6.2.3.4 Total Loop Error Determination (TLE)

The Total Loop Error (TLE) is determined using the following formulas,

For Normal conditions (i.e., no accident effects):

$$TLE = \pm (A + D + V + M + T + H + R + P + SPE + OPE + P_C)^{1/2} \pm P_C \pm Bias$$

For Accident conditions:

$$TLE = \pm (A + D + V + M + T + H + R + P + S + SPE + OPE + P_C)^{1/2} \pm P_C \pm IR \pm Bias$$

NOTES:

- For both conditions either setting tolerance or accuracy are used (but not both values) based upon the tolerance used in the surveillance procedures.
- For accident, either the Seismic term or the accident environmental terms are used.
- The term P_C inside the radical is for random process concerns and the one outside the radical is for bias or directional process concerns.
- The term Bias outside of the radical is to account for any non-random effects associated with the errors.

6.2.3.5 Setpoint Determination

Within this methodology, three (3) terms are derived based on the Analytical Limit (AL) and the calculated loop allowances.

6.2.3.5.1 Nominal Trip Setpoint (NTSP)

For Increasing Setpoints:

NTSP = AL - (TLE * PS)

where: AL is the Analytical Limit as defined by the accident analysis.

PS is Process Equivalent Span

$$TLE = +(A + D + V + M + T + H + R + P + S + SPE + OPE + P_C)^{1/2} + P_C + IR + Bias$$

For Decreasing Setpoints:

NTSP = AL + (TLE * PS)

where: PS is Process Equivalent Span

$$TLE = |-(A + D + V + M + T + H + R + P + S + SPE + OPE + P_C)^{1/2} - P_C - IR - Bias$$

6.2.3.5.2 Allowable Value (AV)

For Increasing Setpoints:

AV = NTSP + (LD * PS)

where: LD is loop drift

$$LD = (A + D + V + M + R_{(n)})^{1/2}$$

For Decreasing Setpoints:

$$AV = NTSP - (LD * PS)$$

where: LD is loop drift

$$LD = (A + D + V + M + R_{(n)})^{1/2}$$

Loop Drift is made up of the error variables checked during the full calibration of the loop where it can be proven that additional variables (i.e., SPE or OPE) values are also verified during the loop calibration then these values may also be added into the Loop Drift equation.

6.2.3.5.3 Rack Allowable (RA)

The rack allowable is the maximum as-found value for the loop when the transmitter is not considered in the functional or channel check. The normal allowable value may not be used to verify loop operability unless the transmitter is also checked during the test.

For Increasing Setpoints:

$$RA = NTSP + (RD * PS)$$

where: RD is the rack component drift for the period of the channel functional check

$$RD = (D_R + V_R + M_R + R_{(n)R})^{1/2}$$

D_R, V_R, M_R and $R_{(n)R}$ are the sum of the squares of components tested during channel functional checks.

For Decreasing Setpoints:

RA = NTSP - (RD * PS)

where: RD is the rack component drift for the period of the channel functional check

$$RD = (D_R + V_R + M_R + R_{(n)R})^{1/2}$$

D_R, V_R, M_R and $R_{(n)}$ are the sum of the squares of components tested during channel functional checks.

APPENDIX 2 CALCULATION DEVELOPMENT FLOW CHART
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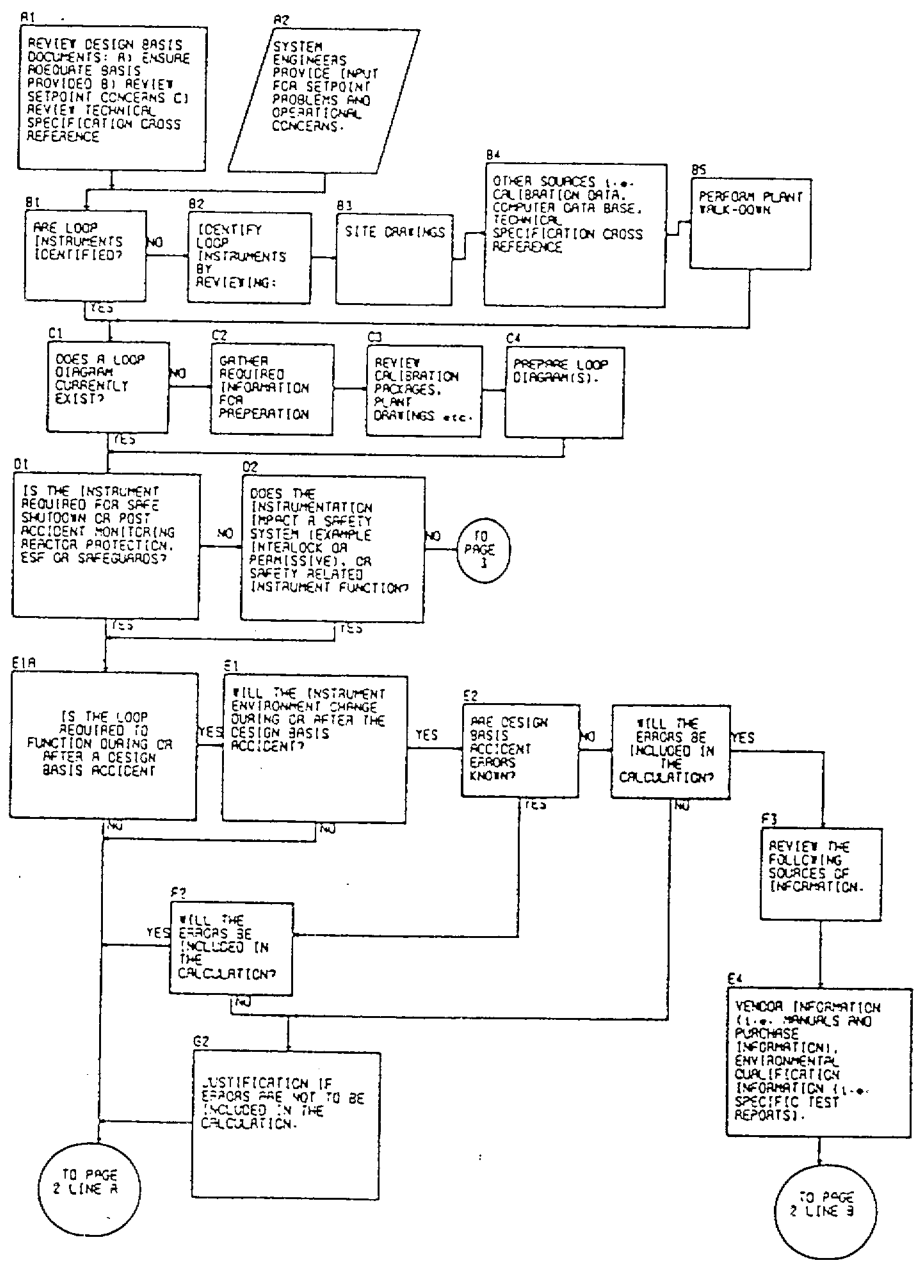

INSTRUMENT SETPOINT/UNCERTAINTY CALCULATIONS

APPENDIX 2 CALCULATION DEVELOPMENT FLOW CHART
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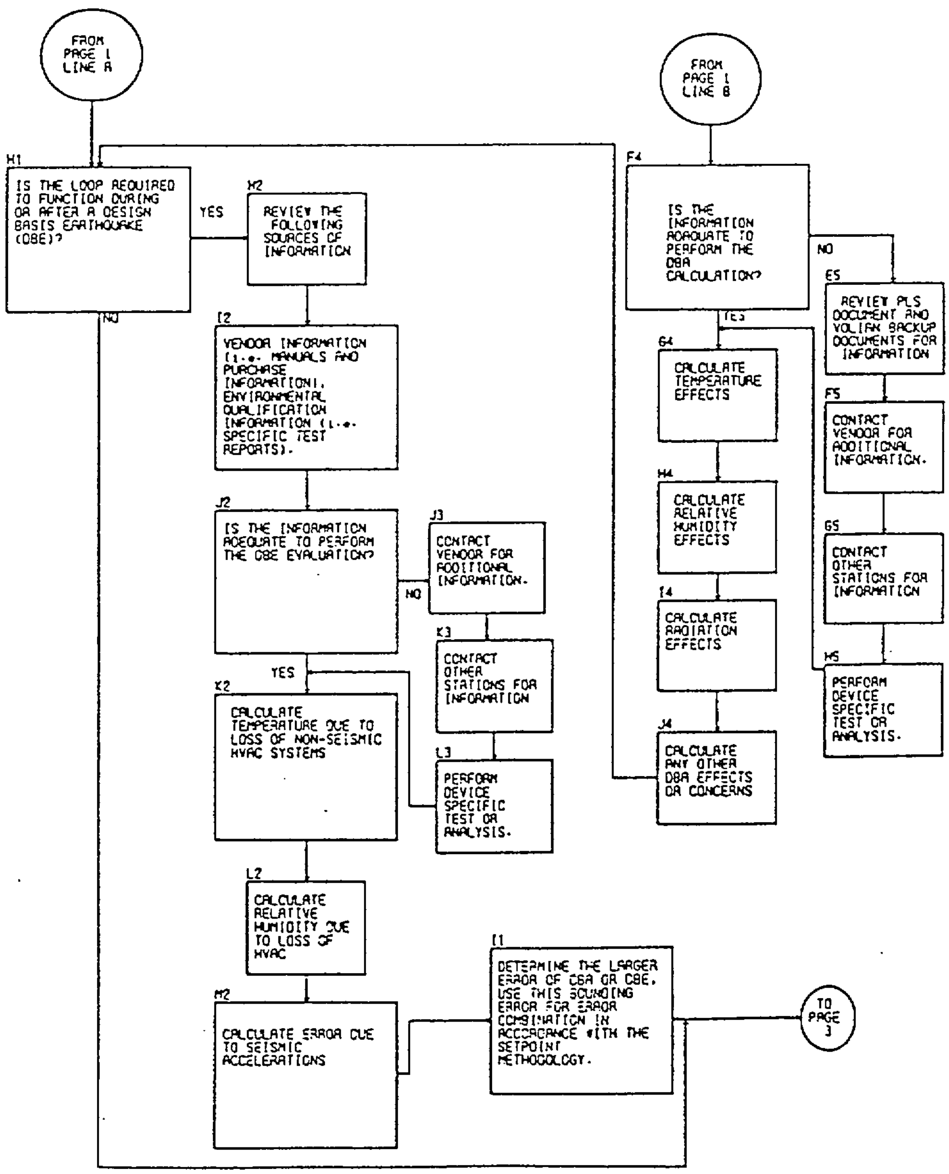

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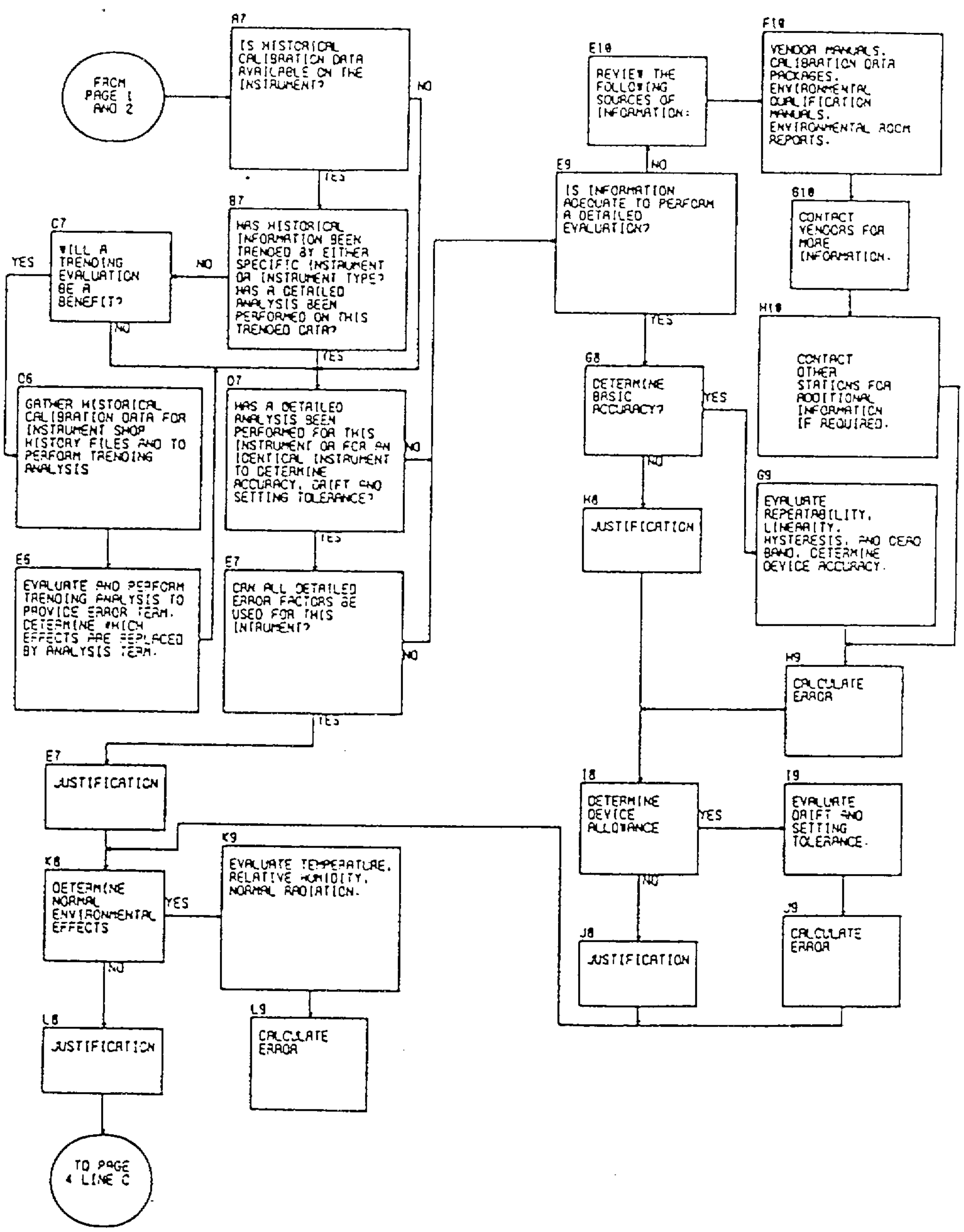

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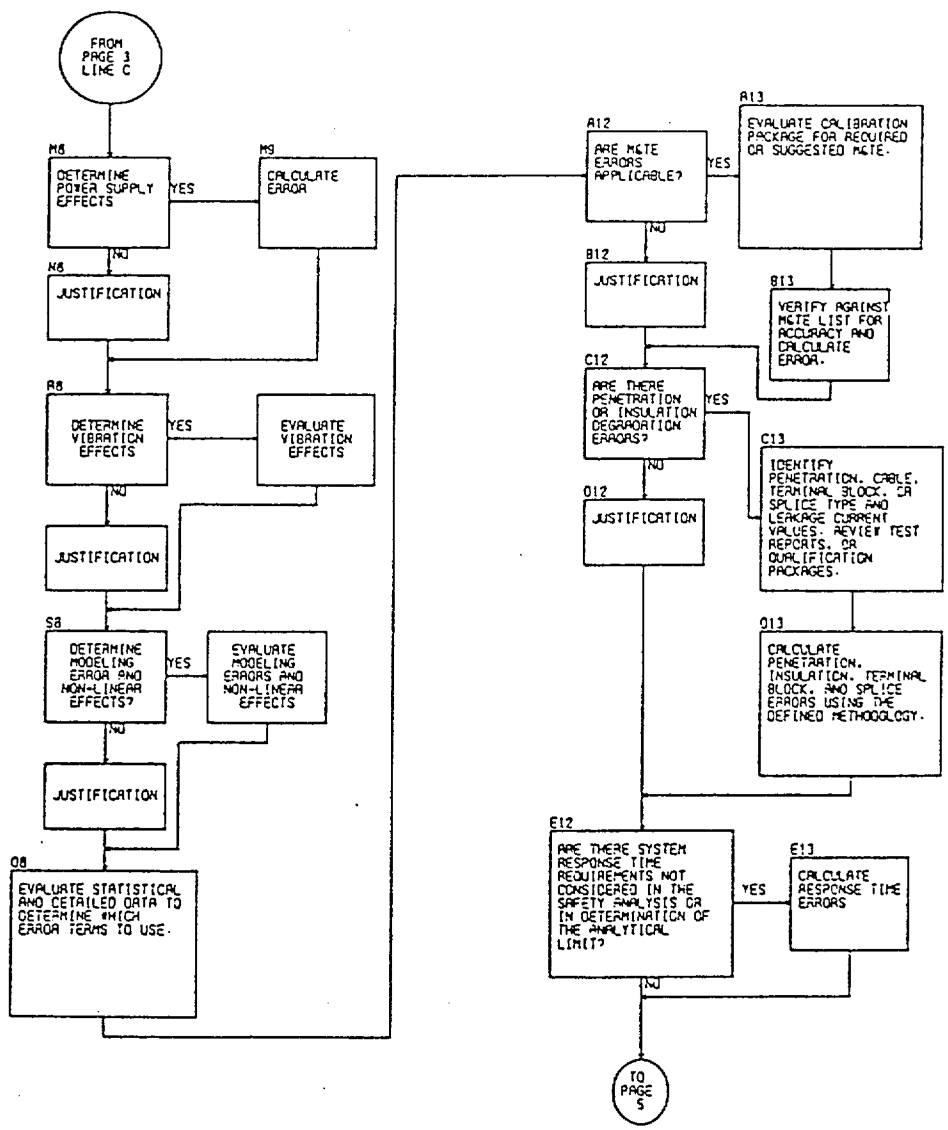

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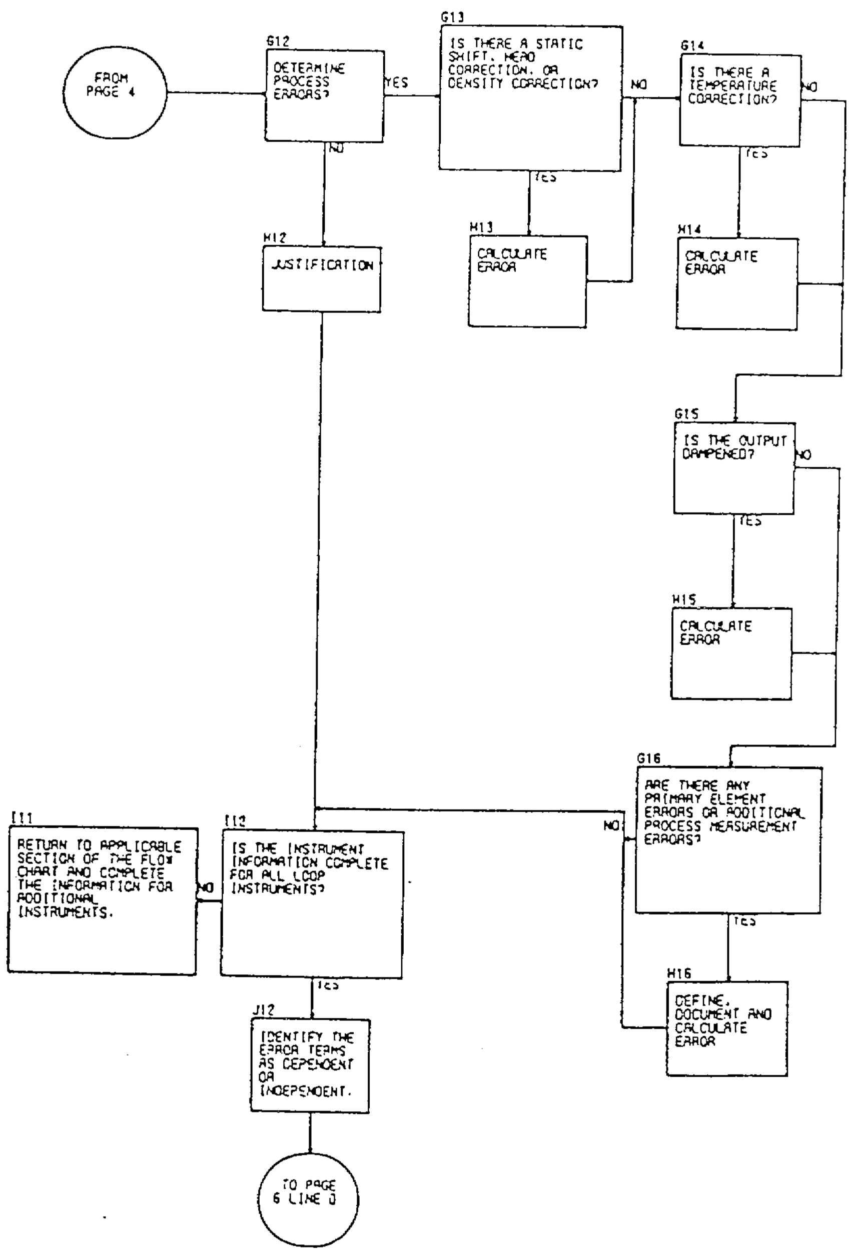

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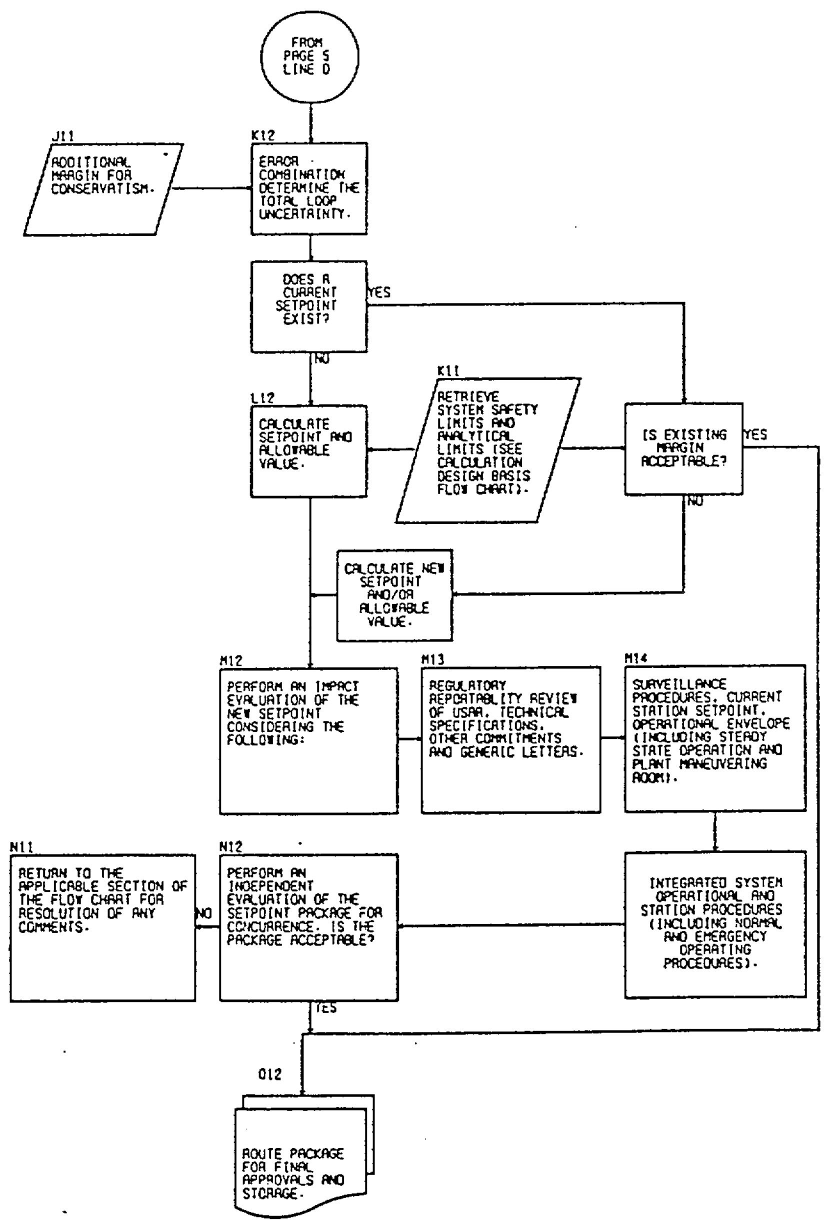


D. RELATED ENGINEERING MANUAL SECTIONS

The following sections provide additional information on the requirements for design considerations involving relay sizing:

1.2.1	Design Control Program
1.2.2	Use of General Design Criteria, Regulatory Guides and Other Licensing Design Criteria
1.2.3	Development of Design Calculations
1.2.6	Verification of Computer Programs
1.2.8	Indexing of Design Analyses
2.1.3	Electrical Component Supports
2.1.10	Seismic Qualification (Including II/I)
2.2.9	High Energy Line Breaks
2.3.13	Under Voltage/Degraded Voltage Analysis
2.3.15	Instruments (Accuracy and Scaling)
2.3.16	Instrument Tubing Installation
2.4.1	Environmental Equipment Qualification
2.4.2	Quality List (Q-List) and Related Classification
2.4.4	Inservice Inspection/Testing (ISI/IST)
2.4.6	Regulatory Guide 1.97 Compliance
2.4.7	Appendix R
2.4.8	Human Factors Engineering

E. REFERENCES

1. Title 10 of the Code of Federal Regulations, Part 50, "Domestic Licensing of Production and Utilization Facilities."

2. Regulatory Guide 1.105, Revision 2, "Instrument Setpoints for Safety-Related Systems, February 1986."

3. Regulatory Guide 1.97, Revision 3, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident, May 1983."

4. ASME Section XI, "ASME Boiler and Pressure Vessel Code."

5. ISA-S-67.04-1987, Standard for, "Setpoints for Nuclear Safety-Related Instrumentation."

6. ISA-RP-67.15-1991, (ISA-S-67.04 PART II COMMITTEE DRAFT 10) "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation" 1991.

7. ANSI/ISA-S51.1-1979, "Process Instrumentation Terminology."

8. IEEE Standard 338-1977, "IEEE Standard Criteria for the Periodic Testing of Nuclear Generating Station Safety Systems."

9. IEEE Standard 498-1980, "Standard Requirements for the Calibration and Control of Measuring and Test Equipment used in the Construction and Maintenance of Nuclear Power Generating Stations."

10. ANSI/ASME PTC 19.1-1985, Part 1 "Measurement Uncertainty, Instruments and Apparatus, Supplement to ASME performance Test Code."

11. ASME PTC 19.5, Part II "Application of Fluid Meters, Instruments and Apparatus, Sixth Edition 1971."

12. ASME MFC-3M-1985, "Measurement of Fluid Flow in Pipes Using Orifice, Nozzle, and Venturi."

13. NUREG/CR-3659 Feb 1985 "Mathematical Model for Assessing the Uncertainties of Instrumentation Measurements for Power and Flow of PWR (Pressurized Water Reactors) Reactors" Battelle Pacific Northwest Labs., Richland, WA.

14. NSP PINGP Calculation "Bounding Effects of Insulation Resistance on Instrument Loop Accuracy for Current and RTD Loops."

