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CSI TECHNOLOGIES, INC.

*Consulting Engineers*

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# Indian Point Energy Center
# Unit 2
# FAC System Susceptibility Evaluation (SSE)

**Report No. 0700.104-02**
**Revision 2**
**Issued For-Use**

**October 14, 2011**

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**Appendix A:** System Susceptibility Evaluation Report
**Appendix B:** Subsystem Susceptibility Evaluation Report
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**Attachment A:** Industry FAC Experience Table
**Attachment B:** Referenced Correspondence and Communications

# 1. Introduction

Flow-Accelerated Corrosion (FAC) is a form of material degradation that results in thinning of the inside pipe wall in carbon steel piping and fittings under certain flow and chemistry conditions. If undetected, FAC may result in piping rupture and subsequent fatalities, injuries, equipment damage, unplanned plant shutdown, and transients that pose undesirable challenges to plant operators. Consequently, all US nuclear plants, including Indian Point, have FAC programs in place to detect and mitigate FAC before piping failure in accordance with Generic Letter 89-08 [7.1].

An effective FAC program includes three key elements: the System Susceptibility Evaluation (SSE), which defines and controls the program scope; the CHECWORKS computer model, which predicts wear rates for every modeled component; and the Susceptible Non-Modeled (SNM) Program, which prioritizes non-modeled but susceptible lines according to FAC potential.

## 2. Purpose

This document contains the development and results of an FAC System Susceptibility Evaluation (SSE) for Indian Point Energy Center Unit 2. Each plant system, subsystem, and line is classified as either susceptible or non-susceptible to FAC. Susceptible piping forms the scope of the Indian Point FAC program, while non-susceptible piping is excluded from the FAC program. Susceptible piping is further categorized as either modelable in the EPRI computer program CHECWORKS Steam/Feedwater Application (SFA) or non-modelable. Susceptible Non-Modeled (SNM) piping falls outside the capabilities of CHECWORKS SFA.

The purpose of this document is to:

- Define the scope of the Flow-Accelerated Corrosion (FAC) program.
- Identify all plant lines to be modeled in the EPRI computer program CHECWORKS Steam/Feedwater Application (SFA).
- Identify all plant lines that form the scope of the Susceptible Non-Modeled (SNM) program.

# 3. Scope

The scope of this System Susceptibility Evaluation is all plant piping. This includes piping in all systems, subsystems, and lines. This document reflects the current operating status of the plant. Periodic review and update of this document is recommended by EPRI'S "Recommendations for an Effective Flow-Accelerated Corrosion Program," NSAC 202L [7.2].

Section 4 of this document contains a record of all assumptions made. Section 5 describes the methodology employed in this analysis. The results obtained are documented in Section 6 and in the Appendices. Finally, Section 7 includes a list of all references used in this analysis.

# 4. Assumptions

## 4.1. General Assumptions

The following assumptions apply to all plant systems, subsystems, or lines.

4.1.1. Piping with nominal pipe size less than or equal to 2" is assumed to be socket welded. Likewise, lines over 2" in diameter are assumed butt-welded.

4.1.2. If piping material is unknown, carbon steel material is assumed.

4.1.3. If a portion of a system, subsystem, or line is susceptible, then the entire system, subsystem, or line is considered susceptible. An exception is made for lines where valves are the only susceptible components. Since valves are inspected by the Preventative Maintenance or Corrective Action programs, they are considered outside the FAC program.

4.1.4. Lines on the Indian Point P&IDs [7.3] containing normally closed valves are assumed to operate less than 2% of the time. Likewise, lines containing valves that are normally open are assumed to operate greater than 2% of the time. This assumption is used when specific valve information is not found in the System Descriptions [7.4], Plant Operating Manuals [7.5], or responses to questions by Indian Point personnel [7.6].

4.1.5. It is assumed that no normally closed valves leak, unless confirmed otherwise by plant operating history.

4.1.6. Lines that exist in non-susceptible systems or subsystems are excluded from further analysis on the system or subsystem level, respectively. These lines may or may not appear in the Appendices.

## 4.2. System, Subsystem, and Line Specific Assumptions

Assumptions and susceptibility decisions made specifically for a single system, subsystem, or line appear in the Comments field of the Susceptibility Evaluation reports in the Appendices.

4.2.1. Instrumentation, level control lines, and indicator lines are assumed to have insufficient flow to be susceptible to FAC.

4.2.2. Floor drains, miscellaneous capped drain and vent lines, and miscellaneous vent lines to the atmosphere are assumed to have insufficient flow to be susceptible to FAC (or operate infrequently).

4.2.3. Multiple line names are used for the same line in cases where susceptibility changed along the line and in cases where relationships to CHECWORKS are simplified by separating sections of lines.

4.2.4. The supply and return headers for multiple unit heaters, lines 2-UH-003 and 2-UH-071, are continued on a drawing that could not be located by Indian Point personnel. The continuations of these lines, as well as any lines fed by these headers should be considered FAC-susceptible until proven otherwise.

4.2.5. It is assumed that Boiler Feed Pump seal water lines from the Condensate system do not increase to above 200ºF when passing through the Boiler Feed Pumps.

4.2.6. Judging by the flow configuration on drawing A209775 [7.3], the header containing steam from several unit heaters (24UHR, 211UHR, 219UHR, 221UHR), steam traps (UHT-2-2, UHT-4-1), and the oil preheater does not appear to have an outlet. If an outlet exists that is not shown on the drawing, it should be assumed susceptible to FAC until proven otherwise through further evaluation.

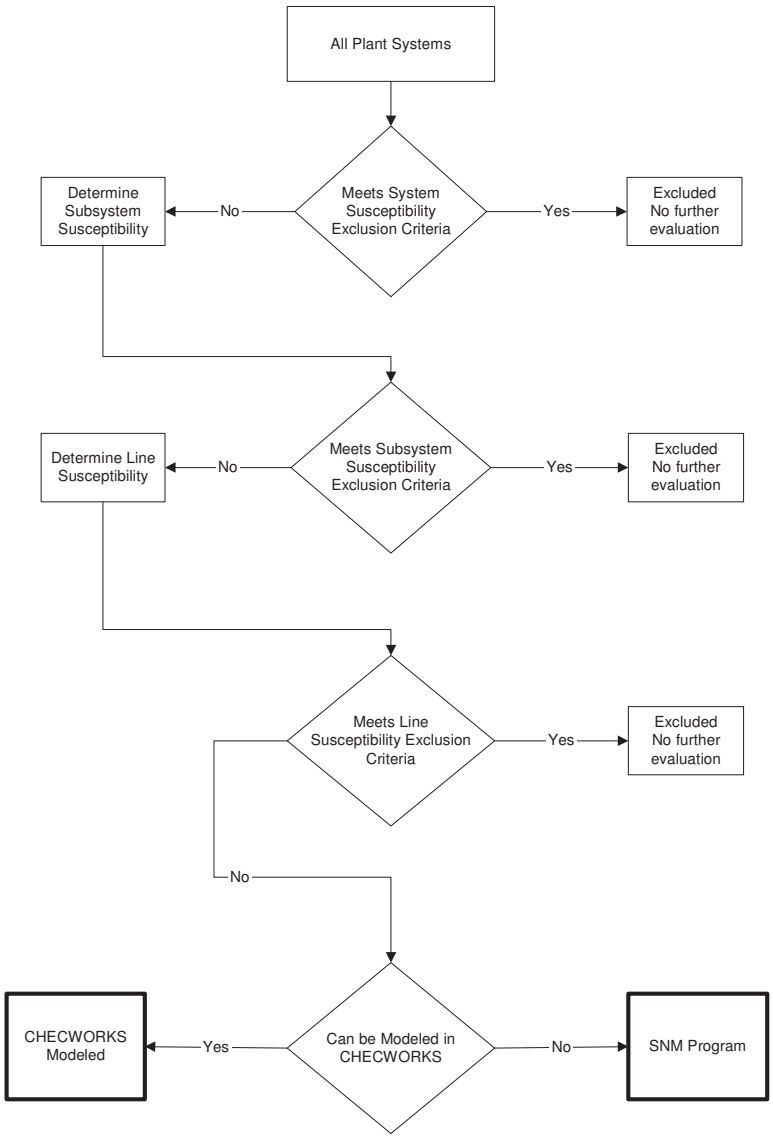
4.2.7. Judging by the flow configuration on drawing B193201 [7.3], lines 2-UH-002 and 2-UH-079 appear to have no inlet. If an inlet exists that is not shown on the drawing, it should be assumed susceptible to FAC until proven otherwise by further evaluation.

# 5. Methodology

The methodology employed in this analysis consisted of a number of successive steps. Each step is explained in detail in the following sections. A flowchart of the methodology used is included in the Figure 5.1

Each plant system, subsystem, and line was reviewed against FAC susceptibility criteria and CHECWORKS modelability criteria (as defined in Section 5.1 and Section 5.2) to determine its susceptibility category. If an entire system or subsystem was determined to be non-susceptible, a line-by-line review was not conducted; however, where that was not the case, each line was evaluated and categorized accordingly and individually.

**Figure 5.1 Susceptibility Evaluation Methodology**



## 5.1. Susceptibility Exclusion Criteria

The criteria used to determine susceptibility to FAC was taken from Section 4.2 of EPRI NSAC 202L [7.2]. Systems, subsystems, and/or lines are not considered susceptible to FAC if one or more of the conditions discussed below apply.

### 5.1.1. FAC Resistant Material

Stainless steel or low-alloy steel with chromium content equal or greater than 1.25% are FAC-resistant [7.2 and 7.7]. Lines or systems made, or replaced with, such materials are not sufficiently susceptible to FAC to warrant further analysis. It should be noted, however, that resistance to FAC does not ensure against other corrosion mechanisms such as cavitation or impingement. Therefore, even if components are replaced with FAC-resistant material, the root cause of wear should be determined before excluding the replaced components from the inspection program.

Wholesale replacement of a line with FAC resistant material would cause that line to be excluded from the FAC program. However, if one component on a line is susceptible, then the whole line was considered susceptible.

Piping material was obtained from the Piping Specifications [7.8], P&IDs [7.3], or the Indian Point isometric drawings [7.9].

### 5.1.2. Superheated Steam

Piping transporting superheated steam with no moisture content was classified as non-susceptible. According to EPRI's "Recommendations for an Effective Flow-Accelerated Corrosion Program", FAC is known to occur only under flowing water or wet steam conditions, and has not been documented in superheated steam piping [7.2].

Steam quality was obtained from the PEPSE Model [7.10] first, followed by the operating conditions found in the Piping Specification [7.8].

### 5.1.3. Single-Phase Piping at Low Temperature

Piping with single-phase flow and an operating temperature below 200$^{o}$F does not experience FAC and was classified as non-susceptible. No temperature exclusion exists for two-phase lines [7.2]. Other degradation mechanisms, such as cavitation, may occur at low temperatures but such mechanisms are outside the scope of this analysis.

Operating temperature was obtained from the PEPSE Model [7.10] first, followed by the operating conditions found in the Piping Specification [7.8].

### 5.1.4. Low Operating Frequency

Piping that operates less than 2% of the plant operating time was deemed non-susceptible. In general, such piping does not experience the amount of flow required to make FAC a legitimate concern and is excluded from further analysis in favor of piping with greater FAC susceptibility. Piping

in this category includes lines with normally closed valves and those feeding or emerging from equipment that operate less than 2% of the plant operating time.

Exceptions to this rule are made when the operating frequency may be low, but the service is especially severe [7.2].

All lines excluded due to infrequent operation would be susceptible to FAC if operating frequency is increased above the 2% threshold. Therefore, if operating frequency is increased, these lines should be reviewed for inclusion in the FAC Program.

Operating frequency was determined by information from Plant Operating Manuals [7.5], by information found in the System Descriptions [7.4], responses to questions by Indian Point personnel [7.6], and by valve position on the P&IDs [7.3]. See Assumption 4.1.3 for more details.

### 5.1.5. Combination Single-Phase Piping with Low Temperature and Operating Frequency

This category is a derivative of the two previous susceptibility criteria described in Sections 5.1.3 and 5.1.4. It may be used for a system, subsystem, or a line that operates >2% of total plant operating time but only occasionally (<2% of the time) will the temperature of the single-phase fluid, within the piping, exceed 200$^{o}$F. Thus, piping containing a single-phase flow that operates less than 2% of the time above 200$^{o}$F was classified as non-susceptible to FAC.

### 5.1.6. Non-Water/Steam Piping

Piping that transports fluids other than water or steam, such as air or oil, are not susceptible to FAC.

### 5.1.7. Dissolved Oxygen Concentration

Lines containing water with high levels of dissolved oxygen (typically greater than 1000 ppb) are considered immune to FAC and can be excluded from further analysis [7.2]. Systems normally meeting this criterion include Service Water, Circulating Water, and Fire Protection.

### 5.1.8. Low or No Flow

While instrumentation and/or sensing lines may operate continuously, they experience very limited fluid flow. Such piping does not experience the amount of flow required to make FAC a legitimate concern and is excluded from further analysis in favor of piping with greater FAC susceptibility.

### 5.1.9. Non-Piping

Systems that do not contain piping (e.g. computer system) were excluded from the FAC program.

### 5.1.10. Piping Removed from Service

Piping that has been removed from service and capped was excluded from the FAC program. Degradation mechanisms may occur in such piping, but for Flow-Accelerated Corrosion to occur, flow is required [7.2].

Table 5.1 provides a summary of the FAC susceptibility exclusion parameters discussed in this section. Also provided is the abbreviation used for each criterion.

**Table 5.1 Susceptibility Exclusion Criteria**

| Abbreviation | Reason | Description |
|---|---|---|
| EM | Material | **E**xcluded due to FAC-resistant **M**aterial |
| EQ | Superheated | **E**xcluded due to high steam **Q**uality (superheated steam) |
| ET | Single Phase, T<200°F | **E**xcluded due to **T**emperature |
| EI | Time <2% | **E**xcluded due to **I**nfrequent operation (note: would be FAC susceptible if operated at a higher frequency) |
| EC | Single Phase, T>200°F for time<2% | **E**xcluded due to a **C**ombination of infrequent operation above temperature threshold |
| EW | Non-water/steam | **E**xcluded due to no **W**ater or steam present |
| EO | High D.O. | **E**xcluded due to dissolved **O**$_2$ content >1000 ppb |
| EF | Low or No Flow | **E**xcluded due to Low or No **F**low |
| EP | Non-Piping | **E**xcluded due to no **P**iping components present |
| ER | Pipe Removed | **E**xcluded due to **R**emoval of piping from service |

## 5.2. Susceptible Non-Modeled (SNM) Criteria

Each line that was not excluded due to criteria listed in Table 5.1 was determined to be susceptible to FAC. An explicit determination of suitability for CHECWORKS modeling was made for these lines. For each line that is susceptible but unsuitable for modeling, the basis for that determination was recorded. Lines were determined to be non-modelable in CHECWORKS if one or more of the conditions discussed below apply.

### 5.2.1. Weld Type

Lines with socket-welded fittings were classified as non-modelable. Almost all small bore lines (less than or equal to 2" in diameter) are constructed using socket-welded fittings. The socket weld uses a fit-up gap of variable size. This gap can greatly impact turbulence in piping, which in turn has a significant impact on wear rate. Since the size of the fit-up gap is unknown, CHECWORKS cannot accurately predict wear for socket-welded components [7.11].

For this analysis, all small bore lines were considered socket-welded and therefore non-modelable (see 4.1.1). In addition, the extremely large linear footage of small-bore lines and the often unknown thermodynamic conditions combine to make detailed modeling of small-bore piping inefficient and sometimes inaccurate.

### 5.2.2. Unknown Operating Conditions

In cases where operating conditions cannot be accurately obtained or calculated, accurate modeling cannot be performed. In addition to chemistry, CHECWORKS requires a value for flow, frequency of operation, and two thermodynamic values (pressure, temperature, quality, or enthalpy) to predict wear. The PEPSE Model was the primary source of flow and thermodynamic conditions [7.10]. Thermodynamic conditions were also obtained from the operating conditions found in the Piping Specification [7.8]. Operating frequency was determined by valve position in the Plant Operating Manuals [7.5], on the P&IDs [7.3], from information found in System Descriptions [7.4], and through responses to questions by Indian Point personnel [7.6].

Where operating conditions were unknown or varied, the lines were classified as SNM.

### 5.2.3. Conditions outside CHECWORKS Modeling Capabilities

Lines that operate with conditions outside of CHECWORKS modeling capabilities were considered SNM. For example, lines with entrained moisture or vent lines containing non-condensable gases were classified as non-modelable.

### 5.2.4. Visually Inspected Lines

Lines that are visually inspected during outages do not require modeling. For many plants, this criterion applies to the Turbine crossunder piping.

### 5.2.5. Localized FAC Susceptibility

Lines that were classified as FAC susceptible only at a single location were deemed non-modelable. Examples include carbon steel nozzles and valves in a low alloy line.

### 5.2.6. High Steam Quality

Lines that contain very high quality (but not superheated) steam were classified as SNM. Modeling such lines is of little value as CHECWORKS predictions would be trivial.

Steam quality was primarily obtained from the PEPSE model [7.10], followed by the operating conditions found in the Pipe Class Specifications [7.8].

Table 5.2 provides a summary of the CHECWORKS model exclusion parameters discussed in this section. Also provided is the abbreviation used for each criterion.

**Table 5.2 CHECWORKS Model Exclusion Criteria**

| Abbreviation | Reason | Description |
|---|---|---|
| NS | Socket-welded | **N**on-modeled due to **S**ocket-welds |
| NC | Unknown conditions | **N**on-modeled due to unknown or varying operating **C**onditions |
| NM | Conditions outside CHECWORKS modeling capabilities | **N**on-modeled due to conditions outside CHECWORKS **M**odeling capabilities |
| NV | Visual inspections | **N**on-modeled due to **V**isual inspections |
| NL | Localized FAC | **N**on-modeled due to **L**ocalized FAC susceptibility |
| NQ | High Steam Quality | **N**on-modeled due to high steam **Q**uality resulting in CHECWORKS predictions of little value |

# 6. Results

The following sections contain a description of the data found in the appendices.

## 6.1. System Susceptibility Evaluation

The results of the System Susceptibility Evaluation appear in Appendix A. The report in this appendix lists all plant systems and classifies each as susceptible or non-susceptible to FAC. For those deemed non-susceptible, the reason for exclusion from the FAC program is provided. The following fields appear in this report.

### 6.1.1. System Code

This field contains the common two-letter designation for the system.

### 6.1.2. System Name

This field contains a brief description or name of the system.

### 6.1.3. Susceptible?

This field states if the system is FAC susceptible.

### 6.1.4. Exclusion Criteria (Excl. Crit.)

This field contains the reason the system is non-susceptible to FAC (see Table 5.1), if applicable.

### 6.1.5. Comments

Pertinent information about the system appears in this field.

### 6.1.6. Reference

References used in determining susceptibility appear in this field.

## 6.2. Subsystem Susceptibility Evaluation

Susceptible systems were divided into subsystems by grouping lines of similar function. The results of the Subsystem Susceptibility Evaluation appear in Appendix B. Only subsystems from susceptible systems were analyzed. The reports in these appendices classify each subsystem as susceptible or non-susceptible to FAC. For those deemed non-susceptible, the reason for exclusion from the FAC program is provided. The following fields appear in this report.

### 6.2.1. Subsystem Number

This field contains the number of the subsystem, where a subsystem is a subset of the system piping with similar operating parameters. Subsystem names were created for this evaluation and include the unit number, common system designation and a sequential number in the following format.

A-BBBB-CC

| | |
|---|---|
| A | Unit Number |
| BBBB | System Abbreviation |
| CC | Sequential Number |

Example: 2-BFD-01, 2-3EX-02

#### 6.2.2. Subsystem Name

This field contains the name of the subsystem preceded by the system (represented by the system code) that it falls into.

#### 6.2.3. Subsystem Boundary

A description of the lines that are grouped in this subsystem is shown here.

#### 6.2.4. Flow Diagram (P&ID)

This field lists the flow diagram(s) on which the subsystem is found.

#### 6.2.5. FAC Susceptible? (FAC. Sus.?)

This field states if the subsystem is FAC susceptible.

#### 6.2.6. Exclusion Criteria (Excl. Crit.)

This field contains the reason the subsystem is non-susceptible to FAC (see Table 5.1), if applicable.

#### 6.2.7. Comments

Pertinent information about the subsystem appears in this field.

#### 6.2.8. Reference

References used in determining susceptibility appear in this field.

### *6.3. Line Susceptibility Evaluation*

Lines in FAC susceptible systems were placed into one of three categories:

- Excluded lines (non-susceptible)
- Susceptible lines to be modeled in CHECWORKS
- Susceptible non-modeled (SNM) lines

Appendix C contains the results of the line susceptibility evaluation for Indian Point Energy Center Unit 2. Appendix C is organized into sections with Section A listing CHECWORKS modeled lines, Section B listing SNM program lines, and Section C listing excluded lines. For SNM lines, the reason for exclusion from the CHECWORKS model is provided. For excluded lines, the reason for exclusion from the FAC program is provided. Not every line in a non-susceptible subsystem was explicitly analyzed and therefore only selected lines will appear in the report (see Section 4.1.6).
The following fields appear in this report.

### 6.3.1. Line Number

Indian Point does not maintain a complete piping line list. Therefore, line names needed to be created. The majority of main piping lines, depending on susceptibility, were assigned a unique Line Number. The naming convention follows a format which includes unit number, system abbreviation, a sequential number, and, if necessary, a section designator used either for parts of the same line with different susceptibility characteristics or specifications or for preventing duplicate line names:

A-BBBB-CCC-D

| | |
|---|---|
| A | Unit Number |
| BBBB | System Abbreviation |
| CCC | Sequential Number |
| D | Section Designator |

Examples: 2-1EST-014, 2-MS-011-A

### 6.3.2. Size

The diameter, in inches, of the majority of the line is listed here.

### 6.3.3. Flow Diagram

This field lists the flow diagram(s) on which that the line is found.

### 6.3.4. Susceptibility Category (Sus. Cat.)

The susceptibility category is listed in this field. Table 6.1 defines the three susceptibility categories.

**Table 6.1 Susceptibility Categories**

| Abbreviation | Category |
|---|---|
| M | CHECWORKS Modeled |
| S | Susceptible non-modeled (SNM) |
| E | Excluded from the FAC program (non-susceptible) |

### 6.3.5. Model Exclusion Criteria (Mod. Ex. Crit.)

This field appears only for SNM lines. It contains the reason each line is not modeled in CHECWORKS (see Table 5.2) when applicable.

### 6.3.6. Susceptibility Exclusion Criteria (FAC Ex. Crit.)

This field appears only for excluded lines. It contains the reason each line is non-susceptible to FAC (see Table 5.1) when applicable.

### 6.3.7. Comments

Pertinent information about the line appears in this field.

#### 6.3.8. Reference

References used in determining susceptibility or modelability appear in this field.

#### 6.3.9. Line Description

This field contains a description of the line.

### 6.4. Color-Coded Flow Diagrams

Flow diagrams of all FAC susceptible systems addressed in this document are included in the Color-Coded Flow Diagrams document. The flow diagrams are color-coded based upon FAC susceptibility category and labeled to indicate line numbers. Line numbers were added to the flow diagrams. See the Color-Coded Flow Diagrams Document 0700.104-04 for the color-code convention.

### 6.5. Revision History

Changes made for each revision of this report are documented in Appendix D.

### 6.6. Industry FAC Experience Table

Attachment A contains a table of important industry FAC events. This table was used as an aide in determining FAC susceptibility.

### 6.7. FAC-Susceptible Lines Containing Orifices

As a subtask of the project, a list of FAC-susceptible lines containing orifices was gathered and is shown in Table 6.2 below.

## Table 6.2 FAC Susceptible Lines Containing Orifices

| Line Number | Line Description | P&ID | Coord. |
|---|---|---|---|
| 2-3HD-027 | FWH 23A Vent to 3EX-53 | A235304 | H4 |
| 2-3HD-028 | FWH 23A Vent to 3EX-534 | A235304 | H4 |
| 2-3HD-029 | FWH 23B Vent to 3EX-536 | A235304 | H5 |
| 2-3HD-030 | FWH 23B Vent to 3EX-539 | A235304 | H5 |
| 2-3HD-031 | FWH 23C Vent to 3EX-541 | A235304 | H6 |
| 2-3HD-032 | FWH 23C Vent to 3EX-544 | A235304 | H6 |
| 2-5HD-047 | FWH 25A Vent | 9321-F-2022 | I4 |
| 2-5HD-048 | FWH 25B Vent | 9321-F-2022 | I5 |
| 2-5HD-049 | FWH 25C Vent | 9321-F-2022 | I6 |
| 2-AF-011-A | #21 BFP discharge overflow line upstream of orifice | 9321-F-2120 | H3 |
| 2-AF-012-A | #22 BFP discharge overflow line upstream of orifice | 9321-F-2120 | G3 |
| 2-AF-013-A | #23 BFP discharge overflow line upstream of orifice | 9321-F-2120 | G3 |
| 2-AF-043 | Service Boiler Deaerator Drain to Service Boiler Feed Pumps | B193201 | C2 |
| 2-AF-053 | AF57 Vent to Service Boiler Deaerator | B193201 | D2 |
| 2-AS-003 | Aux. Steam from #22 LH Boiler | 9321-F-2120 | E5 |
| 2-AS-004 | Aux. Steam from #21 RH Boiler | 9321-F-2120 | B5 |
| 2-AS-009 | Steam to AST-26 | 9321-F-2120 | A5 |
| 2-AS-031 | Steam Header to Barge Steam Connections | B192490 | C4 |
| 2-AS-066 | Steam to and from FP-1198 | 192491 | G5 |
| 2-CD-025 | Condensate from Header to BFP No. 21 | A235307 | B5 |
| 2-CD-026 | Condensate from Header to BFP No. 22 | A235307 | E5 |
| 2-HD-001 | #21 HDP to Heater Drain Pump Header | 9321-F-2022 | D1 |
| 2-HD-002 | #22 HDP to Heater Drain Pump Header | 9321-F-2022 | D1 |
| 2-MS-143 | Main Steam Stop Valve drain to 23 Cond. West Side | A235308 | D1 |
| 2-MS-144 | Main Steam Stop Valve drain to 23 Cond. East Side | A235308 | D2 |
| 2-MSD-157 | Reheater Drain Tank 21A Drain to Header | 9321-F-2023 | G2 |
| 2-MSD-158 | Reheater Drain Tank 22A Drain to Header | 9321-F-2023 | E2 |
| 2-MSD-159 | Reheater Drain Tank 23A Drain to Header | 9321-F-2023 | D2 |
| 2-MSD-166 | Reheater Drain Tank 21B Drain to Header | 9321-F-2023 | H5 |
| 2-MSD-167 | Reheater Drain Tank 22B Drain to Header | 9321-F-2023 | F5 |
| 2-MSD-168 | Reheater Drain Tank 23B Drain to Header | 9321-F-2023 | D5 |

# 7. References

7.1. "Erosion/Corrosion-Induced Pipe Wall Thinning", Generic Letter 89-08, U.S. Nuclear Regulatory Commission (NRC), May 2, 1989.

7.2. "Recommendations for an Effective Flow-Accelerated Corrosion Program," EPRI NSAC 202L-R3, 1011838, May 2006.

7.3. Indian Point 2 FAC Susceptible Piping and Instrumentation Diagrams.

| System (Drawing Title) | P&ID # | Rev # |
|---|---|---|
| Main Steam | 9321-F-2017 | 84 |
| Main Steam | A235308 | 49 |
| Main Steam | 227780 | 53 |
| Main Steam Traps (Sheet 1) | 9321-F-2041 | 35 |
| Main Steam Traps (Sheet 2) | 9321-F-2042 | 21 |
| Steam Drain and Gland Seal for Low and High Pressure Turbines | B237144 | 4 |
| Steam Drain and Gland Seal for Low and High Pressure Turbines | B237145 | 6 |
| Boiler Feed Pump Turbine Steam Lines Drains & Vents | 9321-H-2024 | 23 |
| Moisture Separator and Reheater Drains & Vents | 9321-F-2023 | 35 |
| Moisture Preseparator | A228272 | 16 |
| Extraction Steam | 9321-F-2020 | 43 |
| Extraction Steam Trap System | 9321-F-2031 | 17 |
| Heater Drains & Vents | 9321-F-2022 | 53 |
| Heater Drains & Vents | A235304 | 23 |
| Moisture Separator Reheaters Vent Chamber Discharge | A209847 | 13 |
| Superheater Building Service Boilers | 9321-F-2120 | 69 |
| Auxiliary Steam Supply and Condensate Return System | A209775 | 45 |
| Auxiliary Steam System (Sheet 1) | B192490 | 22 |
| Auxiliary Steam System (Sheet 2) | 192491 | 39 |
| Auxiliary Steam System (Sheet 3) | B192493 | 8 |
| Water Treatment System (Sheet 3) | A192496 | 18 |
| Steam Activated Carbon Filter | B227209 | 16 |
| Auxiliary Boiler Feed | B193201 | 15 |
| Condensate & Boiler Feed Pump Suction (Sheet 1) | 9321-2018 | 141 |
| Condensate & Boiler Feed Pump Suction (Sheet 2) | A235307 | 32 |
| Boiler Feedwater | 9321-F-2019 | 113 |
| Steam Generator Blowdown & Blowdown Sample System | 9321-F-2729 | 69 |

7.4. Indian Point System Descriptions/Design Manuals.

| System Name | SD No. |
|---|---|
| Main and Reheat Steam Supply | 18.00 |
| Extraction Steam and Heater Drains and Vents | 19.02 |
| Condensate | 20.00 |
| Feedwater | 21.00 |
| Circulating Water | 23.04 |
| Service Water | 24.00 |

| System Name | SD No. |
|---|---|
| Main Turbine Lube Oil | 26.00 |
| Auxiliary Steam | 29.01 |
| Instrument Air | 29.02 |

7.5. Indian Point Plant Operating Manuals

| Operating Manual | Doc. No | Rev. |
|---|---|---|
| Auxiliary Steam | 2-SOP-29-01 | 19 |
| House Service Boilers | 2-SOP-29-01-01 | 17 |
| House Service Boilers Fuel Oil | 2-SOP-29-01-02 | 18 |
| House Service Boilers Feedwater | 2-SOP-29-01-03 | 14 |

7.6. Electronic correspondence between CSI and Indian Point personnel (see Attachment B).

7.6.1. Email from Ryan Doremus (CSI) to Ian Mew (IPEC) regarding a Line Naming Convention, dated 7/27/2009.

7.6.2. Email from Ian Mew (IPEC) to Ryan Doremus (CSI) regarding responses to information requests, dated 8/10/2009.

7.6.3. Email from Ian Mew (IPEC) to Ryan Doremus (CSI) regarding responses to information requests, dated 8/13/2009.

7.7. EPRI, Flow-Accelerated Corrosion in Power Plants, B. Chexal et al, EPRI TR-106611-R1, 1998.

7.8. "Entergy Nuclear Northeast Indian Point Energy Center – Unit No. 2: Specification For Fabrication of Piping Systems Turbine Generator Plant"; Specification No. 9321-01-248-18; Revision 18; January 15, 2010.