15. Two Loop Group Instrument Setpoint Methodology Revision 1

16. NSP PINGP Surveillance and Preventive Maintenance Programs

17. NSP PINGP Head Correction

18. NRC Information for setpoint calculations and setpoint control:

- IE Bulletin No. 79-21 — TEMPERATURE EFFECTS ON LEVEL MEASUREMENTS
- IE Information Notice 79-35 — CONTROL OF MAINTENANCE AND ESSENTIAL EQUIPMENT
- IE Bulletin No. 80-16 — POTENTIAL MISAPPLICATION OF ROSEMOUNT ...MODELS 1151 AND 1152 PRESSURE TRANSMITTERS WITH EITHER "A" OR "D" OUTPUT CODES

• IE Information Notice 82-11	POTENTIAL INACCURACIES IN WIDE RANGE PRESSURE INSTRUMENTS USED IN WESTINGHOUSE DESIGNED PLANTS
• IE Information Notice 82-16	HPCI/RCIC HIGH STEAM FLOW SETPOINTS
• IE Information Notice 82-49	CORRECTION FOR SAMPLE CONDITIONS FOR AIR AND GAS MONITORING
• IE Information Notice 83-03	CALIBRATION OF LIQUID LEVEL INSTRUMENTS
• IE Information Notice 84-35	BWR POST-SCRAM DRYWELL PRESSURIZATION
• IE Information Notice 84-54	DEFICIENCIES IN DESIGN BASE DOCUMENTATION AND CALCULATIONS SUPPORTING NUCLEAR POWER PLANT DESIGN
• IE Information Notice 84-88	STANDBY GAS TREATMENT SYSTEM PROBLEMS
• IE Information Notice 85-02	IMPROPER INSTALLATION AND TESTING OF DIFFERENTIAL PRESSURE TRANSMITTERS
• IE Information Notice 85-89	POTENTIAL LOSS OF SOLID-STATE INSTRUMENTATION FOLLOWING FAILURE OF CONTROL ROOM COOLING
• IE Information Notice 85-100	ROSEMOUNT DIFFERENTIAL PRESSURE TRANSMITTER ZERO POINT SHIFT

• IE Information Notice 88-76	RECENT DISCOVERY OF A PHENOMENON NOT PREVIOUSLY CONSIDERED IN THE DESIGN OF SECONDARY CONTAINMENT PRESSURE CONTROL
• IE Information Notice 89-68	EVALUATION OF INSTRUMENT SETPOINTS DURING MODIFICATIONS
• IE Information Notice 90-28	POTENTIAL ERROR IN HIGH STEAMLINE FLOW SETPOINT
• IE Information Notice 91-75	STATIC HEAD CORRECTIONS MISTAKENLY NOT INCLUDED IN PRESSURE TRANSMITTER CALIBRATION PROCEDURES
• IE Information Notice 92-12	EFFECTS OF CABLE LEAKAGE CURRENTS ON INSTRUMENT SETTINGS AND INDICATIONS
• IE Information Notice 92-33	INCREASED INSTRUMENT RESPONSE TIME WHEN PRESSURE DAMPENING DEVICES ARE INSTALLED
• IE Information Notice 92-54	LEVEL INSTRUMENTATION INACCURACIES CAUSED BY RAPID DEPRESSURIZATION
• IE Information Notice 93-27	LEVEL INSTRUMENTATION INACCURACIES OBSERVED DURING NORMAL PLANT DEPRESSURIZATION
• IE Information Notice 93-62	THERMAL STRATIFICATION OF WATER IN BWR REACTOR VESSELS

Prairie Island Nuclear Generating Plant

Attachment 2

to

Supplement to License Amendment Request dated December 11, 2000
Conversion to Improved Technical Specifications (ITS)

Calculation SPCRP019,

"Unit 1 Pressurizer High Pressure Reactor Trip", Rev. 0

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
CALCULATION COVER SHEET

Calculation Number: SPCRP019

Calculation Rev. No.: 0

Calculation Title: Unit 1 Pressurizer High Pressure Reactor Trip

Calculation Type:

☑	Safety Related	Non-Safety Related (review required)
	What if (information only)	Non-Safety Related (review not required)

Plant Conditions:

Normal	☑	Seismic	Post Accident
LOCA		Other	

Calculation Verification Method (check one):
✓ Design Review _____ Alternate Calculation _____ Qualification Testing

Scope of Revision: Original

Documentation of Reviews and Approvals:

Originated By: Thomas M. VerBout **Date:** 12/10/2000
Reviewed By: Brian K. Rogers **Date:** 12/12/2000
Approved By: Chris C. Mundt **Date:** 12/26/2000

TABLE OF CONTENTS

1.0 PURPOSE/RESULTS

1.1. Purpose and Acceptance Criteria

The purpose of this calculation is to determine the Nominal Trip Setpoint and Allowable Value of the Pressurizer High Pressure Reactor Trip Bistables, PC-429A, PC-430A, and PC-431A, given the Analytical limit is 2425 psia per the Prairie Island Nuclear Generating Plant USAR, Appendix 14C, table 6.3. in order to support submittal of the PINGP Improved Technical Specifications (ITS). This calculation SHALL not be implemented on actual plant equipment until ITS has been approved

Per the Prairie Island Nuclear Generating Plant USAR, Reference 5, the pressurizer high pressure instrumentation loop trips the reactor on two out of three coincident high pressure signals to mitigate an RCS overpressurization. This loop also provides input to the calculation that develops the overtemperature deltaT reactor trip function, in conjunction with neutron flux and RCS temperature.

Chapter 14 of the USAR, Reference 5, takes credit for the Pressurizer High Pressure Reactor Trip function to mitigate the consequences of Uncontrolled RCCA Withdrawal at Power (section 14.4.2) and Loss of External Electrical Load (section 14.4.9).

Chapter 14 of the USAR takes no credit for this function to mitigate the consequences of any events that create harsh environmental conditions. Therefore, only normal environmental conditions will be considered. However, since the instruments in this loop are required to function during a Design Basis Earthquake, the effects of the seismic event will be considered.

1.2. Results

HIGH PRESSURE REACTOR TRIP SINGLE ALARM

PARAMETER	VALUE (PSIG)	VALUE (VDC)
Analytical Limit (AL)	2410.0	-
Allowable Value (AV)	2403.9	0.45194
Rack Allowable (RA)	2378.8	0.43942
Nominal Trip Setpoint (NTSP)	2371.2	0.43562
Actual Plant Setting (APS)	2370.0	-
Normal Operation Upper Limit (NOUL)	2235.0	-
Normal Operation Lower Limit (NOLL)	2235.0	-

The results of this calculation show that there is a 1.2 psig margin between the Actual Plant Setting and the Nominal Trip Setpoint.

2.0 METHODOLOGY

The following equations are based on the "Two Loop Group Setpoint Methodology," Revision 0, prepared by TENERA, L.P. for Northern States Power Company, Wisconsin Public Service Corporation, and Wisconsin Electric Power Company. This methodology is based on ISA Standard S67.04-1987, Setpoints for Nuclear Safety-Related Instrumentation Used in Nuclear Power Plants.

2.1. Calculation of Total Loop Error (TLE)

Total Loop Error (TLE) = The Square Root of the Sum of the Squares (SRSS) of the Random terms ± the sum of the Bias terms, or:

TLE_{pos} = SRSS + Bias positive terms
and
TLE_{neg} = - SRSS - Bias negative terms

For normal conditions:

$$SRSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NR} + R_{NR} + H_{NR} + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NBp} + R_{NBp} + H_{NBp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NBn} + R_{NBn} + H_{NBn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn}$$

For accident conditions:

$$SRSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{AR} + R_{ANR} + H_{AR} + READ + SPT_R + PEA_{AR}{}^2 + PMA_{AR}{}^2 + PC_{AR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{ABp} + R_{ANBp} + H_{ABp} + PEA_{ABp} + PMA_{ABp} + PC_{ABp} + IR_{Bp} + SPT_{Bp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{ABn} + R_{ANBn} + H_{ABn} + PEA_{ABn} + PMA_{ABn} + PC_{ABn} + IR_{Bn} + SPT_{Bn}$$

For loss of non-seismic HVAC due to a seismic event:

$$SRSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NSR} + R_{NR} + H_{NSR} + S_R + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NSBp} + R_{NBp} + H_{NSBp} + S_{Bp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NSBn} + R_{NBn} + H_{NSBn} + S_{Bn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn}$$

For Post Accident conditions:

$$SRSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NR} + R_{NR} + H_{NR} + PDBE_R + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NBp} + R_{NBp} + H_{NBp} + PDBE_{Bp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NBn} + R_{NBn} + H_{NBn} + PDBE_{Bn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn}$$

Where:

A = The sum of the squares of all of the random device accuracies (a).

D = The sum of the squares of all of the random device drift effects (d).

M = The sum of the squares of all of the random device M&TE effects (m).

OPE = The sum of the squares of all of the random device over pressure effects (ope).

SPEZ = The sum of the squares of all of the random device static pressure zero effects (spez).

SPES = The sum of the squares of all of the random device static pressure span effects (spes).

P = The sum of the squares of all of the random device power supply effects (p).

T = The sum of the squares of all of the random device temperature effects (t).

R = The sum of the squares of all of the random device radiation effects (r).

H = The sum of the squares of all of the random device humidity effects (h).

S = The sum of the squares of all of the random device seismic effects (s).

READ = The square of the indicator readability term (read).

PEA = The primary element accuracy.

PMA = The process measurement accuracy.

PC = The sum of all of the process considerations.

IR = The error introduced by insulation resistance.

PDBE = The sum of the squares of all of the random device post design basis event effects (pdbe).

The subscripts are defined as follows:

A = For accident conditions only.

N = For normal conditions only.

AN = For cumulative accident and normal conditions.

NS = For loss of non-seismic HVAC conditions only.

R = A Random term.

Bp = A Bias positive term.

Bn = A Bias Negative term.

Notes:

1. When a device's setting tolerance is greater than its accuracy, then the setting tolerance is used in place of that device's accuracy.

2. When accident conditions are being evaluated and a Steam Pressure/Temperature (SPT) effect is given on the vendor screen, the SPT effect will automatically be substituted for T_A and H_A.

3. During all conditions, when Plant Specific Drift is entered on the vendor screen, accuracy, M&TE effect, normal temperature effect, normal radiation effect, and normal humidity effect for that device default to zero since they are all considered to be included in the Plant Specific Drift value. During the calculation, the option to override the default for each effect is given.

2.2. Calculation of the Nominal Trip Setpoint (NTSP) for Safety Related Calculations

For an increasing process: $NTSP = AL - TLE_{neg}$

For a decreasing process: $NTSP = AL + TLE_{pos}$

Where:

AL = Analytical Limit

2.3. Calculation of the Nominal Trip Setpoint (NTSP) for Non-Safety Related Calculations

For an increasing process: $NTSP = PL - TLE_{neg}$

For a decreasing process: $NTSP = PL + TLE_{pos}$

Where:

PL = Process Limit

2.4. Calculation of Allowable Value (AV)

The term AV applies to safety related calculations only. Operational Limit (OL) is the equivalent term for non-safety related calculations.

For an increasing process: $AV = NTSP + LD + LD_{Bp}$

For a decreasing process: $AV = NTSP - LD - LD_{Bn}$

Where:

LD (Loop Drift) = $(A + D_R + M + R_{NR})^{1/2}$

$LD_{Bp} = D_{Bp} + R_{Bp}$

$LD_{Bn} = D_{Bn} + R_{Bn}$

2.5. Calculation of Operational Limit (OL)

The term OL applies to non-safety related calculations only.

For an increasing process: $OL = NTSP + LD + LD_{Bp}$

For a decreasing process: $OL = NTSP - LD - LD_{Bn}$

Where:

LD (Loop Drift) = $(A + D_R + M + R_{NR})^{1/2}$

$LD_{Bp} = D_{Bp} + R_{Bp}$

$LD_{Bn} = D_{Bn} + R_{Bn}$

2.6. Calculation of Rack Allowance (RA)

The term RA applies to safety related calculations only. There is no equivalent term for non-safety related calculations.

For an increasing process: $RA = NTSP + RD + RD_{Bp}$

For a decreasing process: $RA = NTSP - RD - RD_{Bn}$

Where:

$RD\ (\text{Rack Drift}) = (A + D_R + M + R_{NR})^{1/2}$

$RD_{Bp} = D_{Bp} + R_{Bp}$

$RD_{Bn} = D_{Bn} + R_{Bn}$

Note: Rack Drift includes the effects from all loop devices except the sensor.

3.0 ASSUMPTIONS

1. It is assumed that the Analytical/Process limit for the Pressurizer High Pressure Reactor Trip is 2410 psig based on USAR (Reference 5) Appendix 14B, Table 6.3, which shows a High Pressurizer Pressure setpoint of 2425 psia for the value "used in analysis" (i.e., 2425 psia - 15 = 2410 psig).

2. Since Chapter 14 of the USAR takes no credit for the Pressurizer High Pressure Trip function to mitigate the consequences of any accidents that create harsh environmental conditions, only normal environmental conditions are considered for this calculation. However, per section 7.9 of the USAR, the seismic design criteria requires that the Pressurizer High Pressure Trip transmitter and bistable be designed to withstand, without damage or interruption of operations, the forces resulting from a Design Basis Earthquake. Therefore, this calculation considers the effects of a seismic event.

3. Based on a review of the calibration data for the M&TE test equipment used to calibrate the Fluke Model 45 (0-3 vdc scale), the accuracy of the M&TE standard has been determined to be +/- (0.002% of span + 0.1 mv).

4. The plant specific drift for the Foxboro model 63U-AC-0HBA-F bistable was looked at specifically for 2PC-431A based on the calibrations that occurred from 2/26/92 through 10/18/93. A maximum drift value of 0.475% of span is based on the as-found setting of 43.70 mA on 9/23/93 and the as-left setting of 43.51 mA on 5/14/92 (i.e., ((43.70 - 43.51)/40) * 100). In this calculation we use this maximum drift value as the plant specific drift.

   Note, the as-found/as-left values for the unit 1 bistables were reviewed and it was found that the plant specific drift value for 2PC-431A (same model number) was greater than the drift associated with the other bistables, therfore the above drift value is bounding.

5. The normal operating upper and lower limits of the pressurizer pressure are both shown as 2235 psig (i.e., same as normal operating pressure) based on section 4.2 of section B-4A of Reference 4 which states that "pressure is maintained at or near 2235 psig".

6. The Control Room temperature limits are per section 10.3.3.1 of Reference 5.

7. The Control Room humidity and radiation values are per section 2.11 of Appendix A to Reference 2.

8. Insulation Resistance (IR) error is not considered for this calculation since the IR error

would be a bias positive error and would, therefore, have no effect on the Nominal Trip Setpoint or the Analytical limit since for an increasing process, only the bias negative terms are considered.

9. This calculation applies to all three Unit 1 Pressurizer Hi Pressure Reactor Trip instrumentation loops.

10. The control room and containment HVAC are seismically qualified. Therefore, neither the transmitter nor bistable are subject to increased temperature or humidity due to a loss of non-seismic HVAC as a result of a seismic event.

4.0 DESIGN INPUT

4.1. Form 1: Loop/Process Data Sheet

Loop ID	1P-429
Configuration No.	1
Loop Description	PRESSURIZER PRESSURE
Process Span (PS)	1700.0 To 2500.0 PSIG
Analytical/ Process Limit (AL/PL)	2410.0 PSIG
Normal Operation Upper Limit (NOUL)	2235.0 PSIG
Normal Operation Lower Limit (NOLL)	2235.0 PSIG
Process Max Op Pressure (PMOP)	2485.0 PSIG
Process Normal Op Pressure (PNOP)	2235.0 PSIG
Operating Time (Accident)	Min: 0 Hours Max: 0 Hours
Setpoint Direction	I

4.2. Form 2: Instrument Data Sheet

Unit	1
Instrument Tag No.	1PT-429
Function	
Other Tag No.	21146
System	RP
Functional Description	REACTOR COOLANT LOOP PRESSURIZER PRESSURE TRANSMITTER
Rack/Panel No.	
Power Supply Tag No.	1PQ-429
EQ Zone	CNTA1
Elevation	720.00 ft in
Column	11
Row	16
Manuf. Name	ROSEMOUNT
Model Number	1154GP9RC
EQ	Yes
Seismic Category	YES
QA Elec.	X11FM
QA Mech.	2X2PM
Input Span (CS)	1715.0 To 2515.0 PSIG
Output Span (OS)	0.10000 To 0.50000 VDC
Readability (read)	
Surveillance/Calib. Procedure	SP 1002B
Calibration Interval (CI)	24.000 Months
Device Setting Tol. Allowance (st)	0.002
Device M&TE Allowance mte1 : Device M&TE Cal Span mtecs1:	6.0008 PSIG 0 To 3000.0 PSIG
Device M&TE Allowance mte2 : Device M&TE Cal Span mtecs2:	2.8511e-03 VDC 0 To 3.0000 VDC
Device M&TE Allowance mte3 : Device M&TE Cal Span mtecs3:	 To
Device M&TE Allowance mte4 : Device M&Te Cal Span mtecs4:	 To
Device M&TE Allowance mte5 : Device M&TE Cal Span mtecs5:	 To

Unit	1
Instrument Tag No.	1PC-429A
Function	
Other Tag No.	
System	RP
Functional Description	HIGH PRESSURE REACTOR TRIP SINGLE ALARM
Rack/Panel No.	1R1
Power Supply Tag No.	1PQ-429
EQ Zone	CNLRM
Elevation	737.00 ft 6.5000 in
Column	H.7
Row	8.0
Manuf. Name	FOXBORO
Model Number	63U-AC-0HBA-F
EQ	No
Seismic Category	YES
QA Elec.	X11FT
QA Mech.	
Input Span (CS)	0.10000 To 0.50000 VDC
Output Span (OS)	0.10000 To 0.50000 ON / OFF
Readability (read)	
Surveillance/Calib. Procedure	SP 1002A
Calibration Interval (CI)	24.000 Months
Device Setting Tol. Allowance (st)	0.002
Device M&TE Allowance mte1 : Device M&TE Cal Span mtecs1:	2.8511e-03 VDC 0 To 3.0000 VDC
Device M&TE Allowance mte2 : Device M&TE Cal Span mtecs2:	 To
Device M&TE Allowance mte3 : Device M&TE Cal Span mtecs3:	 To
Device M&TE Allowance mte4 : Device M&Te Cal Span mtecs4:	 To
Device M&TE Allowance mte5 : Device M&TE Cal Span mtecs5:	 To

4.3. Form 3: Make/Model Data Sheet

Manuf. Name	ROSEMOUNT
Model Number	1154GP9RC
Range	Min:0 Units:PSIG Max:3000.0
Design Pressure	4500.0 PSIG
Vendor Accuracy Allowance (va)	0.25%*S
Vendor Drift Allowance (vd)	0.2%*R
Drift Time (DT)	30.000 Months Linear or Non-Linear? L Vendor or Plant-Specific? V
Vendor Temp Effect (vte)	(0.75%*R+0.5%*S)/100
Vendor Humidity Effect (vhe)	0
Vendor Over Pressure Effect (vope)	{0<X<=4500,0}{4500<X,0.5%*R}
Vendor Static Pressure Effect Zero (vspez)	0
Vendor Static Pressure Effect Span (vspes)	0
Vendor Power Supply Effect (vp)	0.005%*S/1
Vendor Seismic Effect (vse)	0.5%*R
Vendor Radiation Effect (vre)	{0<X<=5000000,1%*R}{5000000<X<=55000000,1.5%*R+1.0%*S}
Vendor Steam Press/Temp. Effect (vspt)	2.5%*R+0.5%*S
Vendor Post-DBE Effect(vpdbe)	2.5%*R

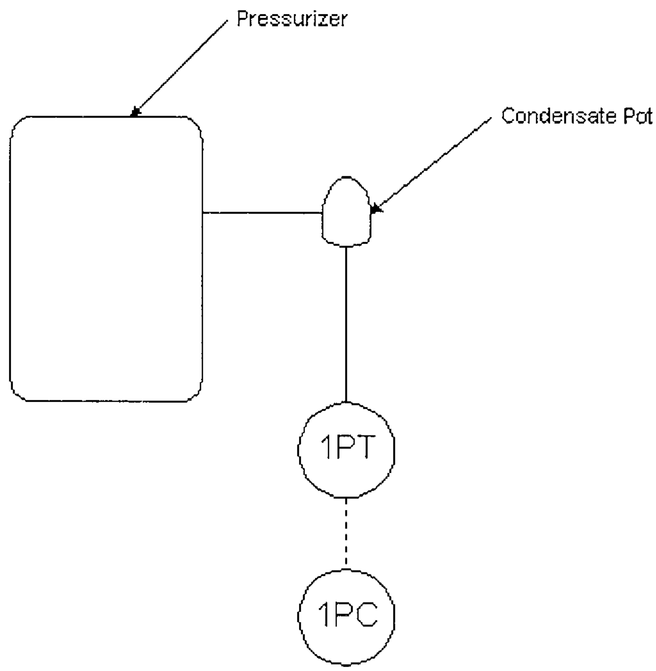
Manuf. Name	FOXBORO
Model Number	63U-AC-0HBA-F
Range	Min:10.000 Units:MADC Max:50.000
Design Pressure	PSIG
Vendor Accuracy Allowance (va)	0.5%*S
Vendor Drift Allowance (vd)	0.475%*S
Drift Time (DT)	12.000 Months Linear or Non-Linear? L Vendor or Plant-Specific? P
Vendor Temp Effect (vte)	0
Vendor Humidity Effect (vhe)	0
Vendor Over Pressure Effect (vope)	0
Vendor Static Pressure Effect Zero (vspez)	0
Vendor Static Pressure Effect Span (vspes)	0
Vendor Power Supply Effect (vp)	0
Vendor Seismic Effect (vse)	0
Vendor Radiation Effect (vre)	0
Vendor Steam Press/Temp. Effect (vspt)	0
Vendor Post-DBE Effect(vpdbe)	0

4.4. Form 4: Environmental Conditions Data Sheet

Eq Zone	CNTA1
Room Description	Unit 1 Containment (Elev 706 and above)
Normal Temperature Range (NTMIN & NTMAX)	Min: 65.000 °F Max: 120.00 °F
Normal Humidity Range (NHMIN & NHMAX)	Min: 30.000 %RH Max: 90.000 %RH
Max. Normal Radiation (NR)	2.85e-03 Rads/Hour
Accident Type	SEISMIC
Accident Temperature (AT)	120.00 °F
Accident Humidity (AH)	90.000 %RH
Accident Radiation (AR)	0 Rads

Eq Zone	CNLRM
Room Description	Unit 1 & 2 Control Room
Normal Temperature Range (NTMIN & NTMAX)	Min: 60.000 °F Max: 85.000 °F
Normal Humidity Range (NHMIN & NHMAX)	Min: 50.000 %RH Max: 50.000 %RH
Max. Normal Radiation (NR)	1.0e-03 Rads/Hour
Accident Type	SEISMIC
Accident Temperature (AT)	85.0 °F
Accident Humidity (AH)	50.000 %RH
Accident Radiation (AR)	0 Rads

PRESSURIZER HIGH PRESSURE REACTOR TRIP
INSTRUMENT LOOP CONFIGURATION



Channel I Red: 1PT-429, 1PC-429A

Channel II White: 1PT-430, 1PC-430A

Channel III Blue: 1PT-431, 1PC-431A

5.0 ERROR ANALYSIS AND SETPOINT DETERMINATION

5.1. Given Conditions

5.1.1. Loop Instrument List

Device	Unit	Instrument Tag	Function
1	1	1PT-429	
2	1	1PC-429A	

5.1.2. Device Dependency Table

Unit	Instrument	Func	Cal	Pwr	Rad	Seismic	Temp	Humidity
1	1PT-429		A	A	A	A	A	A
1	1PC-429A		B	A	B	B	B	B

Device Dependency Assumptions/References

Calibration: References 27 & 28

Power Supply: Reference 17

Radiation: Reference 2

Seismic: Reference 2

Temperature: Reference 2

Humidity: Reference 2

5.1.3. Calibration Static Pressure(CSP), Power Supply Stability(PSS)

Unit	Instrument	Function	CSP (PSIG)	PSS (VOLTS)
1	1PT-429		0	7.0000
1	1PC-429A		0	0

Note: PSS values are only considered for devices with a Vendor Power Supply Effect which is expressed per volt.

CSP and PSS Assumptions/References

CSP: Reference 28

PSS: Reference 7

5.1.4. Insulation Resistance (IR), Primary Element Accuracy (PEA), Process Measurement Accuracy (PMA) and other Process Considerations (PC)

Type	Magnitude (decimal%)	Sign	Acc/ Norm	Dependent Device	Dependent Uncertainty	PC/IR Assumptions/ References

Note: Magnitude is expressed in decimal percent of span, e.g. 0.02 equals 2% of span. IR value per specific Loop Configuration IR calculation.

5.2. Calculation of Instrument Uncertainties

5.2.1. Instrument Accuracy (a_n)

$$a_n = (va_n)(PS/CS_n)$$

Where n = the number of the loop device
va = vendor's accuracy expression

Note: If the Device Setting Tolerance (st), per Form 2, is greater than the Instrument Accuracy (a) for a specific device, then (st) will be used in lieu of (a) in the equation shown above.

Instrument Accuracy(a)

Device	Random	Units
1	$\pm$4.0000	PSIG
*2	$\pm$0	PSIG

* = Uncertainty included with plant specific drift for this device

5.2.2. Instrument Drift (d_n)

d = (CI/DT)(vd)(PS/CS)

Where vd = vendor's drift expression

Note: The factor (CI/DT) is included in the above equation if Drift is linear over time. If Drift is non-linear over time, the factor is replaced by:

$(CI/DT)^{1/2}$

Instrument Drift(d)

Device	Random	+Bias	-Bias	Units
1	$\pm$4.8000	0	0	PSIG
2	$\pm$7.6000	0	0	PSIG

5.2.3. Instrument Measurement and Test Equipment Allowance (m_n)

$mte_x = [(mtea_x + mtestd_x)^2 + (mtet_x)^2 + (mteread_x)^2]^{1/2}$

$m_n = [(mte_1/mtecs_1)^2 + (mte_2/mtecs_2)^2 + (mte_3/mtecs_3)^2 + (mte_4/mtecs_4)^2 + (mte_5/mtecs_5)^2]^{1/2} * PS$

Where:

mte_x = the Measurement and Test Equipment allowance for one M&TE device.

$mtea_x$ = the accuracy of the M&TE device.

$mtet_x$ = the temperature effect of the M&TE device.

$mteread_x$ = the readability of the M&TE device.

$mtestd_x$ = the accuracy of the standard used to calibrate the M&TE device.

m_n = the Measurement and Test Equipment allowance for one loop device.

mtecs = the calibrated span of the M&TE device.

Instrument M&TE(m)

Device	Random	Units
1	±8.2780	PSIG
*2	±0	PSIG

* = Uncertainty included with plant specific drift for this device

5.2.4. Instrument Temperature Effect (t_N, t_A & t_{NS})

Normal: t_N = (NTMAX - NTMIN)(vte)(PS/CS)

Accident: t_A = [(AT - NTMIN)(vte)(PS/CS)] - t_N

Loss of non-seismic HVAC during a seismic event:

t_{NS} = [(NST - NTMIN)(vte)(PS/CS)] - t_N

Where vte = vendor's temperature effect expression

Notes: The factors (NTMAX - NTMIN), (AT - NTMIN) and (NST - NTMIN) are included in the equations shown above only if the Vendor's Temperature Effect (vte) for a specific device is expressed per degree. This is indicated by the character "/" in the Vendor's Temperature Effect equation shown on Form 3.

If the Vendor's Temperature Effect equation is expressed as a step function, then the values of NTMAX, AT and NST will be used to determine the value of "X" in the step function.

Normal Instrument Temperature Effect (t_N)

Device	Random	+Bias	-Bias	Units
1	±14.575	0	0	PSIG
*2	±0	0	0	PSIG

* = Uncertainty included with plant specific drift for this device

Accident Instrument Temperature Effect (t_A)

Device	Random	+Bias	-Bias	Units
1	±0	0	0	PSIG
2	±0	0	0	PSIG

Loss of non-seismic HVAC during a seismic event
Temperature Effect (t_{NS})

Device	Random	+Bias	-Bias	Units
1	±0	0	0	PSIG
2	±0	0	0	PSIG

5.2.5. Instrument Humidity Effect (h_N, h_A & h_{NS})

Normal: h_N = (NHMAX - NHMIN)(vhe)(PS/CS)

Accident: h_A = [(AH - NHMIN)(vhe)(PS/CS)] - h_N

Loss of non-seismic HVAC during a seismic event:

h_{NS} = [(NSH - NHMIN)(vhe)(PS/CS)] - h_N

Where vhe = vendor's humidity effect expression

Notes: The factors (NHMAX - NHMIN), (AH - NHMIN) and (NSH - NHMIN) are included in the equations shown above only if the Vendor's Humidity Effect (vhe) for a specific device is expressed per degree. This is indicated by the character "/" in the Vendor's Humidity Effect equation shown on Form 3.

If the Vendor's Humidity Effect equation is expressed as a step function, then the values of NHMAX, AH and NSH will be used to determine the value of "X" in the step function.

Normal Instrument Humidity Effect (h_N)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PSIG
*2	± 0	0	0	PSIG

* = Uncertainty included with plant specific drift for this device

Accident Instrument Humidity Effect (h_A)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PSIG
2	± 0	0	0	PSIG

Loss of non-seismic HVAC during a seismic event
Humidity Effect (h_{NS})

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PSIG
2	± 0	0	0	PSIG

5.2.6. <u>Instrument Over Pressure Effect (ope)</u>

ope = (PMOP - DP)(vope)(PS/CS)

Where vope = vendor's over pressure effect expression

Notes: The factor (PMOP -DP) is included in the equation shown above only if the Vendor's Over Pressure Effect (vope) for a specific device is expressed per PSI. This is indicated by the character "/" in the Vendor's Over Pressure Effect equation shown on Form 3.

If the Design Pressure for a specific device (DP) is greater than or equal to the Process Maximum Operating Pressure (PMOP), then the Over Pressure Effect (ope) is equal to zero.

Instrument Over Pressure Effect (ope)

Device	Random	+Bias	-Bias	Units
1	±0	0	0	PSIG
2	±0	0	0	PSIG

5.2.7. Instrument Static Pressure Effect Zero (spez)

spez = (PMOP - CSP)(vspez)(PS/CS)

Where vspez = vendor's static pressure zero effect expression

Note: The factor (PMOP - CSP) is included in the equation shown above only if the Vendor's Static Pressure Effect Zero (vspez) for a specific device is linear for the given pressure change defined. This is indicated by the character " / " in the Vendor's Static Pressure Effect Zero equation shown on Form 3.

Instrument Static Pressure Effect Zero (spez)

Device	Random	+Bias	-Bias	Units
1	±0	0	0	PSIG
2	±0	0	0	PSIG

5.2.8. Instrument Static Pressure Effect Span (spes)

spes = (PMOP - CSP)(vspes)(PS/CS)

Where vspes = vendor's static pressure span effect expression
Note: The factor (PMOP - CSP) is included in the equation shown above only if the Vendor's Static Pressure Effect Span (vspes) for a specific device is linear for the given pressure change defined. This is indicated by the character " / " in the Vendor's Static Pressure Effect Span equation shown on Form 3.

Instrument Static Pressure Effect Span (spes)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PSIG
2	± 0	0	0	PSIG

5.2.9. Instrument Power Supply Effect (p)

p = ((PSS)(vp)(PS/CS)

Where p = vendor's power supply effect expression

Note: The factor (PSS) is included in the equation shown above only if the Vendor's Power Supply Effect (vp) for a specific device is expressed per volt. This is indicated by the character " / " in the Vendor's Power Supply Effect equation shown on Form 3.