7.9. Indian Point Isometric Drawings for FAC-susceptible piping, gathered by CSI on 4/3/2009.

7.10. Indian Point "Uprate PEPSE Model with New HP Turbine High Pressure Turbine Expansion", Run Date 10/26/06.

7.11. "CHECWORKS Steam/Feedwater Application Guidelines for Plant Modeling and Evaluation of Component Inspection Data". EPRI, Palo Alto, CA and CSI Technologies, Inc., Elgin, IL: 2009. 1019176.

7.12. "Flow Accelerated Corrosion Program Plan Supplement"; Edited by Hazel Pearsall, FAC Program Engineer; Dated April 28, 2003 (For information only).

7.13. Indian Point FAC Program History Outage Reports, transmitted to CSI on 7/15/2009 (For information only).

7.14. CHUG Industry Experience Documents (see Attachment A) (For information only).

7.15. Indian Point System List. Transmitted to CSI on 1/6/2010 (For information only).

# Appendix A

# System Susceptibility Evaluation Report

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| AF | Auxiliary Feedwater | | Yes | | This system delivers feedwater to the Service Boilers | P&ID |
| AS | Auxiliary Steam | | Yes | | This system generates and distributes steam to the various auxiliaries requiring steam for operation. | SD No. 29.01 |
| AST | Auxiliary Steam Traps | | Yes | | This system includes all steam trap lines for the Auxiliary Steam System | SD No. 29.01 |
| BD | Steam Generator Blowdown | | Yes | | This system takes water from the steam generators for maintaining proper Steam Generator Chemistry. | P&ID |
| CD | Condensate Pump Discharge | | Yes | | This system includes piping from some high temperature Feedwater Heaters. | SD No. 20.0 |
| EST | Extraction Steam Traps | | Yes | | This system includes all steam trap lines originating from extraction steam, heater drains, heater vents, and moisture separator drains. | SD No. 19.02 |
| EX | Extraction Steam | | Yes | | This system includes extraction steam to the Feedwater Heaters | SD No. 19.02 |
| FW | Main Feed Water | | Yes | | This system supplies feedwater to the steam generators. | SD No. 21.0 |
| GS | Gland Sealing Steam | | Yes | | This system supplies sealing steam to the HP, LP, and BFP Turbines. | P&IDs |
| GST | Gland Steam Traps | | Yes | | This system includes all steam trap lines for the Gland Steam System | P&ID |
| HD | Heater Drains & Vents | | Yes | | This system includes Feedwater Heater Drains and Vents, and piping from the Heater Drain Pumps to the Boiler Feed Pump suction. | SD No. 19.02 |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| MS | Main Steam | | Yes | | This system supplies steam to the HP and BFP Turbines and the MSRs. | SD No. 18.0 |
| MSD | Moisture Separator Reheater Drains | | Yes | | This system includes MSR Drains to the Heater Drain Tank, No. 25 Feedwater Heaters, and the Drains Collecting Tank | P&ID |
| MST | Main Steam Traps | | Yes | | This system includes all steam trap lines for the Main Steam System | SD No. 18.0 |
| PD | Moisture Preseparator Drains | | Yes | | This system removes moisture from piping upstream of the HP Turbine Crossunder Piping. | P&ID |
| RST | Reheat Steam Traps | | Yes | | This system includes all steam trap lines from the Reheater Steam system. | SD No. 18.0 |
| SB | Service Boiler | | Yes | | This system contains some steam piping from the Service Boiler. | P&ID |
| UH | Condensate Return Unit Heaters to Service Boiler D | | Yes | | This system contains condensate from the condensate return unit heaters to the service boiler deaerator. | Pipe Spec |
| UHT | Condensate Return Unit Heater Steam Traps | | Yes | | This system includes all steam trap lines for the Condensate Return Unit Heaters to Service Boiler Deaerator system. | P&ID |
| VCD | MSR Vent Chamber Discharge | | Yes | | This system contains steam from the MSRs. | P&ID |
| A | 4160 VAC | | No | EP | This is an electrical system that does not contain piping. | |
| AAC | AAC EDG Controls & Excitation | | No | EP | This system does not contain piping. | |
| AAC | Alternate AC Diesel Generator | | No | EP | This system contains only the generator and not the associated piping. | |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| AB | Auxiliary Building | | No | EP | This system includes the building and not the associated piping. | |
| ABS | Auxiliary Building Sump | | No | ET | This system handles low temperature water from floor drains. | |
| ABV | Auxiliary Building Ventilations | | No | EW | This system vents non-condensable gases. | |
| AC | Chill Water System | | No | ET | This system operates at under 200 degF | |
| ACW | Auxiliary Cooling Water | | No | ET | This system operates at under 200 degF | P&ID |
| ADM | Admin Building | | No | EP | This system includes the building and not the associated piping. | |
| ARMS | Area Radiation Monitoring Systems | | No | EP | This system does not contain piping. | |
| B | 480 VAC | | No | EP | This is an electrical system that does not contain piping. | |
| BA | Breathing Air | | No | EW | This system does not contain water or steam. | |
| BMS | Boron Management | | No | EW | This system does not contain water or steam. | |
| BS | Containment (Building) Spray | | No | EI | Containment spray only operates in emergency situations. | SD No. 10.2 |
| CA | Secondary Chemical Addition | | No | EW | This system does not contain water or steam. | |
| CCW | Component Cooling Water System | | No | ET | This system provides low-temperature water to various equipment in the plant. | P&ID |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| CEDM | Control Element Drive Mechanism Control | | No | EP | This system does not contain piping. | |
| CF | Chemical Feed | | No | EW | This system does not contain water or steam. | P&IDs |
| CL | Chlorination | | No | EW | This system does not contain water or steam. | P&ID |
| COMM | Communications | | No | EP | This system does not contain piping. | |
| CP | Cathodic Protection | | No | EP | This is an electrical system that does not contain piping. | |
| CPC | Core Protection Calculators | | No | EP | This system does not contain piping. | |
| CPV | Penetration Room Ventilation | | No | EW | This system vents non-condensable gases. | |
| CRDX | Cardox (CO2 Fire Protection System) | | No | EW | This system does not contain water or steam. | P&ID |
| CRV | Control Room Ventilation | | No | EW | This system vents non-condensable gases. | |
| CS | Condensate Pump Suction | | No | ET | This system transports low-temperature water from the Condensers to the Condensate Pump. | SD No. 20.0 |
| CT | Condensate Storage & Transfer | | No | ET | Condensate transfer is a low-temperature system used to ensure there is no raw water contamination of the condensate. | SD No. 20.0 |
| CV | Condenser Air Vents | | No | EW | This system does not contain water or steam. | |
| CVCS | Chemical and Volume Control System | | No | EM | This system is comprised entirely of FAC-resistant piping. | P&IDs |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| CVH | Containment Vent Header | | No | EW | This system vents non-condensable gases. | |
| CW | Circulating Water | | No | EO | This system provides river water to cool the steam in the condensers. | SD No. 23.0 |
| D | 125 VDC | | No | EP | This is an electrical system that does not contain piping. | |
| DA | Diesel Generator Starting Air | | No | EW | This system does not contain water or steam. | P&ID |
| DCH | Drain Collection Header | | No | EF | Flow in this system is too low to facilitate FAC. | |
| DF | Diesel Generator Fuel Oil | | No | EW | This system does not contain water or steam. | P&ID |
| DFAS | Diverse Emergency Feed Actuation | | No | EP | This system does not contain piping. | |
| DSS | Diverse Scram System | | No | EP | This system does not contain piping. | |
| DW | Domestic Water | | No | EO | This system contains highly oxygenated water from the city supply. | |
| EC | Plant Computer | | No | EP | This system does not contain piping. | |
| EDG | Emergency Diesel Generator | | No | EP | This system does not contain piping. | |
| EDG | EDG Controls & Excitation | | No | EP | This system does not contain piping. | |
| EFW | Emergency Feed Water | | No | EI | This system only operates in emergency situations. | |
| EHC | Electro-Hydraulic (Mechanical) | | No | EP | This system does not contain piping. | |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| EHC | MFP EHC Controls | | No | EP | This system does not contain piping. | |
| EHC | MTG EHC Controls | | No | EP | This system does not contain piping. | |
| EL | Emergency Lighting (Safe Shutdown) | | No | EP | This system does not contain piping. | |
| EOF | Emergency Operations Facility | | No | EP | This system does not contain piping. | |
| ES | ESFAS | | No | EP | This system does not contain piping. | |
| EXCT | Main Generator Excitation & Protection | | No | EP | This system does not contain piping. | |
| F | Switchyard | | No | EP | This system does not contain piping. | |
| FD | Fire Detection | | No | EP | This system does not contain piping. | |
| FHS | Fuel Handling System | | No | EW | This system does not contain water or steam. | |
| FO | Diesel Fuel Oil Storage and Transfer | | No | EW | This system does not contain water or steam. | P&ID |
| FP | Spent Fuel Pool Cooling | | No | ET | This system operates at under 200 degF | |
| FS | Fire Protection (Water) | | No | ET | This system uses low-temperature city water. | P&IDs |
| FWCS | Feed Water Control System | | No | EF | This system contains low-flow instrumentation lines. | |
| GCH | Gas Collection Header | | No | EW | This system does not contain water or steam. | |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| GG | Generator Gas | | No | EW | This system does not contain water or steam. | |
| GSO | Hydrogen Seal Oil (Mechanical) | | No | EW | This system does not contain water or steam. | |
| GZ | Gaseous Radwaste | | No | EW | This system does not contain water or steam. | |
| H | 6900 VAC | | No | EP | This is an electrical system that does not contain piping. | |
| H2 | Hydrogen | | No | EW | This system does not contain water or steam. | |
| HAL | Halon | | No | EW | This system does not contain water or steam. | |
| HPA | Hydrogen Purge System | | No | EW | This system does not contain water or steam. | |
| HPSI | High Pressure Safety Injection | | No | EM | Lines in this system are composed of FAC-resistant material. | Pipe Spec |
| HR | H2 Recombiners | | No | EW | This system does not contain water or steam. | |
| HS | Generator Hydrogen Supply | | No | EW | This system provides hydrogen to the steam generators. | P&ID |
| HT | Heat Tracking | | No | EP | This system does not contain piping. | |
| IA | Instrument Air | | No | EW | This system does not contain water or steam. | SD No. 29.02 |
| IB | Isophase Bus | | No | EP | This system does not contain piping. | |
| IBC | Isophase Bus Cooling | | No | ET | This system operates at under 200 degF | |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| IC | Incore Instrumentation | | No | EF | This system contains low-flow instrumentation lines. | |
| ICC | Reactor Vessel Level Monitoring & CETs | | No | EF | This system contains low-flow instrumentation lines. | |
| IS | Intake Structure | | No | EO | This system contains highly oxygenated water. | |
| JW | Diesel Generator Jacket Water | | No | EO | This system is fed with raw water. | P&ID |
| K | Annunciators | | No | EP | This system does not contain piping. | |
| LA | 120/208 VAC Misc. Lighting & Power Dist. | | No | EP | This is an electrical system that does not contain piping. | |
| LLRW | Low Level Radwaste Bldg | | No | EP | This system does not contain piping. | |
| LO | Main Turbine Lube Oil | | No | EW | This system does not contain water or steam. | P&ID |
| LPSI | Low Pressure Safety Injection | | No | EM | Lines in this system are composed of FAC-resistant material. | Pipe Spec |
| LRBV | Low Level Radwaste Building Ventilation | | No | EW | This system vents non-condensable gases. | |
| LRW | Liq Radwaste Mgmt | | No | EW | This system does not contain water or steam. | |
| MET | Meteorological Instrumentation | | No | EP | This system does not contain piping. | |
| MW | City Water Make-Up | | No | EO | This system contains highly oxygenated water from the city supply. | P&ID |
| N2 | Nitrogen | | No | EW | This system does not contain water or steam. | P&ID |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| NI | Nuclear Instrumentation | | No | EP | This system does not contain piping. | |
| NT | Neutralizing System | | No | EP | This system does not contain piping. | |
| PA | Reactor Building Purge Air | | No | EW | This system does not contain water or steam. | |
| PASS | Post Accident Sampling | | No | EI | This system only operates in post-accident conditions | |
| PCA | Penetration Cooling Air | | No | EW | This system does not contain water or steam. | P&ID |
| PH | Plant Heating | | No | EW | This system does not contain water or steam. | |
| PMU | Makeup Demineralizer System | | No | ET | This system operates at under 200 degF | |
| PPS | Plant Protection System | | No | EP | This system does not contain piping. | |
| PS | Primary Sampling | | No | EI | This system operates less than 2% of plant operation | |
| PW | Primary Water | | No | ET | This system contains low-temperature water | P&ID |
| RB | Reactor Building | | No | EP | This system does not contain piping. | |
| RBHV | Reactor Building Ventilation | | No | EW | This system vents non-condensable gases. | |
| RCP | Reactor Coolant Pumps | | No | EP | This system does not contain piping. | |
| RCS | Reactor Coolant System | | No | EM | All lines in the RCS system are composed of FAC-resistant piping | P&ID |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| RDAC/SPING | RDAC (Radiation Dose Assessment Computer)/SPING (S | | No | EP | This system does not contain piping. | |
| RHR | Residual Heat Removal System | | No | EM | All lines in the RHR system are stainless steel. | Pipe Spec |
| RMS | Radiation Monitoring | | No | EP | This system does not contain piping. | |
| RPS | Reactor Protection System | | No | EP | This system does not contain piping. | |
| RRS | Reactor Regulating System | | No | EP | This system does not contain piping. | |
| RS | Reheat Steam | | No | EQ | Reheater Steam provides superheated steam to the LP and BFP Turbines. | SD No. 18.0 |
| RT | Resin Transfer | | No | EW | This system does not contain water or steam. | |
| RWB | Radwaste Building | | No | EP | This system does not contain piping. | |
| RX | Reactor Core | | No | EP | This system does not contain piping. | |
| RZ | Regen Waste | | No | EP | This system does not contain piping. | |
| SA | Service Air | | No | EW | This system does not contain water or steam. | P&ID |
| SDBC | Steam Dump Bypass Control System | | No | EP | This system does not contain piping. | |
| SDC | Shutdown Cooling | | No | EI | This system only operates during shutdown. | |
| SEC | Security | | No | EP | This system does not contain piping. | |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| SFP | Spent Fuel Pit | | No | ET | The water in this system is low-temperature. | |
| SGS | Stm. Gen. Secondary | | No | EP | This system does not contain piping. | |
| SI | Safety Injection System | | No | EM | This system is comprised entirely of FAC-resistant piping. | P&ID |
| SMS | Seismic Monitoring System | | No | EP | This system does not contain piping. | |
| SP | Sample System | | No | EM | Sample piping at IPEC is stainless steel. | Pipe Spec |
| SPDS | Safety Parameter Display System | | No | EP | This system does not contain piping. | |
| SS | Secondary Sampling | | No | EM | Sample piping at IPEC is stainless steel. | Pipe Spec |
| STP | Sewage Treatment Plant | | No | EP | This system does not contain piping. | |
| SW | Service Water | | No | EO | Service Water has a high concentration of dissolved oxygen. | P&ID |
| SWC | Stator Water Cooling | | No | ET | This system operates at under 200 degF | |
| SZ | Solid Waste Management | | No | EW | This system does not contain water or steam. | |
| TB | Turbine Building | | No | EP | This system does not contain piping. | |
| TBS | Turbine Building Sump | | No | EF | Flow in this system is too low to facilitate FAC. | |
| TBV | Turbine Building Ventilation | | No | EW | This system vents non-condensable gases. | |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|
| TG | Main Turbine & Generator | | No | EP | This system does not contain piping. | |
| TG | MTG & MFPT Supervisory Instrumentation | | No | EP | This system does not contain piping. | |
| TS | Traveling Screens | | No | EP | This system does not contain piping. | |
| VENT | Miscellaneous Ventilation System | | No | EW | This system vents non-condensable gases. | |
| VLPM | U2 Vibration & Loose Parts Monitoring System | | No | EP | This system does not contain piping. | |
| VS | Condenser Vacuum | | No | EW | This system vents non-condensable gases. | |
| XFMR | Main, Auxiliary & Startup Transformers | | No | EP | This system does not contain piping. | |
| Y | Inverters & Vital 120 VAC | | No | EP | This is an electrical system that does not contain piping. | |

| System Code | System Name | System Number | Susceptible? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|

**Exclusion Criteria Legend:**

| | |
|---|---|
| EC | Excluded due to Combination of infrequent op above temp threshold |
| EF | Excluded due to low or no Flow |
| EI | Excluded due to Infrequent operation |
| EM | Excluded due to FAC-resistant Material |
| EO | Excluded due to high dissolved Oxygen content |
| EP | Exluded, does not contain Piping |
| EQ | Excluded due to high steam Quality |
| ER | Excluded, Removed from service and "cut" and "capped" |
| ET | Excluded due to operating Temperature (single phase, < 200 deg F) |
| EW | Excluded because system, subsytem, or line is non-Water |

# Appendix B

# Subsystem Susceptibility Evaluation Report

# Indian Point Unit 2

## Auxiliary Feedwater (AF), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-AF-01 | Service Boiler Auxiliary Feedwater Lines | | 9321-F-2120, B193201 | Yes | | | P&ID |
| 2-AF-02 | Aux Feedwater to and from Sample Coolers | | 9321-F-2120 | No | EI | Valves to coolers shown closed on P&ID | P&ID |

## Auxiliary Steam (AS), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-AS-01 | Auxiliary Steam to Burner Atomizing Steam | | 9321-F-2120 | No | EQ | Atomizing steam is superheated | SD No. 29.01 |
| 2-AS-02 | Auxiliary Steam to Fuel Oil Suction Heaters | | B192493 | No | ER | Source line shown capped on P&ID | P&ID |
| 2-AS-03 | Remainder of Auxiliary Steam | | 9321-F-2120, A209775, B192490, B192491, B192493, B192496, B193201, B227209 | Yes | | | SD No. 29.01 |

## Auxiliary Steam Traps (AST), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-AST-01 | Steam Trap Lines from Auxiliary Steam Lines | | 9321-F-2120, B192490, B192491 | Yes | | | P&ID |

## Steam Generator Blowdown (BD), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-BD-01 | Steam Generator Blowdown to Sample Coolers and Blowdown Tank | | 9321-F-2729 | Yes | | | SD No. 18.0 |

## Condensate Pump Discharge (CD), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-CD-01 | Condensate Lines Between Condensate Pumps and #22 Feedwater Heaters | | 9321-2018, A235307 | No | ET | Condensate is below 200 degF before passing through the #22 FWHs | PEPSE |
| 2-CD-02 | Condensate Lines Downstream of #22 Feedwater Heaters | | 9321-2018, A235307 | Yes | | | PEPSE |

## Extraction Steam Traps (EST), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-1EST-01 | Extraction Steam Trap Headers to the Drains Collecting Tank | | 9321-F-2031 | Yes | | | P&ID |
| 2-3EST-01 | Steam Trap lines from Extraction Steam to the #23 FWHs | | 9321-F-2031 | Yes | | | P&ID |
| 2-4EST-01 | Lines from Stm Traps to the Stm Trap Drains Header from Ext lines to #24 FWHs | | 9321-F-2031 | Yes | | | P&IDs |
| 2-4EST-02 | Lines upstream of the Stm Traps from #24 FWH's Ext Stm Header | | 9321-F-2031 | No | EQ | Lines upstream of the steam traps are superheated. | PEPSE |
| 2-5EST-01 | Steam Trap lines from Extraction Steam to the #25 FWHs | | 9321-F-2031 | Yes | | | P&ID |
| 2-6EST-01 | Steam Trap lines from Extraction Steam to the #26 FWHs | | 9321-F-2031 | Yes | | | P&ID |

## Extraction Steam (EX), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-1EX-01 | LP Turb Ext Stm to #21 FWHs | | 9321-F-2020 | Yes | | | PEPSE |
| 2-2EX-01 | LP Turbine Extraction Steam to #22 Feedwater Heaters | | 9321-F-2020 | Yes | | | PEPSE |
| 2-3EX-01 | Boiler Feed Pump Turbine Drains to Condensers | | A227780 | Yes | | | PEPSE |
| 2-3EX-02 | LP Turbine Extraction Steam to #23 Feedwater Heaters | | 9321-F-2020, 9321-F-2031 | Yes | | | PEPSE |
| 2-4EX-01 | Extraction Steam Lines to #24 Feedwater Heaters | | 9321-F-2020, 9321-F-2031 | No | EQ | Steam is superheated upstream of the steam traps. | P&IDs |
| 2-5EX-01 | HP Turbine Crossunder Piping Drip Pots to the Condenser | | A235308 | Yes | | | P&IDs |
| 2-5EX-02 | Small Bore Steam Drains to the Condenser via FCV-1156, 1157, 1164, 1165, and 1166. | | A235308 | No | EI | Control valves in these lines are normally closed. | SD No. 18.0 |
| 2-5EX-03 | Extraction Steam from Separating Tanks to #25 Feedwater Heaters | | 9321-F-2020, 9321-F-2031 | Yes | | | PEPSE |
| 2-6EX-01 | HP Turbine Extraction Steam to #26 Feedwater Heaters | | 9321-F-2020 | Yes | | | PEPSE |

## Main Feed Water (FW), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-FW-01 | Feedwater Lines from the Boiler Feed Pumps to the Steam Generators | | 9321-F-2019 | Yes | | | PEPSE |
| 2-FW-02 | Auxiliary Feedwater Lines to Steam Generator | | 9321-F-2019 | No | EI | Auxiliary Feedwater only operates during startup, shutdown, and emergency conditions. | SD No. 21.0 |
| 2-FW-03 | Boiler Feed Pump Recirc Lines to the Drains Collecting Tank | | 9321-F-2019 | Yes | | | SD No. 21.0 |

## Gland Sealing Steam (GS), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-GS-01 | Gland Steam to and from HP, LP, and BFP Turbines | | A235308, B237144, B237145, 9321-H-2024 | Yes | | | P&IDs |

## Gland Steam Traps (GST), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-GST-01 | Steam Trap Lines from the Gland Seal System | | 9321-H-2024 | Yes | | | P&ID |

## Heater Drains & Vents (HD), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-1HD-01 | #21 Feedwater Heater Drain Lines | | A235304 | Yes | | | PEPSE |
| 2-1HD-02 | #21 Feedwater Heater Vents | | A235304 | Yes | | | P&ID |
| 2-2HD-01 | #22 Feedwater Heater Drain Lines | | A235304 | Yes | | | PEPSE |
| 2-2HD-02 | #22 Feedwater Heater Vents | | A235304 | Yes | | | P&ID |
| 2-3HD-01 | #23 Feedwater Heater Drain Lines | | A235304 | Yes | | | PEPSE |
| 2-3HD-02 | #23 Feedwater Heater Vents | | A235304 | Yes | | | P&ID |
| 2-4HD-01 | #24 Feedwater Heater Drain Lines | | A235304 | Yes | | | PEPSE |
| 2-4HD-02 | #24 Feedwater Heater Vents | | A235304 | Yes | | | P&ID |
| 2-5HD-01 | Heater Drains from #25 Feedwater Heaters | | 9321-F-2022 | Yes | | | PEPSE |
| 2-5HD-02 | Heater Vents from #25 Feedwater Heater and Heater Drain Tank vents to #25 Feedwater Heaters | | 9321-F-2022, A235304 | Yes | | | P&ID |
| 2-5HD-03 | HDT Drains to HDPs and Condensers and HDP Vents to HDT | | 9321-F-2022, A235304 | Yes | | | PEPSE |

## Heater Drains & Vents (HD), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-6HD-01 | Heater Drains from #26 Feedwater Heaters | | 9321-F-2022 | Yes | | | PEPSE |
| 2-6HD-02 | Heater Vents from #26 Feedwater Heater | | 9321-F-2022, A235304 | Yes | | | P&ID |
| 2-HD-01 | Heater Drain Pump discharge to Boiler Feed Pumps | | 9321-F-2022 | Yes | | | PEPSE |

## Main Steam (MS), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-MS-01 | Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors. | | 9321-F-2017, A227780, A235308 | Yes | | | P&IDs |
| 2-MS-02 | Main Steam to MSR Header Dumps to Condenser | | A227780 | No | EI | These lines operate during startup and shutdown. | SD No. 18.0 |
| 2-MS-03 | Small Bore Turbine Steam Drains to the Condenser via FCV-1154, 1155, 1158, and 1159 | | A235308 | No | EI | Control valves in these lines are normally closed. | SD No. 18.0 |
| 2-MS-04 | H.P. Cylinder Steam Heating and Seals | | A235308 | No | EI | Control valves in line are closed during normal operation. | SD No. 18.0 |
| 2-MS-05 | Scavenging Steam from 6th Stage Extraction Steam | | 9321-F-2023 | No | ER | Piping is abandoned in place. | P&ID |
| 2-MS-06 | Main Steam Supply to Gland Steam Header | | A235308 | Yes | | | P&ID |
| 2-MS-07 | HP Turbine Crossunder Piping to the Moisture Separators | | A235308, A227780 | Yes | | | PEPSE |

## Moisture Separator Reheater Drains (MSD), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-MSD-01 | Moisture Separator Drains to the Heater Drain Tank and Drains Collecting Tank | | 9321-F-2023 | Yes | | | PEPSE |
| 2-MSD-02 | Reheater Drains to #26 Feedwater Heaters and Condensers | | 9321-F-2023 | Yes | | | PEPSE |

## Main Steam Traps (MST), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-MST-01 | Steam Trap Lines from the Main Steam System | | 9321-F-2041, 9321-F-2042 | Yes | | | P&ID |

## Moisture Preseparator Drains (PD), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-PD-01 | Moisture Preseparator Drain Lines | | A228272 | Yes | | | PEPSE |

## Reheat Steam Traps (RST), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-RST-01 | Reheat Steam Trap Lines Downstream of Reheater Steam Traps | | 9321-H-2024 | Yes | | | P&IDs |
| 2-RST-02 | All other Reheater Steam Trap Lines | | A227780, 9321-H-2024 | No | EQ | Reheat Steam upstream of the steam traps is superheated. | PEPSE |

## Service Boiler (SB), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-SB-01 | Service Boiler Lines | | 9321-F-2120, A227780, A209775, B193201 | Yes | | | SD No. 29.01 |

## Condensate Return Unit Heaters to Service Boiler D (UH), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-UH-01 | Condensate Return from Unit Heaters to the Deaerator | | 9321-F-2120, A209775, B192491, B193201 | Yes | | | P&IDs |

## Condensate Return Unit Heater Steam Traps (UHT), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-UHT-01 | Steam Trap Lines from the Condensate Return from Unit Heaters to the Deaerator system | | A209775 | Yes | | | P&ID |

## MSR Vent Chamber Discharge (VCD), Unit 2

| Subsystem Number | Subsystem Name | Subsystem Boundary | P&ID No. | FAC Sus? | Excl. Crit. | Comments | Reference |
|---|---|---|---|---|---|---|---|
| 2-VCD-01 | Moisture Separator Reheater Vent Chamber Discharge Lines | | A209847 | Yes | | | PEPSE |

### Exclusion Criteria (Excl. Crit.) Legend:

| | |
|---|---|
| EC | Excluded due to Combination of infrequent op above temp threshold |
| EF | Excluded due to low or no Flow |
| EI | Excluded due to Infrequent operation |
| EM | Excluded due to FAC-resistant Material |
| EO | Excluded due to high dissolved Oxygen content |
| EP | Exluded, does not contain Piping |
| EQ | Excluded due to high steam Quality |
| ER | Excluded, Removed from service and "cut" and "capped" |
| ET | Excluded due to operating Temperature (single phase, < 200 deg F) |
| EW | Excluded because system, subsytem, or line is non-Water |

# Appendix C

# Line Susceptibility Evaluation Report

# Indian Point Unit 2

# Auxiliary Feedwater (AF), Unit 2

## Section B: SNM Program Lines

### 2-AF-01: Service Boiler Auxiliary Feedwater Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AF-001 | 6 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Deaerator Header to Boiler Feed Pumps |
| 2-AF-002 | 4 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Feed header to #23 Boiler Feed Pump and #10 House Service Deaerator |
| 2-AF-003 | 4 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Feed header to #21 Boiler Feed Pump |
| 2-AF-004 | 4 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Feed header to #22 Boiler Feed Pump |
| 2-AF-005 | 4 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Feed header to #23 Boiler Feed Pump |
| 2-AF-006 | 6 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Feed header to #10 House Service Deaerator |
| 2-AF-007 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Boiler Feed Pump overflow header to Deaerator |
| 2-AF-008 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Boiler Feed Pump discharge Unit #3 tie-in. |
| 2-AF-011-A | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #21 BFP discharge overflow line upstream of orifice |
| 2-AF-011-B | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #21 BFP discharge overflow line downstream of orifice |
| 2-AF-012-A | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #22 BFP discharge overflow line upstream of orifice |
| 2-AF-012-B | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #22 BFP discharge overflow line downstream of orifice |
| 2-AF-013-A | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #23 BFP discharge overflow line upstream of orifice |

# Auxiliary Feedwater (AF), Unit 2

## Section B: SNM Program Lines

### 2-AF-01: Service Boiler Auxiliary Feedwater Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AF-013-B | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #23 BFP discharge overflow line downstream of orifice |
| 2-AF-014 | 3 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | #21 BFP discharge line |
| 2-AF-015 | 3 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | #22 BFP discharge line |
| 2-AF-016 | 3 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | #23 BFP discharge line |
| 2-AF-017 | 4 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | #21 and #22 BFP discharge header |
| 2-AF-018 | 2.5 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | LH Boiler #22 Feed Line |
| 2-AF-019 | 2.5 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | AF-144 bypass line |
| 2-AF-020 | 4 | B193201, 9321-F-2021 | S | NC | Operating conditions unknown. | P&ID | Unit 1 Service Boiler Feed Pump discharge tie-in line. |
| 2-AF-021 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | BFP discharge header to Desuperheater Station |
| 2-AF-022 | 2.5 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | RH Boiler #21 Feed Line |
| 2-AF-023 | 2.5 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | AF-138 bypass line |
| 2-AF-024 | 0.75 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | RH Boiler #21 Continuous Blowdown Line |
| 2-AF-025 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | RH Boiler #21 Intermittent Blowdown Line |
| 2-AF-026 | 0.75 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | LH Boiler #22 Continuous Blowdown Line |
| 2-AF-027 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | LH Boiler #22 Intermittent Blowdown Line |
| 2-AF-028 | 0.75 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Continuous Blowdown line to HSBSPCLs |