Instrument Power Supply Effect (p)

Device	Random	+Bias	-Bias	Units
1	± 0.28000	0	0	PSIG
2	± 0	0	0	PSIG

5.2.10. Instrument Seismic Effect (s)

s = (vse)(PS/CS)
Where vse = vendor's seismic effect expression

Instrument Seismic Effect (s)

Device	Random	+Bias	-Bias	Units
1	$\pm$15.000	0	0	PSIG
2	$\pm$0	0	0	PSIG

5.2.11. Instrument Radiation Effect (r_N, r_A & r_{AN})

Normal: r_N = (NTID)(vre)(PS/CS)

Accident: r_A = (ATID)(vre)(PS/CS)

Accident: r_{AN} = (ANTID)(vre)(PS/CS)

Where vre = vendor's radiation effect expression

NTID = total integrated dose for normal conditions

ATID = total integrated dose for accident conditions

ANTID = total integrated dose for accident plus normal conditions

Notes: The factors (NTID)(ATID) and (ANTID) are included in the equations only if the Vendor Radiation Effect (vre) for a specific device is expressed per Rad. This is indicated by the character " / " in the Radiation Effect equation shown on Form 3.

If the Radiation Effect equation is expressed as a step function, then the values NTID, ATID and ANTID will be used to determine the value of "X" in the step function.

If plant specific drift is entered for a loop device that is subject to accident radiation, r_A is used in place or r_{AN} if the user does not change the plant specific drift default value of 0 for the normal radiation effect.

Normal Instrument Radiation Effect (r_N)

Device	Random	+Bias	-Bias	Units
1	±30.000	0	0	PSIG
*2	±0	0	0	PSIG

* = Uncertainty included with plant specific drift for this device

Accident Instrument Radiation Effect (r_A)

Device	Random	+Bias	-Bias	Units
1	±0	0	0	PSIG
2	±0	0	0	PSIG

Accident and Normal Instrument Radiation Effect (r_{AN})

Device	Random	+Bias	-Bias	Units
1	±30.000	0	0	PSIG
2	±0	0	0	PSIG

5.2.12. Instrument Steam Pressure/Temperature Effect (spt)

spt = (vspt)(PS/CS)

Where vspt = vendor's steam pressure/temperature effect expression

Instrument Steam Pressure/Temperature Effect (spt)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PSIG
2	± 0	0	0	PSIG

5.2.13. Instrument Post-DBE Effect (pdbe)

pdbe = (vpdbe)(PS/CS)

Where vpdbe = vendor's Post-DBE effect expression

Instrument Post-DBE Effect (pdbe)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PSIG
2	± 0	0	0	PSIG

5.3. Calculation of Combined Loop Effects

5.3.1. Loop Accuracy (A)

Accuracy contains only random terms. Since the individual device Accuracies are considered independent, they may be combined as follows:

$$A = (a_1)^2 + (a_2)^2 + ... + (a_n)^2$$

Using the equations for Instrument Accuracy and combining the results in accordance with the method described above;

$$A = \pm \ 16.000 \ (PSIG)^2$$

5.3.2. Loop Drift (D)

Drift may contain random and bias terms. The individual device drifts which are random are combined according to device calibration dependency groups.

For example, consider a loop which contains devices 1, 2, and 3 which each have random, bias positive, and bias negative terms. If device 1 is calibrated alone (e.g. Calibration Group "A") and devices 2 and 3 are calibrated together (e.g. Calibration Group "B") then:

$$D_R = (d_{1R})^2 + (d_{2R} + d_{3R})^2$$

$$D_{BP} = (d_{1BP} + d_{2BP} + d_{3BP})$$

$$D_{BN} = (d_{1BN} + d_{2BN} + d_{3BN})$$

Combining the results of Instrument Drift calculated in section 5.2.2 in accordance with the method described above;

$$D_R = \pm\ 80.800\ (\text{PSIG})^2$$

$$D_{BP} = 0\ \text{PSIG}$$

$$D_{BN} = 0\ \text{PSIG}$$

5.3.3. Loop Measurement & Test Equipment Allowance (M)

The M&TE Allowance contains a random term only. The individual device M&TE Allowances are combined according to device calibration dependency groups.

For example, consider a loop which contains devices 1, 2, and 3. If device 1 is calibrated alone (e.g. Calibration Group "A") and devices 2 and 3 are calibrated together (e.g. Calibration Group "B") then:

$$M = (m_1)^2 + (m_2 + m_3)^2$$

Combining the results of Instrument M&TE Allowance calculated in section 5.2.3 in accordance with the method described above;

$$M = \pm\ 68.525\ (PSIG)^2$$

5.3.4. Loop Temperature Effect (T_N, T_A and T_{NS})

The Temperature Effect (Normal, Accident and Loss of non-seismic HVAC during a seismic event) contains a random term and bias terms. The individual device Temperature Effects which are random are combined according to device temperature dependency groups. Process Considerations that are considered to be temperature-related are also combined with the associated device Temperature Effect.

For example, consider a loop which contains devices 1, 2, and 3 which each have a random, bias positive, and bias negative terms. The devices also have the following temperature-related process considerations (PC):

PCA_{1R} = Device 1 Accident Random PC

PCN_{1R} = Device 1 Normal Random PC

PCA_{2BP} = Device 2 Accident Bias Positive PC

PCN_{3BN} = Device 3 Normal Bias Negative PC

If device 1 is located in one temperature environment (e.g. Temperature Group "A") and devices 2 and 3 are located in another temperature environment (e.g. Temperature Group "B") then:

Normal:

$$T_{NR} = (t_{N1R} + PCN_{1R})^2 + (t_{N2R} + t_{N3R})^2$$

$$T_{NBP} = (t_{N1BP} + t_{N2BP} + t_{N3BP})$$

$$T_{NBN} = (t_{N1BN} + t_{N2BN} + t_{N3BN} + PCN_{3BN})$$

Accident:

$$T_{AR} = (t_{N1R} + t_{A1R} + PCA_{1R})^2 + (t_{N2R} + t_{A2R} + t_{N3R} + t_{A3R})^2$$

$$T_{ABP} = (t_{N1BP} + t_{A1BP} + t_{N2BP} + t_{A2BP} + t_{N3BP} + t_{A3BP} + PCA_{2BP})$$

$$T_{ABN} = (t_{N1BN} + t_{A1BN} + t_{N2BN} + t_{A2BN} + t_{N3BN} + t_{A3BN})$$

Loss of non-seismic HVAC during a seismic event:

$$T_{NSR} = (t_{N1R} + t_{NS1R} + PCA_{1R})^2 + (t_{N2R} + t_{NS2R} + t_{N3R} + t_{NS3R})^2$$

$$T_{NSBP} = (t_{N1BP} + t_{NS1BP} + t_{N2BP} + t_{NS2BP} + t_{N3BP} + t_{NS3BP} + PCA_{2BP})$$

$$T_{NSBN} = (t_{N1BN} + t_{NS1BN} + t_{N2BN} + t_{NS2BN} + t_{N3BN} + t_{NS3BN})$$

Combining the results of Instrument Temperature Effects calculated in Section 5.2.4 along with the appropriate temperature dependent process considerations in accordance with the method described above;

$T_{NR} = \pm$ 212.43 (PSIG)^2

$T_{NBP} =$ 0 PSIG

$T_{NBN} =$ 0 PSIG

$T_{AR} = \pm$ 212.43 (PSIG)^2

$T_{ABP} =$ 0 PSIG

$T_{ABN} =$ 0 PSIG

$T_{NSR} = \pm$ 212.43 (PSIG)^2

$T_{NSBP} =$ 0 PSIG

$T_{NSBN} =$ 0 PSIG

5.3.5. Loop Humidity Effect (H_N, H_A and H_{NS})

The Humidity Effect (Normal, Accident and Loss of non-seismic HVAC during a seismic event) contains a random term and bias terms. The individual device Humidity Effects which are random are combined according to device humidity dependency groups.

If device 1 is located in one humidity environment (e.g. Humidity Group "A") and devices 2 and 3 are located in another humidity environment (e.g. Humidity Group "B") then:

Normal:

$$H_{NR} = (h_{N1R})^2 + (h_{N2R} + h_{N3R})^2$$

$$H_{NBP} = (h_{N1BP} + h_{N2BP} + h_{N3BP})$$

$$H_{NBN} = (h_{N1BN} + h_{N2BN} + h_{N3BN})$$

Accident:

$$H_{AR} = (h_{N1R} + h_{A1R})^2 + (h_{N2R} + h_{A2R} + h_{N3R} + h_{A3R})^2$$

$$H_{ABP} = (h_{N1BP} + h_{A1BP} + h_{N2BP} + h_{A2BP} + h_{N3BP} + h_{A3BP})$$

$$H_{ABN} = (h_{N1BN} + h_{A1BN} + h_{N2BN} + h_{A2BN} + h_{N3BN} + h_{A3BN})$$

Loss of non-seismic HVAC during a seismic event:

$$H_{NSR} = (h_{N1R} + h_{NS1R})^2 + (h_{N2R} + h_{NS2R} + h_{N3R} + h_{NS3R})^2$$

$$H_{NSBP} = (h_{N1BP} + h_{NS1BP} + h_{N2BP} + h_{NS2BP} + h_{N3BP} + h_{NS3BP})$$

$$H_{NSBN} = (h_{N1BN} + h_{NS1BN} + h_{N2BN} + h_{NS2BN} + h_{N3BN} + h_{NS3BN})$$

Combining the results of Instrument Humidity Effects calculated in Section 5.2.5 in accordance with the method described above;

$H_{NR} = \pm\ 0\ (\text{PSIG})^2$

$H_{NBP} = 0\ \text{PSIG}$

$H_{NBN} = 0\ \text{PSIG}$

$H_{AR} = \pm\ 0\ (\text{PSIG})^2$

$H_{ABP} = 0\ \text{PSIG}$

$H_{ABN} = 0\ \text{PSIG}$

$H_{NSR} = \pm\ 0\ (\text{PSIG})^2$

$H_{NSBP} = 0\ \text{PSIG}$

$H_{NSBN} = 0\ \text{PSIG}$

5.3.6. Loop Over Pressure Effect (OPE)

The Over Pressure Effect contains a random term and bias terms. Since the individual device Over Pressure Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will combined as follows:

$$OPE_R = (ope_{1R})^2 + (ope_{2R})^2 + ... + (ope_{nR})^2$$

$$OPE_{BP} = (ope_{1BP} + ope_{2BP} + ... + ope_{nBP})$$

$$OPE_{BN} = (ope_{1BN} + ope_{2BN} + ... + ope_{nBN})$$

Combining the results of Instrument Over Pressure Effects calculated in Section 5.2.6 in accordance with the method described above;

$OPE_R = \pm\ 0\ (\text{PSIG})^2$

$OPE_{BP} = 0\ \text{PSIG}$

OPE_{BN} = 0 PSIG

5.3.7. Loop Static Pressure Effect Zero (SPEZ)

The Static Pressure Zero Effect contains a random term and bias terms. Since the individual device Static Pressure Zero Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will be combined as follows:

$$SPEZ_R = (spez_{1R})^2 + (spez_{2R})^2 + ... + (spez_{nR})^2$$

$$SPEZ_{BP} = (spez_{1BP} + spez_{2BP} + ... + spez_{nBP})$$

$$SPEZ_{BN} = (spez_{1BN} + spez_{2BN} + ... + spez_{nBN})$$

Combining the results of Instrument Static Pressure Zero Effects calculated in Section 5.2.7 in accordance with the method described above;

$SPEZ_R$ = ± 0 $(PSIG)^2$

$SPEZ_{BP}$ = 0 PSIG

$SPEZ_{BN}$ = 0 PSIG

5.3.8. Loop Static Pressure Effect Span (SPES)

The Static Pressure Span Effect contains a random term and bias terms. Since the individual device Static Pressure Span Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will be combined as follows:

$$SPES_R = (spes_{1R})^2 + (spes_{2R})^2 + ... + (spes_{nR})^2$$

$$SPES_{BP} = (spes_{1BP} + spes_{2BP} + ... + spes_{nBP})$$

$$SPES_{BN} = (spes_{1BN} + spes_{2BN} + ... + spes_{nBN})$$

Combining the results of Instrument Static Pressure Span Effects calculated in Section 5.2.8 in accordance with the method described above;

$$SPES_{R} = \pm\ 0\ (PSIG)^2$$

$$SPES_{BP} = 0\ PSIG$$

$$SPES_{BN} = 0\ PSIG$$

5.3.9. Loop Power Supply Effect (P)

The Power Supply Effect contains a random term and bias terms. The individual device Power Supply Effects which are random are combined according to device power dependency groups.

For example, consider a loop which contains devices 1, 2, and 3 which each have random, bias positive, and bias negative terms. If device 1 is powered by one power supply (e.g. Power Supply Group "A") and devices 2 and 3 are powered by another Power Supply (e.g. Power Supply Group "B") then:

$$P_{R} = (p_{1R})^2 + (p_{2R} + p_{3R})^2$$

$$P_{BP} = (p_{1BP} + p_{2BP} + p_{3BP})$$

$$P_{BN} = (p_{1BN} + p_{2BN} + p_{3BN})$$

Combining the results of Instrument Power Supply Effects calculated in Section 5.2.9 in accordance with the method described above;

$$P_{R} = \pm\ 0.07840\ (PSIG)^2$$

$$P_{BP} = 0\ PSIG$$

$$P_{BN} = 0\ PSIG$$

5.3.10. Loop Seismic Effect (S)

The Seismic Effect contains a random term and bias terms. The individual device Seismic Effects which are random are combined according to device seismic dependency groups.

For example, consider a loop which contains devices 1, 2, and 3 which each have random, bias positive, and bias negative terms. If device 1 is located in one seismic environment (e.g. Seismic Group "A") and devices 2 and 3 are located in another seismic environment (e.g. Seismic Group "B") then:

$$S_R = (s_{1R})^2 + (s_{2R} + s_{3R})^2$$

$$S_{BP} = (s_{1BP} + s_{2BP} + s_{3BP})$$

$$S_{BN} = (s_{1BN} + s_{2BN} + s_{3BN})$$

Combining the results of Instrument Seismic Effects calculated in Section 5.2.10 in accordance with the method described above;

$$S_R = \pm\ 225.00\ (\text{PSIG})^2$$

$$S_{BP} = 0\ \text{PSIG}$$

$$S_{BN} = 0\ \text{PSIG}$$

5.3.11. Loop Radiation Effect (R_N & R_{AN})

The Radiation Effect contains a random term and bias terms. The individual device Radiation Effects which are random are combined according to device radiation dependency groups.

For example, consider a loop which contains devices 1, 2, and 3 which each have random, bias positive, and bias negative terms. If device 1 is located in one radiation environment (e.g. Radiation Group "A") and devices 2 and 3 are located in another radiation environment (e.g. Radiation Group "B") then:

Normal:

$$R_{NR} = (r_{N1R})^2 + (r_{N2R} + r_{N3R})^2$$

$$R_{NBP} = (r_{N1BP} + r_{N2BP} + r_{N3BP})$$

$$R_{NBN} = (r_{N1BN} + r_{N2BN} + r_{N3BN})$$

Accident:

$$R_{ANR} = (r_{AN1R})^2 + (r_{AN2R} + r_{AN3R})^2$$

$$R_{ANBP} = (r_{AN1BP} + r_{AN2BP} + r_{AN3BP})$$

$$R_{ANBN} = (r_{AN1BN} + r_{AN2BN} + r_{AN3BN})$$

Combining the results of Instrument Radiation Effects calculated in Section 5.2.11 in accordance with the method described above;

$R_{NR} = \pm$ 900.00 (PSIG)^2

$R_{NBP} =$ 0 PSIG

$R_{NBN} =$ 0 PSIG

$R_{ANR} = \pm$ 900.00 (PSIG)^2

$R_{ANBP} =$ 0 PSIG

$R_{ANBN} =$ 0 PSIG

5.3.12. Loop Steam Pressure/Temperature Effect (SPT)

The Steam Pressure/Temperature Effect contains a random term and bias terms. Since the individual device Steam Pressure/Temperature Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will be combined as follows:

$$SPT_R = (spt_{1R})^2 + (spt_{2R})^2 + ... + (spt_{nR})^2$$

$$SPT_{BP} = (spt_{1BP} + spt_{2BP} + ... + spt_{nBP})$$

$$SPT_{BN} = (spt_{1BN} + spt_{2BN} + ... + spt_{nBN})$$

Combining the results of Instrument Steam Pressure/Temperature Effects calculated in Section 5.2.12 in accordance with the method described above;

$$SPT_R = \pm \; 0 \; (\mathrm{PSIG})^2$$

$$SPT_{BP} = 0 \text{ PSIG}$$

$$SPT_{BN} = 0 \text{ PSIG}$$

5.3.13. Loop Post-DBE Effect (PDBE)

The Post-DBE Effect contains a random term and bias terms. Since the individual device Post-DBE Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will be combined as follows:

$$PDBE_R = (pdbe_{1R})^2 + (pdbe_{2R})^2 + ... + (pdbe_{nR})^2$$

$$PDBE_{BP} = (pdbe_{1BP} + pdbe_{2BP} + ... + pdbe_{nBP})$$

$$PDBE_{BN} = (pdbe_{1BN} + pdbe_{2BN} + ... + pdbe_{nBN})$$

Combining the results of Instrument Post-DBE Effects calculated in Section 5.2.13 in accordance with the method described above;

$PDBE_R = \pm\ 0\ (PSIG)^2$

$PDBE_{BP} = 0$ PSIG

$PDBE_{BN} = 0$ PSIG

5.3.14. Loop Readability Effect (READ)

The Readability Effect contains a random term only and is the square of the Readability term given on the MCDS table for the loop's indicator, if applicable. The Readability effect is is determined as follows:

$READ_R = (read_{nR})^2$

$READ_R = \pm\ 0\ (PSIG)^2$

5.4. Calculation of Total Loop Error (TLE)

Total Loop Error (TLE) = The Square Root of the Sum of the Squares (SRSS) of the Random terms ± the Bias terms

or

TLE_{pos} = SRSS + Bias positive terms

and

TLE_{neg} = - SRSS - Bias negative terms

For normal conditions:

$SRSSN = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NR} + R_{NR} + H_{NR} + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$

$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NBp} + R_{NBp} + H_{NBp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp} + IR_{Bp}$

$Bias_{neg}$ = $D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NBn} + R_{NBn} + H_{NBn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn} + IR_{Bn}$

SRSSN = ± 35.747 (PSIG)

$Bias_{pos}$ = 0 PSIG

$Bias_{neg}$ = 0 PSIG

$TLEN_{pos}$ = SRSSN + $Bias_{pos}$

$TLEN_{neg}$ = - SRSSN - $Bias_{neg}$

$TLEN_{pos}$ = 35.747 PSIG = 4.4684 % of Process Span

$TLEN_{neg}$ = -35.747 PSIG = -4.4684 % of Process Span

For a seismic event and potential subsequent loss of non-seismic HVAC:

SRSSS = $(A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NSR} + R_{NR} + H_{NSR} + S_R + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$

$Bias_{pos}$ = $D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NSBp} + R_{NBp} + H_{NSBp} + S_{Bp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp}$

$Bias_{neg}$ = $D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NSBn} + R_{NBn} + H_{NSBn} + S_{Bn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn}$

SRSSS = ± 38.766 (PSIG)

$Bias_{pos}$ = 0 PSIG

$Bias_{neg}$ = 0 PSIG

$TLES_{pos}$ = SRSSS + $Bias_{pos}$

$TLES_{neg}$ = - SRSSS - $Bias_{neg}$

$TLES_{pos}$ = 38.766 PSIG = 4.8458 % of Process Span

$TLES_{neg}$ = -38.766 PSIG = -4.8458 % of Process Span

5.5. Calculation of NTSP

The following equations are used to determine the Nominal Trip Setpoint (NTSP) For Normal Conditions:

For an increasing process: $NTSP = AL + TLE_{neg}$

For a decreasing process: $NTSP = AL + TLE_{pos}$

Setpoint Direction (Per Form 1): I

AL = 2410.0 PSIG
(Per Form 1)

NTSP = 2371.2 PSIG

5.6. Calculation of Allowable Value (AV)

The following equations are used to determine the Allowable Value (AV):

For an increasing process: $AV = NTSP + LD_R + LD_{BP}$

For a decreasing process: $AV = NTSP - LD_R - LD_{BN}$

Where:

LD_R (Loop Drift, random component) $= (A + D_R + M + R_{NR})^{1/2}$

LD_{BP} (Loop Drift, bias pos component) $= D_{BP} + R_{NBP}$

LD_{BN} (Loop Drift, bias neg component) $= D_{BN} + R_{NBN}$

LD_R = 32.639 PSIG

LD_{BP} = 0 PSIG

LD_{BN} = 0 PSIG

AV = 2403.9 PSIG

5.7. Calculation of Rack Allowance (RA)

The following equations are used to determine the Rack Allowance (RA):

For an increasing process: $RA = NTSP + RD_R + RD_{BP}$

For a decreasing process: $RA = NTSP - RD_R - RD_{BN}$

Where:

RD_R (Rack Drift, random component) $= (A + D_R + M + R_{NR})^{1/2}$

RD_{BP} (Rack Drift, bias pos component) $= D_{BP} + R_{NBP}$

RD_{BN} (Rack Drift, bias neg component) $= D_{BN} + R_{NBN}$

RD_R = 7.6000 PSIG

RD_{BP} = 0 PSIG

RD_{BN} = 0 PSIG

RA = 2378.8 PSIG

6.0 CONCLUSIONS

The results of this calculation show that there is a 1.2 psig margin between the Actual Plant Setting and the Nominal Trip Setpoint during a seismic event. Therefore, the Actual Plant Setting is slightly conservative based on the data and assumptions used in this calculation.

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8.0 ATTACHMENTS

Prairie Island Nuclear Generating Plant

Attachment 3

to

Supplement to License Amendment Request dated December 11, 2000
Conversion to Improved Technical Specifications (ITS)

SPCRP029,

"Unit 1 Power Range High Flux Reactor Trip High Setpoint",
Rev. 0

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT
CALCULATION COVER SHEET

Calculation Number: SPCRP029

Calculation Rev. No.: 0

Calculation Title: Unit 1 Power Range High Flux Reactor Trip High Setpoint

Calculation Type:

☑ Safety Related
What if (information only)
Non-Safety Related (review required)
Non-Safety Related (review not required)

Plant Conditions:

Normal
LOCA
☑ Seismic
Other
Post Accident

Calculation Verification Method (check one):

✓ Design Review ____ Alternate Calculation ____ Qualification Testing

Scope of Revision: Original

Documentation of Reviews and Approvals:

Originated By:	Brian K. Rogers	**Date:**	11/11/2000
Reviewed By:	Thomas M. VerBout	**Date:**	11/13/2000
Approved By:	Chris C. Mundt	**Date:**	11/15/2000

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1.0 PURPOSE/RESULTS

1.1. Purpose and Acceptance Criteria

The purpose of this calculation is to determine the Nominal Trip Setpoint and Allowable Value of the Unit 1 NIS Power Range High Flux (high setpoint) Reactor Trip Bistables (1N41-NC306, 1N42-NC306, 1N43-NC306, and 1N44-NC306), given the Analytical Limit of 118% RTP specified in USAR section 14, in order to support submittal of the Prairie Island Nuclear Generating Plant (PINGP) Improved Technical Specifications (ITS). This calculation SHALL not be implemented on actual plant equipment until the PINGP ITS has been approved.

Per References 1 and 4, the power range high neutron flux (high setpoint) instrumentation loop trips the reactor when two out of four of the power range channels (N41, N42, N43, N44) exceed the trip setpoint. This reactor trip function protects the reactor core against reactivity excursions which are too rapid to be protected by temperature and pressure protective circuitry in order to prevent DNB and limit fuel and clad temperatures to acceptable limits for the design basis events. This loop also provides input to the overtemperature deltaT and overpower deltaT channels.

Chapter 14 of the USAR, Reference 3, takes credit for the Power Range High Flux (high setpoint) Reactor Trip function to mitigate the consequences of the following events:

- Uncontrolled RCCA Withdrawal from a Subcritical Position (section 14.4.1)
- Uncontrolled RCCA Withdrawal at Power (section 14.4.2)
- Excessive Heat Removal due to Feedwater System Malfunctions (section 14.4.6)
- Excessive Load Increase Incident (section 14.4.7)
- RCCA Ejection (section 14.5.6)

Chapter 14 of the USAR takes no credit for this function to mitigate the consequences of any events that create harsh environmental conditions. Therefore, only normal environmental conditions will be considered. However, since the instruments in this loop are required to function during a Design Basis Earthquake, the effects of the seismic event will be considered.

1.2. Results

POWER RANGE OVERPOWER TRIP HIGH BISTABLE

PARAMETER	VALUE (PCT)	VALUE (VDC)
Analytical Limit (AL)	118.00	-
Allowable Value (AV)	112.52	9.3769
Rack Allowable (RA)	112.34	9.3616
Nominal Trip Setpoint (NTSP)	111.45	9.2874
Actual Plant Setting (APS)	107.40	-
Normal Operation Upper Limit (NOUL)	100.00	-
Normal Operation Lower Limit (NOLL)	0	-

The results of this calculation show that there is a 4.05% power margin between the Actual Plant Setting and the Nominal Trip Setpoint.

2.0 METHODOLOGY

The following equations are based on the "Two Loop Group Setpoint Methodology," Revision 0, prepared by TENERA, L.P. for Northern States Power Company, Wisconsin Public Service Corporation, and Wisconsin Electric Power Company. This methodology is based on ISA Standard S67.04-1987, Setpoints for Nuclear Safety-Related Instrumentation Used in Nuclear Power Plants.

2.1. Calculation of Total Loop Error (TLE)

Total Loop Error (TLE) = The Square Root of the Sum of the Squares (SRSS) of the Random terms ± the sum of the Bias terms, or:

TLE_{pos} = SRSS + Bias positive terms
and
TLE_{neg} = - SRSS - Bias negative terms

For normal conditions:

$$SRSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NR} + R_{NR} + H_{NR} + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NBp} + R_{NBp} + H_{NBp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NBn} + R_{NBn} + H_{NBn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn}$$

For accident conditions:

$$SRSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{AR} + R_{ANR} + H_{AR} + READ + SPT_R + PEA_{AR}{}^2 + PMA_{AR}{}^2 + PC_{AR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{ABp} + R_{ANBp} + H_{ABp} + PEA_{ABp} + PMA_{ABp} + PC_{ABp} + IR_{Bp} + SPT_{Bp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{ABn} + R_{ANBn} + H_{ABn} + PEA_{ABn} + PMA_{ABn} + PC_{ABn} + IR_{Bn} + SPT_{Bn}$$

For loss of non-seismic HVAC due to a seismic event:

$$SRSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NSR} + R_{NR} + H_{NSR} + S_R + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NSBp} + R_{NBp} + H_{NSBp} + S_{Bp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NSBn} + R_{NBn} + H_{NSBn} + S_{Bn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn}$$

For Post Accident conditions:

$$SRSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NR} + R_{NR} + H_{NR} + PDBE_R + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NBp} + R_{NBp} + H_{NBp} + PDBE_{Bp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NBn} + R_{NBn} + H_{NBn} + PDBE_{Bn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn}$$

Where:

A = The sum of the squares of all of the random device accuracies (a).

D = The sum of the squares of all of the random device drift effects (d).

M = The sum of the squares of all of the random device M&TE effects (m).

OPE = The sum of the squares of all of the random device over pressure effects (ope).

SPEZ = The sum of the squares of all of the random device static pressure zero effects (spez).

SPES = The sum of the squares of all of the random device static pressure span effects (spes).

P = The sum of the squares of all of the random device power supply effects (p).

T = The sum of the squares of all of the random device temperature effects (t).

R = The sum of the squares of all of the random device radiation effects (r).

H = The sum of the squares of all of the random device humidity effects (h).

S = The sum of the squares of all of the random device seismic effects (s).

READ = The square of the indicator readability term (read).

PEA = The primary element accuracy.

PMA = The process measurement accuracy.

PC = The sum of all of the process considerations.

IR = The error introduced by insulation resistance.

PDBE = The sum of the squares of all of the random device post design basis event effects (pdbe).

The subscripts are defined as follows:

A = For accident conditions only.

N = For normal conditions only.

AN = For cumulative accident and normal conditions.

NS = For loss of non-seismic HVAC conditions only.

R = A Random term.

Bp = A Bias positive term.

Bn = A Bias Negative term.

Notes:

1. When a device's setting tolerance is greater than its accuracy, then the setting tolerance is used in place of that device's accuracy.

2. When accident conditions are being evaluated and a Steam Pressure/Temperature (SPT) effect is given on the vendor screen, the SPT effect will automatically be substituted for T_A and H_A.

3. During all conditions, when Plant Specific Drift is entered on the vendor screen, accuracy, M&TE effect, normal temperature effect, normal radiation effect, and normal humidity effect for that device default to zero since they are all considered to be included in the Plant Specific Drift value. During the calculation, the option to override the default for each effect is given.

2.2. Calculation of the Nominal Trip Setpoint (NTSP) for Safety Related Calculations

For an increasing process: $NTSP = AL - TLE_{neg}$

For a decreasing process: $NTSP = AL + TLE_{pos}$

Where:

AL = Analytical Limit

2.3. Calculation of the Nominal Trip Setpoint (NTSP) for Non-Safety Related Calculations

For an increasing process: $NTSP = PL - TLE_{neg}$

For a decreasing process: $NTSP = PL + TLE_{pos}$

Where:

PL = Process Limit

2.4. Calculation of Allowable Value (AV)

The term AV applies to safety related calculations only. Operational Limit (OL) is the equivalent term for non-safety related calculations.