# Auxiliary Feedwater (AF), Unit 2

## Section B: SNM Program Lines

### 2-AF-01: Service Boiler Auxiliary Feedwater Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AF-029 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Boiler Blowdown Tank Bottom Drain |
| 2-AF-030 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Boiler Blowdown Tank Drain Bypass |
| 2-AF-031 | 1.25 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Boiler Blowdown Tank Drain Vent |
| 2-AF-032 | 6 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Boiler Blowdown Tank Drain |
| 2-AF-033 | | B193201, 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | ABSPCLB Aux. Feed Inlet |
| 2-AF-034 | | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | ABSPCLB Aux. Feed Outlet to Dissolved O2 Analyzer |
| 2-AF-035 | | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | ABSPCLB Aux. Feed Outlet to Cooling Bath |
| 2-AF-037 | 2 | B193201 | S | NC | Operating conditions unknown. | P&ID | Flash Tank Drain to Service Boiler Deaerator |
| 2-AF-038 | 1.25 | B193201 | S | NS | Operating conditions unknown. | P&ID | Service Boiler Deaerator Vent |
| 2-AF-039 | 6 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Deaerator 6" Drain to OB |
| 2-AF-040 | 4 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Deaerator Drain vent |
| 2-AF-041 | 2 | B193201 | S | NS | Operating conditions unknown. | P&ID | Service Boiler Deaerator 2" Drain to OB |
| 2-AF-042 | 0.75 | B193201 | S | NS | Operating conditions unknown. | P&ID | Drain from multiport valve. |
| 2-AF-043 | 6 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Deaerator Drain to Service Boiler Feed Pumps |
| 2-AF-044 | 4 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Pump No. 11 Feed Line |
| 2-AF-045 | 4 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Pump No. 12 Feed Line |

# Auxiliary Feedwater (AF), Unit 2

## Section B: SNM Program Lines

### 2-AF-01: Service Boiler Auxiliary Feedwater Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AF-046 | 4 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Pump No. 13 Feed Line |
| 2-AF-047 | 3 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Pump No. 11 Discharge Line |
| 2-AF-048 | 3 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Pump No. 12 Discharge Line |
| 2-AF-049 | 3 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Pump No. 13 Discharge Line |
| 2-AF-050 | 6 | B193201 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Pump Discharge Header |
| 2-AF-051 | 1.5 | B193201 | S | NS | Operating conditions unknown. | P&ID | AF59 Vent to Service Boiler Deaerator |
| 2-AF-052 | 1.5 | B193201 | S | NS | Operating conditions unknown. | P&ID | AF58 Vent to Service Boiler Deaerator |
| 2-AF-053 | 1.5 | B193201 | S | NS | Operating conditions unknown. | P&ID | AF57 Vent to Service Boiler Deaerator |
| 2-AF-054 | 1.5 | B193201 | S | NS | Operating conditions unknown. | P&ID | Check valve vent header to Service Boiler Deaerator |
| 2-AF-057 | | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Chemical Bench Sink |

## Section C: Excluded Lines

### 2-AF-01: Service Boiler Auxiliary Feedwater Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AF-009 | 1.5 | 9321-F-2120 | E | EI | Valve shown closed on P&ID. | P&ID | Boiler Feed Pump Bypass line to #22 BFP overflow line |

# Auxiliary Feedwater (AF), Unit 2

## Section C: Excluded Lines

### 2-AF-01: Service Boiler Auxiliary Feedwater Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AF-010 | 1 | 9321-F-2120 | E | EI | Valve shown closed on P&ID. | P&ID | Boiler Feed Pump Bypass line to #23 BFP overflow line |
| 2-AF-036 | | 9321-F-2120 | E | ET | Low Temperature discharge from Cooling Bath | P&ID | Cooling Bath Drain |
| 2-AF-055 | 2 | B193201 | E | ER | #20 HSB Removed from Service | SD No. 29.01 | Line from #20 House Service Boiler to Service Boiler Deaerator |
| 2-AF-056 | 2.5 | B193201 | E | ER | Piping retired in place | P&ID | Line to AF92 |

# Auxiliary Steam (AS), Unit 2

## Section B: SNM Program Lines

### 2-AS-03: Remainder of Auxiliary Steam

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AS-001-A | 10 | B192493, B192490, 192491 | S | NC | Operating conditions unknown. | P&ID | 10" Aux. Steam Header |
| 2-AS-002 | 10 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Steam Header from Service Boilers |
| 2-AS-003 | 8 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Steam from #22 LH Boiler |
| 2-AS-004 | 8 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Steam from #21 RH Boiler |
| 2-AS-005 | 4 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Aux. Steam Drain to Deaerator |
| 2-AS-006 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | FCV-1148 Bypass Line |
| 2-AS-008 | 1.25 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to 21 and 22 Air Tempering Units |
| 2-AS-009 | 8 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Steam to AST-26 |
| 2-AS-015 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #21 RH Boiler Drain |
| 2-AS-016 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #22 LH Boiler Drain |
| 2-AS-017 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Boiler Drain Header to Blowdown Tank |
| 2-AS-018 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | RH Boiler #21 Atomizing Steam bleed-off line |
| 2-AS-019 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | LH Boiler #22 Atomizing Steam bleed-off line |
| 2-AS-025 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Oil Separator Tank outlet |
| 2-AS-026 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Oil Separator Tank outlet to Carbon Filter Tank |
| 2-AS-027 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Oil Separator Tank outlet to Floor Drain |

# Auxiliary Steam (AS), Unit 2

## Section B: SNM Program Lines

### 2-AS-03: Remainder of Auxiliary Steam

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AS-030 | 2 | B192490 | S | NS | Operating conditions unknown. | P&ID | Steam to Water Heater |
| 2-AS-031 | 6 | B192490 | S | NC | Operating conditions unknown. | P&ID | Steam Header to Barge Steam Connections |
| 2-AS-032 | 4 | B192490 | S | NC | Operating conditions unknown. | P&ID | Steam to AS845 |
| 2-AS-033 | 1.5 | B192490 | S | NS | Operating conditions unknown. | P&ID | Steam to AS840 |
| 2-AS-036 | 4 | B192490 | S | NC | Operating conditions unknown. | P&ID | Steam line to UH-1239 |
| 2-AS-037 | 1 | B192490 | S | NS | Operating conditions unknown. | P&ID | PRV-7343 Bypass |
| 2-AS-039 | | B192490 | S | NS | Operating conditions unknown. | P&ID | Steam to Screens |
| 2-AS-046 | 4 | 192491 | S | NC | Operating conditions unknown. | P&ID | Steam header to Service Boiler Feed Pump No. 13 |
| 2-AS-047 | 6 | 192491 | S | NC | Operating conditions unknown. | P&ID | Steam header to Carbon Filter Tanks |
| 2-AS-048 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to Service Boiler Phosphate Mix Tanks and Continuous Heaters |
| 2-AS-051 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to Service Boiler Feed Pump No. 13 |
| 2-AS-053 | 4 | 192491 | S | NC | Operating conditions unknown. | P&ID | Steam from Service Boiler Feed Pump No. 13 |
| 2-AS-054 | 8 | 192491 | S | NC | Operating conditions unknown. | P&ID | Steam from Service Boiler Feed Pump No. 13 to #10 Service Deaerator |
| 2-AS-055 | 8 | 192491 | S | NC | Operating conditions unknown. | P&ID | Steam from Service Boiler Feed Pump No. 13 to Atmospheric Vent header |
| 2-AS-057 | 10 | 192491 | S | NC | Operating conditions unknown. | P&ID | Steam drain to #10 Service Deaerator via AS484 |

# Auxiliary Steam (AS), Unit 2

## Section B: SNM Program Lines

### 2-AS-03: Remainder of Auxiliary Steam

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AS-058 | 4 | 192491 | S | NC | Operating conditions unknown. | P&ID | Steam to Heating and Ventilation Pressure Reducing Station |
| 2-AS-060 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam from Heating and Ventilation Pressure Reducing Station |
| 2-AS-070 | 3 | 192491, B227209 | S | NC | Operating conditions unknown. | P&ID | Steam header to Carbon Filter Tanks |
| 2-AS-073 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Header to Service Boiler Phosphate Mix Tanks |
| 2-AS-074 | 0.75 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to Service Boiler Phosphate Mix Tank No. 11 |
| 2-AS-075 | 0.75 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to Service Boiler Phosphate Mix Tank No. 12 |
| 2-AS-076 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to Continuous Heaters via AS568 |
| 2-AS-077 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to Continuous Heaters via AS112 |
| 2-AS-079 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam header to Continuous Heaters via AS568 |
| 2-AS-080 | 1 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to Continuous Heater No. 11 |
| 2-AS-081 | 1 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to Continuous Heater No. 12 |
| 2-AS-082-A | 8 | 192491 | S | NC | Operating conditions unknown. | P&ID | Floor trench drain to cap |
| 2-AS-082-B | 1.5 | 192491 | S | NS | Operating conditions unknown. | P&ID | Floor trench drain downstream of cap |
| 2-AS-083 | 16 | 192491 | S | NC | Operating conditions unknown. | P&ID | Aux Steam Vent to Atmosphere |
| 2-AS-087 | 3 | B227209 | S | NC | Operating conditions unknown. | P&ID | Steam to 21ACFT |
| 2-AS-088 | 3 | B227209 | S | NC | Operating conditions unknown. | P&ID | Steam to 22ACFT |

# Auxiliary Steam (AS), Unit 2

## Section B: SNM Program Lines

### 2-AS-03: Remainder of Auxiliary Steam

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AS-091 | 0.75 | B227209 | S | NS | Operating conditions unknown. | P&ID | Port Basin drain from Aux. Steam supply to ACFTs |
| 2-AS-093 | 1.5 | B227209 | S | NS | Operating conditions unknown. | P&ID | PRV-5245 Bypass |
| 2-AS-096 | 4 | 192491, B193201 | S | NC | Operating conditions unknown. | P&ID | Aux. Steam to Flash Tank |

## Section C: Excluded Lines

### 2-AS-03: Remainder of Auxiliary Steam

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AS-001-B | 10 | B192493, 141718 | E | ER | Line capped. | P&ID | 10" Aux. Steam Header |
| 2-AS-013 | 0.75 | 9321-F-2120 | E | EI | Valve shown closed on P&ID. | P&ID | #21 RH Boiler Relief Valve Drain |
| 2-AS-014 | 0.75 | 9321-F-2120 | E | EI | Valve shown closed on P&ID. | P&ID | #22 LH Boiler Relief Valve Drain |
| 2-AS-020 | 1 | 9321-F-2120 | E | EQ | Superheated Steam from steam drum | SD No. 29.01 | Aux. Steam to Fuel Oil Heaters |
| 2-AS-026-A | 1 | 9321-F-2120 | E | EI | Valve shown closed on P&ID | P&ID | Oil Separator Tank outlet line between floor drain line and Carbon Filter Tank Line |
| 2-AS-028 | 1 | 9321-F-2120 | E | EI | Valve shown closed on P&ID. | P&ID | Oil Separator Tank outlet line between floor drain line and Carbon Filter Tank Line |
| 2-AS-029 | 2.5 | 9321-F-2120 | E | EI | Soot Blowers are used infrequently | SD No. 29.01 | LH Boiler #22 Soot Blower Line |
| 2-AS-040 | 6 | B192490 | E | EI | Valve shown closed on P&ID. | P&ID | Barge Steam connections header |
| 2-AS-045 | 2 | B192490 | E | ER | Downstream equipment retired in place. | P&ID | Line to House Service Fuel Oil Heaters |
| 2-AS-056 | 3 | 192491 | E | EI | Relief valve normally closed | P&ID | AS527 Bypass Relief Valve Line |

# Auxiliary Steam (AS), Unit 2

## Section C: Excluded Lines

### 2-AS-03: Remainder of Auxiliary Steam

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AS-059 | 2.5 | 192491 | E | EI | Valve shown closed on P&ID. | P&ID | AS484 Bypass Line |
| 2-AS-071 | 3 | B227209, 192491 | E | EI | Relief valve normally closed | P&ID | Relief line from Steam header to Carbon Filter Tanks |
| 2-AS-072 | 10 | 192491 | E | EI | Valve normally closed. | Engineer Judgement; | Vent from Steam header to #10 Service Deaerator |
| 2-AS-078 | 0.75 | 192491 | E | EI | Valve shown closed on P&ID. | P&ID | AS112 Bypass and Bypass Drain |
| 2-AS-084 | 6 | 192491 | E | ER | Turbine retired in place. | P&ID | Motor Gen. Unit No. 13 Turbine Drain line to Atmos. Vent |
| 2-AS-086 | 6 | B192490, B192493 | E | ER | Equipment retired in place | P&ID | Aux. Steam to Steam Tracing in Fuel Oil Pump House |
| 2-AS-094 | 4 | B227209 | E | EI | Valve normally closed. | P&ID | 21ACFT Aux. Steam Supply floor trench drain |
| 2-AS-095 | 4 | B227209 | E | EI | Valve shown closed on P&ID. | P&ID | 22ACFT Aux. Steam Supply floor trench drain |

# Auxiliary Steam Traps (AST), Unit 2

## Section B: SNM Program Lines

### 2-AST-01: Steam Trap Lines from Auxiliary Steam Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AST-002 | 0.75 | A227780, A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-50 |
| 2-AST-006 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Steam to Hot Water Heat Exchangers |
| 2-AST-007 | 0.75 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AS-1176 |
| 2-AST-007-A | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Steam to Condensate Return via AST-35 |
| 2-AST-009 | 2 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Hot Water Heat Exchangers Discharge Line |
| 2-AST-010 | 4 | 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Condensate Return Header |
| 2-AST-011 | 0.75 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AS-1093 |
| 2-AST-013 | | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Steam Supply Drain to Condensate Return via AST-31 |
| 2-AST-017 | 8 | A209775 | S | NC | Operating conditions unknown. | P&ID | Steam to AST-33 |
| 2-AST-019 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | AST-33 Discharge |
| 2-AST-020 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to AST-20 |
| 2-AST-021 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #21 Fuel Oil Heater heating steam outlet |
| 2-AST-021-A | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | AST-20 Discharge |
| 2-AST-022 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #22 Fuel Oil Heater heating steam outlet |
| 2-AST-023 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | #23 Fuel Oil Heater heating steam outlet |
| 2-AST-024 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Fuel Oil heating steam outlet from steam traps to oil separator tank |
| 2-AST-025 | 4 | A209775 | S | NC | Operating conditions unknown. | P&ID | Steam to AST-2 and 3 |

# Auxiliary Steam Traps (AST), Unit 2

## Section B: SNM Program Lines

### 2-AST-01: Steam Trap Lines from Auxiliary Steam Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AST-027 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to AST-6 |
| 2-AST-028 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to AST-7 |
| 2-AST-032 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to AST-4 |
| 2-AST-033 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to AST-5 |
| 2-AST-034 | 0.75 | B192490 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AS849 |
| 2-AST-035-A | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | AST-6 Discharge |
| 2-AST-036 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | AST-7 Discharge |
| 2-AST-037 | 1.5 | A209775 | S | NS | Operating conditions unknown. | P&ID | AST-4 Discharge |
| 2-AST-038 | 0.75 | B192490 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UH-1238 |
| 2-AST-038-A | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | AST-5 Discharge |
| 2-AST-041 | 1 | B192490 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-27 |
| 2-AST-042 | 1 | B192490 | S | NS | Operating conditions unknown. | P&ID | AST-27 Bypass |
| 2-AST-043 | 1 | B192490 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-42 |
| 2-AST-044 | 1 | B192490 | S | NS | Operating conditions unknown. | P&ID | AST-42 Bypass |
| 2-AST-049-A | 0.5 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-38 |
| 2-AST-050-A | 0.5 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-37 |
| 2-AST-052 | 0.75 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-45 |
| 2-AST-058 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | AST-2 Discharge |
| 2-AST-059 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | AST-3 Discharge |
| 2-AST-061 | 1 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-39 |

# Auxiliary Steam Traps (AST), Unit 2

## Section B: SNM Program Lines

### 2-AST-01: Steam Trap Lines from Auxiliary Steam Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AST-063 | 1 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-32 |
| 2-AST-065 | 1 | 192491 | S | NS | Operating conditions unknown. | P&ID | AST-32 and 39 drain to Cond. Return Header |
| 2-AST-066 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to and from FP-1198 |
| 2-AST-067 | 2 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UH-1300 |
| 2-AST-069-A | 3 | 192491 | S | NC | Operating conditions unknown. | P&ID | Stub to AST-30 and drain |
| 2-AST-069-B | 1 | 192491 | S | NS | Operating conditions unknown. | P&ID | Steam to and from AST-30 |

## Section C: Excluded Lines

### 2-AST-01: Steam Trap Lines from Auxiliary Steam Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AST-003 | 0.75 | A227780 | E | EI | Valve shown closed on P&ID. | P&ID | AST-50 Bypass Line |
| 2-AST-008 | 1 | 9321-F-2120 | E | EI | Valve shown closed on P&ID. | P&ID | AST-35 Bypass Line |
| 2-AST-012 | 1 | 9321-F-2120 | E | EI | Valve normally closed. | Engineer Judgement | AST-26 Bypass Line |
| 2-AST-014 | | 9321-F-2120 | E | EI | Valve shown closed on P&ID. | P&ID | AST-31 bypass line |
| 2-AST-018 | 1 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | AST-33 Bypass |
| 2-AST-035 | 0.75 | B192490 | E | EI | Valve shown closed on P&ID. | P&ID | Steam Trap Bypass |
| 2-AST-049-B | 0.5 | 192491 | E | EI | Valve shown closed on P&ID. | P&ID | AST-38 Bypass |
| 2-AST-050-B | 0.5 | 192491 | E | EI | Valve shown closed on P&ID. | P&ID | AST-37 Bypass |
| 2-AST-062 | | 192491 | E | EI | Valve shown closed on P&ID. | P&ID | AST-39 Bypass |

# Auxiliary Steam Traps (AST), Unit 2

## Section C: Excluded Lines

### 2-AST-01: Steam Trap Lines from Auxiliary Steam Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-AST-064 | 1 | 192491 | E | EI | Valve shown closed on P&ID. | P&ID | AST-32 Bypass |
| 2-AST-068 | 1 | 192491 | E | EI | Valve shown closed on P&ID. | P&ID | UH-1301 Bypass Line |
| 2-AST-069-C | 1 | 192491 | E | EI | Valve shown closed on P&ID. | P&ID | AST-30 Bypass |
| 2-AST-069-D | 0.75 | 192491 | E | EF | Low flow to floor drain | P&ID | Stub drain |
| 2-AST-085 | 0.75 | 192491 | E | ER | Turbine retired in place. | P&ID | Motor Gen. Unit No. 13 Turbine Drain line to and from steam trap |

# Steam Generator Blowdown (BD), Unit 2

## Section B: SNM Program Lines

### 2-BD-01: Steam Generator Blowdown to Sample Coolers and Blowdown Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-BD-001 | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 21 Blowdown via MS-67-A |
| 2-BD-002 | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 21 Blowdown via MS-67-B |
| 2-BD-003 | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 22 Blowdown via MS-67-C |
| 2-BD-004 | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 22 Blowdown via MS-67-D |
| 2-BD-005 | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 23 Blowdown via MS-67-E |
| 2-BD-006 | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 23 Blowdown via MS-67-F |
| 2-BD-007 | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 24 Blowdown via MS-67-G |
| 2-BD-008 | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 24 Blowdown via MS-67-H |
| 2-BD-009-A | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 21 Blowdown Upstream of Line Spec Change |
| 2-BD-010-A | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 22 Blowdown Upstream of Line Spec Change |
| 2-BD-011-A | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 23 Blowdown Upstream of Line Spec Change |
| 2-BD-012-A | 2 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 24 Blowdown Upstream of Line Spec Change |
| 2-BD-017 | 1 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 23 1" Blowdown Line |
| 2-BD-018 | 1 | 9321-F-2729 | S | NS | Small bore piping with unknown conditions. | P&ID | SG 24 1" Blowdown Line |
| 2-BD-019 | 18 | 9321-F-2729 | S | NC | Operating conditions unknown. | P&ID | Blowdown Tank vent to Atmosphere |

# Steam Generator Blowdown (BD), Unit 2

## Section C: Excluded Lines

### 2-BD-01: Steam Generator Blowdown to Sample Coolers and Blowdown Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-BD-009-B | 2 | 9321-F-2729 | E | EM | Stainless Steel Piping | Pipe Spec | SG 21 Blowdown Downstream of Line Spec Change |
| 2-BD-010-B | 2 | 9321-F-2729 | E | EM | Stainless Steel Piping | Pipe Spec | SG 22 Blowdown Downstream of Line Spec Change |
| 2-BD-011-B | 2 | 9321-F-2729 | E | EM | Stainless Steel Piping | Pipe Spec | SG 23 Blowdown Downstream of Line Spec Change |
| 2-BD-012-B | 2 | 9321-F-2729 | E | EM | Stainless Steel Piping | Pipe Spec | SG 24 Blowdown Downstream of Line Spec Change |
| 2-BD-013 | 0.75 | 9321-F-2729 | E | EM | Sample lines are SS | CSI Document No. 0700.104.C.010 | SG 21 Blowdown to Sample Cooler |
| 2-BD-014 | 0.75 | 9321-F-2729 | E | EM | Sample lines are SS | CSI Document No. 0700.104.C.010 | SG 22 Blowdown to Sample Cooler |
| 2-BD-015 | 0.75 | 9321-F-2729 | E | EM | Sample lines are SS | CSI Document No. 0700.104.C.010 | SG 23 Blowdown to Sample Cooler |
| 2-BD-016 | 0.75 | 9321-F-2729 | E | EM | Sample lines are SS | CSI Document No. 0700.104.C.010 | SG 24 Blowdown to Sample Cooler |
| 2-BD-020 | | 9321-F-2729 | E | EM | Sample lines are SS | CSI Document No. 0700.104.C.010 | Line to Sample Cooler from Blowdown Tank Vent via MS-1102 |
| 2-BD-021 | | 9321-F-2729 | E | EM | Sample lines are SS | CSI Document No. 0700.104.C.010 | Line to Sample Cooler from Blowdown Tank Vent via MS-1103 |
| 2-BD-022 | | 9321-F-2729 | E | EM | Sample lines are SS | CSI Document No. 0700.104.C.010 | Line to Sample Cooler from Blowdown Tank Vent via MS-1104 |

# Condensate Pump Discharge (CD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-CD-02: Condensate Lines Downstream of #22 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-CD-001 | 14 | 9321-2018 | M | | PEPSE | CD80A-1-FWH 22A to HEADER: Condensate from FWH 22-A to Condensate Header |
| 2-CD-002 | 14 | 9321-2018 | M | | PEPSE | CD80A-2-FWH 22B to HEADER: Condensate from FWH 22-B to Condensate Header |
| 2-CD-003 | 14 | 9321-2018 | M | | PEPSE | CD80A-3-FWH 22C to HEADER: Condensate from FWH 22-C to Condensate Header |
| 2-CD-004 | 20 | 9321-2018 | M | | PEPSE | CD80A-4-FWH 22 OUTLET HEADER: Condensate Header from FWHs 22-A and 22-B |
| 2-CD-005 | 24 | 9321-2018, A235307 | M | | PEPSE | CD80A-5-FWH 22 to FWH 23 HEAD: Condensate Header to #23 FWHs |
| 2-CD-006 | 24 | A235307 | M | | PEPSE | CD80A-6-FWH 23 INLET HEADER: Condensate Header to FWHs 23-A and 23-B |
| 2-CD-007 | 14 | A235307 | M | | PEPSE | CD80A-7-HEADER to FWH 23A: Condensate line to FWH 23-A |
| 2-CD-008 | 14 | A235307 | M | | PEPSE | CD80A-8-HEADER to FWH 23B: Condensate line to FWH 23-B |
| 2-CD-009 | 14 | A235307 | M | | PEPSE | CD80A-9-HEADER to FWH 23C: Condensate line to FWH 23-C |
| 2-CD-013 | 14 | A235307 | M | | PEPSE | CD80-1-FWH 23A to FWH 24A: Condensate line to FWH 24-A |
| 2-CD-014 | 14 | A235307 | M | | PEPSE | CD80-2-FWH 23B to FWH 24B: Condensate line to FWH 24-B |

# Condensate Pump Discharge (CD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-CD-02: Condensate Lines Downstream of #22 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-CD-015 | 14 | A235307 | M | | PEPSE | CD80-3-FWH 23C to FWH 24C: Condensate line to FWH 24-C |
| 2-CD-016 | 14 | A235307 | M | | PEPSE | CD81-1-FWH 24A to FWH 25A: Condensate line to FWH 25-A |
| 2-CD-017 | 14 | A235307 | M | | PEPSE | CD81-2-FWH 24B to FWH 25B: Condensate line to FWH 25-B |
| 2-CD-018 | 14 | A235307 | M | | PEPSE | CD81-3-FWH 24C to FWH 25C: Condensate line to FWH 25-C |
| 2-CD-019 | 14 | A235307 | M | | PEPSE | CD82-1-FWH 25A to HDR: Condensate from FWH 25-A to Condensate Header |
| 2-CD-020 | 14 | A235307 | M | | PEPSE | CD82-2-FWH 25B to HDR: Condensate from FWH 25-B to Condensate Header |
| 2-CD-021 | 14 | A235307 | M | | PEPSE | CD82-3-FWH 25C to HDR: Condensate from FWH 25-C to Condensate Header |
| 2-CD-022 | 24 | A235307 | M | | PEPSE | CD82-4-HDR 25BT to 25CT: Condensate header from FWHs 25-A and 25-B |
| 2-CD-023 | 24 | A235307 | M | | PEPSE | CD82-5-HDR 25CT to HDP OUT: Condensate Header to BFPs Upstream of Heater Drain Pump inlet |
| 2-CD-024 | 30 | A235307 | M | | PEPSE | CD83-1-HDR HDP to BFP21T: Condensate Header to BFPs Downstream of Heater Drain Pump inlet |
| 2-CD-025 | 24 | A235307 | M | | PEPSE | CD83-2-HDR to BFP21: Condensate from Header to BFP No. 21 |

# Condensate Pump Discharge (CD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-CD-02: Condensate Lines Downstream of #22 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-CD-026 | 24 | A235307 | M | | PEPSE | CD83-3-HDR to BFP22: Condensate from Header to BFP No. 22 |

## Section C: Excluded Lines

### 2-CD-02: Condensate Lines Downstream of #22 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-CD-010 | 1.5 | A235307 | E | EI | Valve shown closed on P&ID. | P&ID | CD-16 Bypass Line |
| 2-CD-011 | 1.5 | A235307 | E | EI | Valve shown closed on P&ID. | P&ID | CD-16-1 Bypass Line |
| 2-CD-012 | 1.5 | A235307 | E | EI | Valve shown closed on P&ID. | P&ID | CD-16-2 Bypass Line |
| 2-CD-027 | 12 | A235307 | E | EI | Valve shown closed on P&ID. | P&ID | Feedwater Heater Bypass Line |
| 2-CD-028 | 2 | A235307 | E | EI | Valve shown closed on P&ID. | P&ID | CD-21 Bypass Line |
| 2-CD-029 | 2 | A235307 | E | EI | Valve shown closed on P&ID. | P&ID | CD-21-1 Bypass Line |

# Extraction Steam Traps (EST), Unit 2

## Section B: SNM Program Lines

### 2-1EST-01: Extraction Steam Trap Headers to the Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-1EST-013-A | 4 | 9321-F-2031 | S | NC | Operating conditions unknown. | P&ID | Steam Trap Header from EST-1 and 1A |
| 2-1EST-013-B | 4 | 9321-F-2031 | S | NC | Operating conditions unknown. | P&ID | Steam Trap Header from EST-1, 1A, 2, and 6 |
| 2-1EST-014 | 6 | 9321-F-2031 | S | NC | Operating conditions unknown. | P&ID | Main Extraction Steam Trap Header |

### 2-3EST-01: Steam Trap lines from Extraction Steam to the #23 FWHs

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3EST-012-A | 2 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-14 |
| 2-3EST-012-B | 2 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-14 to Steam Trap Header |
| 2-3EST-013-A | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-15 |
| 2-3EST-013-B | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Header from EST-15 to Steam Trap Header |
| 2-3EST-014-A | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-16 |
| 2-3EST-014-B | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Header from EST-16 to Steam Trap Header |
| 2-3EST-015-A | 2 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-17 |
| 2-3EST-015-B | 2 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-17 to Steam Trap Header |
| 2-3EST-016-A | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-18 |
| 2-3EST-016-B | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-18 to Steam Trap Header |
| 2-3EST-017-A | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-19 |
| 2-3EST-017-B | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-19 to Steam Trap Header |
| 2-3EST-018-A | 2 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-20 |

# Extraction Steam Traps (EST), Unit 2

## Section B: SNM Program Lines

### 2-3EST-01: Steam Trap lines from Extraction Steam to the #23 FWHs

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3EST-018-B | 2 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-20 to Steam Trap Header |
| 2-3EST-019-A | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-21 |
| 2-3EST-019-B | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-21 to Steam Trap Header |
| 2-3EST-020-A | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | Extraction Steam to EST-23 |
| 2-3EST-020-B | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-23 to Steam Trap Header |

### 2-4EST-01: Lines from Stm Traps to the Stm Trap Drains Header from Ext lines to #24 FWHs

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-4EST-001 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-5 to Steam Trap Header |
| 2-4EST-002 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-6 to Steam Trap Header |
| 2-4EST-003 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-7 to Steam Trap Header |
| 2-4EST-004 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-8 to Steam Trap Header |
| 2-4EST-005 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-9 to Steam Trap Header |
| 2-4EST-006 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-10 to Steam Trap Header |
| 2-4EST-007 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-11 to Steam Trap Header |
| 2-4EST-008 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-12 to Steam Trap Header |
| 2-4EST-009 | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-13 to Steam Trap Header |

### 2-5EST-01: Steam Trap lines from Extraction Steam to the #25 FWHs

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EST-040-A | 0.75 | 9321-F-2031 | S | NS | Flow Conditions Unknown | P&ID | Extraction steam to EST-4 |

# Extraction Steam Traps (EST), Unit 2

## Section B: SNM Program Lines

**2-5EST-01: Steam Trap lines from Extraction Steam to the #25 FWHs**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EST-040-B | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-4 to Steam Trap Header |