For an increasing process: $AV = NTSP + LD + LD_{Bp}$

For a decreasing process: $AV = NTSP - LD - LD_{Bn}$

Where:

LD (Loop Drift) $= (A + D_R + M + R_{NR})^{1/2}$

$LD_{Bp} = D_{Bp} + R_{Bp}$

$LD_{Bn} = D_{Bn} + R_{Bn}$

2.5. Calculation of Operational Limit (OL)

The term OL applies to non-safety related calculations only.

For an increasing process: $OL = NTSP + LD + LD_{Bp}$

For a decreasing process: $OL = NTSP - LD - LD_{Bn}$

Where:

LD (Loop Drift) $= (A + D_R + M + R_{NR})^{1/2}$

$LD_{Bp} = D_{Bp} + R_{Bp}$

$LD_{Bn} = D_{Bn} + R_{Bn}$

2.6. Calculation of Rack Allowance (RA)

The term RA applies to safety related calculations only. There is no equivalent term for non-safety related calculations.

For an increasing process: $RA = NTSP + RD + RD_{Bp}$

For a decreasing process: $RA = NTSP - RD - RD_{Bn}$

Where:

RD (Rack Drift) $= (A + D_R + M + R_{NR})^{1/2}$

$RD_{Bp} = D_{Bp} + R_{Bp}$

$RD_{Bn} = D_{Bn} + R_{Bn}$

Note: Rack Drift includes the effects from all loop devices except the sensor.

3.0 ASSUMPTIONS

1. Per USAR Section 14, the Analytical Limit for the Power Range High Flux (high setpoint) trip is 118% reactor thermal power.

2. Chapter 14 of the USAR takes no credit for the Power Range High Flux (high setpoint) trip function to mitigate the consequences of any accidents that create harsh environmental conditions. However, per section 7.9 of the USAR, the seismic design criteria requires that the Nuclear Instrumentation System cabinets be designed to withstand, without damage or interruption of operations, the forces resulting from a Design Basis Earthquake. Even though vendor performance specifications indicate no uncertainties due to the effects of a seismic event, this calculation was performed using seismic event environmental conditions.

3. As described in Section 2.2.4.1 of Ref. 6, "The current signals from the two detector sections are summed, then averaged by Summing and Level Amplifier NM310 to produce a single voltage which is proportional to average reactor current.". The two detector sections are identical, each consisting of an upper (or lower) Power Range Detector and a Detector Current Meter. Per PINGP's Setpoint Methodology, because these two input channels are averaged, their resulting uncertainties can be averaged. In this calculation, averaging of the two Summing and Level Amplifier input channel uncertainties is accomplished by including only one Power Range Detector and one Detector Current Meter in the instrument loop.

4. A process measurement accuracy error of +/- 5% RTP is assumed for process effects such as variations in the neutron flux-water density in the downcomer, detector shielding, and detector placement. This effect is entered into the calculation as an Other Process Consideration.

5. (not used)

6. (not used)

7. This calculation applies to all four Unit 1 Power Range High Flux (high setpoint) instrumentation loops (i.e., channels N41, N42, N43, and N44).

8. The control room and containment HVAC are seismically qualified. Therefore, neither the excore detectors nor Nuclear Instrumentation system rack components (i.e., detector current meters, summing amplifier, and bistable) are subject to increased temperature or humidity due to a loss of non-seismic HVAC as a result of a seismic event.

9. A process measurement accuracy (PMA) error of +/- 2% for the calorimetric error on reactor power measurement is assumed based on USAR Section 14.3.1.

10. (not used)

11. Instruction manual XH-1-1931 (Reference 6), Section 1.4.3.3, states that the specification for bistable NC306 (Westinghouse model 3359C39G01) is described in manual section 1.2.3.6. This section states that the trip level repeatability (i.e. accuracy) is within 5mv of the trip level setpoint and that the trip stability is 0.25% of full scale. For conservatism, the accuracy is calculated at full scale: 5mv/10v = 0.005/10 or 0.05%*R. The stability (i.e., drift) vendor equation is shown as 0.25%*R. Ref. 6 provides no drift interval; a drift interval of 1 fuel cycle (i.e. 18 months) is assumed.

12. Instruction manual XH-1-1931 (Reference 6), Section 1.4.3.1, states that the summing and level amplifier (Westinghouse model 3359C48G01) has a stability (i.e., drift) of 0.1% per 100 hours. Therefore, the vendor drift time is shown as 100 hours/ 730 hours per month = 0.137 months.

13. For NI-301 and NI-302, the MCDS input units, output units, and tolerance are shown in vdc (rather than mvdc as shown on the calibration cards) in order to match the scale units on the associated M&TE device.

14. Since there are no gain values associated with the 2 inputs from the detector current meters to the summing amplifier (i.e., gain = 1), the summer may be treated as a linear device. Therefore, the standard SRSS method of combining errors is valid for this calculation and the standard ISA summer error propagation equation does not need to be used.

15. The calibration interval for the summing and level amplifier (NM310) is daily in accordance with Surveillance Procedure SP 1005 (Reference 17). Therefore, the MCDS calibration interval is: [(1 day)/(365 days/yr)] x [12 months/yr] = 0.033 months. An additional factor of 2 will be added to allow for the surveillance to be performed up to 48 hours (two days) apart. 2 x 0.033 months = 0.066 months. The setting tolerance is 0.5% (i.e., 0.5% * 10 vdc = 0.05 vdc) per SP 1005, Section 7.6.

4.0 DESIGN INPUT

4.1. Form 1: Loop/Process Data Sheet

Loop ID	1N41
Configuration No.	1
Loop Description	Power Range Neutron Flux
Process Span (PS)	0 To 120.00 PCT
Analytical/ Process Limit (AL/PL)	118.00 PCT
Normal Operation Upper Limit (NOUL)	100.00 PCT
Normal Operation Lower Limit (NOLL)	0 PCT
Process Max Op Pressure (PMOP)	PSIG
Process Normal Op Pressure (PNOP)	PSIG
Operating Time (Accident)	Min: 0 Hours Max: 0 Hours
Setpoint Direction	I

4.2. Form 2: Instrument Data Sheet

Unit	1
Instrument Tag No.	1NE-41
Function	U
Other Tag No.	
System	NI
Functional Description	POWER RANGE UPPER DETECTOR
Rack/Panel No.	
Power Supply Tag No.	1N41-NQ303
EQ Zone	CNTA1
Elevation	ft in
Column	
Row	
Manuf. Name	WESTINGHOUSE
Model Number	WL-23686
EQ	No
Seismic Category	YES
QA Elec.	X11FN
QA Mech.	
Input Span (CS)	0 To 120.00 PCT
Output Span (OS)	0 To 0.40000 VDC
Readability (read)	
Surveillance/Calib. Procedure	SP 1006A, SP 1006B, SP 1006C
Calibration Interval (CI)	24.000 Months
Device Setting Tol. Allowance (st)	1.0*a
Device M&TE Allowance mte1 : Device M&TE Cal Span mtecs1:	 To
Device M&TE Allowance mte2 : Device M&TE Cal Span mtecs2:	 To
Device M&TE Allowance mte3 : Device M&TE Cal Span mtecs3:	 To
Device M&TE Allowance mte4 : Device M&Te Cal Span mtecs4:	 To
Device M&TE Allowance mte5 : Device M&TE Cal Span mtecs5:	 To

Unit	1
Instrument Tag No.	1N41-NI301
Function	
Other Tag No.	
System	NI
Functional Description	POWER RANGE DETECTOR CURRENT METER
Rack/Panel No.	
Power Supply Tag No.	1N41-NQ301
EQ Zone	CNLRM
Elevation	735.00 ft in
Column	
Row	
Manuf. Name	WESTINGHOUSE
Model Number	8242C46G01
EQ	No
Seismic Category	YES
QA Elec.	XN2FN
QA Mech.	
Input Span (CS)	0 To 0.40000 VDC
Output Span (OS)	0 To 0.40000 VDC
Readability (read)	
Surveillance/Calib. Procedure	SP 1318.3
Calibration Interval (CI)	24.000 Months
Device Setting Tol. Allowance (st)	0.00003
Device M&TE Allowance mte1 : Device M&TE Cal Span mtecs1:	1.0448e-03 VDC 0 To 2.0000 VDC
Device M&TE Allowance mte2 : Device M&TE Cal Span mtecs2:	 To
Device M&TE Allowance mte3 : Device M&TE Cal Span mtecs3:	 To
Device M&TE Allowance mte4 : Device M&Te Cal Span mtecs4:	 To
Device M&TE Allowance mte5 : Device M&TE Cal Span mtecs5:	 To

Unit	1
Instrument Tag No.	1N41-NM310
Function	
Other Tag No.	
System	NI
Functional Description	POWER RANGE SUMMING & LEVEL AMPLIFIER
Rack/Panel No.	
Power Supply Tag No.	1N41-NQ301
EQ Zone	CNLRM
Elevation	735.00 ft in
Column	
Row	
Manuf. Name	WESTINGHOUSE
Model Number	3359C48G01
EQ	No
Seismic Category	YES
QA Elec.	X11FT
QA Mech.	
Input Span (CS)	0 To 0.40000 VDC
Output Span (OS)	0 To 10.000 VDC
Readability (read)	
Surveillance/Calib. Procedure	SP 1318.3, SP 1005
Calibration Interval (CI)	0.06000 Months
Device Setting Tol. Allowance (st)	0.05
Device M&TE Allowance mte1 : Device M&TE Cal Span mtecs1:	0.01240 VDC 0 To 20.000 VDC
Device M&TE Allowance mte2 : Device M&TE Cal Span mtecs2:	1.0448e-03 VDC 0 To 2.0000 VDC
Device M&TE Allowance mte3 : Device M&TE Cal Span mtecs3:	 To
Device M&TE Allowance mte4 : Device M&Te Cal Span mtecs4:	 To
Device M&TE Allowance mte5 : Device M&TE Cal Span mtecs5:	 To

Unit	1
Instrument Tag No.	1N41-NC306
Function	
Other Tag No.	
System	NI
Functional Description	POWER RANGE OVERPOWER TRIP HIGH BISTABLE
Rack/Panel No.	
Power Supply Tag No.	1N41-NQ301
EQ Zone	CNLRM
Elevation	735.00 ft in
Column	
Row	
Manuf. Name	WESTINGHOUSE
Model Number	3359C39G01
EQ	No
Seismic Category	YES
QA Elec.	X11FT
QA Mech.	
Input Span (CS)	0 To 10.000 VDC
Output Span (OS)	0 To 10.000 ON / OFF
Readability (read)	
Surveillance/Calib. Procedure	SP 1318.3
Calibration Interval (CI)	24.000 Months
Device Setting Tol. Allowance (st)	0.01
Device M&TE Allowance mte1 : Device M&TE Cal Span mtecs1:	0.01240 VDC 0 To 20.000 VDC
Device M&TE Allowance mte2 : Device M&TE Cal Span mtecs2:	 To
Device M&TE Allowance mte3 : Device M&TE Cal Span mtecs3:	 To
Device M&TE Allowance mte4 : Device M&Te Cal Span mtecs4:	 To
Device M&TE Allowance mte5 : Device M&TE Cal Span mtecs5:	 To

4.3. Form 3: Make/Model Data Sheet

Manuf. Name	WESTINGHOUSE
Model Number	WL-23686
Range	Min:0 Units:PCT Max:120.00
Design Pressure	PSIG
Vendor Accuracy Allowance (va)	0.5%*R
Vendor Drift Allowance (vd)	0
Drift Time (DT)	1.0000 Months Linear or Non-Linear? L Vendor or Plant-Specific? V
Vendor Temp Effect (vte)	0
Vendor Humidity Effect (vhe)	0
Vendor Over Pressure Effect (vope)	0
Vendor Static Pressure Effect Zero (vspez)	0
Vendor Static Pressure Effect Span (vspes)	0
Vendor Power Supply Effect (vp)	0
Vendor Seismic Effect (vse)	0
Vendor Radiation Effect (vre)	0
Vendor Steam Press/Temp. Effect (vspt)	0
Vendor Post-DBE Effect(vpdbe)	0

Manuf. Name	WESTINGHOUSE
Model Number	8242C46G01
Range	Min:0 Units:VDC Max:0.40000
Design Pressure	PSIG
Vendor Accuracy Allowance (va)	0.1%*S
Vendor Drift Allowance (vd)	0
Drift Time (DT)	1.0000 Months Linear or Non-Linear? L Vendor or Plant-Specific? V
Vendor Temp Effect (vte)	0
Vendor Humidity Effect (vhe)	0
Vendor Over Pressure Effect (vope)	0
Vendor Static Pressure Effect Zero (vspez)	0
Vendor Static Pressure Effect Span (vspes)	0
Vendor Power Supply Effect (vp)	0
Vendor Seismic Effect (vse)	0
Vendor Radiation Effect (vre)	0
Vendor Steam Press/Temp. Effect (vspt)	0
Vendor Post-DBE Effect(vpdbe)	0

Manuf. Name	WESTINGHOUSE
Model Number	3359C48G01
Range	Min:0 Units:VDC Max:0.40000
Design Pressure	PSIG
Vendor Accuracy Allowance (va)	0.2%*R
Vendor Drift Allowance (vd)	0.1%*R
Drift Time (DT)	0.14000 Months Linear or Non-Linear? L Vendor or Plant-Specific? V
Vendor Temp Effect (vte)	0
Vendor Humidity Effect (vhe)	0
Vendor Over Pressure Effect (vope)	0
Vendor Static Pressure Effect Zero (vspez)	0
Vendor Static Pressure Effect Span (vspes)	0
Vendor Power Supply Effect (vp)	0
Vendor Seismic Effect (vse)	0
Vendor Radiation Effect (vre)	0
Vendor Steam Press/Temp. Effect (vspt)	0
Vendor Post-DBE Effect(vpdbe)	0

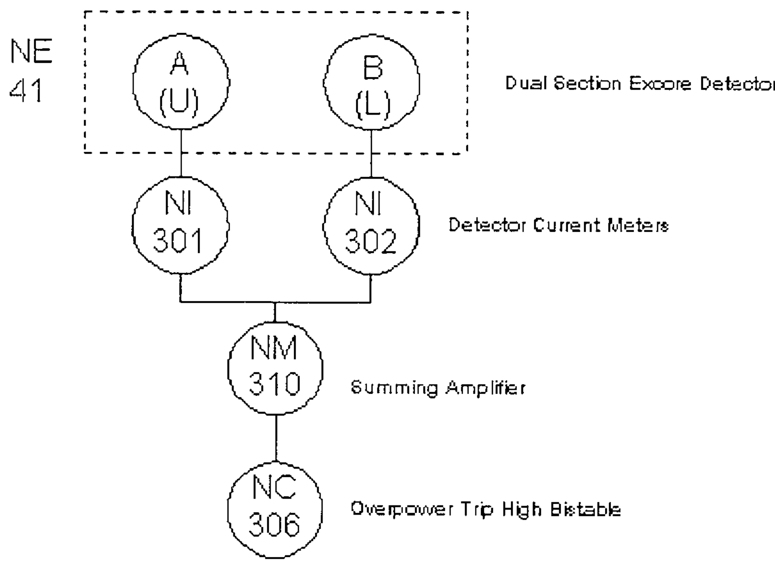
Manuf. Name	WESTINGHOUSE
Model Number	3359C39G01
Range	Min:0 Units:VDC Max:10.000
Design Pressure	PSIG
Vendor Accuracy Allowance (va)	0.05%*R
Vendor Drift Allowance (vd)	0.25%*R
Drift Time (DT)	18.000 Months Linear or Non-Linear? L Vendor or Plant-Specific? V
Vendor Temp Effect (vte)	0
Vendor Humidity Effect (vhe)	0
Vendor Over Pressure Effect (vope)	0
Vendor Static Pressure Effect Zero (vspez)	0
Vendor Static Pressure Effect Span (vspes)	0
Vendor Power Supply Effect (vp)	0
Vendor Seismic Effect (vse)	0
Vendor Radiation Effect (vre)	0
Vendor Steam Press/Temp. Effect (vspt)	0
Vendor Post-DBE Effect(vpdbe)	0

4.4. Form 4: Environmental Conditions Data Sheet

Eq Zone	CNTA1
Room Description	Unit 1 Containment (Elev 706 and above)
Normal Temperature Range (NTMIN & NTMAX)	Min: 65.000 °F Max: 120.00 °F
Normal Humidity Range (NHMIN & NHMAX)	Min: 30.000 %RH Max: 90.000 %RH
Max. Normal Radiation (NR)	2.85e-03 Rads/Hour
Accident Type	SEISMIC
Accident Temperature (AT)	120.00 °F
Accident Humidity (AH)	90.000 %RH
Accident Radiation (AR)	0 Rads

Eq Zone	CNLRM
Room Description	Unit 1 & 2 Control Room
Normal Temperature Range (NTMIN & NTMAX)	Min: 60.000 °F Max: 85.000 °F
Normal Humidity Range (NHMIN & NHMAX)	Min: 50.000 %RH Max: 50.000 %RH
Max. Normal Radiation (NR)	1.0e-03 Rads/Hour
Accident Type	SEISMIC
Accident Temperature (AT)	85.0 °F
Accident Humidity (AH)	50.000 %RH
Accident Radiation (AR)	0 Rads

Power Range High Flux Reactor Trip (High Setpoint)
Instrument Loop Configuration (Typical for channels N41, N42, N43, N44)



5.0 ERROR ANALYSIS AND SETPOINT DETERMINATION

5.1. Given Conditions

5.1.1. Loop Instrument List

Device	Unit	Instrument Tag	Function
1	1	1NE-41	U
2	1	1N41-NI301	
3	1	1N41-NM310	
4	1	1N41-NC306	

5.1.2. Device Dependency Table

Unit	Instrument	Func	Cal	Pwr	Rad	Seismic	Temp	Humidity
1	1NE-41	U	A	A	A	A	A	A
1	1N41-NI301		B	B	B	B	B	B
1	1N41-NM310		C	B	B	B	B	B
1	1N41-NC306		D	B	B	B	B	B

Device Dependency Assumptions/References

Calibration:	References 12, 13, 17
Power Supply:	Reference 15
Radiation:	Reference 5
Seismic:	Reference 5
Temperature:	Reference 5
Humidity:	Reference 5

5.1.3. Calibration Static Pressure(CSP), Power Supply Stability(PSS)

Unit	Instrument	Function	CSP (PSIG)	PSS (VOLTS)
1	1NE-41	U	0	0
1	1N41-NI301		0	0
1	1N41-NM310		0	0
1	1N41-NC306		0	0

Note: PSS values are only considered for devices with a Vendor Power Supply Effect which is expressed per volt.

CSP and PSS Assumptions/References

CSP: N/A

PSS: N/A

5.1.4. Insulation Resistance (IR), Primary Element Accuracy (PEA), Process Measurement Accuracy (PMA) and other Process Considerations (PC)

Type	Magnitude (decimal%)	Sign	Acc/ Norm	Dependent Device	Dependent Uncertainty	PC/IR Assumptions/ References
PMA	0.02000	R	B			Assmp 9
PC	0.05000	R	B			Assmp 4

Note: Magnitude is expressed in decimal percent of span, e.g. 0.02 equals 2% of span. IR value per specific Loop Configuration IR calculation.

5.2. Calculation of Instrument Uncertainties

5.2.1. Instrument Accuracy (a_n)

$a_n = (va_n)(PS/CS_n)$

Where n = the number of the loop device
va = vendor's accuracy expression

Note: If the Device Setting Tolerance (st), per Form 2, is greater than the Instrument Accuracy (a) for a specific device, then (st) will be used in lieu of (a) in the equation shown above.

Instrument Accuracy(a)

Device	Random	Units
1	$\pm$0.60000	PCT
2	$\pm$0.12000	PCT
3	$\pm$0.60000	PCT
4	$\pm$0.12000	PCT

* = Uncertainty included with plant specific drift for this device

5.2.2. Instrument Drift (d_n)

d = (CI/DT)(vd)(PS/CS)

Where vd = vendor's drift expression

Note: The factor (CI/DT) is included in the above equation if Drift is linear over time. If Drift is non-linear over time, the factor is replaced by:

$(CI/DT)^{1/2}$

Instrument Drift(d)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0.05143	0	0	PCT
4	± 0.40000	0	0	PCT

5.2.3. Instrument Measurement and Test Equipment Allowance (m_n)

$$mte_x = [(mtea_x + mtestd_x)^2 + (mtet_x)^2 + (mteread_x)^2\,]^{1/2}$$

$$m_n = [(mte_1/mtecs_1)^2 + (mte_2/mtecs_2)^2 + (mte_3/mtecs_3)^2 + (mte_4/mtecs_4)^2 + (mte_5/mtecs_5)^2]^{1/2} * PS$$

Where:

mte_x = the Measurement and Test Equipment allowance for one M&TE device.

$mtea_x$ = the accuracy of the M&TE device.

$mtet_x$ = the temperature effect of the M&TE device.

$mteread_x$ = the readability of the M&TE device.

$mtestd_x$ = the accuracy of the standard used to calibrate the M&TE device.

m_n = the Measurement and Test Equipment allowance for one loop device.

mtecs = the calibrated span of the M&TE device.

Instrument M&TE(m)

Device	Random	Units
1	± 0	PCT
2	± 0.31344	PCT
3	± 0.34697	PCT
4	± 0.14880	PCT

* = Uncertainty included with plant specific drift for this device

5.2.4. Instrument Temperature Effect (t_N, t_A & t_{NS})

Normal: t_N = (NTMAX - NTMIN)(vte)(PS/CS)

Accident: t_A = [(AT - NTMIN)(vte)(PS/CS)] - t_N

Loss of non-seismic HVAC during a seismic event:

t_{NS} = [(NST - NTMIN)(vte)(PS/CS)] - t_N

Where vte = vendor's temperature effect expression

Notes: The factors (NTMAX - NTMIN), (AT - NTMIN) and (NST - NTMIN) are included in the equations shown above only if the Vendor's Temperature Effect (vte) for a specific device is expressed per degree. This is indicated by the character "/" in the Vendor's Temperature Effect equation shown on Form 3.

If the Vendor's Temperature Effect equation is expressed as a step function, then the values of NTMAX, AT and NST will be used to determine the value of "X" in the step function.

Normal Instrument Temperature Effect (t_N)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

* = Uncertainty included with plant specific drift for this device

Accident Instrument Temperature Effect (t_A)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

Loss of non-seismic HVAC during a seismic event
Temperature Effect (t_{NS})

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

5.2.5. Instrument Humidity Effect (h_N, h_A & h_{NS})

Normal: h_N = (NHMAX - NHMIN)(vhe)(PS/CS)

Accident: h_A = [(AH - NHMIN)(vhe)(PS/CS)] - h_N

Loss of non-seismic HVAC during a seismic event:

h_{NS} = [(NSH - NHMIN)(vhe)(PS/CS)] - h_N

Where vhe = vendor's humidity effect expression

Notes: The factors (NHMAX - NHMIN), (AH - NHMIN) and (NSH - NHMIN) are included in the equations shown above only if the Vendor's Humidity Effect (vhe) for a specific device is expressed per degree. This is indicated by the character "/" in the Vendor's Humidity Effect equation shown on Form 3.

If the Vendor's Humidity Effect equation is expressed as a step function, then the values of NHMAX, AH and NSH will be used to determine the value of "X" in the step function.

Normal Instrument Humidity Effect (h_N)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

* = Uncertainty included with plant specific drift for this device

Accident Instrument Humidity Effect (h_A)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

Loss of non-seismic HVAC during a seismic event
Humidity Effect (h_{NS})

Device	Random	+Bias	-Bias	Units

1	$\pm$0	0	0	PCT
2	$\pm$0	0	0	PCT
3	$\pm$0	0	0	PCT
4	$\pm$0	0	0	PCT

5.2.6. Instrument Over Pressure Effect (ope)

ope = (PMOP - DP)(vope)(PS/CS)

Where vope = vendor's over pressure effect expression

Notes: The factor (PMOP -DP) is included in the equation shown above only if the Vendor's Over Pressure Effect (vope) for a specific device is expressed per PSI. This is indicated by the character "/" in the Vendor's Over Pressure Effect equation shown on Form 3.

If the Design Pressure for a specific device (DP) is greater than or equal to the Process Maximum Operating Pressure (PMOP), then the Over Pressure Effect (ope) is equal to zero.

Instrument Over Pressure Effect (ope)

Device	Random	+Bias	-Bias	Units
1	$\pm$0	0	0	PCT
2	$\pm$0	0	0	PCT
3	$\pm$0	0	0	PCT
4	$\pm$0	0	0	PCT

5.2.7. Instrument Static Pressure Effect Zero (spez)

spez = (PMOP - CSP)(vspez)(PS/CS)

Where vspez = vendor's static pressure zero effect expression

Note: The factor (PMOP - CSP) is included in the equation shown above only if the Vendor's Static Pressure Effect Zero (vspez) for a specific device is linear for the given pressure change defined. This is indicated by the character " / " in the Vendor's Static Pressure Effect Zero equation shown on Form 3.

Instrument Static Pressure Effect Zero (spez)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

5.2.8. Instrument Static Pressure Effect Span (spes)

spes = (PMOP - CSP)(vspes)(PS/CS)

Where vspes = vendor's static pressure span effect expression
Note: The factor (PMOP - CSP) is included in the equation shown above only if the Vendor's Static Pressure Effect Span (vspes) for a specific device is linear for the given pressure change defined. This is indicated by the character " / " in the Vendor's Static Pressure Effect Span equation shown on Form 3.

Instrument Static Pressure Effect Span (spes)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

5.2.9. Instrument Power Supply Effect (p)

p = ((PSS)(vp)(PS/CS)

Where p = vendor's power supply effect expression

Note: The factor (PSS) is included in the equation shown above only if the Vendor's Power Supply Effect (vp) for a specific device is expressed per volt. This is indicated by the character " / " in the Vendor's Power Supply Effect equation shown on Form 3.

Instrument Power Supply Effect (p)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

5.2.10. Instrument Seismic Effect (s)

s = (vse)(PS/CS)
Where vse = vendor's seismic effect expression

Instrument Seismic Effect (s)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

5.2.11. Instrument Radiation Effect (r_N, r_A & r_{AN})

Normal: r_N = (NTID)(vre)(PS/CS)

Accident: r_A = (ATID)(vre)(PS/CS)

Accident: r_{AN} = (ANTID)(vre)(PS/CS)

Where vre = vendor's radiation effect expression

NTID = total integrated dose for normal conditions

ATID = total integrated dose for accident conditions

ANTID = total integrated dose for accident plus normal conditions

Notes: The factors (NTID)(ATID) and (ANTID) are included in the equations only if the Vendor Radiation Effect (vre) for a specific device is expressed per Rad. This is indicated by the character " / " in the Radiation Effect equation shown on Form 3.

If the Radiation Effect equation is expressed as a step function, then the values NTID, ATID and ANTID will be used to determine the value of "X" in the step function.

If plant specific drift is entered for a loop device that is subject to accident radiation, r_A is used in place or r_{AN} if the user does not change the plant specific drift default value of 0 for the normal radiation effect.

Normal Instrument Radiation Effect (r_N)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

* = Uncertainty included with plant specific drift for this device

Accident Instrument Radiation Effect (r_A)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

Accident and Normal Instrument Radiation Effect (r_{AN})

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

5.2.12. Instrument Steam Pressure/Temperature Effect (spt)

spt = (vspt)(PS/CS)

Where vspt = vendor's steam pressure/temperature effect expression

Instrument Steam Pressure/Temperature Effect (spt)

Device	Random	+Bias	-Bias	Units
1	± 0	0	0	PCT
2	± 0	0	0	PCT
3	± 0	0	0	PCT
4	± 0	0	0	PCT

5.2.13. Instrument Post-DBE Effect (pdbe)

pdbe = (vpdbe)(PS/CS)

Where vpdbe = vendor's Post-DBE effect expression

Instrument Post-DBE Effect (pdbe)

Device	Random	+Bias	-Bias	Units
1	$\pm$0	0	0	PCT
2	$\pm$0	0	0	PCT
3	$\pm$0	0	0	PCT
4	$\pm$0	0	0	PCT

5.3. Calculation of Combined Loop Effects

5.3.1. Loop Accuracy (A)

Accuracy contains only random terms. Since the individual device Accuracies are considered independent, they may be combined as follows:

$$A = (a_1)^2 + (a_2)^2 + ... + (a_n)^2$$

Using the equations for Instrument Accuracy and combining the results in accordance with the method described above;

$$A = \pm \quad 0.74880 \ (PCT)^2$$

5.3.2. Loop Drift (D)

Drift may contain random and bias terms. The individual device drifts which are random are combined according to device calibration dependency groups.

For example, consider a loop which contains devices 1, 2, and 3 which each have random, bias positive, and bias negative terms. If device 1 is calibrated alone (e.g. Calibration Group "A") and devices 2 and 3 are calibrated together (e.g. Calibration Group "B") then:

$$D_R = (d_{1R})^2 + (d_{2R} + d_{3R})^2$$

$$D_{BP} = (d_{1BP} + d_{2BP} + d_{3BP})$$

$$D_{BN} = (d_{1BN} + d_{2BN} + d_{3BN})$$

Combining the results of Instrument Drift calculated in section 5.2.2 in accordance with the method described above;

$$D_R = \pm\ 0.16264\ (PCT)^2$$

$$D_{BP} = 0\ PCT$$

$$D_{BN} = 0\ PCT$$

5.3.3. Loop Measurement & Test Equipment Allowance (M)

The M&TE Allowance contains a random term only. The individual device M&TE Allowances are combined according to device calibration dependency groups.