**2-6EST-01: Steam Trap lines from Extraction Steam to the #26 FWHs**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-6EST-015-A | 2 | 9321-F-2031 | S | NS | Flow Conditions Unknown | P&ID | Extraction Steam to EST-1 |
| 2-6EST-015-B | 2 | 9321-F-2031 | S | NS | Flow Conditions Unknown | P&ID | Extraction Steam to EST-1A |
| 2-6EST-015-C | 2 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-1 to Steam Trap Header |
| 2-6EST-015-D | 2 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-1A to Steam Trap Header |
| 2-6EST-016-A | 0.75 | 9321-F-2031 | S | NS | Flow Conditions Unknown | P&ID | Extraction Steam to EST-2 |
| 2-6EST-016-B | 0.75 | 9321-F-2031 | S | NS | Operating conditions unknown. | P&ID | EST-2 to Steam Trap Header |

## Section C: Excluded Lines

**2-3EST-01: Steam Trap lines from Extraction Steam to the #23 FWHs**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3EST-012-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-14 Bypass Line |
| 2-3EST-013-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-15 Bypass Line |
| 2-3EST-014-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-16 Bypass Line |
| 2-3EST-015-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-17 Bypass Line |
| 2-3EST-016-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-18 Bypass Line |
| 2-3EST-017-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-19 Bypass Line |

# Extraction Steam Traps (EST), Unit 2

## Section C: Excluded Lines

**2-3EST-01: Steam Trap lines from Extraction Steam to the #23 FWHs**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3EST-018-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-20 Bypass Line |
| 2-3EST-019-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-21 Bypass Line |
| 2-3EST-020-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-23 Bypass Line |

**2-5EST-01: Steam Trap lines from Extraction Steam to the #25 FWHs**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EST-040-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-4 Bypass Line |

**2-6EST-01: Steam Trap lines from Extraction Steam to the #26 FWHs**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-6EST-015-E | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-1 Bypass Line |
| 2-6EST-015-F | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-1A Bypass Line |
| 2-6EST-016-C | | 9321-F-2031 | E | EI | Valve shown closed on P&ID. | P&ID | EST-2 Bypass Line |

# Extraction Steam (EX), Unit 2

## Section A: CHECWORKS Model Lines

### 2-1EX-01: LP Turb Ext Stm to #21 FWHs

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-1EX-001 | 26 | 9321-F-2020 | M | | PEPSE | ES?-1-1STPT ES TO FWH 21A: NE Extraction Steam to FWH 21A |
| 2-1EX-002 | 26 | 9321-F-2020 | M | | PEPSE | ES?-2-1STPT ES TO FWH 21A: NW Extraction Steam to FWH 21A |
| 2-1EX-003 | 26 | 9321-F-2020 | M | | PEPSE | ES?-3-1STPT ES TO FWH 21A: SW Extraction Steam to FWH 21A |
| 2-1EX-004 | 26 | 9321-F-2020 | M | | PEPSE | ES?-4-1STPT ES TO FWH 21A: SE Extraction Steam to FWH 21A |
| 2-1EX-005 | 26 | 9321-F-2020 | M | | PEPSE | ES?-1-1STPT ES TO FWH 21B: NE Extraction Steam to FWH 21B |
| 2-1EX-006 | 26 | 9321-F-2020 | M | | PEPSE | ES?-2-1STPT ES TO FWH 21B: NW Extraction Steam to FWH 21B |
| 2-1EX-007 | 26 | 9321-F-2020 | M | | PEPSE | ES?-3-1STPT ES TO FWH 21B: SW Extraction Steam to FWH 21B |
| 2-1EX-008 | 26 | 9321-F-2020 | M | | PEPSE | ES?-4-1STPT ES TO FWH 21B: SE Extraction Steam to FWH 21B |
| 2-1EX-009 | 26 | 9321-F-2020 | M | | PEPSE | ES?-1-1STPT ES TO FWH 21C: NE Extraction Steam to FWH 21C |
| 2-1EX-010 | 26 | 9321-F-2020 | M | | PEPSE | ES?-2-1STPT ES TO FWH 21C: NW Extraction Steam to FWH 21C |
| 2-1EX-011 | 26 | 9321-F-2020 | M | | PEPSE | ES?-3-1STPT ES TO FWH 21C: SW Extraction Steam to FWH 21C |
| 2-1EX-012 | 26 | 9321-F-2020 | M | | PEPSE | ES?-4-1STPT ES TO FWH 21C: SE Extraction Steam to FWH 21C |

# Extraction Steam (EX), Unit 2

## Section A: CHECWORKS Model Lines

### 2-2EX-01: LP Turbine Extraction Steam to #22 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-2EX-001-A | 22 | 9321-F-2020 | M | | PEPSE | ES?-1-2NDPT ES TO FWH 22A: NE Extraction Steam to FWH 22A upstream of Exp. Joint |
| 2-2EX-002-A | 22 | 9321-F-2020 | M | | PEPSE | ES?-2-2NDPT ES TO FWH 22A: SW Extraction Steam to FWH 22A upstream of Exp. Joint |
| 2-2EX-003-A | 22 | 9321-F-2020 | M | | PEPSE | ES?-1-2NDPT ES TO FWH 22B: NE Extraction Steam to FWH 22B upstream of Exp. Joint |
| 2-2EX-004-A | 22 | 9321-F-2020 | M | | PEPSE | ES?-2-2NDPT ES TO FWH 22B: SW Extraction Steam to FWH 22B upstream of Exp. Joint |
| 2-2EX-005-A | 22 | 9321-F-2020 | M | | PEPSE | ES?-1-2NDPT ES TO FWH 22C: NE Extraction Steam to FWH 22C upstream of Exp. Joint |
| 2-2EX-006-A | 22 | 9321-F-2020 | M | | PEPSE | ES?-2-2NDPT ES TO FWH 22C: SW Extraction Steam to FWH 22C upstream of Exp. Joint |

### 2-3EX-01: Boiler Feed Pump Turbine Drains to Condensers

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-3EX-001 | 48 | A227780 | M | | PEPSE | BFP #21 Drain to Condenser |
| 2-3EX-002 | 48 | A227780 | M | | PEPSE | BFP #22 Drain to Condenser |

# Extraction Steam (EX), Unit 2

## Section A: CHECWORKS Model Lines

### 2-3EX-02: LP Turbine Extraction Steam to #23 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-3EX-003-A | 20 | 9321-F-2020 | M | | PEPSE | ES1-1-3RDPT ES to FWH 23A: NW Extraction Steam to FWH 23A |
| 2-3EX-003-B | 20 | 9321-F-2020 | M | | PEPSE | ES1-2-3RDPT ES to FWH 23A: SE Extraction Steam to FWH 23A |
| 2-3EX-003-C | 28 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES1-3-3RDPT ES to FWH 23A: Extraction Steam to FWH 23A |
| 2-3EX-004 | 20 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES1-4-3RDPT ES to FWH 23A: Extraction Steam to FWH 23A |
| 2-3EX-005 | 20 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES1-5-3RDPT ES to FWH 23A: Extraction Steam to FWH 23A |
| 2-3EX-006-A | 20 | 9321-F-2020 | M | | PEPSE | ES2-1-3RDPT ES to FWH 23B: NW Extraction Steam to FWH 23B |
| 2-3EX-006-B | 20 | 9321-F-2020 | M | | PEPSE | ES2-2-3RDPT ES to FWH 23B: SE Extraction Steam to FWH 23B |
| 2-3EX-006-C | 28 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES2-3-3RDPT ES to FWH 23B: Extraction Steam to FWH 23B |
| 2-3EX-007 | 20 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES2-4-3RDPT ES to FWH 23B: Extraction Steam to FWH 23B |
| 2-3EX-008 | 20 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES2-5-3RDPT ES to FWH 23B: Extraction Steam to FWH 23B |
| 2-3EX-009-A | 20 | 9321-F-2020 | M | | PEPSE | ES3-1-3RDPT ES to FWH 23C: NW Extraction Steam to FWH 23C |

# Extraction Steam (EX), Unit 2

## Section A: CHECWORKS Model Lines

### 2-3EX-02: LP Turbine Extraction Steam to #23 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-3EX-009-B | 20 | 9321-F-2020 | M | | PEPSE | ES3-2-3RDPT ES to FWH 23C: SE Extraction Steam to FWH 23C |
| 2-3EX-009-C | 28 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES3-3-3RDPT ES to FWH 23C: Extraction Steam to FWH 23C |
| 2-3EX-010 | 20 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES3-4-3RDPT ES to FWH 23C: Extraction Steam to FWH 23C |
| 2-3EX-011 | 20 | 9321-F-2020 | M | Sections of this line were replaced with CrMo. These sections are modeled for continuity within the model. | PEPSE | ES3-5-3RDPT ES to FWH 23C: Extraction Steam to FWH 23C |

## Section B: SNM Program Lines

### 2-3EX-01: Boiler Feed Pump Turbine Drains to Condensers

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3EX-021 | 1.5 | A227780 | S | NC | Unknown conditions in drip pocket to condenser | P&ID | Continuous Drain from #21 Steam Generator Feed Pump Turbine drain to #21 Condenser |
| 2-3EX-022 | 1.5 | A227780 | S | NC | Unknown conditions in drip pocket to condenser | P&ID | Continuous Drain from #22 Steam Generator Feed Pump Turbine drain to #22 Condenser |

### 2-5EX-01: HP Turbine Crossunder Piping Drip Pots to the Condenser

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EX-025-A | 2 | A235308 | S | NS | Flow Conditions Unknown | PEPSE | Crossunder Piping leakoff from Moisture Preseparator A upstream of Pipe Spec Change |

# Extraction Steam (EX), Unit 2

## Section B: SNM Program Lines

### 2-5EX-01: HP Turbine Crossunder Piping Drip Pots to the Condenser

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EX-026-A | 2 | A235308 | S | NS | Flow Conditions Unknown | PEPSE | Crossunder Piping leakoff from Moisture Preseparator B upstream of Pipe Spec Change |
| 2-5EX-027-A | 2 | A235308 | S | NS | Flow Conditions Unknown | PEPSE | Crossunder Piping leakoff from Moisture Preseparator C upstream of Pipe Spec Change |
| 2-5EX-028-A | 2 | A235308 | S | NS | Flow Conditions Unknown | PEPSE | Crossunder Piping leakoff from Moisture Preseparator D upstream of Pipe Spec Change |
| 2-5EX-117 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | HP Turbine Drain |
| 2-5EX-118 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping leakoff to FCV-1156 |
| 2-5EX-119 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping leakoff to FCV-1164 |
| 2-5EX-120 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping leakoff to FCV-1157 |
| 2-5EX-121 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping leakoff to FCV-1165 |
| 2-5EX-122 | | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping to Moisture Separator Outlet Line |
| 2-5EX-123 | | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping to Moisture Separator Outlet Line |
| 2-5EX-124 | | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping to Moisture Separator Outlet Line |
| 2-5EX-125 | | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping to Moisture Separator Outlet Line |
| 2-5EX-128 | | B237145, B237144 | S | NC | Operating conditions unknown. | P&ID | LP Leakoff Header to Gland Condenser |

# Extraction Steam (EX), Unit 2

## Section B: SNM Program Lines

### 2-5EX-01: HP Turbine Crossunder Piping Drip Pots to the Condenser

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EX-129 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Crossunder piping leakoff to FCV1154 |

### 2-6EX-01: HP Turbine Extraction Steam to #26 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-6EX-001-A | 12 | 9321-F-2020 | S | NL | The nozzle is the only susceptible component in this line. | SFA Model | ES8-1-6THPT ES to HDR: HP Turbine Extraction Nozzle to #26 FWHs. |
| 2-6EX-002-A | 12 | 9321-F-2020 | S | NL | The nozzle is the only susceptible component in this line. | SFA Model | ES8-2-6THPT ES to HDR: HP Turbine Extraction Nozzle to #26 FWHs. |
| 2-6EX-006-B | 12 | 9321-F-2020 | S | NL | The nozzle is the only susceptible component in this line. | SFA Model | ES8-7-6THPT ESHDR to FWH 26A: Extraction Steam Inlet Nozzle to FWH 26A. |
| 2-6EX-008-B | 12 | 9321-F-2020 | S | NL | The nozzle is the only susceptible component in this line. | SFA Model | ES8-6-6THPT ESHDR to FWH 26B: Extraction Steam Inlet Nozzle to FWH 26B. |
| 2-6EX-010-B | 12 | 9321-F-2020 | S | NL | The nozzle is the only susceptible component in this line. | SFA Model | ES8-4-6THPT ESHDR to FWH 26C: Extraction Steam Inlet Nozzle to FWH 26C. |

## Section C: Excluded Lines

### 2-2EX-01: LP Turbine Extraction Steam to #22 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-2EX-001-B | 22 | 9321-F-2020 | E | EM | This section of piping was replaced with CrMo in 2R18 | Replacement History | ES?-1-2NDPT ES TO FWH 22A: NE Extraction Steam to FWH 22A downstream of Exp. Joint |

# Extraction Steam (EX), Unit 2

## Section C: Excluded Lines

### 2-2EX-01: LP Turbine Extraction Steam to #22 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-2EX-002-B | 22 | 9321-F-2020 | E | EM | This section of piping was replaced with CrMo in 2R18 | Replacement History | ES?-2-2NDPT ES TO FWH 22A: SW Extraction Steam to FWH 22A downstream of Exp. Joint |
| 2-2EX-003-B | 22 | 9321-F-2020 | E | EM | This section of piping was replaced with CrMo in 2R18 | Replacement History | ES?-1-2NDPT ES TO FWH 22B: NE Extraction Steam to FWH 22B downstream of Exp. Joint |
| 2-2EX-004-B | 22 | 9321-F-2020 | E | EM | This section of piping was replaced with CrMo in 2R18 | Replacement History | ES?-2-2NDPT ES TO FWH 22B: SW Extraction Steam to FWH 22B downstream of Exp. Joint |
| 2-2EX-005-B | 22 | 9321-F-2020 | E | EM | Piping is CrMo. | P&ID | ES?-1-2NDPT ES TO FWH 22C: NE Extraction Steam to FWH 22C downstream of Exp. Joint |
| 2-2EX-006-B | 22 | 9321-F-2020 | E | EM | Piping is CrMo. | P&ID | ES?-2-2NDPT ES TO FWH 22C: SW Extraction Steam to FWH 22C downstream of Exp. Joint |

### 2-5EX-01: HP Turbine Crossunder Piping Drip Pots to the Condenser

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EX-025-B | 2 | A235308 | E | EM | Line is stainless steel. | P&ID | Crossunder Piping leakoff from Moisture Preseparator A downstream of Pipe Spec Change |
| 2-5EX-026-B | 2 | A235308 | E | EM | Line is stainless steel. | P&ID | Crossunder Piping leakoff from Moisture Preseparator B downstream of Pipe Spec Change |
| 2-5EX-027-B | 2 | A235308 | E | EM | Line is stainless steel. | P&ID | Crossunder Piping leakoff from Moisture Preseparator C downstream of Pipe Spec Change |
| 2-5EX-028-B | 2 | A235308 | E | EM | Line is stainless steel. | P&ID | Crossunder Piping leakoff from Moisture Preseparator D downstream of Pipe Spec Change |

# Extraction Steam (EX), Unit 2

## Section C: Excluded Lines

### 2-5EX-01: HP Turbine Crossunder Piping Drip Pots to the Condenser

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EX-029 | 2 | A235308 | E | EM | Line is stainless steel. | P&ID | Crossunder Piping Leakoff Header from Moisture Preseparators A and B |
| 2-5EX-030 | 2 | A235308 | E | EM | Line is stainless steel. | P&ID | Crossunder Piping Leakoff Header from Moisture Preseparators C and D |
| 2-5EX-115 | 1.5 | B237145 | E | EM | Piping is SS | P&ID | HP Turbine Drain from Far Side Inlet |
| 2-5EX-116 | 1.5 | B237145 | E | EM | Piping is SS | P&ID | HP Turbine Drain from Near Side Inlet |
| 2-5EX-126 | 1.5 | B237145 | E | EM | Piping is SS | P&ID | Crossunder piping leakoff to 2-MS-200 |
| 2-5EX-127 | 1.5 | B237145 | E | EM | Piping is SS | P&ID | Balancing line leakoff to 2-MS-201 |

### 2-5EX-03: Extraction Steam from Separating Tanks to #25 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EX-031 | 28 | 9321-F-2020 | E | EM | Line is stainless steel. | SFA Model | ES7-1-5THPT ES to FWH 25ABC: Extraction Steam Header to #25 Heaters |
| 2-5EX-032 | 1.5 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | 5EX-1 Bypass Line |
| 2-5EX-033 | 28 | 9321-F-2020 | E | EM | Line is stainless steel. | SFA Model | ES7-3-5THPT ESHDR 25CT to BT: Extraction Steam Header to FWH 25A and 25B |
| 2-5EX-034 | 18 | 9321-F-2020 | E | EM | Line is stainless steel. | SFA Model | ES7-5-5THPT ESHDR to FWH 25A: Extraction Steam Line to FWH 25A |
| 2-5EX-035 | 18 | 9321-F-2020 | E | EM | Line is stainless steel. | SFA Model | ES7-4-5THPT ESHDR to FWH 25B: Extraction Steam Line to FWH 25B |
| 2-5EX-036 | 18 | 9321-F-2020 | E | EM | Line is stainless steel. | SFA Model | ES7-2-5THPT ESHDR to FWH 25C: Extraction Steam Line to FWH 25C |
| 2-5EX-037 | 1.5 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | 5EX-5 Bypass Line |

# Extraction Steam (EX), Unit 2

## Section C: Excluded Lines

### 2-5EX-03: Extraction Steam from Separating Tanks to #25 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5EX-038 | 1.5 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | 5EX-5-1 Bypass Line |
| 2-5EX-039 | 1.5 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | 5EX-5-2 Bypass Line |

### 2-6EX-01: HP Turbine Extraction Steam to #26 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-6EX-001-B | 12 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-1-6THPT ES to HDR: HP Turbine Extraction Line to #26 FWHs. |
| 2-6EX-002-B | 12 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-2-6THPT ES to HDR: HP Turbine Extraction Line to #26 FWHs. |
| 2-6EX-003 | 18 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-3-6THPT ESHDR to FWH 26: HP Turbine Extraction Line to #26 FWHs. |
| 2-6EX-004 | 18 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-5-6THPT ESHDR 26CT to BT: Extraction Steam header to FWH 26A and 26B |
| 2-6EX-005 | 12 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-7-6THPT ESHDR to FWH 26A: Extraction Steam to FWH 26A Upstream of VCD tie-in. |
| 2-6EX-006-A | 12 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-7-6THPT ESHDR to FWH 26A: Extraction Steam to FWH 26A Downstream of VCD tie-in. |
| 2-6EX-007 | 12 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-6-6THPT ESHDR to FWH 26B: Extraction Steam to FWH 26B Upstream of VCD tie-in. |
| 2-6EX-008-A | 12 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-6-6THPT ESHDR to FWH 26B: Extraction Steam to FWH 26B Downstream of VCD tie-in. |

# Extraction Steam (EX), Unit 2

## Section C: Excluded Lines

### 2-6EX-01: HP Turbine Extraction Steam to #26 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-6EX-009 | 12 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-4-6THPT ESHDR to FWH 26C: Extraction Steam to FWH 26C Upstream of VCD tie-in. |
| 2-6EX-010-A | 12 | 9321-F-2020 | E | EM | Components in this line have been clad with Stainless Steel. | SFA Model | ES8-4-6THPT ESHDR to FWH 26C: Extraction Steam to FWH 26C Downstream of VCD tie-in. |
| 2-6EX-011 | 1 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | 6EX-6 Bypass Line |
| 2-6EX-012 | 1 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | 6EX-6-1 Bypass Line |
| 2-6EX-013 | 1 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | 6EX-6-2 Bypass Line |
| 2-6EX-014 | 1.5 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | 6EX-1 Bypass Line |
| 2-6EX-017 | 1 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 26A Extraction Steam Line Drain |
| 2-6EX-018 | 1 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 26B Extraction Steam Line Drain |
| 2-6EX-019 | 1.5 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 26A and 26B Extraction Steam Line Drain Header |
| 2-6EX-020 | 1 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 26C Extraction Steam Line Drain |
| 2-6EX-021 | 2 | 9321-F-2020 | E | EI | Valve shown closed on P&ID. | P&ID | #26 FWH Extraction Steam Line Drain Header |

# Main Feed Water (FW), Unit 2

## Section A: CHECWORKS Model Lines

### 2-FW-01: Feedwater Lines from the Boiler Feed Pumps to the Steam Generators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-FW-001 | 20 | 9321-F-2019 | M | | PEPSE | FW71-1-BFP21 DISCH to HDR: BFP No. 21 Discharge Upstream of Recirc Line |
| 2-FW-002 | 20 | 9321-F-2019 | M | | PEPSE | FW71-1-BFP21 DISCH to HDR: BFP No. 21 Discharge Downstream of Recirc Line |
| 2-FW-003 | 20 | 9321-F-2019 | M | | PEPSE | FW72-1-BFP22 DISCH to HDR: BFP No. 22 Discharge Upstream of Recirc Line |
| 2-FW-004 | 20 | 9321-F-2019 | M | | PEPSE | FW72-1-BFP22 DISCH to HDR: BFP No. 22 Discharge Downstream of Recirc Line |
| 2-FW-005 | 30 | 9321-F-2019 | M | | PEPSE | FW73-1-BFPHDR to FWH26ABC: BFP Discharge Header to #26 FWHs Upstream of High Pr. FWH Bypass Line |
| 2-FW-006 | 30 | 9321-F-2019 | M | | PEPSE | FW73-2-BFPHDR to FWH26ABC: BFP Discharge Header to #26 FWHs Downstream of High Pr. FWH Bypass Line |
| 2-FW-007 | 30 | 9321-F-2019 | M | | PEPSE | FW73-4-BFPHDR to FWH26ABC: BFP Discharge Header to FWHs 26A and 26B |
| 2-FW-008 | 18 | 9321-F-2019 | M | | PEPSE | FW73-6-BFPHDR to FWH26A: Feedwater to FWH 26A |
| 2-FW-009 | 18 | 9321-F-2019 | M | | PEPSE | FW73-5-BFPHDR to FWH26B: Feedwater to FWH 26B |
| 2-FW-010 | 18 | 9321-F-2019 | M | | PEPSE | FW73-3-BFPHDR to FWH26C: Feedwater to FWH 26C |

# Main Feed Water (FW), Unit 2

## Section A: CHECWORKS Model Lines

### 2-FW-01: Feedwater Lines from the Boiler Feed Pumps to the Steam Generators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-FW-020 | 18 | 9321-F-2019 | M | | PEPSE | FW74-1-FWH26A to DISHDR: Feedwater from FWH 26A |
| 2-FW-021 | 18 | 9321-F-2019 | M | | PEPSE | FW74-2-FWH26B to DISHDR: Feedwater from FWH 26B |
| 2-FW-022 | 18 | 9321-F-2019 | M | | PEPSE | FW74-4-FWH26C to DISHDR: Feedwater from FWH 26C |
| 2-FW-023 | 30 | 9321-F-2019 | M | | PEPSE | FW74-3-FWH26 to DISHDR: Feedwater Header from FWH 26A and 26B |
| 2-FW-024 | 30 | 9321-F-2019 | M | | PEPSE | FW74-5-FWH26 to DISHDR: #26 FWH Feedwater Discharge Header Upstream of Bypass Line |
| 2-FW-025 | 30 | 9321-F-2019 | M | | PEPSE | FW74-5-FWH26 to DISHDR: #26 FWH Feedwater Discharge Header Downstream of Bypass Line |
| 2-FW-026 | 30 | 9321-F-2019 | M | | PEPSE | FW76-2-DISHDR to SG22: Feedwater Header to Steam Generators |
| 2-FW-027 | 30 | 9321-F-2019 | M | | PEPSE | FW76-2-DISHDR to SG22: Feedwater Header to Steam Generators |
| 2-FW-028 | 30 | 9321-F-2019 | M | | PEPSE | FW77-2-DISHDR to SG24: Feedwater Header to Steam Generators |
| 2-FW-029 | 30 | 9321-F-2019 | M | | PEPSE | FW77-2-DISHDR to SG24: Feedwater Header to Steam Generators |
| 2-FW-030 | 30 | 9321-F-2019 | M | | PEPSE | FW78-1-DISHDR to SG23: Feedwater Header to Steam Generators |

# Main Feed Water (FW), Unit 2

## Section A: CHECWORKS Model Lines

### 2-FW-01: Feedwater Lines from the Boiler Feed Pumps to the Steam Generators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-FW-031 | 30 | 9321-F-2019 | M | | PEPSE | FW78-1-DISHDR to SG23: Feedwater Header to Steam Generators |
| 2-FW-032 | 18 | 9321-F-2019 | M | | PEPSE | FW75-1-DISHDR to SG21: Feedwater to 21 Steam Generator |
| 2-FW-034 | 18 | 9321-F-2019 | M | | PEPSE | FW76-1-DISHDR to SG22: Feedwater to 22 Steam Generator |
| 2-FW-036 | 18 | 9321-F-2019 | M | | PEPSE | FW77-1-DISHDR to SG24: Feedwater to 24 Steam Generator |
| 2-FW-038 | 18 | 9321-F-2019 | M | | PEPSE | FW78-1-DISHDR to SG23: Feedwater to 23 Steam Generator |
| 2-FW-058-A | 18 | 9321-F-2019 | M | | PEPSE | FW75-1-DISHDR to SG21: Feedwater to 21 Steam Generator Upstream of BFD-6 |
| 2-FW-058-B | 18 | 9321-F-2019 | M | Operating pressure from PEPSE model exceeds design pressure. | PEPSE | FW75-1-DISHDR to SG21: Feedwater to 21 Steam Generator Downstream of BFD-6 |
| 2-FW-059-A | 18 | 9321-F-2019 | M | | PEPSE | FW76-1-DISHDR to SG22: Feedwater to 22 Steam Generator Upstream of BFD-6-1 |
| 2-FW-059-B | 18 | 9321-F-2019 | M | Operating pressure from PEPSE model exceeds design pressure. | PEPSE | FW76-1-DISHDR to SG22: Feedwater to 22 Steam Generator Downstream of BFD-6-1 |
| 2-FW-060-A | 18 | 9321-F-2019 | M | | PEPSE | FW77-1-DISHDR to SG24: Feedwater to 24 Steam Generator Upstream of BFD-6-3 |
| 2-FW-060-B | 18 | 9321-F-2019 | M | Operating pressure from PEPSE model exceeds design pressure. | PEPSE | FW77-1-DISHDR to SG24: Feedwater to 24 Steam Generator Downstream of BFD-6-3 |

# Main Feed Water (FW), Unit 2

## Section A: CHECWORKS Model Lines

### 2-FW-01: Feedwater Lines from the Boiler Feed Pumps to the Steam Generators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-FW-061-A | 18 | 9321-F-2019 | M | | PEPSE | FW78-1-DISHDR to SG23: Feedwater to 23 Steam Generator Upstream of BFD-6-2 |
| 2-FW-061-B | 18 | 9321-F-2019 | M | Operating pressure from PEPSE model exceeds design pressure. | PEPSE | FW78-1-DISHDR to SG23: Feedwater to 23 Steam Generator Downstream of BFD-6-2 |

## Section B: SNM Program Lines

### 2-FW-01: Feedwater Lines from the Boiler Feed Pumps to the Steam Generators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-FW-031-A | 30 | 9321-F-2019 | S | NC | Flow Conditions Unknown | P&ID | Feedwater Header to Steam Generators downstream of Main Line to SG 23 |
| 2-FW-062 | 0.75 | 9321-F-2019 | S | NS | Operating conditions unknown. | P&ID | Feedwater to Sampling Upstream of BFD-1138 |

### 2-FW-03: Boiler Feed Pump Recirc Lines to the Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-FW-063 | 6 | 9321-F-2019 | S | NC | Flow Conditions Unknown | P&ID | BFP No. 21 Recirc to Drains Collecting Tank |
| 2-FW-064 | 6 | 9321-F-2019 | S | NC | Flow Conditions Unknown | P&ID | BFP No. 22 Recirc to Drains Collecting Tank |

# Main Feed Water (FW), Unit 2

## Section C: Excluded Lines

### 2-FW-01: Feedwater Lines from the Boiler Feed Pumps to the Steam Generators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-FW-013 | 1 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-2-21 Bypass Line |
| 2-FW-014 | 1 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-2-22 Bypass Line |
| 2-FW-015 | 18 | 9321-F-2019 | E | EI | Valve normally closed. | CSI Doc# 0700.104.C.8 | High Pr. FWH Bypass Line |
| 2-FW-016 | 1.5 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-8 Bypass Line |
| 2-FW-017 | 1.5 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-3 Bypass Line |
| 2-FW-018 | 1.5 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-3-1 Bypass Line |
| 2-FW-019 | 1.5 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-3-2 Bypass Line |
| 2-FW-033 | 6 | 9321-F-2019 | E | EM | Piping Replaced with SS | Previous SSE | Feedwater min-flow line to 21 Steam Generator |
| 2-FW-035 | 6 | 9321-F-2019 | E | EM | Piping Replaced with SS | Previous SSE | Feedwater min-flow line to 22 Steam Generator |
| 2-FW-037 | 6 | 9321-F-2019 | E | EM | Piping Replaced with SS | Previous SSE | Feedwater min-flow line to 24 Steam Generator |
| 2-FW-039 | 6 | 9321-F-2019 | E | EM | Piping Replaced with SS | Previous SSE | Feedwater min-flow line to 23 Steam Generator |
| 2-FW-040 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain A from SG 23 Feedwater min-flow line. |
| 2-FW-041 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain A from SG 24 Feedwater min-flow line. |
| 2-FW-042 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain A header from SG 23 & 24 Feedwater min-flow lines. |
| 2-FW-043 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain A from SG 22 Feedwater min-flow line. |
| 2-FW-044 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain A header from SG 22, 23 & 24 Feedwater min-flow lines. |

# Main Feed Water (FW), Unit 2

## Section C: Excluded Lines

### 2-FW-01: Feedwater Lines from the Boiler Feed Pumps to the Steam Generators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-FW-045 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain A from SG 21 Feedwater min-flow line. |
| 2-FW-046 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain A header from Feedwater min-flow lines. |
| 2-FW-047 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain B from SG 23 Feedwater min-flow line. |
| 2-FW-048 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain B from SG 24 Feedwater min-flow line. |
| 2-FW-049 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain B header from SG 23 & 24 Feedwater min-flow lines. |
| 2-FW-050 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain B from SG 22 Feedwater min-flow line. |
| 2-FW-051 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain B header from SG 22, 23 & 24 Feedwater min-flow lines. |
| 2-FW-052 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain B from SG 21 Feedwater min-flow line. |
| 2-FW-053 | 0.75 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | Drain B header from Feedwater min-flow lines. |
| 2-FW-054 | 1.5 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-5 Bypass Line |
| 2-FW-055 | 1.5 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-5-1 Bypass Line |
| 2-FW-056 | 1.5 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-5-3 Bypass Line |
| 2-FW-057 | 1.5 | 9321-F-2019 | E | EI | Valve shown closed on P&ID. | P&ID | BFD-5-2 Bypass Line |

# Gland Sealing Steam (GS), Unit 2

## Section B: SNM Program Lines

### 2-GS-01: Gland Steam to and from HP, LP, and BFP Turbines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-GS-001 | 12 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Steam Header to HP and LP Turbines |
| 2-GS-002 | 10 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to HP Turbine |
| 2-GS-003 | 10 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to HP Turbine |
| 2-GS-004 | 6 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 21 |
| 2-GS-005 | 2 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 21 |
| 2-GS-006 | 6 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 21 |
| 2-GS-007 | 2 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 21 |
| 2-GS-008 | 6 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 22 |
| 2-GS-009 | 2 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 22 |
| 2-GS-010 | 6 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 22 |
| 2-GS-011 | 2 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 22 |
| 2-GS-012 | 6 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 23 |
| 2-GS-013 | 2 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 23 |
| 2-GS-014 | 6 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 23 |
| 2-GS-015 | 2 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal to LP Turbine 23 |
| 2-GS-016 | 6 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | Gland Seal supply to BFP Turbines |
| 2-GS-020 | 4 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | Steam to BFPT #22 |
| 2-GS-021 | 4 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | Steam to BFPT #21 |
| 2-GS-022 | 3 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | Steam to BFPT #22 |
| 2-GS-023 | 3 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | Steam to BFPT #21 |

# Gland Sealing Steam (GS), Unit 2

## Section B: SNM Program Lines

### 2-GS-01: Gland Steam to and from HP, LP, and BFP Turbines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-GS-032 | 3 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | BFPT #22 Gland Steam Discharge |
| 2-GS-034 | 3 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | BFPT #21 Gland Steam Discharge |
| 2-GS-036 | 6 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | BFPT Gland Steam Discharge Header to Gland Condenser |
| 2-GS-038 | 1 | 9321-H-2024, B237144 | S | NS | Operating conditions unknown. | P&ID | BFPT Gland Steam Discharge Header drain to waste header |
| 2-GS-039 | 2 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | BFPT #21 Exhaust Cylinder Drain |
| 2-GS-040 | 2 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | BFPT #22 Exhaust Cylinder Drain |
| 2-GS-041 | 3 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&IDs | BFPT Exhaust Cylinder Drain header to Boiler Feed Pump Drip Tank |
| 2-GS-042 | 1 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | BFPT Exhaust Cylinder Drain header line to Boiler Feed Pump Drip Tank vent |
| 2-GS-043 | 3 | 9321-H-2024 | S | NC | Operating conditions unknown. | P&ID | BFPT Drip Tank vent to Condenser #21 |
| 2-GS-047 | | B237145 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Return from HP Turbine |
| 2-GS-048 | | B237145 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Return from HP Turbine |
| 2-GS-049 | | B237144 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Return from #21 LP Turbine |
| 2-GS-050 | | B237144 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Return from #21 LP Turbine |
| 2-GS-051 | | B237144 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Return from #22 LP Turbine |
| 2-GS-052 | | B237144 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Return from #22 LP Turbine |

# Gland Sealing Steam (GS), Unit 2

## Section B: SNM Program Lines

### 2-GS-01: Gland Steam to and from HP, LP, and BFP Turbines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-GS-053 | | B237144 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Return from #23 LP Turbine |
| 2-GS-054 | | B237144 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Return from #23 LP Turbine |
| 2-GS-055 | | B237145, B237144 | S | NC | Operating conditions unknown. | P&ID | Gland Seal return header to Gland Condenser |
| 2-GS-056 | | B237144 | S | NM | Outside modeling capabilities. | PEPSE | Gland Condenser Drain to Main Condenser |

## Section C: Excluded Lines

### 2-GS-01: Gland Steam to and from HP, LP, and BFP Turbines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-GS-033 | 0.75 | 9321-H-2024 | E | EF | Low flow in waste drain | P&ID | BFPT #22 Gland Steam Discharge Drain |
| 2-GS-035 | 0.75 | 9321-H-2024 | E | EF | Low flow in waste drain | P&ID | BFPT #21 Gland Steam Discharge Drain |
| 2-GS-037 | 0.75 | 9321-H-2024 | E | EI | Valve shown closed on P&ID. | P&ID | BFPT Gland Steam Discharge Header waste drain |
| 2-GS-057 | | B237144 | E | EI | Valve normally closed. | Engineer Judgement | Gland Condenser Waste Drain |

# Gland Steam Traps (GST), Unit 2

## Section B: SNM Program Lines

### 2-GST-01: Steam Trap Lines from the Gland Seal System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-GST-017 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | Steam to GST-1 |
| 2-GST-019 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | GST-1 Discharge to Header |
| 2-GST-024 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | Steam to GST-3 |
| 2-GST-026 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | GST-3 Discharge to Header |
| 2-GST-027 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | Steam to GST-2 |
| 2-GST-029 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | GST-2 Discharge to Header |
| 2-GST-030 | 2 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | Header from GST-1 and 3 |
| 2-GST-031 | 2 | 9321-H-2024 | S | NS | Operating conditions unknown. | P&ID | Gland Steam Trap Header to Boiler Feed Pump Drip Tank |

## Section C: Excluded Lines

### 2-GST-01: Steam Trap Lines from the Gland Seal System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-GST-018 | 0.75 | 9321-H-2024 | E | EI | Valve shown closed on P&ID. | P&ID | GST-1 Bypass |
| 2-GST-025 | 0.75 | 9321-H-2024 | E | EI | Valve shown closed on P&ID. | P&ID | GST-3 Bypass |
| 2-GST-028 | 0.75 | 9321-H-2024 | E | EI | Valve shown closed on P&ID. | P&ID | GST-2 Bypass |

# Heater Drains & Vents (HD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-1HD-01: #21 Feedwater Heater Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-1HD-015 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 21A to Condenser 23 via LCV 1124 |
| 2-1HD-016 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 21B to Condenser 22 via LCV 1125 |
| 2-1HD-017 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 21C to Condenser 21 via LCV 1126 |

### 2-2HD-01: #22 Feedwater Heater Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-2HD-007 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22A Drain to FWH 21A |
| 2-2HD-008 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22A Drain to FWH 21A |
| 2-2HD-009 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22A Drain to FWH 21A |
| 2-2HD-010 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22B Drain to FWH 21B |
| 2-2HD-011 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22B Drain to FWH 21B |
| 2-2HD-012 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22B Drain to FWH 21B |
| 2-2HD-013 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22C Drain to FWH 21C |
| 2-2HD-014 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22C Drain to FWH 21C |
| 2-2HD-015 | 12 | A235304 | M | Low temperature line with potential for flashing | PEPSE | FWH 22C Drain to FWH 21C |

# Heater Drains & Vents (HD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-3HD-01: #23 Feedwater Heater Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-3HD-021 | 8 | A235304 | M | | PEPSE | HD24A-1-FWH23A to CV, HD242A-1-FWH23A CV to FWH22A: FWH 23A Drain to FWH 22A |
| 2-3HD-022 | 8 | A235304 | M | | PEPSE | HD25A-1-FWH23B to CV, HD243A-1-FWH23B CV to FWH22B: FWH 23B Drain to FWH 22B |
| 2-3HD-023 | 8 | A235304 | M | | PEPSE | HD26A-1-FWH23C to CV, HD244A-1-FWH23C CV to FWH22C: FWH 23C Drain to FWH 22C |

### 2-4HD-01: #24 Feedwater Heater Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-4HD-010 | 6 | A235304 | M | | PEPSE | HD21A-1-FWH24A to CV, HD21A-2-FWH24A CV to FWH23A: FWH 24A Drain to FWH 23A |
| 2-4HD-011 | 6 | A235304 | M | | PEPSE | HD22A-1-FWH24B to CV, HD22A-2-FWH24B CV to FWH23B: FWH 24B Drain to FWH 23B |
| 2-4HD-012 | 6 | A235304 | M | | PEPSE | HD23A-1-FWH24C to CV, HD23A-2-FWH24C CV to FWH23C: FWH 24C Drain to FWH 23C |

### 2-5HD-01: Heater Drains from #25 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-5HD-041 | 10 | 9321-F-2022 | M | | PEPSE | HD9-1-FWH25A to HTR DRN TK: FWH 25A Drain to Heater Drain Tank |
| 2-5HD-042 | 10 | 9321-F-2022 | M | | PEPSE | HD9-2-FWH25B to HTR DRN TK: FWH 25B Drain to Heater Drain Tank |

# Heater Drains & Vents (HD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-5HD-01: Heater Drains from #25 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-5HD-043 | 10 | 9321-F-2022 | M | | PEPSE | HD9-3-FWH25C to HTR DRN TK: FWH 25C Drain to Heater Drain Tank |

### 2-5HD-03: HDT Drains to HDPs and Condensers and HDP Vents to HDT

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-5HD-055 | 18 | 9321-F-2022 | M | | PEPSE | HD19-1-HDT to HDP 21 SUCT: HDT to #21 HDP |
| 2-5HD-056 | 18 | 9321-F-2022 | M | | PEPSE | HD19-2-HDT to HDP 22 SUCT: HDT to #22 HDP |

### 2-6HD-01: Heater Drains from #26 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-6HD-022-A | 10 | 9321-F-2022 | M | | PEPSE | HD12-1-FWH26A to CV: Heater Drain from FWH 26A to LCV-1101 |
| 2-6HD-022-B | 10 | 9321-F-2022 | M | This portion of line is CrMo. Modeled for continuity in SFA. | Pipe Spec | HD12-4-FWH26A CV to HTR DR TK: Heater Drain from LCV-1101 to Heater Drain Tank |
| 2-6HD-023-A | 10 | 9321-F-2022 | M | | PEPSE | HD12-2-FWH26B to CV: Heater Drain from FWH 26B to LCV-1102 |
| 2-6HD-023-B | 10 | 9321-F-2022 | M | This portion of line is CrMo. Modeled for continuity in SFA. | Pipe Spec | HD12-5-FWH26B CV to HTR DR TK: Heater Drain from LCV-1102 to Heater Drain Tank |
| 2-6HD-024-A | 10 | 9321-F-2022 | M | | PEPSE | HD12-3-FWH26C to CV: Heater Drain from FWH 26C to LCV-1103 |
| 2-6HD-024-B | 10 | 9321-F-2022 | M | This portion of line is CrMo. Modeled for continuity in SFA. | Pipe Spec | HD12-6-FWH26C CV to HTR DR TK: Heater Drain from LCV-1103 to Heater Drain Tank |

# Heater Drains & Vents (HD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-HD-01: Heater Drain Pump discharge to Boiler Feed Pumps

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-HD-001 | 12 | 9321-F-2022 | M | | PEPSE | HD20-1-HDP21 to BFP SUCTION: #21 HDP to Heater Drain Pump Header |
| 2-HD-002 | 12 | 9321-F-2022 | M | | PEPSE | HD20-2-HDP22 to BFP SUCTION: #22 HDP to Heater Drain Pump Header |
| 2-HD-003 | 16 | 9321-F-2022 | M | | PEPSE | HD20-3-HDP DIS T to BFP SUC: Heater Drain Pump Header to Boiler Feed Pumps |

## Section B: SNM Program Lines

### 2-1HD-02: #21 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-1HD-021 | 6 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 21A High Level Dump to Condenser 23 |
| 2-1HD-022 | 6 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 21B High Level Dump to Condenser 22 |
| 2-1HD-023 | 6 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 21C High Level Dump to Condenser 21 |
| 2-1HD-024 | 5 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 21A 5" Vent to Condenser 23 |
| 2-1HD-025 | 5 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 21B 5" Vent to Condenser 22 |
| 2-1HD-026 | 5 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 21C 5" Vent to Condenser 21 |
| 2-1HD-027 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 21A 1" Vent to Condenser 23 |
| 2-1HD-028 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 21B 1" Vent to Condenser 22 |

# Heater Drains & Vents (HD), Unit 2

## Section B: SNM Program Lines

### 2-1HD-02: #21 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-1HD-029 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 21C 1" Vent to Condenser 21 |

### 2-2HD-02: #22 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-2HD-019 | 6 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 22A High Level Dump to Condenser 23 |
| 2-2HD-020 | 6 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 22B High Level Dump to Condenser 22 |
| 2-2HD-021 | 6 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 22C High Level Dump to Condenser 21 |
| 2-2HD-022 | 2.5 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 22A 2-1/2" Vent to Condenser 23 |
| 2-2HD-023 | 2.5 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 22B 2-1/2" Vent to Condenser 22 |
| 2-2HD-024 | 2.5 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 22C 2-1/2" Vent to Condenser 21 |
| 2-2HD-025 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 22A 1" Vent to Condenser 23 |
| 2-2HD-026 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 22B 1" Vent to Condenser 22 |
| 2-2HD-027 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 22C 1" Vent to Condenser 21 |

### 2-3HD-02: #23 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3HD-027 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23A Vent to 3EX-53 |
| 2-3HD-028 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23A Vent to 3EX-534 |

# Heater Drains & Vents (HD), Unit 2

## Section B: SNM Program Lines

### 2-3HD-02: #23 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3HD-029 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23B Vent to 3EX-536 |
| 2-3HD-030 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23B Vent to 3EX-539 |
| 2-3HD-031 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23C Vent to 3EX-541 |
| 2-3HD-032 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23C Vent to 3EX-544 |
| 2-3HD-039 | 3 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 23A 3" Vent Header |
| 2-3HD-040 | 3 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 23B 3" Vent Header |
| 2-3HD-041 | 3 | A235304 | S | NC | Operating conditions unknown. | P&ID | FWH 23C 3" Vent Header |
| 2-3HD-042 | 4 | A235304 | S | NC | Operating conditions unknown. | P&ID | 4" Vent Header from FWH 23A and 23B |
| 2-3HD-043 | 4 | A235304 | S | NC | Operating conditions unknown. | P&ID | 4" Vent Header from #23 FWHs |
| 2-3HD-044 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23A 1" Vent |
| 2-3HD-045 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23B 1" Vent |
| 2-3HD-046 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 23C 1" Vent |
| 2-3HD-047 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | 2" Vent From FWH 23A and 23B |
| 2-3HD-048 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | 2" Vent From #23 FWHs |

### 2-4HD-02: #24 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-4HD-016 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 24A 1" Vent |
| 2-4HD-017 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 24B 1" Vent |
| 2-4HD-018 | 1 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 24C 1" Vent |

# Heater Drains & Vents (HD), Unit 2

## Section B: SNM Program Lines

### 2-4HD-02: #24 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-4HD-019 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | 2" Vent Header from FWH 24A and 24B |
| 2-4HD-020 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | 2" Vent Header from #24 FWHs to Condenser 22 |
| 2-4HD-021 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 24A 2" Vent |
| 2-4HD-022 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 24B 2" Vent |
| 2-4HD-023 | 2 | A235304 | S | NS | Operating conditions unknown. | P&ID | FWH 24B 2" Vent |
| 2-4HD-024 | 3 | A235304 | S | NC | Operating conditions unknown. | P&ID | 3" Vent Header from FWH 24A and 24B |
| 2-4HD-025 | 3 | A235304 | S | NC | Operating conditions unknown. | P&ID | 3" Vent Header from #24 FWHs to Condenser 22 |

### 2-5HD-02: Heater Vents from #25 Feedwater Heater and Heater Drain Tank vents to #25 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5HD-044 | 10 | 9321-F-2022 | S | NC | Operating conditions unknown. | PEPSE | Heater Drain Tank vent to FWH 25A |
| 2-5HD-045 | 10 | 9321-F-2022 | S | NC | Operating conditions unknown. | PEPSE | Heater Drain Tank vent to FWH 25B |
| 2-5HD-046 | 10 | 9321-F-2022 | S | NC | Operating conditions unknown. | PEPSE | Heater Drain Tank vent to FWH 25C |
| 2-5HD-047 | 1.5 | 9321-F-2022 | S | NS | Operating conditions unknown. | PEPSE | FWH 25A Vent |
| 2-5HD-048 | 1.5 | 9321-F-2022 | S | NS | Operating conditions unknown. | PEPSE | FWH 25B Vent |
| 2-5HD-049 | 1.5 | 9321-F-2022 | S | NS | Operating conditions unknown. | PEPSE | FWH 25C Vent |
| 2-5HD-050 | 2 | 9321-F-2022 | S | NS | Operating conditions unknown. | PEPSE | Vent header from FWH 25A and 25B |
| 2-5HD-051 | 2.5 | 9321-F-2022, A235304 | S | NS | Operating conditions unknown. | PEPSE | #25 FWH Vent header to Condenser |

# Heater Drains & Vents (HD), Unit 2

## Section B: SNM Program Lines

### 2-5HD-03: HDT Drains to HDPs and Condensers and HDP Vents to HDT

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5HD-057 | 2 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&ID | #21 HDP vent to HDT |
| 2-5HD-058 | 2 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&ID | #22 HDP vent to HDT |
| 2-5HD-059 | 24 | 9321-F-2022, A235304 | S | NC | Operating conditions unknown. | PEPSE | Heater Drain Tank drain to Condensers |
| 2-5HD-060 | 24 | A235304 | S | NC | Operating conditions unknown. | PEPSE | HDT Drain Header to Condensers 21 and 22 |
| 2-5HD-061-A | 14 | A235304 | S | NC | Operating conditions unknown. | PEPSE | HDT Drain to LCV-5003 |
| 2-5HD-061-B | 8 | A235304 | S | NC | Operating conditions unknown. | PEPSE | LCV-5003 to Condenser 21 |
| 2-5HD-062-A | 14 | A235304 | S | NC | Operating conditions unknown. | PEPSE | HDT Drain to LCV-5002 |
| 2-5HD-062-B | 8 | A235304 | S | NC | Operating conditions unknown. | PEPSE | LCV-5002 to Condenser 22 |
| 2-5HD-063-A | 14 | A235304 | S | NC | Operating conditions unknown. | PEPSE | HDT Drain to LCV-5001 |
| 2-5HD-063-B | 8 | A235304 | S | NC | Operating conditions unknown. | PEPSE | LCV-5001 to Condenser 23 |

### 2-6HD-02: Heater Vents from #26 Feedwater Heater

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-6HD-025 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26A vent via 6EX-10 |
| 2-6HD-026 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26A vent via 6EX-500 |
| 2-6HD-027 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26A vent from 6EX-10 and 6EX-500 |
| 2-6HD-028 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26A vent via 6EX-9 |
| 2-6HD-029 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26B vent via 6EX-10-1 |
| 2-6HD-030 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26B vent via 6EX-501 |

# Heater Drains & Vents (HD), Unit 2

## Section B: SNM Program Lines

### 2-6HD-02: Heater Vents from #26 Feedwater Heater

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-6HD-031 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26B vent from 6EX-10-1 and 6EX-501 |
| 2-6HD-032 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26B vent via 6EX-9-1 |
| 2-6HD-033 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26C vent via 6EX-10-2 |
| 2-6HD-034 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26C vent via 6EX-502 |
| 2-6HD-035 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26C vent from 6EX-10-2 and 6EX-502 |
| 2-6HD-036 | 1 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | FWH 26C vent via 6EX-9-2 |
| 2-6HD-037 | 1.5 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | Heater Start Up Vent Header from FWH 26A and 26B |
| 2-6HD-038 | 2 | 9321-F-2022, A235304 | S | NS | Operating conditions unknown. | P&IDs | #26 FWH Startup Vent Header to Condenser |
| 2-6HD-039 | 1.5 | 9321-F-2022 | S | NS | Operating conditions unknown. | P&IDs | Heater Vent Header from FWH 26A and 26B |
| 2-6HD-040 | 2 | 9321-F-2022, A235304 | S | NS | Operating conditions unknown. | P&IDs | #26 FWH Vent Header to Condenser |

### 2-HD-01: Heater Drain Pump discharge to Boiler Feed Pumps

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-HD-004-A | 0.5 | 9321-F-2022 | S | NS | Flow Conditions Unknown | PEPSE | #21 HDP to HDP Water Chem. Monitor Upstream of Root Isolation Valve |
| 2-HD-005-A | 0.5 | 9321-F-2022 | S | NS | Flow Conditions Unknown | PEPSE | #22 HDP to HDP Water Chem. Monitor Upstream of Root Isolation Valve |

# Heater Drains & Vents (HD), Unit 2

## Section C: Excluded Lines

### 2-1HD-01: #21 Feedwater Heater Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-1HD-018 | 12 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 21A to Condenser 23 via LCV 1124A |
| 2-1HD-019 | 12 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 21B to Condenser 22 via LCV 1125A |
| 2-1HD-020 | 12 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 21C to Condenser 21 via LCV 1126A |

### 2-2HD-01: #22 Feedwater Heater Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-2HD-016 | 12 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 22A Drain to Condenser 23 |
| 2-2HD-017 | 12 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 22B Drain to Condenser 22 |
| 2-2HD-018 | 12 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 22C Drain to Condenser 21 |

### 2-3HD-01: #23 Feedwater Heater Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3HD-024 | 8 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 23A Drain to Condenser 23 |
| 2-3HD-025 | 8 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 23B Drain to Condenser 22 |
| 2-3HD-026 | 8 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 23C Drain to Condenser 21 |

### 2-3HD-02: #23 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3HD-033 | | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | Orifice Bypass via 3EX-11 |
| 2-3HD-034 | | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | Orifice Bypass via 3EX-533 |

# Heater Drains & Vents (HD), Unit 2

## Section C: Excluded Lines

### 2-3HD-02: #23 Feedwater Heater Vents

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-3HD-035 | | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | Orifice Bypass via 3EX-11-1 |
| 2-3HD-036 | | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | Orifice Bypass via 3EX-538 |
| 2-3HD-037 | | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | Orifice Bypass via 3EX-11-2 |
| 2-3HD-038 | | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | Orifice Bypass via 3EX-543 |

### 2-4HD-01: #24 Feedwater Heater Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-4HD-013-A | 6 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 24A Drain to LCV-1115A |
| 2-4HD-013-B | 6 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | LCV-1115A to Condenser 23 |
| 2-4HD-014-A | 6 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 24B Drain to LCV-1116A |
| 2-4HD-014-B | 6 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | LCV-1116A to Condenser 22 |
| 2-4HD-015-A | 6 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | FWH 24C Drain to LCV-1117A |
| 2-4HD-015-B | 6 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | LCV-1117A to Condenser 21 |

### 2-5HD-02: Heater Vents from #25 Feedwater Heater and Heater Drain Tank vents to #25 Feedwater Heaters

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5HD-052 | | 9321-F-2022 | E | EI | Valve shown closed on P&ID. | P&ID | FE-7635 Bypass Line |
| 2-5HD-053 | | 9321-F-2022 | E | EI | Valve shown closed on P&ID. | P&ID | FE-7636 Bypass Line |
| 2-5HD-054 | | 9321-F-2022 | E | EI | Valve shown closed on P&ID. | P&ID | FE-7637 Bypass Line |

# Heater Drains & Vents (HD), Unit 2

## Section C: Excluded Lines

### 2-5HD-03: HDT Drains to HDPs and Condensers and HDP Vents to HDT

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-5HD-064 | 14 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | LCV-5003 Bypass Line |
| 2-5HD-065 | 14 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | LCV-5002 Bypass Line |
| 2-5HD-066 | 14 | A235304 | E | EI | Valve shown closed on P&ID. | P&ID | LCV-5001 Bypass Line |

### 2-HD-01: Heater Drain Pump discharge to Boiler Feed Pumps

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-HD-004-B | 0.25 | 9321-F-2022 | E | EM | Downstream of root isolation valve is SS | CSI Document No. 0700.104.C.010 | #21 HDP to HDP Water Chem. Monitor Downstream of Root Isolation Valve |
| 2-HD-005-B | 0.25 | 9321-F-2022 | E | EM | Downstream of root isolation valve is SS | CSI Document No. 0700.104.C.010 | #22 HDP to HDP Water Chem. Monitor Downstream of Root Isolation Valve |

# Main Steam (MS), Unit 2

## Section A: CHECWORKS Model Lines

### 2-MS-07: HP Turbine Crossunder Piping to the Moisture Separators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-MS-204 | 32 | A235308 | M | | PEPSE | HP Turbine Crossunder to Moisture Preseparator A |
| 2-MS-205 | 32 | A235308 | M | | PEPSE | HP Turbine Crossunder to Moisture Preseparator B |
| 2-MS-206 | 32 | A235308 | M | | PEPSE | HP Turbine Crossunder to Moisture Preseparator C |
| 2-MS-207 | 32 | A235308 | M | | PEPSE | HP Turbine Crossunder to Moisture Preseparator D |

## Section B: SNM Program Lines

### 2-MS-01: Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors.

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-001 | 28 | 9321-F-2017, A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam from Steam Generator 21 Shell |
| 2-MS-002 | 28 | 9321-F-2017, A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam from Steam Generator 22 Shell |
| 2-MS-003 | 28 | 9321-F-2017, A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam from Steam Generator 23 Shell |
| 2-MS-004 | 28 | 9321-F-2017, A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam from Steam Generator 24 Shell |
| 2-MS-005 | 24 | A235308 | S | NQ | High quality main steam line. | PEPSE | Line from 2-MS-001 to Seal Steam and MSR Header. |
| 2-MS-006 | 24 | A235308 | S | NQ | High quality main steam line. | PEPSE | Line from 2-MS-002 to Gland Seal Steam and MSR B Header. |
| 2-MS-007 | 20 | A235308, A227780 | S | NQ | High quality main steam line. | PEPSE | Gland Seal Steam, MSR B, and Aux. Steam Header. |

# Main Steam (MS), Unit 2

## Section B: SNM Program Lines

**2-MS-01: Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors.**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-008 | 24 | A235308 | S | NQ | High quality main steam line. | PEPSE | Line from 2-MS-001 (3) to MSR A Header |
| 2-MS-009 | 24 | A235308 | S | NQ | High quality main steam line. | PEPSE | Line from 2-MS-004 to MSR A Header |
| 2-MS-010 | 20 | A235308, A227780 | S | NQ | High quality main steam line. | PEPSE | MSR A, BFP Turbine, SJAE, and Priming Ejector Header |
| 2-MS-011 | 28 | A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam to NE HP Turbine Inlet |
| 2-MS-011-A | 4 | A235308 | S | NQ | High quality main steam line. | PEPSE | MS-863 Bypass |
| 2-MS-012 | 28 | A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam to SE HP Turbine Inlet |
| 2-MS-012-A | 4 | A235308 | S | NQ | High quality main steam line. | PEPSE | MS-864 Bypass |
| 2-MS-013 | 28 | A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam to NW HP Turbine Inlet |
| 2-MS-013-A | 4 | A235308 | S | NQ | High quality main steam line. | PEPSE | MS-865 Bypass |
| 2-MS-014 | 28 | A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam to SW HP Turbine Inlet |
| 2-MS-014-A | 4 | A235308 | S | NQ | High quality main steam line. | PEPSE | MS-866 Bypass |
| 2-MS-015 | 20 | A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam Balancing Line between 2-MS-001 and 2-MS-003 |
| 2-MS-016 | 12 | A227780 | S | NQ | High quality main steam line. | PEPSE | Main Steam to Reheater Steam Control Station A. |
| 2-MS-017 | 8 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Steam Control Station A line to PCV 1175-1 |
| 2-MS-018 | 8 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Steam Control Station A line to PCV 1175-2 |
| 2-MS-019 | 1 | A227780 | S | NS | High quality main steam line. | PEPSE | Reheater Steam Control Station A line to PCV 1108 |
| 2-MS-020 | 12 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Steam Header A |

# Main Steam (MS), Unit 2

## Section B: SNM Program Lines

**2-MS-01: Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors.**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-021 | 6 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Header to MSR 21A |
| 2-MS-022 | 6 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Header to MSR 22A |
| 2-MS-023 | 6 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Header to MSR 23A |
| 2-MS-024 | 12 | A227780 | S | NQ | High quality main steam line. | PEPSE | Main Steam to Reheater Steam Control Station B. |
| 2-MS-025 | 8 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Steam Control Station B line to PCV 1175-3 |
| 2-MS-026 | 8 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Steam Control Station B line to PCV 1175-4 |
| 2-MS-027 | 1 | A227780 | S | NS | High quality main steam line. | PEPSE | Reheater Steam Control Station B line to PCV 1109 |
| 2-MS-028 | 12 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Steam Header B |
| 2-MS-029 | 6 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Header to MSR 21B |
| 2-MS-030 | 6 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Header to MSR 22B |
| 2-MS-031 | 6 | A227780 | S | NQ | High quality main steam line. | PEPSE | Reheater Header to MSR 23B |
| 2-MS-032 | 1 | A227780 | S | NS | High quality main steam line. | PEPSE | Reheater Cal. Line |
| 2-MS-033 | 4 | A227780 | S | NQ | High quality main steam line. | PEPSE | Main Steam to BFP #21 Turbine |
| 2-MS-034 | 4 | A227780 | S | NQ | High quality main steam line. | PEPSE | Main Steam to BFP #22 Turbine |
| 2-MS-035 | 6 | A227780 | S | NQ | High quality main steam line. | PEPSE | Main Steam to SJAEs and Priming Ejectors |
| 2-MS-036-A | 3 | A227780 | S | NQ | High quality main steam line. | PEPSE | SJAE Steam Supply Upstream of PCV 1132 |
| 2-MS-036-B | 3 | A227780 | S | NC | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply Downstream of PCV 1132 |

# Main Steam (MS), Unit 2

## Section B: SNM Program Lines

**2-MS-01: Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors.**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-037 | 3 | A227780 | S | N | Operating conditions unknown. | SD No. 18.0 | SJAE Header |
| 2-MS-038 | 2 | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | Header to SJAE 21 |
| 2-MS-039 | 2 | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | Header to SJAE 22 |
| 2-MS-040 | 2 | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | Header to SJAE 23 |
| 2-MS-041 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-797 |
| 2-MS-042 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-798 |
| 2-MS-043 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-799 |
| 2-MS-044 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-800 |
| 2-MS-045 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-801 |
| 2-MS-046 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-802 |
| 2-MS-047 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-803 |
| 2-MS-048 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-804 |
| 2-MS-049 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-805 |
| 2-MS-050 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-806 |
| 2-MS-051 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-807 |
| 2-MS-052 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-808 |
| 2-MS-053 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-809 |
| 2-MS-054 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-810 |
| 2-MS-055 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-811 |
| 2-MS-056 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-812 |