For example, consider a loop which contains devices 1, 2, and 3. If device 1 is calibrated alone (e.g. Calibration Group "A") and devices 2 and 3 are calibrated together (e.g. Calibration Group "B") then:

$$M = (m_1)^2 + (m_2 + m_3)^2$$

Combining the results of Instrument M&TE Allowance calculated in section 5.2.3 in accordance with the method described above;

$$M = \pm\ 0.24077\ (PCT)^2$$

5.3.4. Loop Temperature Effect (T_N, T_A and T_{NS})

The Temperature Effect (Normal, Accident and Loss of non-seismic HVAC during a seismic event) contains a random term and bias terms. The individual device Temperature Effects which are random are combined according to device temperature dependency groups. Process Considerations that are considered to be temperature-related are also combined with the associated device Temperature Effect.

For example, consider a loop which contains devices 1, 2, and 3 which each have a random, bias positive, and bias negative terms. The devices also have the following temperature-related process considerations (PC):

PCA_{1R} = Device 1 Accident Random PC

PCN_{1R} = Device 1 Normal Random PC

PCA_{2BP} = Device 2 Accident Bias Positive PC

PCN_{3BN} = Device 3 Normal Bias Negative PC

If device 1 is located in one temperature environment (e.g. Temperature Group "A") and devices 2 and 3 are located in another temperature environment (e.g. Temperature Group "B") then:

Normal:

$$T_{NR} = (t_{N1R} + PCN_{1R})^2 + (t_{N2R} + t_{N3R})^2$$

$$T_{NBP} = (t_{N1BP} + t_{N2BP} + t_{N3BP})$$

$$T_{NBN} = (t_{N1BN} + t_{N2BN} + t_{N3BN} + PCN_{3BN})$$

Accident:

$$T_{AR} = (t_{N1R} + t_{A1R} + PCA_{1R})^2 + (t_{N2R} + t_{A2R} + t_{N3R} + t_{A3R})^2$$

$$T_{ABP} = (t_{N1BP} + t_{A1BP} + t_{N2BP} + t_{A2BP} + t_{N3BP} + t_{A3BP} + PCA_{2BP})$$

$$T_{ABN} = (t_{N1BN} + t_{A1BN} + t_{N2BN} + t_{A2BN} + t_{N3BN} + t_{A3BN})$$

Loss of non-seismic HVAC during a seismic event:

$$T_{NSR} = (t_{N1R} + t_{NS1R} + PCA_{1R})^2 + (t_{N2R} + t_{NS2R} + t_{N3R} + t_{NS3R})^2$$

$$T_{NSBP} = (t_{N1BP} + t_{NS1BP} + t_{N2BP} + t_{NS2BP} + t_{N3BP} + t_{NS3BP} + PCA_{2BP})$$

$$T_{NSBN} = (t_{N1BN} + t_{NS1BN} + t_{N2BN} + t_{NS2BN} + t_{N3BN} + t_{NS3BN})$$

Combining the results of Instrument Temperature Effects calculated in Section 5.2.4 along with the appropriate temperature dependent process considerations in accordance with the method described above;

$$T_{NR} = \pm\ 0\ (PCT)^2$$

$$T_{NBP} = 0\ PCT$$

$$T_{NBN} = 0\ PCT$$

$$T_{AR} = \pm\ 0\ (PCT)^2$$

$$T_{ABP} = 0\ PCT$$

$$T_{ABN} = 0\ PCT$$

$$T_{NSR} = \pm\ 0\ (PCT)^2$$

$$T_{NSBP} = 0\ PCT$$

$$T_{NSBN} = 0\ PCT$$

5.3.5. Loop Humidity Effect (H_N, H_A and H_{NS})

The Humidity Effect (Normal, Accident and Loss of non-seismic HVAC during a seismic event) contains a random term and bias terms. The individual device Humidity Effects which are random are combined according to device humidity dependency groups.

If device 1 is located in one humidity environment (e.g. Humidity Group "A") and devices 2 and 3 are located in another humidity environment (e.g. Humidity Group "B") then:

Normal:

$$H_{NR} = (h_{N1R})^2 + (h_{N2R} + h_{N3R})^2$$

$$H_{NBP} = (h_{N1BP} + h_{N2BP} + h_{N3BP})$$

$$H_{NBN} = (h_{N1BN} + h_{N2BN} + h_{N3BN})$$

Accident:

$$H_{AR} = (h_{N1R} + h_{A1R})^2 + (h_{N2R} + h_{A2R} + h_{N3R} + h_{A3R})^2$$

$$H_{ABP} = (h_{N1BP} + h_{A1BP} + h_{N2BP} + h_{A2BP} + h_{N3BP} + h_{A3BP})$$

$$H_{ABN} = (h_{N1BN} + h_{A1BN} + h_{N2BN} + h_{A2BN} + h_{N3BN} + h_{A3BN})$$

Loss of non-seismic HVAC during a seismic event:

$$H_{NSR} = (h_{N1R} + h_{NS1R})^2 + (h_{N2R} + h_{NS2R} + h_{N3R} + h_{NS3R})^2$$

$$H_{NSBP} = (h_{N1BP} + h_{NS1BP} + h_{N2BP} + h_{NS2BP} + h_{N3BP} + h_{NS3BP})$$

$$H_{NSBN} = (h_{N1BN} + h_{NS1BN} + h_{N2BN} + h_{NS2BN} + h_{N3BN} + h_{NS3BN})$$

Combining the results of Instrument Humidity Effects calculated in Section 5.2.5 in accordance with the method described above;

$$H_{NR} = \pm\ 0\ (\mathrm{PCT})^2$$

$$H_{NBP} = 0\ \mathrm{PCT}$$

$$H_{NBN} = 0\ \mathrm{PCT}$$

$$H_{AR} = \pm\ 0\ (\mathrm{PCT})^2$$

$$H_{ABP} = 0\ \mathrm{PCT}$$

$$H_{ABN} = 0\ \mathrm{PCT}$$

$H_{NSR} = \pm\ 0\ (PCT)^2$

$H_{NSBP} = 0\ PCT$

$H_{NSBN} = 0\ PCT$

5.3.6. Loop Over Pressure Effect (OPE)

The Over Pressure Effect contains a random term and bias terms. Since the individual device Over Pressure Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will combined as follows:

$$OPE_R = (ope_{1R})^2 + (ope_{2R})^2 + ... + (ope_{nR})^2$$

$$OPE_{BP} = (ope_{1BP} + ope_{2BP} + ... + ope_{nBP})$$

$$OPE_{BN} = (ope_{1BN} + ope_{2BN} + ... + ope_{nBN})$$

Combining the results of Instrument Over Pressure Effects calculated in Section 5.2.6 in accordance with the method described above;

$OPE_R = \pm\ 0\ (PCT)^2$

$OPE_{BP} = 0\ PCT$

$OPE_{BN} = 0\ PCT$

5.3.7. Loop Static Pressure Effect Zero (SPEZ)

The Static Pressure Zero Effect contains a random term and bias terms. Since the individual device Static Pressure Zero Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will be combined as follows:

$SPEZ_R = (spez_{1R})^2 + (spez_{2R})^2 + ... + (spez_{nR})^2$

$SPEZ_{BP} = (spez_{1BP} + spez_{2BP} + ... + spez_{nBP})$

$SPEZ_{BN} = (spez_{1BN} + spez_{2BN} + ... + spez_{nBN})$

Combining the results of Instrument Static Pressure Zero Effects calculated in Section 5.2.7 in accordance with the method described above;

$SPEZ_R = \pm\ 0\ (PCT)^2$

$SPEZ_{BP} = 0\ PCT$

$SPEZ_{BN} = 0\ PCT$

5.3.8. Loop Static Pressure Effect Span (SPES)

The Static Pressure Span Effect contains a random term and bias terms. Since the individual device Static Pressure Span Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will be combined as follows:

$SPES_R = (spes_{1R})^2 + (spes_{2R})^2 + ... + (spes_{nR})^2$

$SPES_{BP} = (spes_{1BP} + spes_{2BP} + ... + spes_{nBP})$

$SPES_{BN} = (spes_{1BN} + spes_{2BN} + ... + spes_{nBN})$

Combining the results of Instrument Static Pressure Span Effects calculated in Section 5.2.8 in accordance with the method described above;

$SPES_R = \pm\ 0\ (PCT)^2$

$SPES_{BP} = 0\ PCT$

$SPES_{BN} = 0\ PCT$

5.3.9. Loop Power Supply Effect (P)

The Power Supply Effect contains a random term and bias terms. The individual device Power Supply Effects which are random are combined according to device power dependency groups.

For example, consider a loop which contains devices 1, 2, and 3 which each have random, bias positive, and bias negative terms. If device 1 is powered by one power supply (e.g. Power Supply Group "A") and devices 2 and 3 are powered by another Power Supply (e.g. Power Supply Group "B") then:

$$P_R = (p_{1R})^2 + (p_{2R} + p_{3R})^2$$

$$P_{BP} = (p_{1BP} + p_{2BP} + p_{3BP})$$

$$P_{BN} = (p_{1BN} + p_{2BN} + p_{3BN})$$

Combining the results of Instrument Power Supply Effects calculated in Section 5.2.9 in accordance with the method described above;

$$P_R = \pm\ 0\ (PCT)^2$$

$$P_{BP} = 0\ PCT$$

$$P_{BN} = 0\ PCT$$

5.3.10. Loop Seismic Effect (S)

The Seismic Effect contains a random term and bias terms. The individual device Seismic Effects which are random are combined according to device seismic dependency groups.

For example, consider a loop which contains devices 1, 2, and 3 which each have random, bias positive, and bias negative terms. If device 1 is located in one seismic environment (e.g. Seismic Group "A") and devices 2 and 3 are located in another seismic environment (e.g. Seismic Group "B") then:

$$S_R = (s_{1R})^2 + (s_{2R} + s_{3R})^2$$

$$S_{BP} = (s_{1BP} + s_{2BP} + s_{3BP})$$

$$S_{BN} = (s_{1BN} + s_{2BN} + s_{3BN})$$

Combining the results of Instrument Seismic Effects calculated in Section 5.2.10 in accordance with the method described above;

$$S_R = \pm\ 0\ (\mathrm{PCT})^2$$

$$S_{BP} = 0\ \mathrm{PCT}$$

$$S_{BN} = 0\ \mathrm{PCT}$$

5.3.11. Loop Radiation Effect (R_N & R_{AN})

The Radiation Effect contains a random term and bias terms. The individual device Radiation Effects which are random are combined according to device radiation dependency groups.

For example, consider a loop which contains devices 1, 2, and 3 which each have random, bias positive, and bias negative terms. If device 1 is located in one radiation environment (e.g. Radiation Group "A") and devices 2 and 3 are located in another radiation environment (e.g. Radiation Group "B") then:

Normal:

$$R_{NR} = (r_{N1R})^2 + (r_{N2R} + r_{N3R})^2$$

$$R_{NBP} = (r_{N1BP} + r_{N2BP} + r_{N3BP})$$

$$R_{NBN} = (r_{N1BN} + r_{N2BN} + r_{N3BN})$$

Accident:

$$R_{ANR} = (r_{AN1R})^2 + (r_{AN2R} + r_{AN3R})^2$$

$$R_{ANBP} = (r_{AN1BP} + r_{AN2BP} + r_{AN3BP})$$

$$R_{ANBN} = (r_{AN1BN} + r_{AN2BN} + r_{AN3BN})$$

Combining the results of Instrument Radiation Effects calculated in Section 5.2.11 in accordance with the method described above;

$$R_{NR} = \pm\ 0\ (\text{PCT})^2$$

$$R_{NBP} = 0\ \text{PCT}$$

$$R_{NBN} = 0\ \text{PCT}$$

$$R_{ANR} = \pm\ 0\ (\text{PCT})^2$$

$$R_{ANBP} = 0\ \text{PCT}$$

$$R_{ANBN} = 0\ \text{PCT}$$

5.3.12. Loop Steam Pressure/Temperature Effect (SPT)

The Steam Pressure/Temperature Effect contains a random term and bias terms. Since the individual device Steam Pressure/Temperature Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will be combined as follows:

$$SPT_R = (spt_{1R})^2 + (spt_{2R})^2 + ... + (spt_{nR})^2$$

$$SPT_{BP} = (spt_{1BP} + spt_{2BP} + ... + spt_{nBP})$$

$$SPT_{BN} = (spt_{1BN} + spt_{2BN} + ... + spt_{nBN})$$

Combining the results of Instrument Steam Pressure/Temperature Effects calculated in Section 5.2.12 in accordance with the method described above;

$SPT_R = \pm\ 0\ (PCT)^2$

$SPT_{BP} = 0\ PCT$

$SPT_{BN} = 0\ PCT$

5.3.13. Loop Post-DBE Effect (PDBE)

The Post-DBE Effect contains a random term and bias terms. Since the individual device Post-DBE Effects are considered independent, the random terms may be combined by the sum of the squares. The random and bias terms will be combined as follows:

$$PDBE_R = (pdbe_{1R})^2 + (pdbe_{2R})^2 + ... + (pdbe_{nR})^2$$

$$PDBE_{BP} = (pdbe_{1BP} + pdbe_{2BP} + ... + pdbe_{nBP})$$

$$PDBE_{BN} = (pdbe_{1BN} + pdbe_{2BN} + ... + pdbe_{nBN})$$

Combining the results of Instrument Post-DBE Effects calculated in Section 5.2.13 in accordance with the method described above;

$PDBE_R = \pm\ 0\ (PCT)^2$

$PDBE_{BP} = 0\ PCT$

$PDBE_{BN} = 0\ PCT$

5.3.14. Loop Readability Effect (READ)

The Readability Effect contains a random term only and is the square of the Readability term given on the MCDS table for the loop's indicator, if applicable. The Readability effect is is determined as follows:

$$READ_R = (read_{nR})^2$$

$READ_R = \pm 0\ (PCT)^2$

5.4. Calculation of Total Loop Error (TLE)

Total Loop Error (TLE) = The Square Root of the Sum of the Squares (SRSS) of the Random terms ± the Bias terms

or

TLE_{pos} = SRSS + Bias positive terms

and

TLE_{neg} = - SRSS - Bias negative terms

For normal conditions:

$$SRSSN = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NR} + R_{NR} + H_{NR} + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NBp} + R_{NBp} + H_{NBp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp} + IR_{Bp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NBn} + R_{NBn} + H_{NBn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn} + IR_{Bn}$$

$SRSSN = \pm\ 6.5507\ (PCT)$

$Bias_{pos} = 0$ PCT

$Bias_{neg} = 0$ PCT

$TLEN_{pos} = SRSSN + Bias_{pos}$

$TLEN_{neg} = - SRSSN - Bias_{neg}$

$TLEN_{pos}$ = 6.5507 PCT = 5.4590 % of Process Span

$TLEN_{neg}$ = -6.5507 PCT = -5.4590 % of Process Span

For a seismic event and potential subsequent loss of non-seismic HVAC:

$$SRSSS = (A + D_R + M + OPE_R + SPEZ_R + SPES_R + P_R + T_{NSR} + R_{NR} + H_{NSR} + S_R + READ + PEA_{NR}{}^2 + PMA_{NR}{}^2 + PC_{NR}{}^2)^{1/2}$$

$$Bias_{pos} = D_{Bp} + OPE_{Bp} + SPEZ_{Bp} + SPES_{Bp} + P_{Bp} + T_{NSBp} + R_{NBp} + H_{NSBp} + S_{Bp} + PEA_{NBp} + PMA_{NBp} + PC_{NBp}$$

$$Bias_{neg} = D_{Bn} + OPE_{Bn} + SPEZ_{Bn} + SPES_{Bn} + P_{Bn} + T_{NSBn} + R_{NBn} + H_{NSBn} + S_{Bn} + PEA_{NBn} + PMA_{NBn} + PC_{NBn}$$

SRSSS = ± 6.5507 (PCT)

$Bias_{pos}$ = 0 PCT

$Bias_{neg}$ = 0 PCT

$TLES_{pos} = SRSSS + Bias_{pos}$

$TLES_{neg} = - SRSSS - Bias_{neg}$

$TLES_{pos}$ = 6.5507 PCT = 5.4590 % of Process Span

$TLES_{neg}$ = -6.5507 PCT = -5.4590 % of Process Span

5.5. Calculation of NTSP

The following equations are used to determine the Nominal Trip Setpoint (NTSP) For Normal Conditions:

For an increasing process: $NTSP = AL + TLE_{neg}$

For a decreasing process: $NTSP = AL + TLE_{pos}$

Setpoint Direction (Per Form 1): I

AL = 118.00 PCT
(Per Form 1)

NTSP = 111.45 PCT

5.6. Calculation of Allowable Value (AV)

The following equations are used to determine the Allowable Value (AV):

For an increasing process: $AV = NTSP + LD_R + LD_{BP}$

For a decreasing process: $AV = NTSP - LD_R - LD_{BN}$

Where:

LD_R (Loop Drift, random component) $= (A + D_R + M + R_{NR})^{1/2}$

LD_{BP} (Loop Drift, bias pos component) $= D_{BP} + R_{NBP}$

LD_{BN} (Loop Drift, bias neg component) $= D_{BN} + R_{NBN}$

LD_R = 1.0734 PCT

LD_{BP} = 0 PCT

LD_{BN} = 0 PCT

AV = 112.52 PCT

5.7. Calculation of Rack Allowance (RA)

The following equations are used to determine the Rack Allowance (RA):

For an increasing process: $RA = NTSP + RD_R + RD_{BP}$

For a decreasing process: $RA = NTSP - RD_R - RD_{BN}$

Where:

RD_R (Rack Drift, random component) $= (A + D_R + M + R_{NR})^{1/2}$

RD_{BP} (Rack Drift, bias pos component) $= D_{BP} + R_{NBP}$

RD_{BN} (Rack Drift, bias neg component) $= D_{BN} + R_{NBN}$

RD_R = 0.89007 PCT

RD_{BP} = 0 PCT

RD_{BN} = 0 PCT

RA = 112.34 PCT

6.0 CONCLUSIONS

The results of this calculation show that there is a 4.05% power margin between the Actual Plant Setting and the Nominal Trip Setpoint during a seismic event. Therefore, the Actual Plant Setting is conservative based on the data and assumptions used in this calculation.

7.0 REFERENCES

1. Northern States Power Company Prairie Island Nuclear Generating Plant Design Basis Document WCAP-13123, Rev. 0, 12/91.

2. Northern States Power Company Prairie Island Nuclear Generating Plant Operations Manual, Rev. 2.

3. Northern States Power Company Prairie Island Nuclear Generating Plant Updated Safety Analysis Report, Rev. 11.

4. Technical Specifications, Appendix A to Facility Operating License DPR-42 and Facility Operating License DPR-60 for Prairie Island Nuclear Generating Plant Units 1 and 2, Northern States Power Company Docket Nos. 50-282 and 50-306, Revision 5, 10/25/74.

5. Northern States Power Company Prairie Island Nuclear Generating Plant Design Basis Document for the Environmental Qualification of Electrical Equipment, DBD-TOP-03, Rev. 1.

6. Northern States Power Technical Manual Number XH-1-1931, Rev. 2, Nuclear Instrumentation System.

7. Northern States Power Company, Prairie Island Nuclear Generating Plant, Design Basis Document for the Reactor Protection System, DBD-SYS-08, Revision 0.

8. General Arrangement, Operating Floor East, NF-39206, Rev. M.

9. General Arrangement, Control Room, NF-39750, Rev. U.

10. Setpoint Study for the Northern States Power Company Units No.1 and No. 2, WCAP-7721, August, 1971.

11. Seismic Testing of Electrical and Control Equipment, WCAP-7817, December, 1971.

12. Surveillance Procedure, NIS Power Range Channel Calibration, SP 1318.3, Rev. 2.

13. Surveillance Procedure, NIS Power Range Axial Offset Calibration Power Greater Than 50%, SP 1006B, Rev. 31.

14. Section Work Instruction, Test Instrument Calibration Control, I&C-TI-1, Rev. 9.

15. Functional Block Diagram, Nuclear Instrumentation System, Power Range N-41, X-HIAW-1001-170, Rev. 8.

16. Northern States Power Technical Manual Number XH-1-1838, Rev. 0, Power Range Ionization Chambers.

17. Surveillance Procedure, NIS Power Range Daily Calibration, SP 1005, Rev. 23.

18. Northern States Power Company, Prairie Island Nuclear Generating Plant Engineering Manual, Section 3.3.4.1, Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations. Rev. 0.

8.0 ATTACHMENTS

Prairie Island Nuclear Generating Plant

Attachment 4

to

Supplement to License Amendment Request dated December 11, 2000
Conversion to Improved Technical Specifications (ITS)

Revision 1 Change Pages

Improved Technical Specifications
Supplement dated 3/6/01

Revision 1 Change Page List

UPDATING INSTRUCTIONS

Remove				Insert			
Chapter/ Section	Part	Page	Revision/ Date	Chapter/ Section	Part	Page	Revision/ Date
2.0	B	B 2.1.1-4	12/11/00	2.0	B	B 2.1.1-4	2/20/01
	E	---	---		E	2.0-4	1
		B 2.1.1-4				B 2.1.1-4	1
		---	---			B 2.1.1-9	1
3.0	E	B 3.0-17		3.0	E	B 3.0-17	1
3.1	B	3.1.4-2	12/11/00	3.1	B	3.1.4-2	2/20/01
	CTS Cross-Ref	All pages for Table			CTS Cross-Ref	Table-1	Repaginate
						Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01
						Table-19 through Table-22	Repaginate
	ITS Cross-Ref	3.1-1	12/11/00		ITS Cross-Ref	3.1-1	2/20/01
		3.1-2	12/11/00			3.1-2	Repaginate
		3.1-3	12/11/00			3.1-3	Repaginate
3.2	B	B 3.2.3-4	12/11/00	3.2	B	B 3.2.3-4	2/20/01
	CTS Cross-Ref	All pages for Table			CTS Cross-Ref	Table-1	Repaginate
						Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01
						Table-19 through Table-22	Repaginate

Improved Technical Specifications
Supplement dated 3/6/01
Revision 1 Change Page List

UPDATING INSTRUCTIONS

Remove				Insert			
Chapter/ Section	Part	Page	Revision/ Date	Chapter/ Section	Part	Page	Revision/ Date
3.3	B	3.3.4-2	12/11/00	3.3	B	3.3.4-2	2/20/01
		3.3.4-4	12/11/00			3.3.4-4	2/20/01
		B 3.3.4-2	12/11/00			B 3.3.4-2	2/20/01
		B 3.3.4-6	12/11/00			B 3.3.4-6	2/20/01
		B 3.3.4-8	12/11/00			B 3.3.4-8	2/20/01
		B 3.3.4-9	12/11/00			B 3.3.4-9	2/20/01
	C	8 of 72			C	8 of 72	1
		63 of 72				63 of 72	1
		67 of 72				67 of 72	1
	E	3.3.1-5			E	3.3.1-5	1
		3.3.4-2				3.3.4-2	1
		3.3.4-4				3.3.4-4	1
		3.3.4-5				3.3.4-5	1
		B 3.3.4-3				B 3.3.4-3	1
		B 3.3.4-8				B 3.3.4-8	1
		B 3.3.4-11				B 3.3.4-11	1
		B 3.3.4-12				B 3.3.4-12	Repaginate
	F	40	12/11/00		F	40	2/20/01
	CTS Cross-Ref	All pages for Table			CTS Cross-Ref	Table-1	Repaginate
						Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01
						Table-19 through Table-22	Repaginate
	ITS Cross-Ref	All pages	12/11/00		ITS Cross-Ref	3.3-1 through 3.3-14	Repaginate
						3.3-15	2/20/01
						3.3-16 and 3.3-17	Repaginate

Improved Technical Specifications
Supplement dated 3/6/01

Revision 1 Change Page List

UPDATING INSTRUCTIONS

Remove				Insert			
Chapter/ Section	**Part**	**Page**	**Revision/ Date**	**Chapter/ Section**	**Part**	**Page**	**Revision/ Date**
3.4	D	26	12/11/00	3.4	D	26	2/20/01
	E	3.4.5-4			E	3.4.5-4	1
	F	41	12/11/01		F	41	2/20/01
	CTS Cross-Ref	All pages for Table			CTS Cross-Ref	Table-1	Repaginate
						Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01
						Table-19 through Table-22	Repaginate
3.5	B	3.5.2-1	12/11/00	3.5	B	3.5.2-1	2/20/01
		3.5.4-2	12/11/00			3.5.4-2	2/20/01
		B 3.5.4-2	12/11/00			B 3.5.4-2	2/20/01
	E	3.5.2-1			E	3.5.2-1	1
		B 3.5.1-3				B 3.5.1-3	1
		B 3.5.4-3				B 3.5.4-3	1
	CTS Cross-Ref	All pages for Table			CTS Cross-Ref	Table-1	Repaginate
						Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01
						Table-19 through Table-22	Repaginate
3.6	F	28	12/11/00	3.6	F	28	2/20/01
		30	12/11/00			30	2/20/01
	CTS Cross-Ref	All pages for Table			CTS Cross-Ref	Table-1	Repaginate

Improved Technical Specifications
Supplement dated 3/6/01
Revision 1 Change Page List

UPDATING INSTRUCTIONS

Remove				Insert			
Chapter/ Section	**Part**	**Page**	**Revision/ Date**	**Chapter/ Section**	**Part**	**Page**	**Revision/ Date**
3.6 (cont.)				3.6 (cont.)		Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01
						Table-19 through Table-22	Repaginate
	ITS Cross-Ref	3.6-4	12/11/00		ITS Cross-Ref	3.6-4	2/20/01
3.7	F	37	12/11/00	3.7	F	37	2/20/01
	CTS Cross-Ref	All pages for Table			CTS Cross-Ref	Table-1	Repaginate
						Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01
						Table-19 through Table-22	Repaginate
3.8	B	3.8.5-1	12/11/00	3.8	B	3.8.5-1	2/20/01
	E	3.8.5-2			E	3.8.5-2	1
3.9	CTS Cross-Ref	All pages for Table	12/11/00	3.9	CTS Cross-Ref	Table-1	Repaginate
						Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01

Remove				Insert			
Chapter/ Section	**Part**	**Page**	**Revision/ Date**	**Chapter/ Section**	**Part**	**Page**	**Revision/ Date**
				3.9 (cont.)		Table-19 through Table-22	Repaginate
5.0	CTS Cross-Ref	All pages for Table	12/11/00	5.0	CTS Cross-Ref	Table-1	Repaginate
						Table-2	2/20/01
						Table-3 through Table-15	Repaginate
						Table 16	2/20/01
						Table 17	Repaginate
						Table 18	2/20/01
						Table-19 through Table-22	Repaginate

BASES

SAFETY LIMITS (continued)

For the lower pressure curves, at lower ΔT, vessel exit temperature T_{sat} is limiting, to ensure the ΔT measurement remains valid. At all pressures after the first knee, at higher ΔT, the minimum DNBR derived from the critical heat flux correlation is limiting. The change in slope near full power ΔT is due to more restrictive $F_{\Delta H}$ consideration in the DNBR limit at high power.

The curves are based on enthalpy hot channel factor limits provided in the CORE OPERATING LIMITS REPORT (COLR). Figure B 2.1.1-1 shows an example of a limit curve at 2235 psig. In addition, it illustrates the various RPS functions that are designed to prevent the unit from reaching the limit.

The SL is higher than the setpoint calculated when the AXIAL FLUX DIFFERENCE (AFD) is within the limits of the $F(\Delta I)$ function of the overtemperature ΔT reactor trip. When the AFD is not within the tolerance, the AFD effect on the overtemperature ΔT reactor trips will reduce the setpoints to provide protection consistent with the reactor core SLs (Ref. 3).

APPLICABILITY

SL 2.1.1 only applies in MODES 1 and 2 because these are the only MODES in which the reactor is critical. Automatic protection functions are required to be OPERABLE during MODES 1 and 2 to ensure operation within the reactor core SLs. The steam generator safety valves and automatic protection actions serve to prevent RCS heatup to the reactor core SL conditions or to initiate a reactor trip function, which forces the unit into MODE 3. Allowable values for the reactor trip functions are specified in LCO 3.3.1, "Reactor Trip System (RTS) Instrumentation." In MODES 3, 4, 5, and 6, Applicability is not required since the reactor is not generating significant THERMAL POWER.

CL2.0-13

New Figure

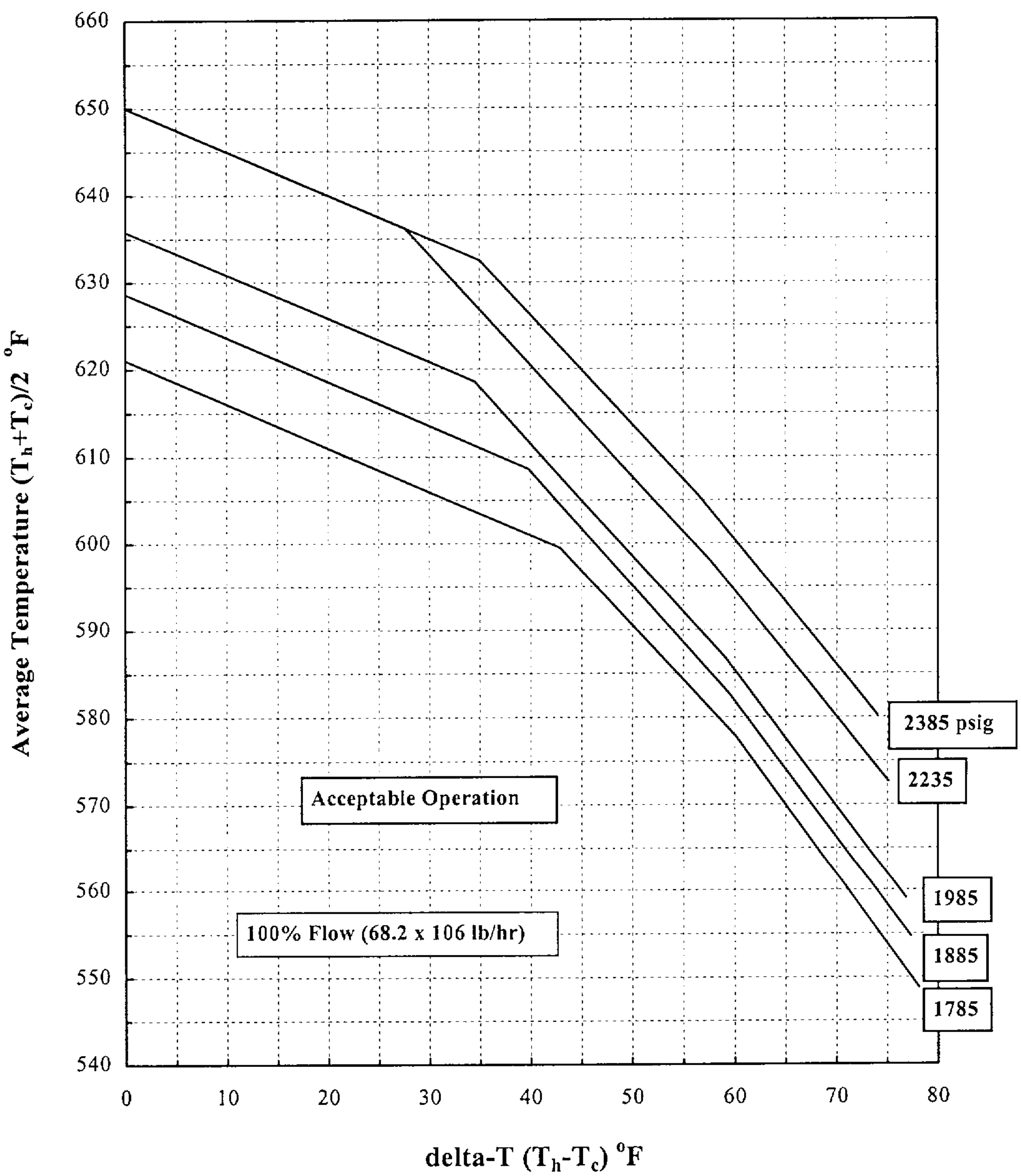


Figure 2.1.1-1 (page 1 of 1)
Reactor Core Safety Limits

R-1

BASES (continued)

SAFETY LIMITS

The curves provided in Figure ~~B~~-2.1.1-1 show the loci of points of THERMAL POWER, RCS pressure, and average temperature for which the minimum DNBR is not less than the safety analyses limit, that fuel centerline temperature remains below melting, that the average enthalpy in the hot leg is less than or equal to the enthalpy of saturated liquid, or that the core exit quality is within the limits defined by the DNBR correlation. PA2.0-27 CL2.0-31

The SL curves in Figure 2.1.1-1 define the regions of acceptable operation with respect to average temperatures, power (measured in ΔT), and pressurizer pressure. Each of the curves in the Figure has three slopes. For the 2235 and 2385 psig curves, at lower power (lower ΔT) the vessel exit design temperature, 650°F, is limiting. For the lower pressure curves, at lower ΔT, vessel exit temperature T_{sat} is limiting, to ensure the ΔT measurement remains valid. At all pressures after the first knee, at higher ΔT, the minimum DNBR derived from the critical heat flux correlation is limiting. The change in slope near full power ΔT is due to more restrictive $F_{\Delta H}$ consideration in the DNBR limit at high power. CL2.0-32

CL2.0-33

The curves are based on enthalpy hot channel factor limits provided in the CORE OPERATING LIMITS REPORT (COLR). ~~The dashed line of~~ Figure B 2.1.1-1 shows an example of a limit curve at 2235 psig. In addition, it illustrates the various RPS functions that are designed to prevent the unit from reaching the limit. R-1

PA2.0-34

SAFETY LIMITS (continued)

The SL is higher than the setpoint~~limit~~ calculated when the AXIAL FLUX DIFFERENCE (AFD) is within the limits of the $F_1(\Delta I)$ function of the overtemperature ΔT reactor trip. When the AFD is not within the tolerance, the AFD effect on the overtemperature ΔT reactor trips will reduce the setpoints to provide R-1

(continued)

New Figure

CL2.0-33

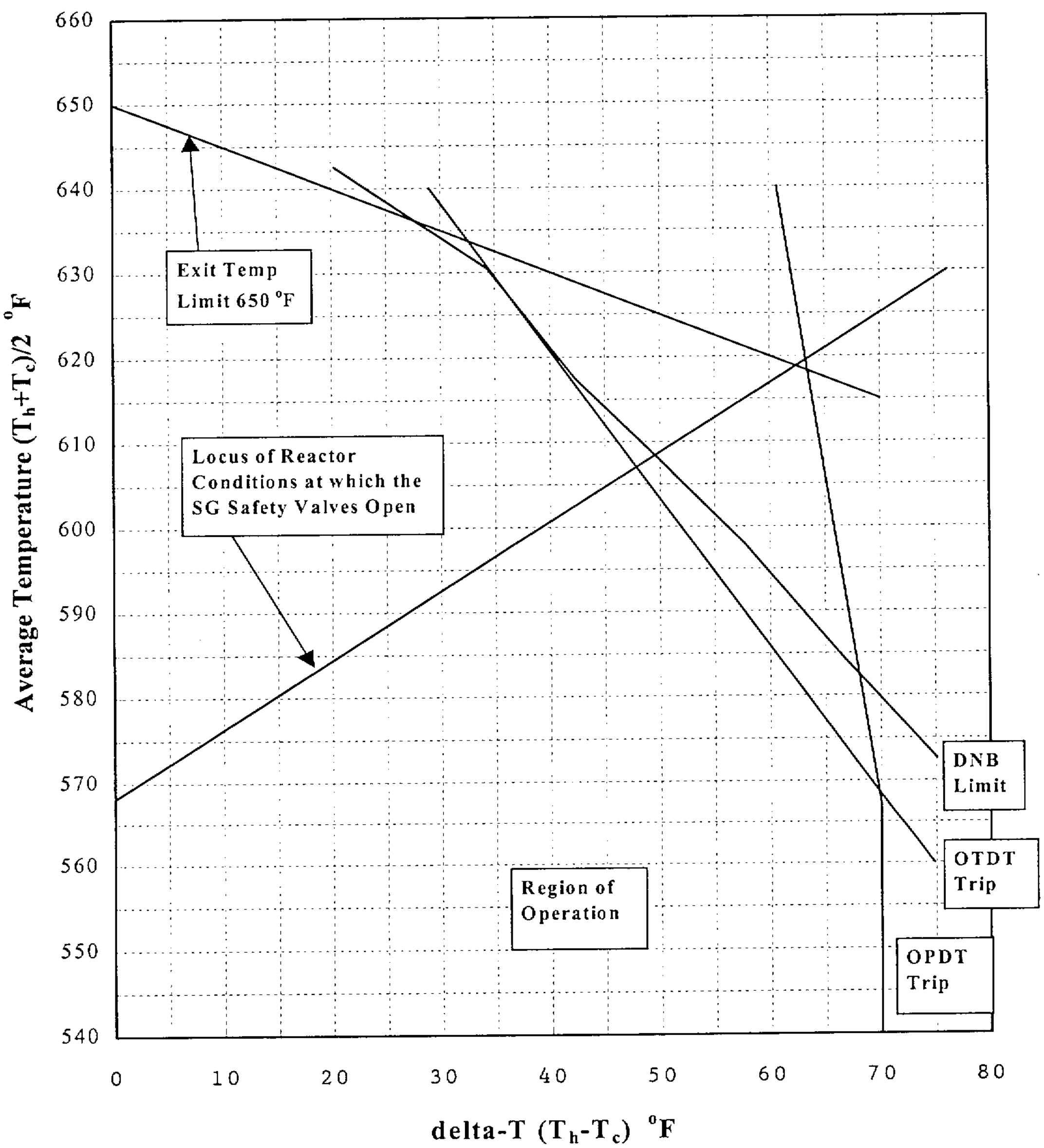


Figure B 2.1.1-1 (page 1 of 1)
Reactor Core Safety Limits vs. Boundary of Protection

R-1

performance of the Required Action on a "once per . . ." interval.

SR 3.0.2 permits a ±25% allowance~~extension~~ of the interval specified in the Frequency. This allowance~~extension~~ facilitates Surveillance scheduling and considers plant operating conditions that may not be suitable for conducting the Surveillance (e.g., transient conditions or other ongoing Surveillance or maintenance activities). CL3.0-53

The 25% allowance~~extension~~ does not significantly degrade the reliability that results from performing the Surveillance at its specified Frequency. This is based on the recognition that the most probable result of any particular Surveillance being performed is the verification of conformance with the SRs. The exceptions to SR 3.0.2 are those Surveillances for which the 25% extension of the interval specified in the Frequency does not apply. These exceptions are stated in the individual Specifications. An example of where SR 3.0.2 does not apply is the Containment Leakage Rate Testing Program~~a Surveillance with a Frequency of "in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions." The requirements of regulations take precedence over the TS. The TS cannot in and of themselves extend a test interval specified in the regulations. Therefore, there is a Note in the Frequency~~ TA3.0-54 R-1

BASES

SR 3.0.2 (continued)

~~stating, "SR 3.0.2 is not applicable."~~

As stated in SR 3.0.2, the 25% extension also does not apply to the initial portion of a periodic Completion Time that requires performance on a "once per ..." basis. The 25% extension applies to each performance after the initial performance. The initial performance of the Required

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One rod not within alignment limits.	B.1.1 Verify SDM is within the limits provided in the COLR.	1 hour
	<u>OR</u>	
	B.1.2 Initiate boration to restore SDM to within limit.	1 hour
	<u>AND</u>	
	B.2.1.1 Perform SR 3.2.1.1 and SR 3.2.1.2.	2 hours
	<u>AND</u>	
	B.2.1.2 Perform SR 3.2.2.1.	2 hours
	<u>OR</u>	
	B.2.2 Reduce THERMAL POWER to ≤ 85% RTP.	2 hours
	<u>AND</u>	
	B.3 Verify SDM is within the limits provided in the COLR.	Once per 12 hours
	<u>AND</u>	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

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ITS Section	ITS Table Item number	Section Type	CTS Section	CTS Table Item number
ITS Section 3.1				
3.1.1		LCO	3.10.A.1	
3.1.1		LCO	3.10.A.2	
3.1.1		LCO	3.10.A.3	
3.1.1.1		SR	New	
3.1.2		LCO	4.9	
3.1.2		LCO	New	
3.1.2.1		SR	New	
3.1.2.2		SR	4.9	
3.1.3		LCO	3.1.F.1	
3.1.3		LCO	3.1.F.2	
3.1.3		LCO	3.1.F.3.a	
3.1.3		LCO	New	
3.1.3.1		SR	New	
3.1.3.2		SR	New	
3.1.3.3		SR	New	
3.1.4		LCO	3.10.E.1	
3.1.4		LCO	3.10.F.5	

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item number	Section Type	CTS Section	CTS Table Item number
3.1.4		LCO	3.10.G.2	
3.1.4		LCO	3.10.G.3	
3.1.4		LCO	3.10.G.4	
3.1.4		LCO	3.10.G.5	
3.1.4		LCO	3.10.G.6	
3.1.4		LCO	New	
3.1.4.1		SR	Table 4.1-1C	2
3.1.4.2		SR	Table 4.1-2A	2
3.1.4.3		SR	Table 4.1-2A	1
3.1.4.3		SR	3.10.H	
3.1.5		LCO	3.10.D.1	
3.1.5		LCO	3.10.D.3	
3.1.5		LCO	New	
3.1.5.1		SR	New	
3.1.6		LCO	3.10.D.2	
3.1.6		LCO	3.10.D.3	
3.1.6		LCO	New	
3.1.6.1		SR	New	

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item number	Section Type	CTS Section	CTS Table Item number
3.1.6.2		SR	New	
3.1.6.3		SR	New	
3.1.7		LCO	3.10.F.1	
3.1.7		LCO	3.10.F.2	
3.1.7		LCO	3.10.F.3	
3.1.7		LCO	3.10.F.4	
3.1.7		LCO	New	
3.1.7.1		SR	Table 4.1-1C	2
3.1.7.1		SR	Table 4.1-1C	Note 30
3.1.8		LCO	3.10.D.3	
3.1.8		LCO	New	
3.1.8.1		SR	New	
3.1.8.2		SR	New	
3.1.8.3		SR	New	
3.1.8.4		SR	New	

BASES (continued)

LCO

The shape of the power profile in the axial (i.e., the vertical) direction is largely under the control of the operator, through either the manual operation of the control banks, or automatic motion of control banks responding to temperature deviations resulting from either manual operation of the Chemical and Volume Control System to change boron concentration, or from power level changes.

Signals are available to the operator from the Nuclear Instrumentation System (NIS) excore neutron detectors. Separate signals are taken from the top and bottom detectors. The AFD is defined as the difference in normalized flux signals between the top and bottom excore detector in each detector well. For convenience, this flux difference is converted to provide flux difference units expressed as a percentage and labeled as % Δflux or % ΔI.

The required target band varies with axial burnup distribution, which in turn varies with the core average accumulated burnup. The target band defined in the COLR may provide one target band for the entire cycle or more than one band, each to be followed for a specific range of cycle burnup and target flux difference.

With THERMAL POWER $\geq$ 90% RTP, the AFD must be kept within the target band. With the AFD outside the target band with THERMAL POWER $\geq$ 90% RTP, the assumptions of the accident analyses may be violated.

Violating the LCO on the AFD could produce unacceptable consequences if a Condition II, III, or IV event occurs while the AFD is outside its limits.

The LCO is modified by four Notes. Note 1 states the conditions necessary for declaring the AFD outside of the target band. With one channel removed from service (e.g., for calibration, testing or repairs), if two of the remaining channels indicate outside the target band, then the AFD shall be considered outside the target band.

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. ------------NOTE----------- Only applicable in MODE 1, 2, 3, or 4. ------------------------------ Required Action and associated Completion Time of Condition A not met. OR Function a or b or both with two channels per bus inoperable. OR One required automatic load sequencer inoperable.	B.1 Perform SR 3.3.4.1 and SR 3.3.4.2 for OPERABLE automatic load sequencer.	6 hours AND Once per 24 hours thereafter
	AND B.2 Establish offsite paths block loading capability for associated 4 kV safeguards bus.	8 hours
	AND B.3 Verify operability of offsite paths for associated 4kV safeguards bus.	8 hours AND Once per 8 hours thereafter.
	AND B.4 Restore automatic load sequencer to OPERABLE status.	7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.4.1	Perform COT.	31 days
SR 3.3.4.2	Perform ACTUATION LOGIC TEST.	31 days
SR 3.3.4.3	Perform CHANNEL CALIBRATION with Allowable Value as follows: a. Undervoltage Allowable Value ≥ 3016 V and ≤ 3224 V with an undervoltage time delay of 4 ± 1.5 seconds. b. Degraded voltage Allowable Value ≥ 3944 V and ≤ 4002 V with a degraded voltage time delay of 8 ± 0.5 seconds and degraded voltage DG start time delay of 60 ± 3 seconds.	24 months

BASES

BACKGROUND (continued)

automatically start, connect to the bus, and provide load reception. However, when a load sequencer is inoperable, the associated DG can still be manually started and loaded, thus providing its intended safety function.

Allowable Values and Trip Setpoints

The trip setpoints used in the relays are based on the plant specific voltage analysis discussed in the USAR (Ref. 1).

The Allowable Value in conjunction with the trip setpoint and LCO establishes the threshold for protective action to ensure that the consequences of Design Basis Accidents (DBA's), in coincidence with offsite power unavailability or instability, will be acceptable. The Allowable Value is considered a limiting value such that a channel is OPERABLE if the measured setpoint is found not to exceed the Allowable Value during the CHANNEL OPERATIONAL TEST (COT). Note that, although a channel is OPERABLE under these circumstances, the setpoint must be left adjusted to within the established calibration tolerance band of the trip setpoint in accordance with the uncertainty assumptions stated in the referenced setpoint methodology (as-left criteria).

Setpoints adjusted consistent with the requirements of the Allowable Values provide a conservative margin with regard to instrument uncertainties to ensure that the consequences of DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the accident and that the equipment functions as designed.

Allowable Values are specified as applicable for each Function in SR 3.3.4.3. Trip setpoints are also specified in the unit specific setpoint calculations. The specified trip setpoints are selected to

BASES

ACTIONS (continued)

B.1

Condition B applies in MODES 1, 2, 3, or 4 when Required Action and associated Completion Time of Condition A is not met, when Functions a or b or both with two channels per bus are inoperable, or when one required load sequencer is inoperable.

Required Action B.1 requires the performance of SR 3.3.4.2 for the OPERABLE automatic load sequencer. The 6 hour Completion Time provides a reasonable time for performance of the SR. Performance of this SR on a more frequent basis, once per 24 hours thereafter, ensures that the OPERABLE load sequencer remains OPERABLE while in this Condition. If the redundant train load sequencer fails to pass the SR it is inoperable and Condition D must then be entered.

B.2 and B.3

To ensure a highly reliable power source remains with an inoperable load sequencer, the offsite paths for the associated 4 kV safeguards bus must be capable of accepting the block loading that could result from an SI signal and availability must be verified on a more frequent basis. The 8 hour Completion Time is consistent with the Completion Time for an inoperable 4 kV safeguards bus, as required in LCO 3.8.9, "Distribution Systems - Operating." The verification of the operability of the offsite paths for associated 4kV safeguards on a more frequent basis, once per 8 hours thereafter, ensures that the OPERABLE paths remain OPERABLE while in this Condition.

An inoperable load sequencer results in associated DG unavailability for automatic start, connection to the bus and load reception. In Condition B, the remaining OPERABLE DG and offsite paths are adequate to supply electrical power to the onsite Safeguards AC Distribution System.

BASES

ACTIONS

D.1 (continued)

load sequencer is inoperable in MODE 5 or 6. The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the unit safety systems may be without sufficient power.

SURVEILLANCE REQUIREMENTS

SR 3.3.4.1

SR 3.3.4.1 is the performance of a COT every 31 days.

A COT is performed on each required voltage relay channel and automatic load sequencer to ensure they will perform the intended function. For these tests, the relay trip setpoints are verified and adjusted as necessary. The Frequency is based on the known reliability of the relays and load sequencers and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

SR 3.3.4.2

SR 3.3.4.2 is the performance of an ACTUATION LOGIC TEST on each required load sequence every 31 days.

The test verifies that the logic functions provided by the load sequencer for voltage and load restoration are OPERABLE. The Frequency is based on the known reliability of the load sequencers and has been shown to be acceptable through operating experience.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.4.3

SR 3.3.4.3 is the performance of a CHANNEL CALIBRATION.

The setpoints, as well as the response to a UV and a DV test, shall include a single point verification that an actuation occurs within the required time delay, as shown in Reference 1.

A CHANNEL CALIBRATION is performed every 24 months, or approximately at every refueling. CHANNEL CALIBRATION is a complete check of the voltage relay channel. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency of 24 months is based on operating experience and consistency with the typical PI refueling cycle and is justified by the assumption of a 24 month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. USAR, Section 8.4.
2. "Engineering Manual Section 3.3.4.1,Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations".
3. USAR, Section 14.

TABLE TS.3.5-1 (continued)

ENGINEERED SAFETY INITIATION INSTRUMENTATION LIMITING SET POINTS

	FUNCTIONAL UNIT	CHANNEL	LIMITING SET POINTS	
	10. 4KV Safeguards Busses Voltage Restoration	a. Degraded Voltage		
SR3.3.4.3		Voltage (% nominal)	≥94.8% and ≤96.2%	
SR3.3.4.3		Degraded voltage Time Delay ~~1~~	8 ± 0.5 sec	M3.3-09
SR3.3.4.3		Degraded voltage DG Start Time Delay ~~2~~	~~8 ± 0.5 to~~ 60 ± 3 sec	
		b. Undervoltage		
SR3.3.4.3		Voltage (% nominal)	75 ± 2.5%	
SR3.3.4.3		Undervoltage Time Delay	4 ± 1.5 sec	R-1

~~TABLE TS.3.5-1 Page 2 of 2~~
~~REV 103 12/17/92~~

TABLE TS.4.1-1B (Page 6 of 7)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

A3.3-72

FUNCTIONAL UNIT	CHECK	CALIBRATE	~~FUNCTIONAL~~ ~~TEST~~	RESPONSE TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
LCO3.3.4 ~~8.~~ LOSS OF POWER					
a. Degraded Voltage 4kV Safeguards Bus	N.A.	R SR3.3.4.3	M SR3.3.4.1	N.A.	1, 2, 3, 4
b. Undervoltage 4kV Safeguards Bus	N.A.	R SR3.3.4.3	M SR3.3.4.1	N.A.	1, 2, 3, 4

R-1

~~TABLE TS.4.1-1C (Page 1 of 4)(Overflow)~~

Table 3.3.3-1 Func 16	8.	Refueling Water Storage Tank Level	~~M~~W SR3.3.3.1	R SR3.3.3.2	M	N.A.	1, 2, 3, 4
	~~9.~~	~~Volume Control Tank Level~~	~~S~~	~~R~~	~~N.A.~~	~~N.A.~~	~~1, 2, 3, 4~~
	10.	Annulus Pressure (Vacuum Breaker)	N.A.	R	R	N.A.	See Note (39)
LCO3.3.4	11.	Auto Load Sequencers	N.A.	N.A.	M SR3.3.4.1 SR3.3.4.2	N.A.	1, 2, 3, 4
	~~12.~~	~~Boric Acid Make-up Flow Channel~~	~~N.A.~~	~~R~~	~~N.A.~~	~~N.A.~~	~~1, 2, 3, 4~~

L3.3-113

A3.3-114

Addressed elsewhere

R-1

A3.3-114

~~TABLE TS.4.1-1C (Page 1 of 4) (Overflow)~~
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ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One channel inoperable.	------------NOTES------------ 1. The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels. 2. An additional power range instrumentation channel may be made inoperable for low power PHYSICS TESTS. ---------------------------	CL3.3-152
	E.1 Place channel in trip.	6 hours
	OR	
	E.2 Be in MODE 3.	12 hours
F. ~~THERMAL POWER > P-6 and < P-10, O~~One Intermediate Range Neutron Flux channel inoperable.	F.1 Reduce THERMAL POWER to < P-6.	TA3.3-151 TA3.3-154 R-1
	OR	
	F.2 Increase THERMAL POWER to > P-10.	24 hours 24 hours

(continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME	
A. ~~One or more~~ Functions a or b or both with one channel per bus inoperable.	A.1 ~~------NOTE------ The inoperable channel may be bypassed for up to 4 hours for surveillance testing of other channels.~~ --------------- Place channel in bypass~~trip~~.	 6 hours	CL3.3-315
~~B. One or more Functions with two or more channels per bus inoperable.~~	~~B.1 Restore all but one channel to OPERABLE status.~~	~~1 hour~~	CL3.3-316

(continued)

B~~C~~. ----------NOTE--------- Only applicable in MODE 1, 2, 3, or 4. -------------------- Required Action and associated Completion Time of Condition A not met. <u>OR</u> Function a or b or both with two channels per bus inoperable.	B~~C~~.1 ~~Enter applicable Condition(s) and Required Action(s) for the associated DG made inoperable by LOP DG start instrumentation.~~ Perform SR 3.3.4.1 and SR 3.3.4.2 for OPERABLE automatic load sequencer.	~~Immediately~~ 6 hours <u>AND</u> Once per 24 hours thereafter	CL3.3-317 R-1

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. ---------NOTE--------- Only applicable in MODES 5 or 6. --------------------- Required Action and associated Completion Time of Condition A not met. OR Function a or b or both with two channels per bus inoperable. OR One required automatic load sequencer inoperable.	D.1 Enter applicable LCO 3.8.2 Condition(s) and Required Action(s) for the associated DG.	Immediately X3.3-312

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
[~~SR 3.3.5.1 Perform CHANNEL CHECK.~~]	[~~12 hours~~] CL3.3-321
SR 3.3.4~~5~~.1~~2~~ Perform C~~TAD~~OT.	[31 days] CL3.3-322
SR 3.3.4.2 Perform ACTUATION LOGIC TEST.	CL3.3-322 31 days

R-1

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
		(continued) X3.3-172
SR 3.3.4~~5~~.3	Perform CHANNEL CALIBRATION with ~~[setpoint~~ Allowable Value~~] [Trip Setpoint and Allowable Value]~~ as follows: a. Under~~Loss of~~ voltage Allowable Value ≥ 3016~~[2912]~~ V and ≤ 3224 V with an undervoltage time delay of 4~~[0.8]~~ ± 1.5~~[ ]~~ seconds. b. ~~Loss of voltage Trip Setpoint ≥ [2975] V with a time delay of [0.8] ± [ ] second.~~ Degraded voltage Allowable Value ≥ 3944~~[3683]~~ V and ≤ 4002 V with a degraded voltage time delay of 8~~[20]~~ ± 0.5~~[ ]~~ seconds and degraded voltage DG start time delay of 60 ± 3 seconds. ~~Degraded voltage Trip Setpoint ≥ [3746] V with a time delay of [20] ± [ ] seconds.~~	24 ~~[18]~~ months R-1 CL3.3-323

BASES

circumstances, the setpoint must be left adjusted to within the established calibration tolerance band of the trip setpoint in accordance with the uncertainty assumptions stated in the referenced setpoint methodology (as-left criteria).

Setpoints adjusted consistent~~in accordance~~ with the requirements of the Allowable Values provide a conservative margin with regard to instrument uncertainties to ensure that the consequences of ~~accidents~~ DBAs will be acceptable, providing the unit is operated from within the LCOs at the onset of the accident and that the equipment functions as designed. TA3.3-324

TA3.3-324

Allowable Values ~~and/or Trip Setpoints~~ are specified as applicable for each Function in SR 3.3.4.3~~the LCO~~. ~~Nominal~~ Trip s~~S~~etpoints are also specified in the unit specific setpoint calculations. The ~~nominal~~specified trip setpoints are selected to ensure that the setpoint measured by the surveillance procedure does not exceed the R-1

~~BACKGROUND~~ ~~Trip Setpoints and Allowable Values (continued)~~

Allowable Value if the relay is performing as required. If the measured setpoint does not exceed the Allowable Value, the relay is considered OPERABLE. Operation with a measured ~~Trip S~~setpoint less conservative than the specified~~nominal~~ ~~T~~trip ~~S~~setpoint, but within the Allowable Value, is acceptable provided that operation and testing is consistent with the assumptions of the unit specific setpoint calculation. Each Allowable Value ~~and/or Trip Setpoint~~ specified is ~~more~~ conservative ~~than the analytical limit~~with respect to the values assumed in the ~~transient and accident~~ analyses described in Reference 1 in order to account for instrument uncertainties appropriate to the trip function. These uncertainties are defined in ~~the "Unit Specific RTS/ESFAS Setpoint Methodology Study" (Ref. 3)~~Reference 2.

(continued)

PA3.3-356 PA3.3-311 X3.3-312

BASES

Condition B applies in MODES 1, 2, 3, or 4 when Required Action and associated Completion Time of Condition A is not met, when Functions a or b or both with two channels per bus are inoperable, or when one required load sequencer is inoperable. CL3.3-317

CL3.3-317 R-1

Required Action B.1 requires the performance of SR 3.3.4.2 for the OPERABLE automatic load sequencer. The 6 hour Completion Time provides a reasonable time for performance of the SR. Performance of this SR on a more frequent basis, once per 24 hours thereafter, ensures that the OPERABLE load sequencer remains OPERABLE while in this Condition. If the redundant train load sequencer fails to pass the SR it is inoperable and Condition D must then be entered.

<u>B.2 and B.3</u>

To ensure a highly reliable power source remains with an inoperable load sequencer, the offsite paths for the associated 4 kV safeguards bus must be capable of accepting the block loading that could result from an SI signal and availability must be verified on a more frequent basis. The 8 hour Completion Time is consistent with the Completion Time for an inoperable 4 kV safeguards bus, as required in LCO 3.8.9, "Distribution Systems - Operating." The verification of the operability of the offsite paths for associated 4kV safeguards on a more frequent basis, once per 8 hours thereafter, ensures that the OPERABLE paths remain OPERABLE while in this Condition.

An inoperable load sequencer results in associated DG unavailability for automatic start, connection to the bus and load reception. In Condition B, the remaining OPERABLE DG and offsite paths are adequate to supply electrical power to the onsite Safeguards AC Distribution System. CL3.3-317

(continued)

PA3.3-356 PA3.3-311 X3.3-312

BASES

~~SURVEILLANCE REQUIREMENTS (continued)~~

~~SR 3.3.5.2~~

CL3.3-322

SR 3.3.4~~5~~.1~~2~~ is the performance of a ~~TADOT~~COT~~. This test is performed~~ every ~~[~~31 days~~]~~.