# Main Steam (MS), Unit 2

## Section B: SNM Program Lines

**2-MS-01: Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors.**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-057 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-813 |
| 2-MS-058 | | A227780 | S | NS | Operating conditions unknown. | SD No. 18.0 | SJAE Steam Supply via MS-814 |
| 2-MS-059-A | 6 | A227780 | S | NQ | High quality main steam line. | PEPSE | Main Steam to Priming Ejectors Header Upstream of PCV 1133 |
| 2-MS-059-B | 6 | A227780 | S | N | Operating conditions unknown. | SD No. 18.0 | Main Steam to Priming Ejectors Header Downstream of PCV 1133 |
| 2-MS-060 | 6 | A227780 | S | N | Operating conditions unknown. | SD No. 18.0 | Priming Ejectors Header |
| 2-MS-061 | 3 | A227780 | S | N | Operating conditions unknown. | SD No. 18.0 | Priming Ejectors Header to PE 21 |
| 2-MS-062 | 3 | A227780 | S | N | Operating conditions unknown. | SD No. 18.0 | Priming Ejectors Header to PE 22 |
| 2-MS-063 | 3 | A227780 | S | N | Operating conditions unknown. | SD No. 18.0 | Priming Ejectors Header to PE 23 |
| 2-MS-064 | 12 | A235308 | S | NQ | High quality main steam line. | PEPSE | Balancing line between SE and SW HP Turbine Steam Feed Lines. |
| 2-MS-076 | 3 | A235308 | S | NC | Operating conditions unknown. | P&ID | MS-863 Valve leakoff to condenser. |
| 2-MS-077 | 3 | A235308 | S | NC | Operating conditions unknown. | P&ID | MS-864 Valve leakoff to condenser. |
| 2-MS-078 | 3 | A235308 | S | NC | Operating conditions unknown. | P&ID | MS-865 Valve leakoff to condenser. |
| 2-MS-079 | 3 | A235308 | S | NC | Operating conditions unknown. | P&ID | MS-866 Valve leakoff to condenser. |
| 2-MS-143 | 0.75 | A235308 | S | NS | Operating conditions unknown. | P&ID | Main Steam Stop Valve drain to 23 Cond. West Side |
| 2-MS-144 | 0.75 | A235308 | S | NS | Operating conditions unknown. | P&ID | Main Steam Stop Valve drain to 23 Cond. East Side |
| 2-MS-192 | 4 | A227780 | S | NQ | High quality main steam line. | PEPSE | Main Steam Header to Aux. Steam Upstream of PCV-1015 |
| 2-MS-198 | | B237145 | S | NS | Operating conditions unknown. | P&ID | LH Control Valve Stem Leak-off Lines |

# Main Steam (MS), Unit 2

## Section B: SNM Program Lines

**2-MS-01: Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors.**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-199 | | B237145 | S | NS | Operating conditions unknown. | P&ID | RH Control Valve Stem Leak-off Lines |
| 2-MS-200 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Upper LH HP Turbine Feed Leakoff |
| 2-MS-201 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Lower LH HP Turbine Feed Leakoff |
| 2-MS-202 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Upper RH HP Turbine Feed Leakoff |
| 2-MS-203 | 1.5 | B237145 | S | NS | Operating conditions unknown. | P&ID | Lower LH HP Turbine Feed Leakoff |

**2-MS-06: Main Steam Supply to Gland Steam Header**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-187 | 4 | A235308 | S | NQ | High quality main steam line. | PEPSE | Main Steam Supply to Gland Seal Regulator Station |
| 2-MS-188-A | 3 | A235308 | S | NQ | High quality main steam line. | PEPSE | Gland Seal Steam Supply upstream of PCV-1145-1 |
| 2-MS-188-B | 12 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Steam Supply downstream of PCV-1145-1 |
| 2-MS-189-A | 3 | A235308 | S | NQ | High quality main steam line. | PEPSE | Gland Seal Steam Supply upstream of PCV-1145-2 |
| 2-MS-189-B | 12 | A235308 | S | NC | Operating conditions unknown. | P&ID | Gland Seal Steam Supply downstream of PCV-1145-2 |
| 2-MS-191 | 12 | A235308 | S | NC | Operating conditions unknown. | P&ID | Main Steam to Gland Seal Steam Header. |

# Main Steam (MS), Unit 2

## Section C: Excluded Lines

**2-MS-01: Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors.**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-036-C | 2 | A227780 | E | EI | Valve shown closed on P&ID. | P&ID | PCV 1132 Bypass Line |
| 2-MS-059-C | 6 | A227780 | E | EI | Valve shown closed on P&ID. | P&ID | PCV 1133 Bypass Line |
| 2-MS-065 | 4 | 9321-F-2017 | E | EI | Aux. FW Turbine does not run during normal operation. | SD No. 18.0 | Aux. Feed Pump Turbine Drive Steam Supply from SG 22 Shell |
| 2-MS-066 | 4 | 9321-F-2017 | E | EI | Aux. FW Turbine does not run during normal operation. | SD No. 18.0 | Aux. Feed Pump Turbine Drive Steam Supply from SG 23 Shell |
| 2-MS-067-A | 4 | 9321-F-2017 | E | EI | Aux. FW Turbine does not run during normal operation. | SD No. 18.0 | Aux. Feed Pump Turbine Drive Steam Header Upstream of PCV 1139 |
| 2-MS-067-B | 4 | 9321-F-2017 | E | EI | Aux. FW Turbine does not run during normal operation. | SD No. 18.0 | Aux. Feed Pump Turbine Drive Steam Header Downstream of PCV 1139 |
| 2-MS-068 | 1 | 9321-F-2017 | E | EI | Valve shown closed on P&ID. | P&ID | PCV 1310A Bypass Line |
| 2-MS-069 | 1 | 9321-F-2017 | E | EI | Valve shown closed on P&ID. | P&ID | PCV 1310A and 1310B Equalization Line |
| 2-MS-070 | 1 | 9321-F-2017 | E | EI | Valve shown closed on P&ID. | P&ID | PCV 1310B Bypass Line |
| 2-MS-071 | 12 | 9321-F-2017 | E | EI | Aux. FW Turbine does not run during normal operation. | SD No. 18.0 | Aux. Feed Pump Turbine Drive Vent to Atmosphere. |
| 2-MS-072 | 0.75 | 9321-F-2041 | E | EI | The Aux. Feed Turbine operates less than 2% of the time. | SD No. 21.0 | Aux. Feed Pump Turbine Drive Vent Drip Leg |
| 2-MS-181 | 1 | A209847 | E | EI | FCV-5066B normally closed | SD No. 18.0 | PCV-1175-1 Leakoff Line to Condenser |
| 2-MS-182 | 1 | A209847 | E | EI | FCV-5066A normally closed | SD No. 18.0 | PCV-1175-2 Leakoff Line to Condenser |
| 2-MS-183 | 1 | A209847 | E | EI | FCV-5065B normally closed | SD No. 18.0 | PCV-1175-3 Leakoff Line to Condenser |

# Main Steam (MS), Unit 2

## Section C: Excluded Lines

**2-MS-01: Main Steam from Stm Gen to HP Turbine, BFP Turbine, MSRs, Aux. Steam, SJAEs, and Priming Ejectors.**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-184 | 1 | A209847 | E | EI | FCV-5065A normally closed | SD No. 18.0 | PCV-1175-4 Leakoff Line to Condenser |
| 2-MS-185 | 2 | A209847 | E | EI | Upstream valves normally closed | SD No. 18.0 | PCV-1175-1 and 2 Leakoff Header to Condenser |
| 2-MS-186 | 2 | A209847 | E | EI | Upstream valves normally closed | SD No. 18.0 | PCV-1175-3 and 4 Leakoff Header to Condenser |
| 2-MS-194 | 1 | A227780 | E | EI | Valve shown closed on P&ID. | P&ID | MS-1133 Bypass |
| 2-MS-195 | 0.75 | A227780 | E | EI | Valve shown closed on P&ID. | P&ID | MST-100 Bypass via MS-1139 and MS-1140 |
| 2-MS-197 | 3 | A227780 | E | EI | Valve shown closed on P&ID. | P&ID | PCV-1015 Bypass |

**2-MS-06: Main Steam Supply to Gland Steam Header**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-190 | 3 | A235308 | E | EI | Valve shown closed on P&ID. | P&ID | PCV-1145-1 and 2 bypass line |

**2-MS-07: HP Turbine Crossunder Piping to the Moisture Separators**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-208 | 32 | A235308 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS56-1-PRESEP to MSR-A: Moisture Preseparator A to MSR Header |
| 2-MS-209 | 32 | A235308 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS57-1-PRESEP to MSR-B: Moisture Preseparator B to MSR Header |
| 2-MS-210 | 32 | A235308 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS56-2-PRESEP to MSR-A: Moisture Preseparator C to MSR Header |

# Main Steam (MS), Unit 2

## Section C: Excluded Lines

### 2-MS-07: HP Turbine Crossunder Piping to the Moisture Separators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-211 | 32 | A235308 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS57-2-PRESEP to MSR-B: Moisture Preseparator D to MSR Header |
| 2-MS-212 | 46.5 | A235308, A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS56-3-PRESEP to MSR-A: Moisture Preseparator Header to A MSRs |
| 2-MS-213 | 46.5 | A235308, A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS57-3-PRESEP to MSR-B: Moisture Preseparator Header to B MSRs |
| 2-MS-214 | 37 | A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS56-5-PRESEP to MSR-A: Moisture Preseparator Header to MSR 21A and 22A |
| 2-MS-215 | 37 | A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS57-5-PRESEP to MSR-B: Moisture Preseparator Header to MSR 21B and 22B |
| 2-MS-216 | 26.5 | A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS56-7-PRESEP to MSR21A: Moisture Preseparator Header to MSR 21A |
| 2-MS-217 | 26.5 | A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS56-6-PRESEP to MSR22A: Moisture Preseparator Header to MSR 22A |
| 2-MS-218 | 26.5 | A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS56-4-PRESEP to MSR23A: Moisture Preseparator Header to MSR 23A |
| 2-MS-219 | 26.5 | A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS57-7-PRESEP to MSR21B: Moisture Preseparator Header to MSR 21B |
| 2-MS-220 | 26.5 | A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS57-6-PRESEP to MSR22B: Moisture Preseparator Header to MSR 22B |

# Main Steam (MS), Unit 2

## Section C: Excluded Lines

### 2-MS-07: HP Turbine Crossunder Piping to the Moisture Separators

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MS-221 | 26.5 | A227780 | E | EM | Line is clad with Stainless Steel. | SFA Model | MS57-4-PRESEP to MSR23B: Moisture Preseparator Header to MSR 23B |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-MSD-01: Moisture Separator Drains to the Heater Drain Tank and Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-MSD-067 | 12 | 9321-F-2023 | M | | PEPSE | MSD27-1-MS21A to MSDT 21A: MSR 21A Drain from 16N |
| 2-MSD-068 | 12 | 9321-F-2023 | M | | PEPSE | MSD27-2-MS21A to MSDT 21A: MSR 21A Drain from 17N |
| 2-MSD-069 | 12 | 9321-F-2023 | M | | PEPSE | MSD27-4-MS21A to MSDT 21A: MSR 21A Drain Header from 16N and 17N |
| 2-MSD-070 | 12 | 9321-F-2023 | M | | PEPSE | MSD27-3-MS21A to MSDT 21A: MSR 21A Drain from 19N |
| 2-MSD-071 | 12 | 9321-F-2023 | M | | PEPSE | MSD27-5-MS21A to MSDT 21A: MSR 21A Drain to MSR Drain Tank 21A |
| 2-MSD-072 | 12 | 9321-F-2023 | M | | PEPSE | MSD28-1-MS22A to MSDT 22A: MSR 22A Drain from 16N |
| 2-MSD-073 | 12 | 9321-F-2023 | M | | PEPSE | MSD28-2-MS22A to MSDT 22A: MSR 22A Drain from 17N |
| 2-MSD-074 | 12 | 9321-F-2023 | M | | PEPSE | MSD28-4-MS22A to MSDT 22A: MSR 22A Drain Header from 16N and 17N |
| 2-MSD-075 | 12 | 9321-F-2023 | M | | PEPSE | MSD28-3-MS22A to MSDT 22A: MSR 22A Drain from 19N |
| 2-MSD-076 | 12 | 9321-F-2023 | M | | PEPSE | MSD28-5-MS22A to MSDT 22A: MSR 22A Drain to MSR Drain Tank 22A |
| 2-MSD-077 | 12 | 9321-F-2023 | M | | PEPSE | MSD29-1-MS23A to MSDT 23A: MSR 23A Drain from 16N |
| 2-MSD-078 | 12 | 9321-F-2023 | M | | PEPSE | MSD29-2-MS23A to MSDT 23A: MSR 23A Drain from 17N |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-MSD-01: Moisture Separator Drains to the Heater Drain Tank and Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-MSD-079 | 12 | 9321-F-2023 | M | | PEPSE | MSD29-4-MS23A to MSDT 23A: MSR 23A Drain Header from 16N and 17N |
| 2-MSD-080 | 12 | 9321-F-2023 | M | | PEPSE | MSD29-3-MS23A to MSDT 23A: MSR 23A Drain from 19N |
| 2-MSD-081 | 12 | 9321-F-2023 | M | | PEPSE | MSD29-5-MS23A to MSDT 23A: MSR 23A Drain to MSR Drain Tank 23A |
| 2-MSD-082 | 12 | 9321-F-2023 | M | | PEPSE | MSD30-1-MS21B to MSDT 21B: MSR 21B Drain from 19N |
| 2-MSD-083 | 12 | 9321-F-2023 | M | | PEPSE | MSD30-2-MS21B to MSDT 21B: MSR 21B Drain from 18N |
| 2-MSD-084 | 12 | 9321-F-2023 | M | | PEPSE | MSD30-4-MS21B to MSDT 21B: MSR 21B Drain Header from 18N and 19N |
| 2-MSD-085 | 12 | 9321-F-2023 | M | | PEPSE | MSD30-3-MS21B to MSDT 21B: MSR 21B Drain from 16N |
| 2-MSD-086 | 12 | 9321-F-2023 | M | | PEPSE | MSD30-5-MS21B to MSDT 21B: MSR 21B Drain to MSR Drain Tank 21B |
| 2-MSD-087 | 12 | 9321-F-2023 | M | | PEPSE | MSD31-1-MS22B to MSDT 22B: MSR 22B Drain from 19N |
| 2-MSD-088 | 12 | 9321-F-2023 | M | | PEPSE | MSD31-2-MS22B to MSDT 22B: MSR 22B Drain from 18N |
| 2-MSD-089 | 12 | 9321-F-2023 | M | | PEPSE | MSD31-4-MS22B to MSDT 22B: MSR 22B Drain Header from 18N and 19N |
| 2-MSD-090 | 12 | 9321-F-2023 | M | | PEPSE | MSD31-3-MS22B to MSDT 22B: MSR 22B Drain from 16N |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-MSD-01: Moisture Separator Drains to the Heater Drain Tank and Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-MSD-091 | 12 | 9321-F-2023 | M | | PEPSE | MSD31-5-MS22B to MSDT 22B: MSR 22B Drain to MSR Drain Tank 22B |
| 2-MSD-092 | 12 | 9321-F-2023 | M | | PEPSE | MSD32-1-MS23B to MSDT 23B: MSR 23B Drain from 19N |
| 2-MSD-093 | 12 | 9321-F-2023 | M | | PEPSE | MSD32-2-MS23B to MSDT 23B: MSR 23B Drain from 18N |
| 2-MSD-094 | 12 | 9321-F-2023 | M | | PEPSE | MSD32-4-MS23B to MSDT 23B: MSR 23B Drain Header from 18N and 19N |
| 2-MSD-095 | 12 | 9321-F-2023 | M | | PEPSE | MSD32-3-MS23B to MSDT 23B: MSR 23B Drain from 16N |
| 2-MSD-096 | 12 | 9321-F-2023 | M | | PEPSE | MSD32-5-MS23B to MSDT 23B: MSR 23B Drain to MSR Drain Tank 23B |

### 2-MSD-02: Reheater Drains to #26 Feedwater Heaters and Condensers

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-MSD-151 | 6 | 9321-F-2023 | M | | PEPSE | MSD39-1-RHTR 21A to RHDT 21A: Reheater 21A to Reheater Drain Tank |
| 2-MSD-152 | 6 | 9321-F-2023 | M | | PEPSE | MSD40-1-RHTR 22A to RHDT 22A: Reheater 22A to Reheater Drain Tank |
| 2-MSD-153 | 6 | 9321-F-2023 | M | | PEPSE | MSD41-1-RHTR 23A to RHDT 23A: Reheater 23A to Reheater Drain Tank |
| 2-MSD-154 | 6 | 9321-F-2023 | M | | PEPSE | MSD42-1-RHTR 21B to RHDT 21B: Reheater 21B to Reheater Drain Tank |
| 2-MSD-155 | 6 | 9321-F-2023 | M | | PEPSE | MSD43-1-RHTR 22B to RHDT 22B: Reheater 22B to Reheater Drain Tank |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-MSD-02: Reheater Drains to #26 Feedwater Heaters and Condensers

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-MSD-156 | 6 | 9321-F-2023 | M | | PEPSE | MSD44-1-RHTR 23B to RHDT 23B: Reheater 23B to Reheater Drain Tank |
| 2-MSD-157 | 6 | 9321-F-2023 | M | Components downstream of the control valve in this line have been replaced with stainless steel. These components are modeled for continuity. | PEPSE | MSD45A-1-RHDT21A to CV, MSD45B-1-RHDT21A CV to FWH26: Reheater Drain Tank 21A Drain to Header |
| 2-MSD-158 | 8 | 9321-F-2023 | M | Components downstream of the control valve in this line have been replaced with stainless steel. These components are modeled for continuity. | PEPSE | MSD46A-1-RHDT22A to CV, MSD46A-2-RHDT22A CV to FWH26: Reheater Drain Tank 22A Drain to Header |
| 2-MSD-159 | 6 | 9321-F-2023 | M | | PEPSE | MSD47-1-RHDT23A to CV, MSD47-2-RHDT23A CV to FWH26: Reheater Drain Tank 23A Drain to Header |
| 2-MSD-160 | 10 | 9321-F-2023 | M | | PEPSE | MSD45C-1-RHDT A HDR to FWH26, MSD45C-2-RHDT A HDR to FWH26: Reheater Drain Tank Header |
| 2-MSD-161 | 10 | 9321-F-2023 | M | | PEPSE | MSD45C-3-RHDT A HDR to FWH26: "A" Reheater Drain Tank Header to #26 FWHs |
| 2-MSD-162 | 8 | 9321-F-2023 | M | | PEPSE | MSD45C-5-RHDT A HDR to FWH26: "A" Reheater Drain Tank Header to FWH 26A and 26B |
| 2-MSD-163 | 6 | 9321-F-2023 | M | | PEPSE | MSD45D-2-RHDT A HDR to FWH26A: "A" Reheater Drain Tank Header to FWH 26A |
| 2-MSD-164 | 6 | 9321-F-2023 | M | | PEPSE | MSD45D-1-RHDT A HDR to FWH26B: "A" Reheater Drain Tank Header to FWH 26B |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-MSD-02: Reheater Drains to #26 Feedwater Heaters and Condensers

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-MSD-165 | 6 | 9321-F-2023 | M | A portion of this line has been replaced with stainless steel. These components are modeled for continuity. | PEPSE | MSD45C-4-RHDT A HDR to FWH26C: "A" Reheater Drain Tank Header to FWH 26C |
| 2-MSD-166 | 6 | 9321-F-2023 | M | | PEPSE | MSD48A-1-RHDT21B to CV, MSD48B-1-RHDT21B CV to FWH26: Reheater Drain Tank 21B Drain to Header |
| 2-MSD-167 | 10 | 9321-F-2023 | M | | PEPSE | MSD49A-1-RHDT22B to CV, MSD49B-1-RHDT22B CV to FWH26: Reheater Drain Tank 22B Drain to Header |
| 2-MSD-168 | 6 | 9321-F-2023 | M | | PEPSE | MSD50A-1-RHDT23B to CV, MSD50C-1-RHDT23B CV to FWH26: Reheater Drain Tank 23B Drain to Header |
| 2-MSD-169 | 8 | 9321-F-2023 | M | | PEPSE | MSD48B-2-RHDT B HDR to FWH26: Reheater Drain Tank Header Downstream of Reheater 22B and 23B Inlet |
| 2-MSD-170 | 10 | 9321-F-2023 | M | | PEPSE | MSD49C-1-RHDT B HDR to FWH26: "B" Reheater Drain Tank Header to #26 FWHs |
| 2-MSD-171 | 10 | 9321-F-2023 | M | | PEPSE | MSD49C-3-RHDT B HDR: "B" Reheater Drain Tank Header to FWH 26A and 26B |
| 2-MSD-172 | 6 | 9321-F-2023 | M | | PEPSE | MSD49C-5-RHDT B HDR to FWH26A: "B" Reheater Drain Tank Header to FWH 26A |
| 2-MSD-173 | 6 | 9321-F-2023 | M | | PEPSE | MSD49C-4-RHDT B HDR to FWH26B: "B" Reheater Drain Tank Header to FWH 26B |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-MSD-02: Reheater Drains to #26 Feedwater Heaters and Condensers

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-MSD-174 | 6 | 9321-F-2023 | M | | PEPSE | MSD49C-2-RHDT B HDR to FWH26C: "B" Reheater Drain Tank Header to FWH 26C |

## Section B: SNM Program Lines

### 2-MSD-01: Moisture Separator Drains to the Heater Drain Tank and Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MSD-097 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | PEPSE | MS Drain Tank 21A vent to MSR |
| 2-MSD-098 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | PEPSE | MS Drain Tank 22A vent to MSR |
| 2-MSD-099 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | PEPSE | MS Drain Tank 23A vent to MSR |
| 2-MSD-100 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | PEPSE | MS Drain Tank 21B vent to MSR |
| 2-MSD-101 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | PEPSE | MS Drain Tank 22B vent to MSR |
| 2-MSD-102 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | PEPSE | MS Drain Tank 23B vent to MSR |
| 2-MSD-103-A | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD33A-1-MSDT 21A to HDT: MS Drain Tank 21A Nozzle to Heater Drain Tank |
| 2-MSD-103-C | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD33A-1-MSDT 21A to HDT: Heater Drain Tank Nozzle from MS Drain Tank 21A |
| 2-MSD-104-A | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD34A-1-MSDT 22A to HDT: MS Drain Tank 22A Nozzle to Heater Drain Tank |
| 2-MSD-104-C | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD34A-1-MSDT 22A to HDT: Heater Drain Tank Nozzle from MS Drain Tank 22A |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section B: SNM Program Lines

### 2-MSD-01: Moisture Separator Drains to the Heater Drain Tank and Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MSD-105-A | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD35A-1-MSDT 23A to HDT: MS Drain Tank 23A Nozzle to Heater Drain Tank |
| 2-MSD-105-C | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD35A-1-MSDT 23A to HDT: Heater Drain Tank Nozzle from MS Drain Tank 23A |
| 2-MSD-106-A | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD36A-1-MSDT 21B to HDT: MS Drain Tank 21B Nozzle to Heater Drain Tank |
| 2-MSD-106-C | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD36A-1-MSDT 21B to HDT: Heater Drain Tank Nozzle from MS Drain Tank 21B |
| 2-MSD-107-A | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD37A-1-MSDT 22B to HDT: MS Drain Tank 22B Nozzle to Heater Drain Tank |
| 2-MSD-107-C | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD37A-1-MSDT 22B to HDT: Heater Drain Tank Nozzle from MS Drain Tank 22B |
| 2-MSD-108-A | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD38A-1-MSDT 23B to HDT: MS Drain Tank 23B Nozzle to Heater Drain Tank |
| 2-MSD-108-C | 6 | 9321-F-2023 | S | NL | The nozzles are the only susceptible components in this line. | SFA Model | MSD38A-1-MSDT 23B to HDT: Heater Drain Tank Nozzle from MS Drain Tank 23B |

### 2-MSD-02: Reheater Drains to #26 Feedwater Heaters and Condensers

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MSD-145 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater Drain Tank 21A Vent to MSR |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section B: SNM Program Lines

### 2-MSD-02: Reheater Drains to #26 Feedwater Heaters and Condensers

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MSD-146 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater Drain Tank 22A Vent to MSR |
| 2-MSD-147 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater Drain Tank 23A Vent to MSR |
| 2-MSD-148 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater Drain Tank 21B Vent to MSR |
| 2-MSD-149 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater Drain Tank 22B Vent to MSR |
| 2-MSD-150 | 2.5 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater Drain Tank 23B Vent to MSR |
| 2-MSD-175 | 8 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater 21A to Condenser 23 |
| 2-MSD-176 | 8 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater 22A to Condenser 22 |
| 2-MSD-177 | 8 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater 23A to Condenser 23 |
| 2-MSD-178 | 6 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater 21B to Condenser 21 |
| 2-MSD-179 | 6 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater 22B to Condenser 22 |
| 2-MSD-180 | 6 | 9321-F-2023 | S | NC | Operating conditions unknown. | P&ID | Reheater 23B to Condenser 21 |

## Section C: Excluded Lines

### 2-MSD-01: Moisture Separator Drains to the Heater Drain Tank and Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MSD-103-B | 6 | 9321-F-2023 | E | EM | This line has been clad with Stainless Steel. | SFA Model | MSD33A-1-MSDT 21A to HDT: MS Drain Tank 21A Drain to Heater Drain Tank |

# Moisture Separator Reheater Drains (MSD), Unit 2

## Section C: Excluded Lines

### 2-MSD-01: Moisture Separator Drains to the Heater Drain Tank and Drains Collecting Tank

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MSD-104-B | 6 | 9321-F-2023 | E | EM | This line has been clad with Stainless Steel. | SFA Model | MSD34A-1-MSDT 22A to HDT: MS Drain Tank 22A Drain to Heater Drain Tank |
| 2-MSD-105-B | 6 | 9321-F-2023 | E | EM | This line has been clad with Stainless Steel. | SFA Model | MSD35A-1-MSDT 23A to HDT: MS Drain Tank 23A Drain to Heater Drain Tank |
| 2-MSD-106-B | 6 | 9321-F-2023 | E | EM | This line has been clad with Stainless Steel. | SFA Model | MSD36A-1-MSDT 21B to HDT: MS Drain Tank 21B Drain to Heater Drain Tank |
| 2-MSD-107-B | 6 | 9321-F-2023 | E | EM | This line has been clad with Stainless Steel. | SFA Model | MSD37A-1-MSDT 22B to HDT: MS Drain Tank 22B Drain to Heater Drain Tank |
| 2-MSD-108-B | 6 | 9321-F-2023 | E | EM | This line has been clad with Stainless Steel. | SFA Model | MSD38A-1-MSDT 23B to HDT: MS Drain Tank 23B Drain to Heater Drain Tank |
| 2-MSD-109 | 6 | 9321-F-2023 | E | EI | Line operates less than 2% of the time | CSI Document 0700.104.C.008 | MS Drain Tank 21A Drain to Drains Collecting Tank |
| 2-MSD-110 | 6 | 9321-F-2023 | E | EI | Line operates less than 2% of the time | CSI Document 0700.104.C.008 | MS Drain Tank 22A Drain to Drains Collecting Tank |
| 2-MSD-111 | 6 | 9321-F-2023 | E | EI | Line operates less than 2% of the time | CSI Document 0700.104.C.008 | MS Drain Tank 23A Drain to Drains Collecting Tank |
| 2-MSD-112 | 6 | 9321-F-2023 | E | EI | Line operates less than 2% of the time | CSI Document 0700.104.C.008 | MS Drain Tank 21B Drain to Drains Collecting Tank |
| 2-MSD-113 | 6 | 9321-F-2023 | E | EI | Line operates less than 2% of the time | CSI Document 0700.104.C.008 | MS Drain Tank 22B Drain to Drains Collecting Tank |
| 2-MSD-114 | 6 | 9321-F-2023 | E | EI | Line operates less than 2% of the time | CSI Document 0700.104.C.008 | MS Drain Tank 23B Drain to Drains Collecting Tank |

# Main Steam Traps (MST), Unit 2

## Section B: SNM Program Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-019-A | 12 | A227780 | S | NC | Flow Conditions Unknown | PEPSE | Crossunder Steam Trap to Condenser 21 |
| 2-MST-020-A | 12 | A227780 | S | NC | Flow Conditions Unknown | PEPSE | Crossunder Steam Trap to Condenser 21 |
| 2-MST-021-A | 12 | A227780 | S | NC | Flow Conditions Unknown | PEPSE | Crossunder Steam Trap to Condenser 22 |
| 2-MST-022-A | 12 | A227780 | S | NC | Flow Conditions Unknown | PEPSE | Crossunder Steam Trap to Condenser 22 |
| 2-MST-023-A | 12 | A227780 | S | NC | Flow Conditions Unknown | PEPSE | Crossunder Steam Trap to Condenser 23 |
| 2-MST-024-A | 12 | A227780 | S | NC | Flow Conditions Unknown | PEPSE | Crossunder Steam Trap to Condenser 23 |
| 2-MST-080-A | 1.5 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main steam to MST-1 |
| 2-MST-080-B | 1.5 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-1 to Steam Trap Header |
| 2-MST-081-A | 1.5 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main steam to MST-2 |
| 2-MST-081-B | 1.5 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-2 to Steam Trap Header |
| 2-MST-082-A | 1.5 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main steam to MST-3 |
| 2-MST-082-B | 1.5 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-3 to Steam Trap Header |
| 2-MST-083-A | 1.5 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from Drain Pot to MST-4 |
| 2-MST-083-B | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-1-24 US Leakoff to MST-4. |
| 2-MST-083-C | | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-4 to Steam Trap Header |
| 2-MST-084-A | 1.25 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-1-21 US Leakoff to MST-5 |

# Main Steam Traps (MST), Unit 2

## Section B: SNM Program Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-084-B | 1.25 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-5 to Steam Trap Header |
| 2-MST-085-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-2A US Leakoff to MST-6 |
| 2-MST-085-B | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-1-21 DS Leakoff to MST-6 |
| 2-MST-085-C | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-6 to Steam Trap Header |
| 2-MST-086-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-2A DS Leakoff to MST-8 |
| 2-MST-086-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-8 to Steam Trap Header |
| 2-MST-087-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-2B DS Leakoff to MST-9 |
| 2-MST-087-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-9 to Steam Trap Header |
| 2-MST-088-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-1-22 DS Leakoff to MST-10 |
| 2-MST-088-B | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-2B US Leakoff to MST-10 |
| 2-MST-088-C | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-10 to Steam Trap Header |
| 2-MST-089-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-1-22 US Leakoff to MST-12 |
| 2-MST-089-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-12 to Steam Trap Header |
| 2-MST-090-A | 1.25 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-1-23 US Leakoff to MST-13 |
| 2-MST-090-B | 1.25 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-13 to Steam Trap Header |
| 2-MST-091-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-1-23 DS Leakoff to MST-14 |