A COT is performed on each required voltage relay channel and automatic load sequencer to ensure they will perform the intended function.~~ The test checks trip devices that provide actuation signals directly, bypassing the analog process control equipment.~~ For these tests, the relay t~~T~~rip s~~S~~etpoints are verified and adjusted as necessary. The Frequency is based on the known reliability of the relays and load sequencers~~controls~~ and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

CL3.3-322

SR 3.3.4.2

SR 3.3.4.2 is the performance of an ACTUATION LOGIC TEST on each required load sequence every 31 days.

The test verifies that the logic functions provided by the load sequencer for voltage and load restoration are OPERABLE. The Frequency is based on the known reliability of the load sequencers and has been shown to be acceptable through operating experience.

SR 3.3.4 ~~5~~.3

SR 3.3.4~~5~~.3 is the performance of a CHANNEL CALIBRATION.

R-1

The setpoints, as well as the response to a UV~~loss of voltage~~ and a DV~~degraded voltage~~ test, shall include a single point verification that an actuation~~the trip~~ occurs within the required time delay, as shown in Reference 1.

A CHANNEL CALIBRATION is performed every 24~~[18]~~ months, or approximately at every refueling. CHANNEL CALIBRATION X3.3-172

BASES

is a complete check of the voltage relay channel~~instrument loop, including the sensor~~. The test verifies that the channel responds to a measured parameter within the necessary range and accuracy.

The Frequency of 24~~[18]~~ months is based on operating experience and consistency with the typical PI~~industry~~ refueling cycle and is justified by the assumption of a~~n~~ 24~~[18]~~ month calibration interval in the determination of the magnitude of equipment drift in the setpoint analysis. X3.3-172

REFERENCES

1. U~~F~~SAR, Section ~~[~~8.4~~3]~~.
2. "Engineering Manual Section 3.3.4.1,Engineering Design Standard for Instrument Setpoint/Uncertainty Calculations".~~FSAR, Chapter [15]~~.
3. USAR, Section 14.~~Unit Specific RTS/ESFAS Setpoint Methodology Study.~~

Difference Category	Difference Number 3.3-	Justification for Differences
CL	319	NUREG-1431, Rev. 1, LCO 3.3.4, Applicable Safety Analysis has been revised by adding the specific wording "small break" loss of coolant accident (LOCA). This is a clarification based on the PI safety analysis. At PI, the DG is loaded on the loss of offsite power event during a small break LOCA.
PA	320	NUREG-1431, Rev. 1, LCO 3.3.4, Background Section has been revised by adding a discussion and specific details about the PI design and relationship between the DGs and the load sequencer. This additional information is necessary to assist operators in understanding how specific load rejection and sequencing is performed, as well as the effects of an inoperable load sequencer, as a support system, to its respective DG.
CL	321	Bracketted NUREG-1431 SR 3.3.5.1 is not included in the ITS since PI does not have any comparable CTS requirement. The associated Bases has also been deleted to be consistent with the SR.
CL	322	NUREG-1431 SR 3.3.5.2 and associated Bases have been modified to a COT and an ALT (ITS SR's 3.3.4.1 and 3.3.4.2) to be consistent with CTS requirements for this instrumentation. The combination of these two SR's ensures testing equivalent to the Functional Test required in CTS for the voltage relays and load sequencers.

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
ITS Section 3.3				
3.3.1-1	1	TABLE	Table 3.5-2A	1
3.3.1-1	1	TABLE	Table 4.1-1A	1
3.3.1-1	2a	TABLE	2.3.A.2.a	
3.3.1-1	2a	TABLE	Table 3.5-2A	2a
3.3.1-1	2a	TABLE	Table 4.1-1A	2a
3.3.1-1	2b	TABLE	2.3.A.1.b	
3.3.1-1	2b	TABLE	Table 3.5-2A	2b
3.3.1-1	2b	TABLE	Table 4.1-1A	2b
3.3.1-1	3a	TABLE	2.3.A.2.i.1	
3.3.1-1	3a	TABLE	Table 3.5-2A	3
3.3.1-1	3a	TABLE	Table 4.1-1A	3
3.3.1-1	3b	TABLE	2.3.A.2.i.2	
3.3.1-1	3b	TABLE	Table 3.5-2A	4
3.3.1-1	3b	TABLE	Table 4.1-1A	4
3.3.1-1	4	TABLE	2.3.A.1.a	
3.3.1-1	4	TABLE	Table 3.5-2A	5
3.3.1-1	4	TABLE	Table 4.1-1A	5

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.1-1	5	TABLE	2.3.A.1.c	
3.3.1-1	5	TABLE	Table 3.5-2A	6
3.3.1-1	5	TABLE	Table 4.1-1A	6
3.3.1-1	6	TABLE	2.3.A.2.d	
3.3.1-1	6	TABLE	Table 3.5-2A	7
3.3.1-1	6	TABLE	Table 4.1-1A	2a
3.3.1-1	6	TABLE	Table 4.1-1A	7
3.3.1-1	7	TABLE	2.3.A.2.e	
3.3.1-1	7	TABLE	Table 3.5-2A	8
3.3.1-1	7	TABLE	Table 4.1-1A	2a
3.3.1-1	7	TABLE	Table 4.1-1A	8
3.3.1-1	8a	TABLE	2.3.A.2.c	
3.3.1-1	8a	TABLE	Table 3.5-2A	9
3.3.1-1	8a	TABLE	Table 4.1-1A	9
3.3.1-1	8b	TABLE	2.3.A.2.b	
3.3.1-1	8b	TABLE	Table 3.5-2A	10
3.3.1-1	8b	TABLE	Table 4.1-1A	10
3.3.1-1	9	TABLE	2.3.A.3.a	
3.3.1-1	9	TABLE	Table 3.5-2A	11

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.1-1	9	TABLE	Table 4.1-1A	11
3.3.1-1	10	TABLE	2.3.A.2.f	
3.3.1-1	10	TABLE	Table 3.5-2A	12
3.3.1-1	10	TABLE	Table 4.1-1A	12
3.3.1-1	11a	TABLE	2.3.A.2.h	
3.3.1-1	11a	TABLE	Table 3.5-2A	16a
3.3.1-1	11a	TABLE	Table 4.1-1A	16a
3.3.1-1	11b	TABLE	2.3.A.2.h	
3.3.1-1	11b	TABLE	Table 3.5-2A	16b
3.3.1-1	11b	TABLE	Table 4.1-1A	16b
3.3.1-1	12	TABLE	2.3.A.2.g	
3.3.1-1	12	TABLE	Table 3.5-2A	15
3.3.1-1	12	TABLE	Table 4.1-1A	15
3.3.1-1	13	TABLE	2.3.A.3.b	
3.3.1-1	13	TABLE	Table 3.5-2A	14
3.3.1-1	13	TABLE	Table 4.1-1A	14
3.3.1-1	14	TABLE	2.3.A.3.c	
3.3.1-1	14	TABLE	Table 3.5-2A	13
3.3.1-1	14	TABLE	Table 4.1-1A	13

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.1-1	15	TABLE	Table 3.5-2A	17
3.3.1-1	15	TABLE	Table 4.1-1A	17
3.3.1-1	16	TABLE	Table 3.5-2A	New Func
3.3.1-1	16	TABLE	Table 4.1-1A	New Func
3.3.1-1	16a	TABLE	2.3.B.1	
3.3.1-1	16b	TABLE	2.3.B.2	
3.3.1-1	16c	TABLE	2.3.B.3	
3.3.1-1	16d	TABLE	2.3.B.4	
3.3.1-1	16e	TABLE	2.3.B.5	
3.3.1-1	17	TABLE	Table 3.5-2A	19
3.3.1-1	17	TABLE	Table 4.1-1A	19
3.3.1-1	17	TABLE	Table 3.5-2A	20
3.3.1-1	17	TABLE	Table 4.1-1A	20
3.3.1-1	17	TABLE	Table 4.1-1A	Note 15
3.3.1-1	18	TABLE	Table 3.5-2A	New Func
3.3.1-1	18	TABLE	Table 4.1-1A	New Func
3.3.1-1	18	TABLE	Table 4.1-1A	Note 12
3.3.1-1	19	TABLE	Table 3.5-2A	18
3.3.1-1	19	TABLE	Table 4.1-1A	18

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.1-1	Note 1	TABLE	2.3.A.2.d	
3.3.1-1	Note 2	TABLE	2.3.A.2.e	
3.3.1-1	Note a	TABLE	Table 3.5-2A	Note a
3.3.1-1	Note a	TABLE	Table 4.1-1A	Note 1
3.3.1-1	Note b	TABLE	Table 3.5-2A	Note b
3.3.1-1	Note b	TABLE	Table 4.1-1A	Note 3
3.3.1-1	Note c	TABLE	Table 3.5-2A	New Note
3.3.1-1	Note c	TABLE	Table 4.1-1A	New Note
3.3.1-1	Note d	TABLE	Table 3.5-2A	Note c
3.3.1-1	Note d	TABLE	Table 4.1-1A	Note 2
3.3.1-1	Note e	TABLE	Table 3.5-2A	New Note
3.3.1-1	Note e	TABLE	Table 4.1-1A	New Note
3.3.1-1	Note f	TABLE	Table 3.5-2A	New Note
3.3.1-1	Note f	TABLE	Table 4.1-1A	New Note
3.3.1-1	Note g	TABLE	Table 3.5-2A	New Note
3.3.1-1	Note h	TABLE	Table 4.1-1A	New Note
3.3.1-1	Note i	TABLE	Table 3.5-2A	Note d
3.3.1-1	Note i	TABLE	Table 4.1-1A	Note 16
3.3.1-1	Note j	TABLE	Table 3.5-2A	New Note

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.1-1	Note j	TABLE	Table 4.1-1A	New Note
3.3.1.1		SR	Table 4.1-1A	Various
3.3.1.2		SR	Table 4.1-1A	Note 5
3.3.1.3		SR	Table 4.1-1A	Note 6
3.3.1.3		SR	Table 4.1-1A	Note 7
3.3.1.4		SR	Table 4.1-1A	Note 9
3.3.1.5		SR	Table 4.1-1A	Note 9
3.3.1.6		SR	Table 4.1-1A	Note 9
3.3.1.6		SR	Table 4.1-1A	Note 8
3.3.1.7		SR	Table 4.1-1A	Various
3.3.1.8		SR	Table 4.1-1A	Note 4
3.3.1.8		SR	Table 4.1-1A	Note 10
3.3.1.8		SR	Table 4.1-1A	Note 17
3.3.1.9		SR	Table 4.1-1A	Note 11
3.3.1.10		SR	Table 4.1-1A	New Note
3.3.1.11		SR	Table 4.1-1A	Note 7
3.3.1.11		SR	Table 4.1-1A	New Note
3.3.1.12		SR	Table 4.1-1C	18
3.3.1.12		SR	Table 4.1-1A	New Note

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.1.13		SR	Table 4.1-1A	New
3.3.1.14		SR	Table 4.1-1A	Various
3.3.1.15		SR	Table 4.1-1A	Note 4a
3.3.1.15		SR	Table 4.1-1A	Note 11
3.3.1.16		SR	Table 4.1-1A	New Note
3.3.1 B		LCO	Table 3.5-2A	Action 1
3.3.1 C		LCO	Table 3.5-2A	Action 8
3.3.1 C		LCO	Table 3.5-2A	Action 10
3.3.1 D		LCO	Table 3.5-2A	Action 2
3.3.1 D		LCO	3.10.C.4	
3.3.1 E		LCO	Table 3.5-2A	Action 2
3.3.1 E		LCO	Table 3.5-2A	Action 6
3.3.1 F		LCO	Table 3.5-2A	Action 3
3.3.1 G		LCO	Table 3.5-2A	New Action
3.3.1 H		LCO	Table 3.5-2A	Action 4
3.3.1 I		LCO	Table 3.5-2A	New Action
3.3.1 J		LCO	Table 3.5-2A	Action 5
3.3.1 K		LCO	Table 3.5-2A	Action 6
3.3.1 L		LCO	Table 3.5-2A	Action11

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.1 M		LCO	Table 3.5-2A	Action 1
3.3.1 N		LCO	Table 3.5-2A	Action 6
3.3.1 O		LCO	Table 3.5-2A	Action 7
3.3.1.P		LCO	Table 3.5-2A	Action 9a
3.3.1 P		LCO	Table 3.5-2A	Action 9b
3.3.1 P		LCO	Table 3.5-2A	Action 10
3.3.1 Q		LCO	Table 3.5-2A	New Action
3.3.1 R		LCO	Table 3.5-2A	New Action
3.3.1 S		LCO	Table 3.5-2A	Action 9a
3.3.1 S		LCO	Table 3.5-2A	New Action
3.3.2-1	1a	TABLE	Table 3.5-2B	1a
3.3.2-1	1a	TABLE	Table 4.1-1B	1a
3.3.2-1	1b	TABLE	Table 3.5-2B	1e
3.3.2-1	1b	TABLE	Table 4.1-1B	1e
3.3.2-1	1c	TABLE	Table 3.5-1	1
3.3.2-1	1c	TABLE	Table 3.5-2B	1b
3.3.2-1	1c	TABLE	Table 4.1-1B	1b
3.3.2-1	1d	TABLE	Table 3.5-1	3
3.3.2-1	1d	TABLE	Table 3.5-2B	1d

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.2-1	1d	TABLE	Table 4.1-1B	1d
3.3.2-1	1e	TABLE	Table 3.5-1	4
3.3.2-1	1e	TABLE	Table 3.5-2B	1c
3.3.2-1	1e	TABLE	Table 4.1-1B	1c
3.3.2-1	2a	TABLE	Table 3.5-2B	2a
3.3.2-1	2a	TABLE	Table 4.1-1B	2a
3.3.2-1	2b	TABLE	Table 3.5-2B	2c
3.3.2-1	2b	TABLE	Table 4.1-1B	2c
3.3.2-1	2c	TABLE	Table 3.5-1	2a
3.3.2-1	2c	TABLE	Table 3.5-2B	2b
3.3.2-1	2c	TABLE	Table 4.1-1B	2b
3.3.2-1	3a	TABLE	Table 3.5-2B	3b
3.3.2-1	3a	TABLE	Table 4.1-1B	3b
3.3.2-1	3b	TABLE	Table 3.5-2B	3c
3.3.2-1	3b	TABLE	Table 4.1-1B	3c
3.3.2-1	3c	TABLE	Table 3.5-2B	3a
3.3.2-1	3c	TABLE	Table 4.1-1B	3a
3.3.2-1	4a	TABLE	Table 3.5-2B	5e
3.3.2-1	4a	TABLE	Table 4.1-1B	5e

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.2-1	4b	TABLE	Table 3.5-1	2b
3.3.2-1	4b	TABLE	Table 3.5-2B	5b
3.3.2-1	4b	TABLE	Table 4.1-1B	5b
3.3.2-1	4c	TABLE	Table 3.5-1	5
3.3.2-1	4c	TABLE	Table 3.5-2B	5d
3.3.2-1	4c	TABLE	Table 4.1-1B	5d
3.3.2-1	4d	TABLE	Table 3.5-1	6
3.3.2-1	4d	TABLE	Table 3.5-2B	5c
3.3.2-1	4d	TABLE	Table 4.1-1B	5c
3.3.2-1	5a	TABLE	Table 3.5-2B	6d
3.3.2-1	5a	TABLE	Table 4.1-1B	6d
3.3.2-1	5b	TABLE	Table 3.5-2B	6a
3.3.2-1	5b	TABLE	Table 4.1-1B	6a
3.3.2-1	5c	TABLE	Table 3.5-2B	6b
3.3.2-1	5c	TABLE	Table 4.1-1B	6b
3.3.2-1	6a	TABLE	Table 3.5-2B	7f
3.3.2-1	6a	TABLE	Table 4.1-1B	7f
3.3.2-1	6b	TABLE	2.3.A.3.b	
3.3.2-1	6b	TABLE	Table 3.5-2B	7b

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.2-1	6b	TABLE	Table 4.1-1B	7b
3.3.2-1	6c	TABLE	Table 3.5-2B	7e
3.3.2-1	6c	TABLE	Table 4.1-1B	7e
3.3.2-1	6d	TABLE	2.3.A.2.g	
3.3.2-1	6d	TABLE	Table 3.5-2B	7c
3.3.2-1	6d	TABLE	Table 4.1-1B	7c
3.3.2-1	6e	TABLE	Table 3.5-2B	7d
3.3.2-1	6e	TABLE	Table 4.1-1B	7d
3.3.5-1	Note a, b	TABLE	Table 3.5-2B	Note b
3.3.2-1	Note a	TABLE	Table 3.5-2B	Note a
3.3.2-1	Note a	TABLE	Table 4.1-1B	Note 21
3.3.2-1	Note b	TABLE	Table 3.5-1	4
3.3.2-1	Note c	TABLE	Table 3.5-2B	Note c
3.3.2-1	Note c	TABLE	Table 4.1-1B	Note 23
3.3.2-1	Note c,d	TABLE	Table 3.5-2B	Note d
3.3.2-1	Note d	TABLE	Table 3.5-2B	Note d
3.3.2-1	Note e	TABLE	Table 3.5-2B	New Note
3.3.2-1	Note e	TABLE	Table 4.1-1B	New Note
3.3.2-1	Note f	TABLE	Table 3.5-2B	7c

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.2-1	Note f	TABLE	Table 4.1-1B	7c
3.3.2-1	Note g	TABLE	Table 3.5-2B	7d*
3.3.2-1	Note g	TABLE	Table 4.1-1B	7d
3.3.2.1		SR	Table 4.1-1B	Various
3.3.2.2		SR	Table 4.1-1B	Note 22
3.3.2.3		SR	Table 4.1-1B	Various
3.3.2.4		SR	Table 4.1-1B	Various
3.3.2.5		SR	Table 4.1-1B	Note 20
3.3.2.6		SR	Table 4.1-1B	Various
3.3.2 A		LCO	3.5	
3.3.2 B		LCO	Table 3.5-2B	Act 23
3.3.2 C		LCO	Table 3.5-2B	Act 20
3.3.2 D		LCO	Table 3.5-2B	Act 24
3.3.2 D		LCO	Table 3.5-2B	Act 29
3.3.2 E		LCO	Table 3.5-2B	Act 21
3.3.2 F		LCO	Table 3.5-2B	Act 28
3.3.2 F		LCO	Table 3.5-2B	Act 25
3.3.2 G		LCO	Table 3.5-2B	Act 24
3.3.2 H		LCO	Table 3.5-2B	Act 29

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.2 l		LCO	Table 3.5-2B	Act 26
3.3.2 l		LCO	Table 3.5-2B	Act 30
3.3.3-1	1	TABLE	Table 3.15-1	1
3.3.3-1	2	TABLE	Table 3.15-1	2
3.3.3-1	3	TABLE	Table 3.15-1	3
3.3.3-1	4	TABLE	Table 3.15-1	4
3.3.3-1	5	TABLE	Table 3.15-1	5
3.3.3-1	6	TABLE	Table 3.15-1	6
3.3.3-1	7	TABLE	Table 3.15-1	7
3.3.3-1	8	TABLE	Table 3.15-1	8
3.3.3-1	9	TABLE	Table 3.15-1	9
3.3.3-1	10	TABLE	Table 3.15-1	10
3.3.3-1	11	TABLE	Table 3.15-1	11
3.3.3-1	12	TABLE	Table 3.15-1	12
3.3.3-1	13	TABLE	Table 3.15-1	13
3.3.3-1	14	TABLE	Table 3.15-1	14
3.3.3-1	15	TABLE	Table 3.15-1	15
3.3.3-1	16	TABLE	Table 3.15-1	16
3.3.3-1	Note a	TABLE	Table 3.15-1	Action b

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.3-1	Note b	TABLE	Table 3.15-1	Action c
3.3.3-1	Note c	TABLE	Table 3.15-1	New Note
3.3.3 A		LCO	Table 3.15-1	Action a1
3.3.3 B		LCO	Table 3.15-1	Action a5
3.3.3 C		LCO	Table 3.15-1	Action a5
3.3.3 D		LCO	Table 3.15-1	Action a2
3.3.3 E		LCO	Table 3.15-1	Action a4
3.3.3 F		LCO	Table 3.15-1	Action a6
3.3.3 G		LCO	Table 3.15-1	Action a6
3.3.3 H		LCO	Table 3.15-1	New Cond
3.3.3 I		LCO	Table 3.15-1	Action a2
3.3.3 J		LCO	Table 3.15-1	Action a3
3.3.3		LCO	Table 3.15-1	Action a
3.3.3		LCO	Table 3.15-1	Action a5
3.3.3.1		SR	Table 4.1-1C	21
3.3.3.1		SR	Table 4.1-1C	29
3.3.3.2		SR	Table 4.1-1C	21
3.3.3.3		SR	Table 4.1-1C	21
3.3.3.3		SR	Table 4.1-1C	New Note

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.4		LCO	Table 3.5-2B	8
3.3.4.1		SR	Table 4.1-1B	8
3.3.4.1		SR	Table 4.1-1C	11
3.3.4.2		SR	Table 4.1-1C	11
3.3.4.3		SR	Table 3.5-1	10
3.3.4.3		SR	Table 4.1-1B	8
3.3.4.a		LCO	Table 3.5-2B	8a
3.3.4.b		LCO	Table 3.5-2B	8b
3.3.4.c		LCO	New	
3.3.4 A		LCO	Table 3.5-2B	Act 31
3.3.4 B		LCO	Table 3.5-2B	Act 33
3.3.4 C		LCO	Table 3.5-2B	New Action
3.3.4 D		LCO	Table 3.5-2B	New Action
3.3.5		LCO	3.6.D.2.c	
3.3.5-1	1	TABLE	Table 3.5-2B	4b
3.3.5-1	1	TABLE	Table 4.1-1B	4b
3.3.5-1	2	TABLE	Table 3.5-2B	4f
3.3.5-1	2	TABLE	Table 4.1-1B	4f
3.3.5-1	3	TABLE	Table 3.5-1	9

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ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.5-1	3	TABLE	Table 3.5-2B	4e
3.3.5-1	3	TABLE	Table 4.1-1B	4e
3.3.5-1	4	TABLE	Table 3.5-2B	4d
3.3.5-1	4	TABLE	Table 4.1-1B	4d
3.3.5-1	5	TABLE	Table 3.5-2B	4a
3.3.5-1	5	TABLE	Table 4.1-1B	4a
3.3.5-1	6	TABLE	Table 3.5-2B	4c
3.3.5-1	6	TABLE	Table 4.1-1B	4c
3.3.5-1	Note a	TABLE	Table 3.5-2B	Note b
3.3.5-1	Note b	TABLE	Table 3.5-2B	Note b
3.3.5-1	Note c	TABLE	Table 3.5-1	9
3.3.5.1		SR	Table 4.1-1B	4e
3.3.5.2		SR	Table 4.1-1B	4f
3.3.5.3		SR	Table 4.1-1B	4e
3.3.5.4		SR	Table 4.1-1B	4b
3.3.5.5		SR	Table 4.1-1B	4e
3.3.5 A		LCO	Table 3.5-2B	Act 22
3.3.5 B		LCO	Table 3.5-2B	Act 22
3.3.5 B		LCO	3.6.D.2.d	

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.3.5 C		LCO	Table 3.5-2B	Act 22

NSHD Category	Change Number 3.4-	Discussion of Change
M	64	A new surveillance requirement, SR 3.4.3.1, has been included for consistency with NUREG-1431 which requires verification that RCS pressure, temperature and heatup and cooldown rates are within the specified limits. Plant operators currently monitor these variables for compliance with Specification 3.1.B.1.b although it is not explicitly written as a TS SR. Since these are new TS requirements they are considered more restrictive on plant operations. This more restrictive change is included to make the PI ITS complete.
	65	Not used.
R	66	CTS 3.1.B.2. In conformance with the guidance of NUREG-1431, the pressurizer heatup and cooldown specifications have been relocated from the TS to the PTLR. This change is acceptable since the Bases for Specification 3.4.3 state that the reactor pressure vessel is the most limiting component for brittle fracture; thus the requirements for the pressurizer have not been included in the ITS. The shutdown requirements associated with pressurizer heatup and cooldown limitations have been relocated to the TRM.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.4.5.2	Verify steam generator secondary side water levels are ≥ 60~~[17]~~% (Wide Range) for both~~required~~ RCS loops.	12 hours X3.4-121
SR 3.4.5.3	-------------------NOTE------------------- Not required to be performed until 24 hours after a required pump is not in operation. -- Verify correct breaker alignment and indicated power are available to each~~the~~ required pump~~ that is not in operation~~.	TA3.4-125 7 days

R-1

Difference Category	Difference Number 3.4-	Justification for Differences
CL	305	CTS requirements have been relocated to the ITS Bases.
CL	306	The PI list of PIVs is in the CTS and has been relocated to the Bases LCO discussion. Reference to a separate list in the USAR is not required. This list is based on the NRC study provided in the letter from Robert A. Clark, NRC, to L. O. Mayer, NSP, subject: "Order for Modification of License Concerning Primary Coolant System Pressure Isolation Valves," dated April 20, 1981.
CL	307	The CTS required minimum test pressure differential across the PIVs has been relocated to the Bases.
	308	Not used
CL	309	The definition of PIVs provided in these Bases is very broad and thus the Bases are clarified to assure that only the PIVs included in the CTS are included in this LCO. The CTS lists PIVs based on the NRC study which identified the risk significant configurations. Thus the Bases are modified to clarify that this Specification applies to the risk significant valves as identified in the LCO section of the Bases.

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS - Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

-----------------------------------NOTE-----------------------------------
In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.15.1.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable.	A.1 Restore train(s) to OPERABLE status.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. <u>AND</u> B.2 Be in MODE 4.	6 hours 12 hours
C. Less than 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.	C.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.4.1	Verify RWST borated water volume is ≥ 200,000 gallons (68%).	7 days
SR 3.5.4.2	Verify RWST boron concentration is ≥ 2600 ppm and ≤ 3500 ppm.	7 days

BASES

BACKGROUND (continued)

When the suction for the ECCS pumps is transferred to the containment sump, the RWST and SI pump recirculation flow paths must be isolated to prevent a release of the containment sump contents to the RWST, which could result in a release of contaminants to the Auxiliary Building atmosphere and the eventual loss of suction head for the ECCS pumps.

This LCO ensures that:

a. The RWST contains sufficient borated water to support the ECCS during the injection phase;

b. Sufficient water volume exists in the containment sump to support continued operation of the ECCS pumps at the time of transfer to the recirculation mode of cooling; and

c. The reactor remains subcritical following a LOCA.

Insufficient water in the RWST could result in inadequate net positive suction head (NPSH) for the RHR pumps when the transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of SHUTDOWN MARGIN (SDM) or excessive boric acid precipitation in the core following the LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside the containment.

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWST provides a source of borated water to the ECCS and Containment Spray System pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.2, "ECCS Systems." These analyses are used to assess changes to the RWST in order to evaluate their effects in relation to the acceptance limits in the analyses.

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.2 ECCS – Operating

LCO 3.5.2 Two ECCS trains shall be OPERABLE.

~~APPLICABILITY: MODES 1, 2, and 3.~~

TA3.5-37

-----NOTES-----

~~1.~~ In MODE 3, both safety injection (SI) pump flow paths may be isolated by closing the isolation valves for up to 2 hours to perform pressure isolation valve testing per SR 3.4.154.1.

R-1

PA3.5-38

~~2. Operation in MODE 3 with ECCS pumps declared inoperable pursuant to LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System," is allowed for up to 4 hours or until the temperature of all RCS cold legs exceeds [375]°F, whichever comes first.~~

CL3.5-39

APPLICABILITY: MODES 1, 2, and 3.

TA3.5-37

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more trains inoperable. ~~AND~~ ~~At least 100% of the ECCS flow equivalent to a single OPERABLE ECCS train available.~~	A.1 Restore train(s) to OPERABLE status.	72 hours TA3.5-40

BASES (continued)

APPLICABLE SAFETY ANALYSES

The accumulators are assumed OPERABLE in both the large and small break LOCA analyses at full power (Ref. 1~~2~~). These are the Design Basis Accidents (DBAs) that establish the acceptance limits for the accumulators. Reference to the analyses for these DBAs is used to assess changes in the accumulators as they relate to the acceptance limits.

In performing the LOCA calculations, conservative assumptions are made concerning the availability of ECCS flow. In the early stages of a large break LOCA, with or without a loss of offsite power, the accumulators provide the sole source of makeup water to the RCS. The assumption of loss of offsite power is required by regulations and conservatively imposes a delay wherein the ECCS pumps cannot deliver flow until the emergency diesel generators start, come to rated speed, and go through their timed loading sequence. In cold leg break scenarios, the entire contents of one accumulator are assumed to be lost through the break. CL3.5-62 R-1

The limiting large break LOCA is a double ended guillotine break at the discharge of the reactor coolant pump. During this event, the accumulators discharge to the RCS as soon as RCS pressure decreases to below accumulator pressure.

As a conservative estimate, no credit is taken for ECCS pump flow until an effective delay has elapsed. This delay accounts for safety injection (SI) signal generation, the diesels starting and the pumps being loaded and delivering full flow. ~~The delay time is conservatively set with an additional 2 seconds to account for SI signal generation.~~ During this time, the accumulators are analyzed as providing the sole source of emergency core cooling. No operator action is assumed during the blowdown stage of a large break LOCA. CL3.5-71

The worst case small break LOCA analyses also assume a time delay before pumped flow reaches the core. For the larger

(continued)

c. The reactor remains subcritical following a LOCA.

Insufficient water in the RWST could result in inadequate net positive suction head (NPSH) for the RHR pumps~~insufficient cooling capacity~~ when the CL3.5-133

BASES

BACKROUND (continued)

transfer to the recirculation mode occurs. Improper boron concentrations could result in a reduction of SHUTDOWN MARGIN(SDM) or excessive boric acid precipitation in the core following the LOCA, as well as excessive caustic stress corrosion of mechanical components and systems inside the containment. R-1

APPLICABLE SAFETY ANALYSES

During accident conditions, the RWST provides a source of borated water to the ECCS and Containment Spray System pumps. As such, it provides containment cooling and depressurization, core cooling, and replacement inventory and is a source of negative reactivity for reactor shutdown (Ref. 1). The design basis transients and applicable safety analyses concerning each of these systems are discussed in the Applicable Safety Analyses section of B 3.5.2, "ECCS – Operating"; B 3.5.3, "ECCS – Shutdown"; and B 3.6.5~~6~~, "Containment Spray and Cooling Systems." These analyses are used to assess changes to the RWST in order to evaluate their effects in relation to the acceptance limits in the analyses.

The RWST must also meet volume~~,~~ and boron concentration~~, and temperature~~ requirements for non-LOCA events. The volume is not an explicit assumption in non-LOCA events since the required volume is a small fraction of the available volume. The deliverable volume limit is set by the LOCA and containment analyses. For the RWST, the deliverable volume is determined by the volume of water required in the containment sump to provide the necessary CL3.5-51 CL3.5-133

(continued)

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

Difference Category	Difference Number 3.6-	Justification for Differences
	218	Not used.
	219	Not used.
	220	Not used.
CL	221	Within the PI current licensing basis, one system, the CVCS, does isolate the affected penetration flow path, thus this exception is stated.
PA	222	Guidance is provided for the operators on acceptable means for verification of flow path isolation.
PA	223	The Bases have been revised to be consistent with the SR stated requirements.
PA	224	This SR only applies when the plant is in MODE 5; thus the discussion of MODES 1, 2, 3 and 4 is irrelevant and is not included.
	225	Not used.
	226	Not used.

Difference Category	Difference Number 3.6-	Justification for Differences
CL	234	Since the Containment Spray (CS) and Containment Cooling Systems do not provide redundant cooling capability at PI, this discussion was revised. Each train of CS provides 100% of the CS heat removal capability. Containment Cooling is also required to provide heat removal.
	235	Not used.
CL	236	The use of the term "inject" implies that some motive force is applied to push the NaOH into the containment spray flow. At PI, the Spray Additive System is a gravity feed system and does not forcibly "inject" into the spray; therefore this term has been changed to "mixes".
CL	237	This was revised to reference PI specific instrumentation, design features and procedures.
CL	238	PI does not have ECCS automatic containment sump isolation valves which are tested in accordance with SR 3.5.2.5; thus, this paragraph is not included in the ITS.
	239	Not used.
	240	Not used.

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

Improved Technical Specification Cross-Reference

ITS Section	ITS Table Item Number	Section Type	CTS Section	CTS Table Item Number
3.6.8		LCO	3.6.B.2	
3.6.8.1		SR	Table 3.5-1	7
3.6.8.1		SR	Table 4.1-1C	10
3.6.8.1		SR	Table 4.1-1C	Note 39
3.6.8.1		SR	4.4.C	
3.6.8.2		SR	Table 4.1-1C	10
3.6.8.2		SR	Table 4.1-1C	Note 39
3.6.9		LCO	3.6.H	
3.6.9.1		SR	4.4.B.4.d	
3.6.9.2		SR	4.4.B.3	
3.6.9.2		SR	4.4.B.5	
3.6.9.3		SR	4.4.B.3.c	
3.6.9.4		SR	4.4.E	
3.6.9.5		SR	4.4.B.1	
3.6.10		LCO	1.0	
3.6.10		LCO	3.6.G	
3.6.10.1		SR	New	

Difference Category	Difference Number 3.7-	Justification for Differences
CL	266	NUREG-1431 discussion of the CC system safety functions and assumptions has been replaced with discussion appropriate for PI.
CL	267	Since PI has a shared surge tank, the clause "and associated surge tank" is not appropriate and has not been included.
	268-270	Not used.
PA	271	Clarification is provided to indicate that RHR heat exchanger cooling is not the only function for which the CC system must be operable. This change has been made to be accurate and avoid operator confusion.
PA	272	Clarification is provided that this SR may be satisfied by a control room check of valve positions.
PA	273	At PI, this SR is unlikely to cause a plant transient and therefore may be performed at power. However, as noted in the added Bases discussion, the 24 month Frequency is necessary since there may be some times that performing the test at power could jeopardize plant operations.

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources-Shutdown

LCO 3.8.5 One DC electrical power source shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems-Shutdown."

APPLICABILITY: MODES 5 and 6,
During movement of irradiated fuel assemblies.

ACTIONS

--NOTE--

LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required DC electrical power source inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	<u>OR</u>	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	<u>AND</u>	
	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	<u>AND</u>	

PA3.8-100

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One ~~or more~~ required DC electrical power source~~subsystems~~ inoperable.	A.1.1 Declare affected required feature(s) inoperable.	TA3.8-175 Immed iately R-1
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies.	Immediately
	AND	
	A.2.3 ~~Initiate action to~~ ~~s~~Suspend operations involving positive reactivity additions that could result in loss of required SDM boron concentration.	Immediately TA3.8-117
	AND	
	A.2.4 Initiate action to restore required DC electrical power source~~subsystems~~ to OPERABLE status.	Immediately

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

Current Technical Specification Cross-Reference

CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
CTS Section Table				
Table 1-1		TABLE	Table 1.1-1	
Table 1-1	Note *	LCO	3.9.1	
New		LCO	3.9.1	
Table 1-1	Note *	(Partial)	Relocated - COLR	
Table 1-1	Note **		Deleted	
Table 3.5-1	9	TABLE	3.3.5-1	Note c
Table 3.5-1	1	TABLE	3.3.2-1	1c
Table 3.5-1	2a	TABLE	3.3.2-1	2c
Table 3.5-1	2b	TABLE	3.3.2-1	4b
Table 3.5-1	3	TABLE	3.3.2-1	1d
Table 3.5-1	4	TABLE	3.3.2-1	1e
Table 3.5-1	4	TABLE	3.3.2-1	Note b
Table 3.5-1	5	TABLE	3.3.2-1	4c
Table 3.5-1	6	TABLE	3.3.2-1	4d
Table 3.5-1	7	SR	3.6.8.1	
Table 3.5-1	8		Relocated - TRM	
Table 3.5-1	9	TABLE	3.3.5-1	3

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-1	10	SR	3.3.4.3	
Table 3.5-2A	1	TABLE	3.3.1-1	1
Table 3.5-2A	2a	TABLE	3.3.1-1	2a
Table 3.5-2A	2b	TABLE	3.3.1-1	2b
Table 3.5-2A	3	TABLE	3.3.1-1	3a
Table 3.5-2A	4	TABLE	3.3.1-1	3b
Table 3.5-2A	5	TABLE	3.3.1-1	4
Table 3.5-2A	6	TABLE	3.3.1-1	5
Table 3.5-2A	7	TABLE	3.3.1-1	6
Table 3.5-2A	8	TABLE	3.3.1-1	7
Table 3.5-2A	9	TABLE	3.3.1-1	8a
Table 3.5-2A	10	TABLE	3.3.1-1	8b
Table 3.5-2A	11	TABLE	3.3.1-1	9
Table 3.5-2A	12	TABLE	3.3.1-1	10
Table 3.5-2A	13	TABLE	3.3.1-1	14
Table 3.5-2A	14	TABLE	3.3.1-1	13
Table 3.5-2A	15	TABLE	3.3.1-1	12
Table 3.5-2A	16a	TABLE	3.3.1-1	11a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	16b	TABLE	3.3.1-1	11b
Table 3.5-2A	17	TABLE	3.3.1-1	15
Table 3.5-2A	18	TABLE	3.3.1-1	19
Table 3.5-2A	19	TABLE	3.3.1-1	17
Table 3.5-2A	20	TABLE	3.3.1-1	17
Table 3.5-2A	New Func	TABLE	3.3.1-1	16
Table 3.5-2A	New Func	TABLE	3.3.1-1	18
Table 3.5-2A	Act 1	LCO	3.3.1 B	
Table 3.5-2A	Action 1	LCO	3.3.1 M	
Table 3.5-2A	Action 2	LCO	3.3.1 D	
Table 3.5-2A	Action 2	LCO	3.3.1 E	
Table 3.5-2A	Act 2	SR	3.2.4.2	
Table 3.5-2A	Act 2c	SR	3.2.4.2	
Table 3.5-2A	Act 3	LCO	3.3.1 F	
Table 3.5-2A	New Action	LCO	3.3.1 G	
Table 3.5-2A	Action 4	LCO	3.3.1 H	
Table 3.5-2A	New Action	LCO	3.3.1 I	
Table 3.5-2A	Action 5	LCO	3.3.1 J	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	Action 6	LCO	3.3.1 E	
Table 3.5-2A	Action 6	LCO	3.3.1 K	
Table 3.5-2A	Action 6	LCO	3.3.1 N	
Table 3.5-2A	Action 7	LCO	3.3.1 O	
Table 3.5-2A	Act 8	LCO	3.3.1 C	
Table 3.5-2A	Action 9a	LCO	3.3.1 S	
Table 3.5-2A	Action 9a	LCO	3.3.1.P	
Table 3.5-2A	Action 9b	LCO	3.3.1 P	
Table 3.5-2A	Action 10	LCO	3.3.1 C	
Table 3.5-2A	Act 10	LCO	3.3.1 P	
Table 3.5-2A	Action11	LCO	3.3.1 L	
Table 3.5-2A	New Action	LCO	3.3.1 Q	
Table 3.5-2A	New Action	LCO	3.3.1 R	
Table 3.5-2A	New Action	LCO	3.3.1 S	
Table 3.5-2A	Note a	TABLE	3.3.1-1	Note a
Table 3.5-2A	Note b	TABLE	3.3.1-1	Note b
Table 3.5-2A	Note c	TABLE	3.3.1-1	Note d
Table 3.5-2A	Note d	TABLE	3.3.1-1	Note i

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note e
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note f
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note g
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note h
Table 3.5-2A	New Note	TABLE	3.3.1-1	Note j
Table 3.5-2B	1a	TABLE	3.3.2-1	1a
Table 3.5-2B	1b	TABLE	3.3.2-1	1c
Table 3.5-2B	1c	TABLE	3.3.2-1	1e
Table 3.5-2B	1d	TABLE	3.3.2-1	1d
Table 3.5-2B	1e	TABLE	3.3.2-1	1b
Table 3.5-2B	2a	TABLE	3.3.2-1	2a
Table 3.5-2B	2b	TABLE	3.3.2-1	2c
Table 3.5-2B	2c	TABLE	3.3.2-1	2b
Table 3.5-2B	3a	TABLE	3.3.2-1	3c
Table 3.5-2B	3b	TABLE	3.3.2-1	3a
Table 3.5-2B	3c	TABLE	3.3.2-1	3b
Table 3.5-2B	4a	TABLE	3.3.5-1	5
Table 3.5-2B	4b	TABLE	3.3.5-1	1

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	4c	TABLE	3.3.5-1	6
Table 3.5-2B	4d	TABLE	3.3.5-1	4
Table 3.5-2B	4e	TABLE	3.3.5-1	3
Table 3.5-2B	4f	TABLE	3.3.5-1	2
Table 3.5-2B	5a	LCO	3.7.2	
Table 3.5-2B	5b	TABLE	3.3.2-1	4b
Table 3.5-2B	5c	TABLE	3.3.2-1	4d
Table 3.5-2B	5d	TABLE	Not used	
Table 3.5-2B	5e	TABLE	3.3.2-1	4a
Table 3.5-2B	6a	TABLE	3.3.2-1	5b
Table 3.5-2B	6b	TABLE	3.3.2-1	5c
Table 3.5-2B	6c		Relocated - TRM	
Table 3.5-2B	6d	TABLE	3.3.2-1	5a
Table 3.5-2B	7a		Relocated - TRM	
Table 3.5-2B	7b	TABLE	3.3.2-1	6b
Table 3.5-2B	7c	TABLE	3.3.2-1	6d
Table 3.5-2B	7c	TABLE	3.3.2-1	Note f
Table 3.5-2B	7d	TABLE	3.3.2-1	6e

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	7d*	TABLE	3.3.2-1	Note g
Table 3.5-2B	7e	TABLE	3.3.2-1	6c
Table 3.5-2B	7f	TABLE	3.3.2-1	6a
Table 3.5-2B	8a	LCO	3.3.4.a	
Table 3.5-2B	8b	LCO	3.3.4.b	
Table 3.5-2B	9		Deleted - LAR	
Table 3.5-2B	Act 20	LCO	3.3.2 C	
Table 3.5-2B	Act 21	LCO	3.3.2 D	
Table 3.5-2B	Act 21	LCO	3.3.2 E	
Table 3.5-2B	Act 22	LCO	3.3.5 A	
Table 3.5-2B	Act 23	LCO	3.3.2 B	
Table 3.5-2B	Act 24	LCO	3.3.2 D	
Table 3.5-2B	Act 24	LCO	3.3.2 G	
Table 3.5-2B	Act 25	LCO	3.3.2 F	
Table 3.5-2B	Act 26	LCO	3.3.2 I	
Table 3.5-2B	Act 27	LCO	3.7.2	
Table 3.5-2B	Act 28	LCO	3.3.2 F	
Table 3.5-2B	Act 29	LCO	3.3.2 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.5-2B	Act 29	LCO	3.3.2 H	
Table 3.5-2B	Act 30	LCO	3.3.2 I	
Table 3.5-2B	Act 31	LCO	3.3.4 A	
Table 3.5-2B	Act 32		Deleted	
Table 3.5-2B	Act 33	LCO	3.3.4 B	
Table 3.5-2B	Act 34		Deleted - LAR	
Table 3.5-2B	New Action	LCO	3.3.4 C	
Table 3.5-2B	New Action	LCO	3.3.4 D	
Table 3.5-2B	Act 35		Deleted - LAR	
Table 3.5-2B	Act 36		Deleted - LAR	
Table 3.5-2B	Note a	TABLE	3.3.2-1	Note a
Table 3.5-2B	Note b	TABLE	3.3.5-1	Note a, b
Table 3.5-2B	Note c	TABLE	3.3.2-1	Note c
Table 3.5-2B	Note c	LCO	3.7.2	
Table 3.5-2B	Note d	TABLE	3.3.2-1	Note c,d
Table 3.5-2B	New Note	TABLE	3.3.2-1	Note e
Table 3.15-1	1	TABLE	3.3.3-1	1
Table 3.15-1	2	TABLE	3.3.3-1	2

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	3	TABLE	3.3.3-1	3
Table 3.15-1	4	TABLE	3.3.3-1	4
Table 3.15-1	5	TABLE	3.3.3-1	5
Table 3.15-1	6	TABLE	3.3.3-1	6
Table 3.15-1	7	TABLE	3.3.3-1	7
Table 3.15-1	8	TABLE	3.3.3-1	8
Table 3.15-1	9	TABLE	3.3.3-1	9
Table 3.15-1	10	TABLE	3.3.3-1	10
Table 3.15-1	11	TABLE	3.3.3-1	11
Table 3.15-1	12	TABLE	3.3.3-1	12
Table 3.15-1	13	TABLE	3.3.3-1	13
Table 3.15-1	14	TABLE	3.3.3-1	14
Table 3.15-1	15	TABLE	3.3.3-1	15
Table 3.15-1	16	TABLE	3.3.3-1	16
Table 3.15-1	Action a	LCO	3.3.3	
Table 3.15-1	Action a1	LCO	3.3.3 A	
Table 3.15-1	Action a1	LCO	3.3.3 C	
Table 3.15-1	Action a2	LCO	3.3.3 D	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 3.15-1	Action a2	LCO	3.3.3 I	
Table 3.15-1	Action a3	LCO	3.3.3 D	
Table 3.15-1	Action a3	LCO	3.3.3 J	
Table 3.15-1	Action a4	LCO	3.3.3 E	
Table 3.15-1	Action a4	LCO	3.3.3 I	
Table 3.15-1	Action a5	LCO	3.3.3 B	
Table 3.15-1	Action a5	LCO	3.3.3 C	
Table 3.15-1	Action a5	LCO	3.3.3	
Table 3.15-1	Action a6	LCO	3.3.3 F	
Table 3.15-1	Action a6	LCO	3.3.3 G	
Table 3.15-1	Action a6	LCO	3.3.3 I	
Table 3.15-1	New Cond	LCO	3.3.3 H	
Table 3.15-1	Action b	TABLE	3.3.3-1	Note a
Table 3.15-1	Action c	TABLE	3.3.3-1	Note b
Table 3.15-1	New Note	TABLE	3.3.3-1	Note c
Table 4.1-1A	1	TABLE	3.3.1-1	1
Table 4.1-1A	2a	TABLE	3.3.1-1	2a
Table 4.1-1A	2a	TABLE	3.3.1-1	6

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	2a	TABLE	3.3.1-1	7
Table 4.1-1A	2b	TABLE	3.3.1-1	2b
Table 4.1-1A	3	TABLE	3.3.1-1	3a
Table 4.1-1A	4	TABLE	3.3.1-1	3b
Table 4.1-1A	5	TABLE	3.3.1-1	4
Table 4.1-1A	6	TABLE	3.3.1-1	5
Table 4.1-1A	7	TABLE	3.3.1-1	6
Table 4.1-1A	8	TABLE	3.3.1-1	7
Table 4.1-1A	9	TABLE	3.3.1-1	8a
Table 4.1-1A	10	TABLE	3.3.1-1	8b
Table 4.1-1A	11	TABLE	3.3.1-1	9
Table 4.1-1A	12	TABLE	3.3.1-1	10
Table 4.1-1A	13	TABLE	3.3.1-1	14
Table 4.1-1A	14	TABLE	3.3.1-1	13
Table 4.1-1A	15	TABLE	3.3.1-1	12
Table 4.1-1A	16a	TABLE	3.3.1-1	11a
Table 4.1-1A	16b	TABLE	3.3.1-1	11b
Table 4.1-1A	17	TABLE	3.3.1-1	15

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	18	TABLE	3.3.1-1	19
Table 4.1-1A	19	TABLE	3.3.1-1	17
Table 4.1-1A	20	TABLE	3.3.1-1	17
Table 4.1-1A	New Func	TABLE	3.3.1-1	16
Table 4.1-1A	New Func	TABLE	3.3.1-1	18
Table 4.1-1A	Note 1	TABLE	3.3.1-1	Note a
Table 4.1-1A	Note 2	TABLE	3.3.1-1	Note d
Table 4.1-1A	Note 3	TABLE	3.3.1-1	Note b
Table 4.1-1A	Note 4	SR	3.3.1.8	
Table 4.1-1A	Note 4a	SR	3.3.1.15	
Table 4.1-1A	Note 5	SR	3.3.1.2	
Table 4.1-1A	Note 6	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.3	
Table 4.1-1A	Note 7	SR	3.3.1.11	
Table 4.1-1A	Note 8	SR	3.3.1.6	
Table 4.1-1A	Note 9	SR	3.3.1.4	
Table 4.1-1A	Note 9	SR	3.3.1.5	
Table 4.1-1A	Note 10	SR	3.3.1.8	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1A	Note 10	(Partial)	Relocated - Bases	
Table 4.1-1A	Note 11	SR	3.3.1.9	
Table 4.1-1A	Note 11	SR	3.3.1.15	
Table 4.1-1A	Note 12	TABLE	3.3.1-1	18
Table 4.1-1A	Note 13		Relocated - Bases	
Table 4.1-1A	Note 14		Relocated - Bases	
Table 4.1-1A	Note 15	TABLE	3.3.1-1	17
Table 4.1-1A	Note 16	TABLE	3.3.1-1	Note i
Table 4.1-1A	New Note	SR	3.3.1.4	
Table 4.1-1A	Note 17	SR	3.3.1.8	
Table 4.1-1A	Note 18		Relocated - TRM	
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note c
Table 4.1-1A	New Note	SR	3.3.1.16	
Table 4.1-1A	New Note	SR	3.3.1.10	
Table 4.1-1A	New Note	SR	3.3.1.11	
Table 4.1-1A	New Note	SR	3.3.1.12	
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note e

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Table 4.1-1A	New Note	TABLE	3.3.1-1	Note f
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note g
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note h
Table 4.1-1A	New Note	TABLE	3.3.1-1	Note j
Table 4.1-1B	1a	TABLE	3.3.2-1	1a
Table 4.1-1B	1b	TABLE	3.3.2-1	1c
Table 4.1-1B	1c	TABLE	3.3.2-1	1e
Table 4.1-1B	1d	TABLE	3.3.2-1	1d
Table 4.1-1B	1e	TABLE	3.3.2-1	1b
Table 4.1-1B	2a	TABLE	3.3.2-1	2a
Table 4.1-1B	2b	TABLE	3.3.2-1	2c
Table 4.1-1B	2c	TABLE	3.3.2-1	2b
Table 4.1-1B	3a	TABLE	3.3.2-1	3c
Table 4.1-1B	3b	TABLE	3.3.2-1	3a
Table 4.1-1B	3c	TABLE	3.3.2-1	3b
Table 4.1-1B	4a	TABLE	3.3.5-1	5
Table 4.1-1B	4b	TABLE	3.3.5-1	1
Table 4.1-1B	4b	SR	3.3.5.4	

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Table 4.1-1B	4c	TABLE	3.3.5-1	6
Table 4.1-1B	4d	TABLE	3.3.5-1	4
Table 4.1-1B	4e	TABLE	3.3.5-1	3
Table 4.1-1B	4e	SR	3.3.5.1	
Table 4.1-1B	4e	SR	3.3.5.3	
Table 4.1-1B	4e	SR	3.3.5.5	
Table 4.1-1B	4f	TABLE	3.3.5-1	2
Table 4.1-1B	4f	SR	3.3.5.2	
Table 4.1-1B	5a	SR	3.7.2.1	
Table 4.1-1B	5a	(partial)	Relocated - IST	
Table 4.1-1B	5b	TABLE	3.3.2-1	4b
Table 4.1-1B	5c	TABLE	3.3.2-1	4d
Table 4.1-1B	5d	TABLE	3.3.2-1	4c
Table 4.1-1B	5e	TABLE	3.3.2-1	4a
Table 4.1-1B	6a	TABLE	3.3.2-1	5b
Table 4.1-1B	6b	TABLE	3.3.2-1	5c
Table 4.1-1B	6c		Relocated - TRM	
Table 4.1-1B	6d	TABLE	3.3.2-1	5a

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1B	7a		Relocated - TRM	
Table 4.1-1B	7b	TABLE	3.3.2-1	6b
Table 4.1-1B	7c	TABLE	3.3.2-1	6d
Table 4.1-1B	7c	TABLE	3.3.2-1	Note f
Table 4.1-1B	7d	TABLE	3.3.2-1	6e
Table 4.1-1B	7e	TABLE	3.3.2-1	6c
Table 4.1-1B	7f	TABLE	3.3.2-1	6a
Table 4.1-1B	8	SR	3.3.4.1	
Table 4.1-1B	8	SR	3.3.4.3	
Table 4.1-1B	Note 20	SR	3.3.2.5	
Table 4.1-1B	Note 21	TABLE	3.3.2-1	Note a
Table 4.1-1B	Note 22	SR	3.3.2.2	
Table 4.1-1B	Note 23	TABLE	3.3.2-1	Note c
Table 4.1-1B	Note 23	LCO	3.7.2	
Table 4.1-1B	Note 24	TABLE	3.3.5-1	Note d
Table 4.1-1B	Note 25		Deleted	
Table 4.1-1B	Note 26	LCO	3.3.5-1	
Table 4.1-1B	New Note	TABLE	3.3.2-1	Note e

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Table 4.1-1B	7d	TABLE	3.3.2-1	Note g
Table 4.1-1C	1		Relocated - TRM	
Table 4.1-1C	2	SR	3.1.4.1	
Table 4.1-1C	2	SR	3.1.7.1	
Table 4.1-1C	2	(Partial)	Relocated - TRM	
Table 4.1-1C	2	(Partial)	Deleted	
Table 4.1-1C	3		Relocated - TRM	
Table 4.1-1C	4		Relocated - TRM	
Table 4.1-1C	5		Deleted - Boric Acid LAR	
Table 4.1-1C	6		Relocated - TRM	
Table 4.1-1C	7		Deleted - Boric Acid LAR	
Table 4.1-1C	8	SR	3.3.3.1	
Table 4.1-1C	8	SR	3.3.3.2	
Table 4.1-1C	9		Deleted - Boric Acid LAR	
Table 4.1-1C	10	SR	3.6.8.1	
Table 4.1-1C	10	SR	3.6.8.2	

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CTS Section	CTS Table Item Number	Section Type	ITS Section	ITS Table Item Number
Table 4.1-1C	11	SR	3.3.4.1	
Table 4.1-1C	11	SR	3.3.4.2	
Table 4.1-1C	12		Deleted - Boric Acid LAR	
Table 4.1-1C	13		Relocated - TRM	
Table 4.1-1C	14		CTS Deleted	
Table 4.1-1C	15		Relocated - TRM	
Table 4.1-1C	16		Relocated - TRM	
Table 4.1-1C	17		Relocated - TRM	
Table 4.1-1C	18	SR	3.3.1.12	
Table 4.1-1C	19		Relocated - TRM	
Table 4.1-1C	20		Relocated - TRM	
Table 4.1-1C	21	SR	3.3.3.1	
Table 4.1-1C	21	SR	3.3.3.2	
Table 4.1-1C	21	SR	3.3.3.3	
Table 4.1-1C	22		CTS Deleted	
Table 4.1-1C	23		CTS Deleted	
Table 4.1-1C	24		Relocated - TRM	

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Table 4.1-1C	24	SR	3.3.6.5	
Table 4.1-1C	24	SR	3.3.6.2	
Table 4.1-1C	25	SR	3.4.12.4	
Table 4.1-1C	25	SR	3.4.12.5	
Table 4.1-1C	25	SR	3.4.13.5	
Table 4.1-1C	25	SR	3.4.13.6	
Table 4.1-1C	26		Relocated - TRM	
Table 4.1-1C	27		Relocated - TRM	
Table 4.1-1C	28		Relocated - TRM	
Table 4.1-1C	29	SR	3.3.3.1	
Table 4.1-1C	29	SR	3.3.3.2	
Table 4.1-1C	29	(Partial)	Relocated - TRM	
Table 4.1-1C	30		Relocated - TRM	
Table 4.1-1C	31		Relocated - TRM	
Table 4.1-1C	Note 30	SR	3.1.7.1	
Table 4.1-1C	Note 31		Deleted	
Table 4.1-1C	Note 32		Relocated - TRM	

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Table 4.1-1C	Note 33		Deleted - Boric Acid LAR	
Table 4.1-1C	Note 34		Deleted	
Table 4.1-1C	Note 35		Deleted	
Table 4.1-1C	Note 36		Deleted	
Table 4.1-1C	Note 37		Deleted	
Table 4.1-1C	Note 38	SR	3.4.12.4	
Table 4.1-1C	Note 38	SR	3.4.13.5	
Table 4.1-1C	Note 39	SR	3.6.8.2	
Table 4.1-1C	Note 39	SR	3.6.8.1	
Table 4.1-1C	New Note	SR	3.3.3.3	
Table 4.1-2A	1	SR	3.1.4.3	
Table 4.1-2A	1	(Partial)	Relocated - TRM	
Table 4.1-2A	2	SR	3.1.4.2	
Table 4.1-2A	3	SR	3.4.10.1	
Table 4.1-2A	4	SR	3.7.1.1	
Table 4.1-2A	5	SR	3.9.2.1	
Table 4.1-2A	6	SR	3.4.11.1	
Table 4.1-2A	7	SR	3.4.11.2	

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Table 4.1-2A	8		CTS Deleted	
Table 4.1-2A	9	SR	3.4.14.1	
Table 4.1-2A	10		CTS Deleted	
Table 4.1-2A	11		Relocated - TRM	
Table 4.1-2B	1	SR	3.4.17.1	
Table 4.1-2B	2	SR	3.4.17.2	
Table 4.1-2B	3	SR	3.4.17.3	
Table 4.1-2B	4a	LCO	3.4.17	
Table 4.1-2B	4b	SR	3.4.17.2	
Table 4.1-2B	5		Relocated - TRM	
Table 4.1-2B	6		Relocated - TRM	
Table 4.1-2B	7		Deleted in CTS	
Table 4.1-2B	8		Relocated - TRM	
Table 4.1-2B	8	SR	3.9.1.1	
Table 4.1-2B	9	SR	3.5.4.2	
Table 4.1-2B	10		Deleted by Boric Acid LAR	
Table 4.1-2B	11	SR	3.6.6.3	

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Table 4.1-2B	12	SR	3.5.1.4	
Table 4.1-2B	13	SR	3.7.16.1	
Table 4.1-2B	14		Relocated - TRM	
Table 4.1-2B	15	SR	3.7.14.1	
Table 4.1-2B	16		Relocated - TRM	
Table 4.1-2B	Note 1	SR	3.4.17.3	
Table 4.1-2B	Note 2		Relocated - TRM	
Table 4.1-2B	Note 3	SR	3.9.1.1	
Table 4.1-2B	Note 4		Relocated - TRM	
Table 4.1-2B	Note 5		Deleted	
Table 4.1-2B	Note 6		Relocated - TRM	
Table 4.2-1	1	G	5.5.6	
Table 4.12-1		G	5.5.8	
Table 4.12-2		G	5.5.8	
Table 4.13-1			Relocated - TRM	