# Main Steam Traps (MST), Unit 2

## Section B: SNM Program Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-091-B | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-2C US Leakoff to MST-14 |
| 2-MST-091-C | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-14 to Steam Trap Header |
| 2-MST-092-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-2C DS Leakoff to MST-16 |
| 2-MST-092-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-16 to Steam Trap Header |
| 2-MST-093-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-1-24 DS Leakoff to MST-18 |
| 2-MST-093-B | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-2D US Leakoff to MST-18 |
| 2-MST-093-C | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-18 to Steam Trap Header |
| 2-MST-094-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam from MS-2D DS Leakoff to MST-20 |
| 2-MST-094-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-20 to Steam Trap Header |
| 2-MST-095-A | 1.5 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-21 |
| 2-MST-095-B | 1.5 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-21 to Steam Trap Header |
| 2-MST-096-A | 1.5 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-22 |
| 2-MST-096-B | 1.5 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-22 to Steam Trap Header |
| 2-MST-097-A | 1.5 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-23 |
| 2-MST-097-B | 1.5 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-23 to Steam Trap Header |
| 2-MST-098-A | 1 | 9321-F-2041 | S | NS | DS of nozzle Chrome-Moly | PEPSE | Exit Nozzle US of Valve MS-90-1 |
| 2-MST-099-A | 1 | 9321-F-2041 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-25 via Steam Dump Lines |

# Main Steam Traps (MST), Unit 2

## Section B: SNM Program Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-099-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-25 to Steam Trap Header |
| 2-MST-100-A | 1.25 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-26 via Steam Dump Lines |
| 2-MST-100-B | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-26 to Steam Trap Header |
| 2-MST-101-A | 1 | 9321-F-2041 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-27 via Steam Dump Lines |
| 2-MST-101-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-27 to Steam Trap Header |
| 2-MST-102-A | 1.25 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-28 via Steam Dump Lines |
| 2-MST-102-B | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-28 to Steam Trap Header |
| 2-MST-103-A | 1.25 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-29 via Steam Dump Lines |
| 2-MST-103-B | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-29 to Steam Trap Header |
| 2-MST-104-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-30 |
| 2-MST-104-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-30 to Steam Trap Header |
| 2-MST-105-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-31 |
| 2-MST-105-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-31 to Header |
| 2-MST-105-D | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | Header to Steam Trap Header |
| 2-MST-106-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-32 |
| 2-MST-106-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-32 to Steam Trap Header |
| 2-MST-107-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-33 |
| 2-MST-107-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-33 to Steam Trap Header |

# Main Steam Traps (MST), Unit 2

## Section B: SNM Program Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-108-A | 1.25 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-34 |
| 2-MST-108-B | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-34 to Steam Trap Header |
| 2-MST-109-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-35 |
| 2-MST-109-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-35 to Steam Trap Header |
| 2-MST-110-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-36 |
| 2-MST-110-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-36 to Steam Trap Header |
| 2-MST-111-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-37 |
| 2-MST-111-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-37 to Steam Trap Header |
| 2-MST-112-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-38 |
| 2-MST-112-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-38 to Steam Trap Header |
| 2-MST-113-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-39 |
| 2-MST-113-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-39 to Header |
| 2-MST-113-D | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | Header to Steam Trap Header |
| 2-MST-114-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-40 |
| 2-MST-114-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-40 to Header |
| 2-MST-115-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-41 |
| 2-MST-115-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-41 to Header |
| 2-MST-116-A | 1.25 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-42 via Steam Dump Lines |
| 2-MST-116-B | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-42 to Steam Trap Header |

# Main Steam Traps (MST), Unit 2

## Section B: SNM Program Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-117-A | 1.25 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-43 via Steam Dump Lines |
| 2-MST-117-B | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-43 to Steam Trap Header |
| 2-MST-118-A | 1.25 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-44 via Steam Dump Lines |
| 2-MST-118-B | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-44 to Steam Trap Header |
| 2-MST-119-A | 1.25 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-45 via Steam Dump Lines |
| 2-MST-119-B | 1.25 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-45 to Steam Trap Header |
| 2-MST-120-A | 1 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-46 via Steam Dump Lines |
| 2-MST-120-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-46 to Steam Trap Header |
| 2-MST-121-A | 1 | 9321-F-2042 | S | NS | Pressurized line with flow to steam trap. | PEPSE | Main Steam to MST-47 via Steam Dump Lines |
| 2-MST-121-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-47 to Steam Trap Header |
| 2-MST-122-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-48 |
| 2-MST-122-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-48 to Steam Trap Header |
| 2-MST-123-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-49 |
| 2-MST-123-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-49 to Steam Trap Header |
| 2-MST-124-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-50 |
| 2-MST-124-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-50 to Steam Trap Header |
| 2-MST-125-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-51 |
| 2-MST-125-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-51 to Steam Trap Header |

# Main Steam Traps (MST), Unit 2

## Section B: SNM Program Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-126-A | 1 | 9321-F-2042 | S | NS | High quality main steam line. | PEPSE | Main Steam to MST-52 |
| 2-MST-126-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-52 to Steam Trap Header |
| 2-MST-127-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-56 |
| 2-MST-127-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-56 to Steam Trap Header |
| 2-MST-128-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-57 |
| 2-MST-128-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-57 to Steam Trap Header |
| 2-MST-129-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-58 |
| 2-MST-129-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-58 to Steam Trap Header |
| 2-MST-130-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-59 |
| 2-MST-130-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-59 to Steam Trap Header |
| 2-MST-131-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-60 |
| 2-MST-131-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-60 to Header |
| 2-MST-132-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-61 |
| 2-MST-132-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-61 to Steam Trap Header |
| 2-MST-133-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-62 |
| 2-MST-133-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-62 to Steam Trap Header |
| 2-MST-134-A | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-63 |
| 2-MST-134-B | 1 | 9321-F-2042 | S | NS | Operating conditions unknown. | P&ID | MST-63 to Steam Trap Header |
| 2-MST-135-A | 1 | 9321-F-2041 | S | NS | High quality main steam line. | PEPSE | Steam to MST-64 |
| 2-MST-135-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-64 to Header |

# Main Steam Traps (MST), Unit 2

## Section B: SNM Program Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-136-A | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | SD No. 18.0 | Steam to MST-65 |
| 2-MST-136-B | 1 | 9321-F-2041 | S | NS | Operating conditions unknown. | P&ID | MST-65 to Header |
| 2-MST-193-A | 0.75 | A227780 | S | NQ | High quality main steam line. | PEPSE | Main Steam to MST-100 |
| 2-MST-193-B | 0.75 | A227780 | S | NS | Operating conditions unknown. | P&ID | MST-100 to Steam Trap Header |

## Section C: Excluded Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-019-B | 10 | A227780 | E | EI | SD. 18 states FCV-1206 is closed until air is actuated to the operator upon a turbine trip or loss of electrical loading. | SD No. 18.0 | Crossunder Steam Trap Bypass Line & LP Turbine Steam Dump |
| 2-MST-020-B | 10 | A227780 | E | EI | SD. 18 states FCV-1207 is closed until air is actuated to the operator upon a turbine trip or loss of electrical loading. | SD No. 18.0 | Crossunder Steam Trap Bypass Line & LP Turbine Steam Dump |
| 2-MST-021-B | 10 | A227780 | E | EI | SD. 18 states FCV-1208 is closed until air is actuated to the operator upon a turbine trip or loss of electrical loading. | SD No. 18.0 | Crossunder Steam Trap Bypass Line & LP Turbine Steam Dump |
| 2-MST-022-B | 10 | A227780 | E | EI | SD. 18 states FCV-1209 is closed until air is actuated to the operator upon a turbine trip or loss of electrical loading. | SD No. 18.0 | Crossunder Steam Trap Bypass Line & LP Turbine Steam Dump |
| 2-MST-023-B | 10 | A227780 | E | EI | SD. 18 states FCV-1210 is closed until air is actuated to the operator upon a turbine trip or loss of electrical loading. | SD No. 18.0 | Crossunder Steam Trap Bypass Line & LP Turbine Steam Dump |
| 2-MST-024-B | 10 | A227780 | E | EI | SD. 18 states FCV-1211 is closed until air is actuated to the operator upon a turbine trip or loss of electrical loading. | SD No. 18.0 | Crossunder Steam Trap Bypass Line & LP Turbine Steam Dump |

# Main Steam Traps (MST), Unit 2

## Section C: Excluded Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-073 | 0.5 | 9321-F-2041 | E | EI | The Aux. Feed Turbine operates less than 2% of the time. | SD No. 21.0 | Aux. Feed Pump Turbine Drive Drain via MST-69 |
| 2-MST-074 | 0.75 | 9321-F-2041 | E | EI | The Aux. Feed Turbine operates less than 2% of the time. | SD No. 21.0 | Aux. Feed Pump Turbine Drive Drain via MST-68 |
| 2-MST-075 | 0.75 | 9321-F-2041 | E | EI | The Aux. Feed Turbine operates less than 2% of the time. | SD No. 21.0 | Aux. Feed Pump Turbine Drive Drain via MST-67 |
| 2-MST-080-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-1 Bypass Line |
| 2-MST-080-D | 1.5 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-1 Bypass Line to Steam Trap Header |
| 2-MST-080-E | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MS-91A Bypass Line |
| 2-MST-081-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-2 Bypass Line |
| 2-MST-081-D | 1.5 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-2 Bypass Line to Steam Trap Header |
| 2-MST-081-E | 0.75 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MS-91B Bypass Line |
| 2-MST-082-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-3 Bypass Line |
| 2-MST-082-D | 1.5 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-3 Bypass Line to Steam Trap Header |
| 2-MST-082-E | 0.75 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MS-91C Bypass Line |
| 2-MST-083-D | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-4 Bypass Line |
| 2-MST-083-E | 1.5 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-4 Bypass Line to Steam Trap Header |
| 2-MST-083-F | 0.75 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MS-91D Bypass Line |
| 2-MST-084-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-5 Bypass Line |
| 2-MST-085-D | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-6 Bypass Line |

# Main Steam Traps (MST), Unit 2

## Section C: Excluded Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-085-E | 3 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-6 Drain to Steam Trap Header |
| 2-MST-086-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-8 Bypass Line |
| 2-MST-087-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-9 Bypass Line |
| 2-MST-088-D | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-10 Bypass Line |
| 2-MST-088-E | 1 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-10 Bypass to Steam Trap Header |
| 2-MST-089-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-12 Bypass Line |
| 2-MST-090-C | 1.25 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-13 Bypass Line |
| 2-MST-091-D | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-14 Bypass Line |
| 2-MST-091-E | 0.5 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-14 Drain to Drain Header |
| 2-MST-092-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-16 Bypass Line |
| 2-MST-093-D | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-18 Bypass Line |
| 2-MST-093-E | 1 | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-18 Drain to Drain Header |
| 2-MST-094-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-20 Bypass Line |
| 2-MST-095-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-21 Bypass Line |
| 2-MST-096-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-22 Bypass Line |
| 2-MST-097-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-23 Bypass Line |
| 2-MST-098 | 1 | 9321-F-2041 | E | EM | Piping is CrMo. | P&ID | MST-24 Steam Trap Line |
| 2-MST-099-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-25 Bypass Line |
| 2-MST-100-C | 1.25 | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-26 Bypass Line |
| 2-MST-101-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-27 Bypass Line |

# Main Steam Traps (MST), Unit 2

## Section C: Excluded Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-102-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-28 Bypass Line |
| 2-MST-103-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-29 Bypass Line |
| 2-MST-104-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-30 Bypass Line |
| 2-MST-105-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-31 Bypass Line |
| 2-MST-106-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-32 Bypass Line |
| 2-MST-107-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-33 Bypass Line |
| 2-MST-108-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-34 Bypass Line |
| 2-MST-109-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-35 Bypass Line |
| 2-MST-110-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-36 Bypass Line |
| 2-MST-111-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-37 Bypass Line |
| 2-MST-112-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-38 Bypass Line |
| 2-MST-113-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-39 Bypass Line |
| 2-MST-114-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-40 Bypass Line |
| 2-MST-115-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-41 Bypass Line |
| 2-MST-116-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-42 Bypass Line |
| 2-MST-117-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-43 Bypass Line |
| 2-MST-118-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-44 Bypass Line |
| 2-MST-119-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-45 Bypass Line |
| 2-MST-120-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-46 Bypass Line |
| 2-MST-121-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-47 Bypass Line |

# Main Steam Traps (MST), Unit 2

## Section C: Excluded Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-122-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-48 Bypass Line |
| 2-MST-123-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-49 Bypass Line |
| 2-MST-124-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-50 Bypass Line |
| 2-MST-125-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-51 Bypass Line |
| 2-MST-126-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-52 Bypass Line |
| 2-MST-127-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-56 Bypass Line |
| 2-MST-128-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-57 Bypass Line |
| 2-MST-129-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-58 Bypass Line |
| 2-MST-130-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-59 Bypass Line |
| 2-MST-131-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-60 Bypass Line |
| 2-MST-132-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-61 Bypass Line |
| 2-MST-133-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-62 Bypass Line |
| 2-MST-134-C | | 9321-F-2042 | E | EI | Valve normally closed. | P&ID | MST-63 Bypass Line |
| 2-MST-135-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-64 Bypass Line |
| 2-MST-136-C | | 9321-F-2041 | E | EI | Valve shown closed on P&ID. | P&ID | MST-65 Bypass Line |
| 2-MST-137 | 1 | 9321-F-2041 | E | ER | Scavenging steam piping removed from service. | P&ID | MST-66 Lines |
| 2-MST-138 | 3 | 9321-F-2041 | E | EI | All feeding valves shown normally closed on P&ID | P&ID | Main Steam Trap Drain and Bypass Header. |
| 2-MST-139 | 4 | 9321-F-2041, 9321-F-2042 | E | EM | Line replaced with Stainless Steel | FAC Program Plan Supplement | Main Steam Trap Main Header to Drains Collecting Tank. |

# Main Steam Traps (MST), Unit 2

## Section C: Excluded Lines

### 2-MST-01: Steam Trap Lines from the Main Steam System

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-MST-140 | 2 | 9321-F-2042 | E | EM | Line replaced with Stainless Steel | FAC Program Plan Supplement | Main Steam Traps Header to Main Header |
| 2-MST-141 | 2 | 9321-F-2042 | E | EM | Line replaced with Stainless Steel | FAC Program Plan Supplement | Main Steam Traps Header to Main Header |
| 2-MST-142 | 4 | 9321-F-2042 | E | EI | Valve shown closed on P&ID. | P&ID | Main Steam Traps Main Header Drain to Discharge Tunnel |
| 2-MST-196 | 0.75 | A227780 | E | EI | Valve shown closed on P&ID. | P&ID | MST-100 Bypass via MS-1144 |

# Moisture Preseparator Drains (PD), Unit 2

## Section A: CHECWORKS Model Lines

### 2-PD-01: Moisture Preseparator Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|
| 2-PD-001 | 20 | A228272 | M | | PEPSE | Moisture Preseparator "A" to Separating Tank A |
| 2-PD-002 | 20 | A228272 | M | | PEPSE | Moisture Preseparator "B" to Separating Tank A |
| 2-PD-003 | 20 | A228272 | M | | PEPSE | Moisture Preseparator "C" to Separating Tank B |
| 2-PD-004 | 20 | A228272 | M | | PEPSE | Moisture Preseparator "D" to Separating Tank B |
| 2-PD-011 | 10 | A228272 | M | | PEPSE | Separating Tank A Drain to Control Valves |
| 2-PD-012 | 10 | A228272 | M | | PEPSE | Separating Tank B Drain to Control Valves |
| 2-PD-013 | 10 | A228272 | M | | PEPSE | Separating Tank A to LCV 5198 |
| 2-PD-014 | 10 | A228272 | M | | PEPSE | Separating Tank A to LCV 5199 |
| 2-PD-015 | 10 | A228272 | M | | PEPSE | Separating Tank B to LCV 5205 |
| 2-PD-016 | 10 | A228272 | M | | PEPSE | Separating Tank B to LCV 5206 |
| 2-PD-017 | 10 | A228272 | M | | PEPSE | Separating Tank A control valves to Heater Drain Tank |
| 2-PD-018 | 10 | A228272 | M | | PEPSE | Separating Tank B control valves to Heater Drain Tank |

# Moisture Preseparator Drains (PD), Unit 2

## Section B: SNM Program Lines

### 2-PD-01: Moisture Preseparator Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-PD-005 | 3 | A228272 | S | NC | Flow Rate unknown. | PEPSE | Moisture Preseparator "A" to 20" Line |
| 2-PD-006 | 3 | A228272 | S | NC | Flow Rate unknown. | PEPSE | Moisture Preseparator "B" to 20" Line |
| 2-PD-007 | 3 | A228272 | S | NC | Flow Rate unknown. | PEPSE | Moisture Preseparator "C" to 20" Line |
| 2-PD-008 | 3 | A228272 | S | NC | Flow Rate unknown. | PEPSE | Moisture Preseparator "D" to 20" Line |
| 2-PD-009-A | 20 | A228272 | S | NL | The nozzle is the only susceptible component in this line. | SFA Model | ES7A-1-SEP TKA VNT to FWH25: Separating Tank A Nozzle to Extraction Steam Header |
| 2-PD-010-A | 20 | A228272 | S | NL | The nozzle is the only susceptible component in this line. | SFA Model | ES7A-2-SEP TKB VNT to FWH25: Separating Tank B Nozzle to Extraction Steam Header |

## Section C: Excluded Lines

### 2-PD-01: Moisture Preseparator Drain Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-PD-009-B | 20 | A228272 | E | EM | This line was replaced with stainless steel in RFO13. | SFA Model | ES7A-1-SEP TKA VNT to FWH25: Separating Tank A to Extraction Steam Header |
| 2-PD-010-B | 20 | A228272 | E | EM | This line was replaced with stainless steel in RFO13. | SFA Model | ES7A-2-SEP TKB VNT to FWH25: Separating Tank B to Extraction Steam Header |
| 2-PD-019 | 1 | A228272 | E | EI | Valve shown closed on P&ID. | P&ID | 1" Line from Separating Tank B Vent to Extraction header. |

# Reheat Steam Traps (RST), Unit 2

## Section B: SNM Program Lines

### 2-RST-01: Reheat Steam Trap Lines Downstream of Reheater Steam Traps

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-RST-001 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | PEPSE | RST-1 to BFP Turbine Drip Tank Header |
| 2-RST-002 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | PEPSE | RST-2 to BFP Turbine Drip Tank Header |
| 2-RST-003 | 0.75 | 9321-H-2024 | S | NS | Operating conditions unknown. | PEPSE | RST-3 to BFP Turbine Drip Tank Header |
| 2-RST-004 | 2 | 9321-H-2024 | S | NS | Operating conditions unknown. | PEPSE | Reheat Steam Trap Header to BFP Turbine Drip Tank |

# Service Boiler (SB), Unit 2

## Section B: SNM Program Lines

### 2-SB-01: Service Boiler Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-SB-001 | 6 | A227780, A209775 | S | NC | Operating conditions unknown. | P&ID | Auxiliary Steam from PCV-1015 |
| 2-SB-004 | 2 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Steam to Condensate Return, Hot Water Heat Exchangers, and Office Unit Heaters |
| 2-SB-005 | 2 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Steam to Hot Water Heat Exchangers and Office Unit Heaters |
| 2-SB-011 | 1 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Header Drain to AST-35 |
| 2-SB-012 | 1.5 | 9321-F-2120 | S | NS | Operating conditions unknown. | P&ID | Steam to Office Unit Heaters |
| 2-SB-015 | 8 | A209775 | S | NC | Operating conditions unknown. | P&ID | Steam from Aux. Steam Header |
| 2-SB-016 | 8 | A209775 | S | NC | Operating conditions unknown. | P&ID | Desuperheater Header |
| 2-SB-022 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam trap header to Cond. Receiver |
| 2-SB-023 | 4 | A209775 | S | NC | Operating conditions unknown. | P&ID | Header to Steam Traps |
| 2-SB-026 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Desuperheater Header |
| 2-SB-030 | 8 | A209775 | S | NC | Operating conditions unknown. | P&ID | Steam to Desuperheater |
| 2-SB-039 | 4 | A209775 | S | NC | Operating conditions unknown. | P&ID | Service Boiler Header to Air Tempering Units |
| 2-SB-042 | 6 | 9321-F-2021, B193201 | S | NC | Operating conditions unknown. | P&ID | Line from #10 House Service Boiler Deaerator |
| 2-SB-043 | 1.5 | 9321-F-2021, B193201 | S | NS | Operating conditions unknown. | P&ID | Line from #10 House Service Boiler Deaerator |

# Service Boiler (SB), Unit 2

## Section C: Excluded Lines

### 2-SB-01: Service Boiler Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-SB-010 | 1 | 9321-F-2120 | E | EI | Valve shown closed on P&ID. | P&ID | Cross Tie Between 2-SB-005 and 2-SB-007 |
| 2-SB-029 | 0.5 | A209775 | E | EI | Operating conditions unknown. | P&ID | Desuperheater bypass |
| 2-SB-031 | 8 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | PCV-1257 Bypass |
| 2-SB-034 | 2 | A209775 | E | EF | Low flow to floor drain | P&ID | Steam to floor drain via UH-575 |
| 2-SB-040 | 1 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | PCV-1252 Bypass |
| 2-SB-041 | 2 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | Steam to UHT-514 |
| 2-SB-044 | 1 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | TCV-1257-B Bypass Line |
| 2-SB-045 | 1 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | TCV-1257-A Bypass Line |
| 2-SB-046 | 2 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | Floor Drain via UH-571 |
| 2-SB-047 | 3 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | Aux. Steam to Condenser Water Box Priming Steam Jet Air Ejectors |

# Condensate Return Unit Heaters to Service Boiler D (UH), Unit 2

## Section B: SNM Program Lines

### 2-UH-01: Condensate Return from Unit Heaters to the Deaerator

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-UH-001 | 4 | A209775, 9321-F-2120 | S | NC | Operating conditions unknown. | P&ID | Condensate return pumps to #20 House Service Deaerator |
| 2-UH-002 | 4 | 9321-F-2120, B193201 | S | NC | Operating conditions unknown. | P&ID | Condensate return to #10 House Service Deaerator |
| 2-UH-003 | 10 | A209775 | S | NC | Operating conditions unknown. | SD No. 29.01 | Desuperheater outlet header to various unit heaters |
| 2-UH-004 | 8 | A209775 | S | NC | Operating conditions unknown. | SD No. 29.01 | Desuperheater outlet steam to Gland Seal Steam Header |
| 2-UH-071 | 6 | A209775 | S | NC | Operating conditions unknown. | P&ID | Unit Heater Drain Header to Condensate Receiver |
| 2-UH-072 | 6 | A209775 | S | NC | Operating conditions unknown. | P&ID | Unit Heater Drain Header to Condensate Receiver |
| 2-UH-073 | 4 | A209775 | S | NC | Operating conditions unknown. | P&ID | Condensate Receiver Vent to Atmosphere |
| 2-UH-074 | 3 | A209775 | S | NC | Operating conditions unknown. | P&ID | Condensate Receiver Drain to Cond. Return Pump #21 |
| 2-UH-075 | 3 | A209775 | S | NC | Operating conditions unknown. | P&ID | Condensate Receiver Drain to Cond. Return Pump #22 |
| 2-UH-077 | 4 | A209775 | S | NC | Operating conditions unknown. | P&ID | Cond. Return Pump #21 Discharge |
| 2-UH-078 | 4 | A209775 | S | NC | Operating conditions unknown. | P&ID | Cond. Return Pump #21 Discharge |
| 2-UH-079 | 2 | B193201 | S | NS | Operating conditions unknown. | P&ID | Line from #20 House Service Boiler to Service Boiler Deaerator |

# Condensate Return Unit Heaters to Service Boiler D (UH), Unit 2

## Section C: Excluded Lines

### 2-UH-01: Condensate Return from Unit Heaters to the Deaerator

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-UH-054 | 2 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | Drain line via UH-1103 |
| 2-UH-055 | 2 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | Steam to and from Dirty and Clean Oil Storage Tanks |
| 2-UH-076 | 1 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | Condensate Receiver Bottom Drain |
| 2-UH-080 | 6 | A209775 | E | EI | Valve shown closed on P&ID. | P&ID | PC-5289 Bypass Line |

# Condensate Return Unit Heater Steam Traps (UHT), Unit 2

## Section B: SNM Program Lines

**2-UHT-01: Steam Trap Lines from the Condensate Return from Unit Heaters to the Deaerator system**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-UHT-005 | 1 | A209775 | S | NC | Operating conditions unknown. | SD No. 29.01 | Steam to UHT-510 |
| 2-UHT-006 | 1 | A209775 | S | NC | Operating conditions unknown. | SD No. 29.01 | Steam to UHT-511 |
| 2-UHT-007 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam trap header to Cond. Receiver from UHT-510. |
| 2-UHT-008 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam from gland steam supply steam traps |
| 2-UHT-009 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 215UHR |
| 2-UHT-010 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 217UHR |
| 2-UHT-011 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 29UHR |
| 2-UHT-012 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 22UHR |
| 2-UHT-013 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UHT-2-1 |
| 2-UHT-014 | 2 | A209775 | S | NS | Operating conditions unknown. Flow direction is unclear and seems to indicate that no outlet exists. | P&ID | Steam to and from 221UHR |
| 2-UHT-015 | 2 | A209775 | S | NS | Operating conditions unknown. Flow direction is unclear and seems to indicate that no outlet exists. | P&ID | Steam to and from 219UHR |
| 2-UHT-016 | 2 | A209775 | S | NS | Operating conditions unknown. Flow direction is unclear and seems to indicate that no outlet exists. | P&ID | Steam to and from 211UHR |
| 2-UHT-017 | 2 | A209775 | S | NS | Operating conditions unknown. Flow direction is unclear and seems to indicate that no outlet exists. | P&ID | Steam to and from 24UHR |
| 2-UHT-018 | 1 | A209775 | S | NS | Operating conditions unknown. Flow direction is unclear and seems to indicate that no outlet exists. | P&ID | Steam to and from UHT-2-2 |

# Condensate Return Unit Heater Steam Traps (UHT), Unit 2

## Section B: SNM Program Lines

**2-UHT-01: Steam Trap Lines from the Condensate Return from Unit Heaters to the Deaerator system**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-UHT-019 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 225UHR |
| 2-UHT-020 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 224UHR |
| 2-UHT-021 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 223UHR |
| 2-UHT-022 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 213UHR |
| 2-UHT-023 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 27UHR |
| 2-UHT-024 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UHT-1-1 |
| 2-UHT-024-A | 4 | A209775 | S | NC | Operating conditions unknown. | P&ID | Steam to UHT-512 and 513 |
| 2-UHT-025 | 1 | A209775 | S | NS | Operating conditions unknown. Flow direction is unclear and seems to indicate that no outlet exists. | P&ID | Steam to and from Oil Preheater |
| 2-UHT-026 | 1 | A209775 | S | NS | Operating conditions unknown. Flow direction is unclear and seems to indicate that no outlet exists. | P&ID | Steam to and from UHT-4-1 |
| 2-UHT-027 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 24AUHR |
| 2-UHT-028 | 1.5 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UHT-2-3 |
| 2-UHT-029 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 248UHR |
| 2-UHT-030 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 250UHR |
| 2-UHT-031 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 249UHR |
| 2-UHT-032 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 252UHR |
| 2-UHT-033 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 251UHR |
| 2-UHT-034 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UHT-11-3 |
| 2-UHT-035 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 247UHR |

# Condensate Return Unit Heater Steam Traps (UHT), Unit 2

## Section B: SNM Program Lines

**2-UHT-01: Steam Trap Lines from the Condensate Return from Unit Heaters to the Deaerator system**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-UHT-036 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 246UHR |
| 2-UHT-037 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 245UHR |
| 2-UHT-038 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UHT-11-2 |
| 2-UHT-039 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | UHT-511 outlet |
| 2-UHT-040 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 214UHR |
| 2-UHT-041 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 216UHR |
| 2-UHT-042 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 218UHR |
| 2-UHT-043 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 220UHR |
| 2-UHT-044 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 222UHR |
| 2-UHT-045 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 260UHR |
| 2-UHT-046 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UHT-4-2 |
| 2-UHT-047 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 21UHR |
| 2-UHT-048 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 28UHR |
| 2-UHT-049 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 23UHR |
| 2-UHT-050 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 210UHR |
| 2-UHT-051 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 212UHR |
| 2-UHT-052 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 25UHR |
| 2-UHT-053 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UHT-11-1 |
| 2-UHT-056 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | UHT-513 Discharge |
| 2-UHT-057 | 0.5 | A209775 | S | NS | Operating conditions unknown. | P&ID | UHT-512 Discharge |

# Condensate Return Unit Heater Steam Traps (UHT), Unit 2

## Section B: SNM Program Lines

**2-UHT-01: Steam Trap Lines from the Condensate Return from Unit Heaters to the Deaerator system**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | Mod. Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-UHT-060 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | 21 Air Tempering Unit Discharge |
| 2-UHT-061 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | 22 Air Tempering Unit Discharge |
| 2-UHT-062 | 1 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to various unit heaters |
| 2-UHT-063 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UH-TSC-1 |
| 2-UHT-064 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 242UHR |
| 2-UHT-065 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 243UHR |
| 2-UHT-066 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 244UHR |
| 2-UHT-067 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UHT-8-246 |
| 2-UHT-068 | 0.75 | A209775 | S | NS | Operating conditions unknown. | P&ID | Steam to and from 253UHR |
| 2-UHT-069 | 2 | A209775 | S | NS | Operating conditions unknown. | P&ID | Unit Heater Drain to Discharge Tunnel |
| 2-UHT-089 | 0.75 | B227209 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UH-1020 |
| 2-UHT-090 | 0.75 | B227209 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UH-1019 |
| 2-UHT-092 | 0.75 | B227209 | S | NS | Operating conditions unknown. | P&ID | Steam to and from UH-1021 |

## Section C: Excluded Lines

**2-UHT-01: Steam Trap Lines from the Condensate Return from Unit Heaters to the Deaerator system**

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-UHT-070 | 0.75 | A209775 | E | ER | Pipe capped upstream of trap. | P&ID | Line to and from UHT-3-2 |

# MSR Vent Chamber Discharge (VCD), Unit 2

## Section C: Excluded Lines

### 2-VCD-01: Moisture Separator Reheater Vent Chamber Discharge Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-VCD-001 | 3 | A209847 | E | EM | Piping replaced with SS. | Previous SSE | MSR 21A Vent Chamber Discharge |
| 2-VCD-002 | 3 | A209847 | E | EM | Piping replaced with SS. | Previous SSE | MSR 22A Vent Chamber Discharge |
| 2-VCD-003 | 3 | A209847 | E | EM | Piping replaced with SS. | Previous SSE | MSR 23A Vent Chamber Discharge |
| 2-VCD-004 | 3 | A209847 | E | EM | Piping replaced with SS. | Previous SSE | MSR 21B Vent Chamber Discharge |
| 2-VCD-005 | 3 | A209847 | E | EM | Piping replaced with SS. | Previous SSE | MSR 22B Vent Chamber Discharge |
| 2-VCD-006 | 3 | A209847 | E | EM | Piping replaced with SS. | Previous SSE | MSR 23B Vent Chamber Discharge |
| 2-VCD-007 | 4 | A209847 | E | EM | Stainless Steel Piping | P&ID | Vent Chamber Discharge Header to FWH 26A |
| 2-VCD-008 | 4 | A209847 | E | EM | Stainless Steel Piping | P&ID | Vent Chamber Discharge Header to FWH 26B |
| 2-VCD-009 | 4 | A209847 | E | EM | Stainless Steel Piping | P&ID | Vent Chamber Discharge Header to FWH 26C |
| 2-VCD-010-A | 3 | A209847 | E | EM | Stainless Steel Piping | P&ID, Replacement History | MSR 21A VCD through HCV-5067B |
| 2-VCD-010-B | 3 | A209847 | E | EM | Piping replaced with CrMo. | P&ID | MSR 21A VCD downstream of HCV-5067B |
| 2-VCD-011-A | 3 | A209847 | E | EM | Stainless Steel Piping | P&ID, Replacement History | MSR 22A VCD through HCV-5069B |
| 2-VCD-011-B | 3 | A209847 | E | EM | Piping replaced with CrMo. | P&ID | MSR 22A VCD downstream of HCV-5069B |
| 2-VCD-012-A | 3 | A209847 | E | EM | Stainless Steel Piping | P&ID, Replacement History | MSR 23A VCD through HCV-5071B |
| 2-VCD-012-B | 3 | A209847 | E | EM | Piping replaced with CrMo. | P&ID | MSR 23A VCD downstream of HCV-5071B |
| 2-VCD-013-A | 3 | A209847 | E | EM | Stainless Steel Piping | P&ID, Replacement History | MSR 21B VCD through HCV-5068B |
| 2-VCD-013-B | 3 | A209847 | E | EM | Piping replaced with CrMo. | P&ID | MSR 21B VCD downstream of HCV-5068B |

# MSR Vent Chamber Discharge (VCD), Unit 2

## Section C: Excluded Lines

### 2-VCD-01: Moisture Separator Reheater Vent Chamber Discharge Lines

| Line Number | Size (in.) | P&ID No. | Sus. Cat. | FAC Ex. Crit. | Comments | Reference | Line Description |
|---|---|---|---|---|---|---|---|
| 2-VCD-014-A | 3 | A209847 | E | EM | Stainless Steel Piping | P&ID, Replacement History | MSR 22B VCD through HCV-5070B |
| 2-VCD-014-B | 3 | A209847 | E | EM | Piping replaced with CrMo. | P&ID | MSR 22B VCD downstream of HCV-5070B |
| 2-VCD-015-A | 3 | A209847 | E | EM | Stainless Steel Piping | P&ID, Replacement History | MSR 23B VCD through HCV-5072B |
| 2-VCD-015-B | 3 | A209847 | E | EM | Piping replaced with CrMo. | P&ID | MSR 23B VCD downstream of HCV-5072B |

## Susceptibility Category (Sus. Cat.) Legend:

| | |
|---|---|
| M | CHECWORKS Modeled |
| S | Susceptible, not modeled |
| E | Excluded from the FAC program (non-susceptible) |

## Model Exclusion Criteria (Mod. Ex. Crit.) Legend:

| | |
|---|---|
| NC | Not modeled due to unknown or varying operating Conditions |
| NL | Not to be modeled due to Localized FAC susceptibility |
| NM | Non-Modelable due to conditions outside CHECWORKS Modeling capabilities |
| NQ | Not to be modeled due to high steam Quality, CHECWORKS predictions are of little value |
| NS | Non-modelable due to Socket-welded fittings |
| NV | Not to be modeled because line is Visually inspected |

## FAC Exclusion Criteria (FAC Ex. Crit.) Legend:

| | |
|---|---|
| EC | Excluded due to Combination of infrequent op above temp threshold |
| EF | Excluded due to low or no Flow |
| EI | Excluded due to Infrequent operation |
| EM | Excluded due to FAC-resistant Material |
| EO | Excluded due to high dissolved Oxygen content |
| EP | Exluded, does not contain Piping |
| EQ | Excluded due to high steam Quality |
| ER | Excluded, Removed from service and "cut" and "capped" |
| ET | Excluded due to operating Temperature (single phase, < 200 deg F) |
| EW | Excluded because system, subsytem, or line is non-Water |

# Appendix D
# Revision History

## Revision 0

Initial Issue of document.

## Revision 1

Systems, subsystem names, and line names were updated to incorporate the new system list.

## Revision 2

SSE was updated to incorporate line replacements. Tables D.1, D.2, and D.3 below detail the changes:

**Table D.1 System Changes**

| System Number | Change | Reference |
|---|---|---|
| MSR Vent Chamber Discharge | System changed to excluded due to non-susceptible material. | Replacement History |

**Table D.2 Subsystem Changes**

| Subsystem Number | Change | Reference |
|---|---|---|
| 2-5EX-03 | Subsystem changed to excluded due to non-susceptible material. | SFA Database |
| 2-VCD-01 | Subsystem changed to excluded due to non-susceptible material. | Replacement History |

**Table D.3 Line Changes**

| Line Number | Change | Reference |
|---|---|---|
| 2-2EX-001 | Split line into 2-2EX-001-A and 2-2EX-001-B to separate CrMo and Carbon Steel sections of line. | SFA Database |
| 2-2EX-002 | Split line into 2-2EX-002-A and 2-2EX-002-B to separate CrMo and Carbon Steel sections of line. | SFA Database |
| 2-5EX-031 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-5EX-033 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-5EX-034 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-5EX-035 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-5EX-036 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-6EX-001 | Line changed to excluded due to non-susceptible material. Renamed to 2-6EX-001-B. | SFA Database |
| 2-6EX-001-A | Added line for susceptible exit nozzle. | SFA Database |

| Line Number | Change | Reference |
|---|---|---|
| 2-6EX-002 | Line changed to excluded due to non-susceptible material. Renamed to 2-6EX-002-B. | SFA Database |
| 2-6EX-002-A | Added line for susceptible exit nozzle. | SFA Database |
| 2-6EX-003 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-6EX-004 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-6EX-005 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-6EX-006 | Line changed to excluded due to non-susceptible material. Renamed to 2-6EX-006-A. | SFA Database |
| 2-6EX-006-B | Added line for susceptible exit nozzle. | SFA Database |
| 2-6EX-007 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-6EX-008 | Line changed to excluded due to non-susceptible material. Renamed to 2-6EX-008-A. | SFA Database |
| 2-6EX-008-B | Added line for susceptible exit nozzle. | SFA Database |
| 2-6EX-009 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-6EX-010 | Line changed to excluded due to non-susceptible material. Renamed to 2-6EX-010-A. | SFA Database |
| 2-6EX-010-B | Added line for susceptible exit nozzle. | SFA Database |
| 2-MS-208 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-209 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-210 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-211 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-212 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-213 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-214 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-215 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-216 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-217 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-218 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-219 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-220 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MS-221 | Line changed to excluded due to non-susceptible material. | SFA Database |
| 2-MSD-103 | Line changed to excluded due to non-susceptible material. Renamed to 2-MSD-103-B. | SFA Database |
| 2-MSD-103-A | Added line for susceptible exit nozzle. | SFA Database |
| 2-MSD-103-C | Added line for susceptible inlet nozzle. | SFA Database |
| 2-MSD-104 | Line changed to excluded due to non-susceptible material. Renamed to 2-MSD-104-B. | SFA Database |
| 2-MSD-104-A | Added line for susceptible exit nozzle. | SFA Database |
| 2-MSD-104-C | Added line for susceptible inlet nozzle. | SFA Database |
| 2-MSD-105 | Line changed to excluded due to non-susceptible material. Renamed to 2-MSD-105-B. | SFA Database |

| Line Number | Change | Reference |
|---|---|---|
| 2-MSD-105-A | Added line for susceptible exit nozzle. | SFA Database |
| 2-MSD-105-C | Added line for susceptible inlet nozzle. | SFA Database |
| 2-MSD-106 | Line changed to excluded due to non-susceptible material. Renamed to 2-MSD-106-B. | SFA Database |
| 2-MSD-106-A | Added line for susceptible exit nozzle. | SFA Database |
| 2-MSD-106-C | Added line for susceptible inlet nozzle. | SFA Database |
| 2-MSD-107 | Line changed to excluded due to non-susceptible material. Renamed to 2-MSD-107-B. | SFA Database |
| 2-MSD-107-A | Added line for susceptible exit nozzle. | SFA Database |
| 2-MSD-107-C | Added line for susceptible inlet nozzle. | SFA Database |
| 2-MSD-108 | Line changed to excluded due to non-susceptible material. Renamed to 2-MSD-108-B. | SFA Database |
| 2-MSD-108-A | Added line for susceptible exit nozzle. | SFA Database |
| 2-MSD-108-C | Added line for susceptible inlet nozzle. | SFA Database |
| 2-PD-009 | Line changed to excluded due to non-susceptible material. Renamed to 2-PD-009-B. | SFA Database |
| 2-PD-009-A | Added line for susceptible exit nozzle. | SFA Database |
| 2-PD-010 | Line changed to excluded due to non-susceptible material. Renamed to 2-PD-010-B. | SFA Database |
| 2-PD-010-A | Added line for susceptible exit nozzle. | SFA Database |

# Attachment A
# Industry FAC Experience Table

Industry experience is an important factor in the identification of systems, subsystems, and lines susceptible to Flow-Accelerated Corrosion (FAC). A table of important industry events and their applicability to Indian Point 2 was compiled using the following sources:

- "Recommendations for an Effective Flow-Accelerated Corrosion Program," EPRI NSAC 202L-R3, 2006.
- EPRI, *Flow-Accelerated Corrosion in Power Plants*, B. Chexal et al, EPRI TR-106611-R1, 1998.
- CHUG Plant Experience Database, Revision 2, December 1995.
- 26th CHUG Meeting Presentation by Jeff Horowitz "Review and Lessons Learned from Historical FAC Failures".
- 31st CHUG Meeting Presentation by Aaron Kelley "Unit 1 #2 LP Heater ES Nozzles".
- 32th CHUG Meeting Presentation by Doug Munson "Update on Mihama-3".
- 33rd CHUG Meeting Presentation by Aaron Kelley "Results of L2R10 Inspections at LaSalle Unit 2".
- 33rd CHUG Meeting Presentation by Whit Gallman "Unisolable Steam Leak Downstream of Valve 2HM-23".
- CHUG Conference Meeting Minutes, FAC Experience Reports, and Presentations.
- FACnet Email Message Archive.
- Secondary Pipe Rupture (9 August 2004, Mihama Unit 3, Kansai EPC), WANO EAR TYO 04-013, October 8, 2004.
- Information Notice 82-2: Failures in Turbine Exhaust Lines", U.S. Nuclear Regulatory Commission (NRC), July 9, 1982.
- "Information Notice 86-106: Feedwater Line Break", U.S. Nuclear Regulatory Commission (NRC), December 16, 1986.
- "Information Notice 86-106, Supplement 1: Feedwater Line Break", U.S. Nuclear Regulatory Commission (NRC), February 13, 1987.
- "Information Notice 86-106, Supplement 2: Feedwater Line Break", U.S. Nuclear Regulatory Commission (NRC), March 18, 1987.
- "NRC Bulletin No. 87-01: Thinning of Pipe Walls in Nuclear Power Plants", U.S. Nuclear Regulatory Commission (NRC), July 9, 1987.
- "Information Notice 87-36, Significant Unexpected Erosion of Feedwater Lines", U.S. Nuclear Regulatory Commission (NRC), August 4, 1987.
- "Information Notice 88-17, Summary of Responses to NRC Bulletin 87-01, Thinning of Pipe Walls in Nuclear Power Plants", U.S. Nuclear Regulatory Commission (NRC), April 22, 1988.

- "Information Notice 86-106, Supplement 3: Feedwater Line Break", U.S. Nuclear Regulatory Commission (NRC), November 10, 1988.
- "Erosion/Corrosion-Induced Pipe Wall Thinning", Generic Letter 89-08, U.S. Nuclear Regulatory Commission (NRC), May 2, 1989.
- "Investigation into Flow-Accelerated Corrosion at Low Temperatures", Document 1015070, Electric Power Research Institute (EPRI), November 2007.
- "Flow-Accelerated Corrosion – The Entrance Effect", Document 1015072, Electric Power Research Institute (EPRI), November 2007.
- "Erosive Attack", Technical Update 1015071, Electric Power Research Institute (EPRI), November 2007.

| Item Number | System | Location/Area | Plant | Plant Type | Year | Notes |
|---|---|---|---|---|---|---|
| 1 | All | Downstream of Flow Orifices and Flow Meters | Many | BWR, PWR | | Failures reported in piping immediately downstream of orifices and flow meters. This is a generic issue applicable to all systems. |
| 2 | All | Downstream of Control Valves (level control valves) | Millstone 2&3, Surry | BWR, PWR | | Many plants reported instances of FAC degradation and some significant failures (Millstone 2&3, Surry). This is a generic issue applicable to all systems. |
| 3 | All | Downstream of Leaking Valves and Steam Traps | Many | All | | Leaking valves and steam traps may be found by plant thermal performance evaluation. Downstream piping may experience severe conditions and may have been excluded from FAC Program due to infrequent operation. This is a generic issue applicable to all systems. |
| 4 | All | Miscellaneous Drains to Common Headers into Condenser | Many | All | | Extensive industry exp in miscellaneous drain headers from steam drains to the condenser. In addition to FAC, these headers are susceptible to liquid impingement erosion and/or flashing/cavitation as explained in EPRI Erosive Attack Technical Update 1015071. |
| 5 | Condensate | Feedwater Pump Suction | Surry Unit 2 | PWR | 1986 | Pipe rupture at Surry Unit 2. Occurred in 18" OD, Tnom = 0.5" elbow upstream of feedwater pumps (first elbow off header to FWP). T=374 deg F. |
| 6 | Condensate | Condensate (between 4th highest pressure FWH and dearator) | Mihama | PWR | 2004 | Failure in condensate system at Mihama. Occurred in 22" pipe downstream of flow measuring orifice. 284 deg F |
| 7 | Extraction Steam (or Bleed Steam) | Extraction Steam (All stages carrying wet steam) | Oconee, Vermont Yankee, Trojan, Zion, Browns Ferry | BWR, PWR | 1982 | Failures in steam lines due to FAC. All extraction stages carrying wet steam are susceptible to FAC. In general, all plants have experience with thinning in the extraction steam system (plants listed appeared in NRC Information Notice 82-22) |
| 8 | Extraction Steam (or Bleed Steam) | HP Extraction 2nd Stage | ANO 2 | PWR | 1989 | Fishmouth failure at ANO 2. Occurred in 14" OD, 2-phase flow. Failure at Zion (1988), Oconee (1982). |
| 9 | Extraction Steam (or Bleed Steam) | HP Extraction | Sequoyah 2 | PWR | 1993 | Fishmouth failure at Sequoyah 2. Occurred in 10" straight pipe downstream of tee in HP extraction. |

| Item Number | System | Location/Area | Plant | Plant Type | Year | Notes |
|---|---|---|---|---|---|---|
| 10 | Extraction Steam (or Bleed Steam) | Extraction (4th Stage) | Fort Calhoun | PWR | 1997 | Fishmouth rupture at Fort Calhoun in third elbow (12" bent pipe R/D = 5) downstream of turbine in extraction steam system. Section of upstream piping had been replaced in 1985 due to FAC; this downstream section was not inspected. 411 deg F, 2 phase |
| 11 | Extraction Steam (or Bleed Steam) | Extraction (carbon steel components in Cr-Mo/Stainless/etc line) | LaSalle | BWR | 2004 | Failure of LP Heater inlet nozzles (carbon steel nozzles in Cr-Mo line). Also through-walls on carbon steel pup piece on bellows assembly in Cr-Mo line (bellows was stainless steel). The conclusion from these events is that to be non-susceptible to FAC the entire line (incl. nozzles, valves, pup pieces, etc.) must be of FAC-resistant material. |
| 12 | Feedwater | Feedwater Pump Outlet & DS of CVs | Oyster Creek | BWR | 1978 | Thinning caused by FAC at Oyster Creek in 1978. Cracking observed at feedwater pump outlet and downstream of flow/level control valves. |
| 13 | Feedwater | Feedwater Pump Discharge | Navajo | Fossil | 1982 | Pipe rupture at Navajo. Occurred in 10" OD, Tnom = 0.365" elbow downstream of boiler feed pump. T=360 deg F. |
| 14 | Feedwater | Final Feedwater (Safety-Related) | Trojan | PWR | 1987 | Extensive thinning to min acceptable wall thickness at Trojan in safety related feedwater (and non-safety related). High velocity and large counterbores exacerbated FAC. |
| 15 | Feedwater | Feedwater at Flow Measurement Orifice | Loviisa | PWR | 1990 | Rupture at Loviisa. Occurred in feedwater system at flow measurement orifice. |
| 16 | Feedwater | Feedwater | Pleasant Prairie | Fossil | 1995 | Instantaneous double-ended pipe break at Pleasant Prairie. Occurred in 12" feedwater line downstream of valve station and upstream of economizer and boiler. |
| 17 | Feedwater | Control Valve Bypass Lines | San Onofre and Diablo Canyon | BWR, PWR | | Serious thinning at San Onofre and Diablo Canyon (could be valve leakage, left open at full power-high velocity, or infrequent but severe conditions). |
| 18 | Feedwater | Feedwater Pump Min Flow (Recirculation) Lines | Many | All | | Feedwater pump min flow lines to condenser have experienced significant degradation. |
| 19 | Heater Drain | Heater Drain Pump Recirc (Bypass) | Millstone 2 | PWR | 1995 | Failure at Millstone 2. Occurred in 8" recirc line from heater drain pump to heater drain tank. Line operated during startup only (0-30% power). |

| Item Number | System | Location/Area | Plant | Plant Type | Year | Notes |
|---|---|---|---|---|---|---|
| 20 | Heater Vents | Feedwater Heater Vents to Condenser | ANO, Kewaunee, McGuire, Point Beach, Waterford | PWR, BWR | | Extensive FAC-induced thinning found throughout this system at many plants. Some plants have replaced the entire system with non-susceptible material (stainless steel or Cr-Mo). |
| 21 | Main Steam | Cross-Under Piping (also called Cold Reheat, HP Turbine to Moisture Separator) | North Anna, ANO, Point Beach, D.C. Cook | BWR, PWR | | Significant FAC in cross-under piping at North Anna, ANO, and Point Beach. Some plants have small amounts of Cu/Cr in this lines which significantly reduces FAC. |
| 22 | Moisture Separator Drain | Moisture Separator Drain Tank Drain | Millstone 3 | PWR | 1990 | Catastrophic failure at Millstone 3. Occurred in 6" OD Moisture Sep. Drain Tank drain immediately downstream of level CV. 380 deg F, 0% quality. |
| 23 | Reheater Drain | Reheater Drain Tank Drain | Millstone 2 | PWR | 1991 | Rupture at Millstone 2. Occurred in 8" Reheater Drain Tank drain immediately downstream of level CV. 463 deg F, 0% quality. |
| 24 | Reheater Drain | First Stage Reheater Drain | Callaway | PWR | 1999 | Failure at Callaway just downstream of long horizontal section in first stage reheater drain. 417 deg F, 4.5% quality |
| 25 | Reheater Drain | Moisture Separator Reheater Drain/Vent to Drain Tank (Scavenging Steam) | McGuire | PWR | 2005 | Unisolable steam leak occurred in 2" line that vents wet steam from MSR to drain tank. Flashing contributed to wear (pressure drop caused by "tortuous path" through many fittings in line). 540 deg F, wet steam |
| 26 | Multiple Systems | Deoxygenated lines operating at 120ºF | South Texas Project, Palo Verde, Surry | PWR, BWR | | Some plants have experienced Low-Temperature FAC wear in deoxygenated, neutral water at about 120ºF as per EPRI Technical Report 1015170 “Investigation into Flow-Accelerated Corrosion at Low Temperatures. |
| 27 | Multiple Systems | Multiple Locations | Diablo Canyon, Salem, V. C. Summer | PWR, BWR | | Pipes made of corrosive material have shown high corrosion rates downstream of welds connecting non-resistant material to the resistant material. |

# Attachment B
# Referenced Correspondence and Communication

## Email from Ryan Doremus (CSI) to Ian Mew (IPEC) regarding a Line Naming Convention, dated 7/27/2009.

Ian,

I'm close to the point where I will have to start assigning line names for categorization purposes. Since the P&IDs seem to be very good at giving line information (size, pipe class, etc.), I want to propose a simple naming convention that consists of Unit #, System Abbreviation, a sequential number, and if needed a sequential letter that would be used if susceptibility changes within a line.

U-SSS-000-A

U = Unit Number
SSS = System Abbreviation
000 = Sequential Number
A = Section of line that is split for susceptibility.

For example: 2-6EX-003 or 2-BFD-002-A

Let me know what you think.

Thank you,

**Ryan D. Doremus**
Engineer
CSI Technologies, Inc.
(847) 836-3000 x796
rdoremus@csitechnologies.com

## Email from Ian Mew (IPEC) to Ryan Doremus (CSI) regarding responses to information requests, dated 8/10/2009.

Ryan,
Answers to item 6, 9 & 10 will be sent shortly.

*Ian D. Mew*
IPEC FAC Engineer
Phone 914-827-7741

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**From:** Koutsakos, Michael
**Sent:** Monday, August 10, 2009 7:32 AM
**To:** Mew, Ian
**Cc:** Koutsakos, Michael
**Subject:** RE: IPEC Unit 2 SSE/SNM Information Request

1. Lines actually exist. They should be included in the Checworks model.
2. Under normal operation, all MS trap bypasses are normally closed, unless the trap has been identified as deficient.
3. Under normal operation, less than 2% of the time.
4. Under normal operation, less than 2% of the time.
5. Under normal operation, less than 2% of the time.
6. Talk to James Peters (Chemistry Supervisor)
7. Under normal operation, less than 2% of the time.
8. Under normal operation, less than 2% of the time.
9. Talk to James Peters (Chemistry Supervisor)
10. Talk to James Peters (Chemistry Supervisor)

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**From:** Mew, Ian
**Sent:** Thursday, August 06, 2009 9:56 AM
**To:** Koutsakos, Michael
**Subject:** FW: IPEC Unit 2 SSE/SNM Information Request

Can you answer Questions 1-10 or point me to a person who can.

*Ian D. Mew*
IPEC FAC Engineer
Phone 914-827-7741

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**From:** Ryan Doremus [mailto:RDoremus@csitechnologies.com]
**Sent:** Friday, July 24, 2009 4:29 PM
**To:** Mew, Ian
**Subject:** IPEC Unit 2 SSE/SNM Information Request

CSI Document No. 0700.104.C.004

Ian,

I completed a cursory review of the SSE/SNM IP2 and have a few pieces of information that would be helpful:

1. Do actual lines exist from the HP Turbine to the Moisture Preseparators or are the Preseparators connected directly to the turbine? If they exist, are they inspected visually or should they be included in the CHECWORKS model?
2. Is it safe to assume that all Main Steam steam trap bypass valves on 9321-F-2041 and 9321-F-2042 are normally closed despite the fact that some are shown open?
3. Does the Feedwater Heater Bypass line (A235307, G-5) operate more or less than 2% of the time?
4. Do the Boiler Feed Pump discharge lines to the Drains Collecting Tank (9321-F-2017, H-6) operate more or less than 2% of the time?
5. Does the 18" HP Feedwater Heater Bypass line (9321-F-2019, F-3) operate more or less than 2% of the time?
6. Do the lines from the Heater Drain Pump Discharge to the HDP Water Chemistry Monitor (9321-F-2022, A2) operate more or less than 2% of the time?
7. Do the level control lines from the Heater Drain Tank to the Condenser (A235304, A-1 C-1 F-1) operate more or less than 2% of the time?
8. Do the Moisture Separator drains to the Drains Collecting Tank (9321-F-2023, H4) operate more or less than 2% of the time?
9. Do the SG Blowdown lines to the sample coolers (9321-F-2729, D-6) operate more or less than 2% of the time?
10. What is the outlet temperature of the SG Blowdown sample coolers (9321-F-2729, E-6)?

Any information on these would be helpful. Feel free to forward these questions on to system engineers or to send me operating procedures that might answer the questions. To maintain the integrity of the project schedule, we will need these answers by Wednesday, August 5.

In addition to the above, please send the Aux. Steam operating procedures (SOP 29.1.1, 29.1.2, and 29.1.3) and the following drawings:

9321-F-2027
9321-F-2028
9321-F-2033
9321-F-2067
9321-F-2720
9321-F-2722
9321-F-2723
9321-F-2745
9321-F-7020
A205957
B237144
192491

If it's possible, I would like to have these drawings and the Aux. Steam OPs by next week, even if they come separately from the questions, to give me time to analyze them. If you have any questions, please feel free to contact me.

Thank you,

**Ryan D. Doremus**
Engineer
CSI Technologies, Inc.
(847) 836-3000 x796
rdoremus@csitechnologies.com

## Email from Ian Mew (IPEC) to Ryan Doremus (CSI) regarding responses to information requests, dated 8/13/2009.

See Answers below.

*Ian D. Mew*
IPEC FAC Engineer
Phone 914-827-7741

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**From:** Mew, Ian
**Sent:** Monday, August 10, 2009 7:49 AM
**To:** Peters, James G
**Subject:** FW: IPEC Unit 2 SSE/SNM Information Request

Jim,
Can you answer the following questions? I need the answer to develop a System Susceptibility Evaluation for the FAC program for IP2.

11. Do the lines from the Heater Drain Pump Discharge to the HDP Water Chemistry Monitor (9321-F-2022, A2) operate more or less than 2% of the time? Yes 1 month a year – all material is SS after the root isolation valve which is less than 1 foot long
12. Do the SG Blowdown lines to the sample coolers (9321-F-2729, D-6) operate more or less than 2% of the time? Sample lines are all SS from the blowdown lines thru the coolers
13. What is the outlet temperature of the SG Blowdown sample coolers (9321-F-2729, E-6)? - from CCW heat exchanger outlet temp is <140F

*Ian D. Mew*
IPEC FAC Engineer
Phone 914-827-7741

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**From:** Ryan Doremus [mailto:RDoremus@csitechnologies.com]
**Sent:** Friday, July 24, 2009 4:29 PM
**To:** Mew, Ian
**Subject:** IPEC Unit 2 SSE/SNM Information Request

CSI Document No. 0700.104.C.004

Ian,

I completed a cursory review of the SSE/SNM IP2 and have a few pieces of information that would be helpful:

14. Do actual lines exist from the HP Turbine to the Moisture Preseparators or are the Preseparators connected directly to the turbine? If they exist, are they inspected visually or should they be included in the CHECWORKS model?
15. Is it safe to assume that all Main Steam steam trap bypass valves on 9321-F-2041 and 9321-F-2042 are normally closed despite the fact that some are shown open?
16. Does the Feedwater Heater Bypass line (A235307, G-5) operate more or less than 2% of the time?
17. Do the Boiler Feed Pump discharge lines to the Drains Collecting Tank (9321-F-2017, H-6) operate more or less than 2% of the time?

18. Does the 18" HP Feedwater Heater Bypass line (9321-F-2019, F-3) operate more or less than 2% of the time?
19. Do the lines from the Heater Drain Pump Discharge to the HDP Water Chemistry Monitor (9321-F-2022, A2) operate more or less than 2% of the time?
20. Do the level control lines from the Heater Drain Tank to the Condenser (A235304, A-1 C-1 F-1) operate more or less than 2% of the time?
21. Do the Moisture Separator drains to the Drains Collecting Tank (9321-F-2023, H4) operate more or less than 2% of the time?
22. Do the SG Blowdown lines to the sample coolers (9321-F-2729, D-6) operate more or less than 2% of the time?
23. What is the outlet temperature of the SG Blowdown sample coolers (9321-F-2729, E-6)?

Any information on these would be helpful. Feel free to forward these questions on to system engineers or to send me operating procedures that might answer the questions. To maintain the integrity of the project schedule, we will need these answers by Wednesday, August 5.

In addition to the above, please send the Aux. Steam operating procedures (SOP 29.1.1, 29.1.2, and 29.1.3) and the following drawings:

9321-F-2027
9321-F-2028
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9321-F-2067
9321-F-2720
9321-F-2722
9321-F-2723
9321-F-2745
9321-F-7020
A205957
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192491

If it's possible, I would like to have these drawings and the Aux. Steam OPs by next week, even if they come separately from the questions, to give me time to analyze them. If you have any questions, please feel free to contact me.

Thank you,

**Ryan D. Doremus**
Engineer
CSI Technologies, Inc.
(847) 836-3000 x796
rdoremus@csitechnologies.com

## Email from Brian Trudeau (CSI) to Ian Mew (IPEC) regarding report comments, dated 11/23/2009.

CSI Doc. No. 0700.104.C.019

Ian,

This email captures our discussion today concerning your comments on the Unit 2 SSE & SNM. I understand that these two items are the extent of your comments. We will give you a call to go over these and inform you how we have incorporated them prior to sending the final version of the SSE & SNM on or before Dec 4.

1) Ian sent new data to CSI's Ryan Doremus on historical inspections and replacements that he would like incorporated. This may impact plant experience for SNM lines and susceptibility if the entire line has been replaced with FAC resistant material. CSI will assess this data, make the appropriate changes, and provide Ian with a list of impacted lines.
2) Ian requested that CSI provide comments on why SNM lines were evaluated for high consequence of failure. A reason code is given, such as plant shutdown (FT) or unable to isolate (FI), but Ian would like further comments/discussion of this reason. For example, Ian would like to know <u>why</u> a line would cause the plant to shutdown if it fails. For large bore SNM lines, CSI will add the note "This large bore line is important to plant operation and/or may be a personnel safety issue upon failure."

CSI will apply comment 2, above to applicable lines in the Unit 3 SNM.

Thanks,

Brian Trudeau
CSI Technologies, Inc.
(847) 836-3000 ext. 717