2.9.3 Gaseous Waste Processing System

1.0 Description

The gaseous waste processing system (GWPS) is a non-safety system that utilizes delay beds containing activated carbon to reduce the activity of the waste gas before release to the Nuclear Auxiliary Building for additional processing and release through the vent stack. A high-radiation signal from the activity monitor downstream of the delay beds activates an alarm in the main control room (MCR) and terminates gaseous waste releases.

The only safety-related function of the GWPS is containment isolation.

2.0 Arrangement

2.1 The functional arrangement of the GWPS is as shown on Figure 2.9.3-1—Gaseous Waste Processing System Functional Arrangement.

2.2 The location of the GWPS equipment is as listed in Table 2.9.3-1— GWPS Equipment Mechanical Design.

3.0 Mechanical Design Features

3.1 Components identified as Seismic Category I in Table 2.9.3-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.9.3-1.

3.2 GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 is designed in accordance with ASME Code Section III requirements.

3.3 GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 is installed in accordance with an ASME Code Section III Design Report.

3.4 Pressure boundary welds in GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 are in accordance with ASME Code Section III.

3.5 GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 retains pressure boundary integrity at design pressure.

3.6 GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 is installed and inspected in accordance with ASME Code Section III requirements.

3.7 Components listed in Table 2.9.3-1 as ASME Code Section III are designed in accordance with ASME Code Section III requirements.

3.8 Components listed in Table 2.9.3-1 as ASME Code Section III are fabricated in accordance with ASME Code Section III requirements.

3.9 Pressure boundary welds on components listed in Table 2.9.3-1 as ASME Code Section III are in accordance with ASME Code Section III requirements.

3.10 Components listed in Table 2.9.3-1 as ASME Code Section III retain pressure boundary integrity at design pressure.

3.11 Components listed in Table 2.9.3-1 as ASME Code Section III are installed in accordance with ASME Code Section III requirements.

3.12 Valves listed in Table 2.9.3-1 will be functionally designed and qualified such that each valve is capable of performing its intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under conditions ranging from normal operating to design-basis accident conditions.

4.0 Instrumentation and Controls (I&C) Design Features, Displays, and Controls

4.1 Displays listed in Table 2.9.3-2—GWPS Equipment I&C and Electrical Design are retrievable in the main control room (MCR) as listed in Table 2.9.3-2.

4.2 The GWPS equipment controls are provided in the MCR as listed in Table 2.9.3-2.

5.0 Electrical Power Design Features

5.1 The components designated as Class 1E in Table 2.9.3-2 are powered from the Class 1E division as listed in Table 2.9.3-2 in a normal or alternate feed condition.

6.0 Environmental Qualifications

6.1 Components in Table 2.9.3-2, that are designated as harsh environment, will perform the function listed in Table 2.9.3-1 in the environments that exist during and following design basis events.

7.0 Equipment and System Performance

7.1 The GWPS processing equipment contains delay beds filled with the proper types and amounts of activated charcoal.

7.2 The GWPS discharge valve closes upon receipt of a high-radiation signal from the activity monitor downstream of the delay beds.

7.3 Containment isolation valves listed in Table 2.9.3-1 close within the containment isolation response time following initiation of a containment isolation signal.

8.0 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.9.3-3 lists the gaseous waste processing system ITAAC.

Table 2.9.3-1—GWPS Equipment Mechanical Design

Description	Tag Number(1)	Location	ASME Code Section III	Function	Seismic Category I
GWPS delay beds	30KPL50AT001 30KPL50AT002 30KPL50AT003	Nuclear Auxiliary Building	No	Delay radioactive gas release to atmosphere	No
Discharge valve	30KPL83AA005	Downstream of GWPS delay beds	No	Close	No
GWPS containment isolation valves	30KPL84AA003 30KPL85AA003	Reactor Building	Yes	Close (containment isolation)	I
GWPS containment isolation valves	30KPL84AA002 30KPL85AA004	Fuel Building	Yes	Close (containment isolation)	I

1) Equipment tag numbers are provided for information only and are not part of the certified design.

Table 2.9.3-2—GWPS Equipment I&C and Electrical Design

Description	Tag Number(1)	Location	IEEE Class 1E(2)	EQ – Harsh Env.	PACS	MCR Displays	MCR Controls
GWPS containment isolation valve	30KPL84AA003	Reactor Building	1^{N} 2^{A}	Yes	No	Position	Open-Close
GWPS containment isolation valve	30KPL85AA003	Reactor Building	1^{N} 2^{A}	Yes	No	Position	Open-Close
GWPS containment isolation valve	30KPL84AA002	Fuel Building	4^{N} 3^{A}	No	No	Position	Open-Close
GWPS containment isolation valve	30KPL85AA004	Fuel Building	4^{N} 3^{A}	No	No	Position	Open-Close
Discharge valve	30KPL83AA005	Downstream of GWPS delay beds	No	No	No	Position	Open-Close
Radiation monitor	30KPL83CR001	Downstream of GWPS delay beds	No	No	No	Radiation activity level	N/A

1) Equipment tag numbers are provided for information only and are not part of the certified design.

2) ^{N} denotes the division the component is normally powered from. ^{A} denotes the division the component is powered from when alternate feed is implemented.

Table 2.9.3-3—Gaseous Waste Processing System ITAAC
(6 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the GWPS is as shown on Figure 2.9.3-1.	Inspections of the as-built GWPS will be performed.	The as-built GWPS conforms with the functional arrangement as shown on Figure 2.9.3-1.
2.2	The location of the GWPS equipment is as listed in Table 2.9.3-1.	Inspections will be performed to verify equipment locations.	The equipment listed in Table 2.9.3-1 is located as listed in Table 2.9.3-1.
3.1	Components identified as Seismic Category I in Table 2.9.3-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.9.3-1.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the components identified as Seismic Category I in Table 2.9.3-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. Inspections will be performed of the Seismic Category I components identified in Table 2.9.3-1 to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).	a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category I components identified in Table 2.9.3-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.9.3-1 including the time required to perform the listed function. b. Inspection reports exist and conclude that the Seismic Category I components identified in Table 2.9.3-1, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).
3.2	GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 is designed in accordance with ASME Code Section III requirements.	Inspections of the ASME Code Section III Design Reports (NCA-3550) and associated reference documents will be performed.	ASME Code Section III Design Reports (NCA-3550) exist and conclude that GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 complies with ASME Code Section III requirements.

Table 2.9.3-3—Gaseous Waste Processing System ITAAC
(6 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.3	GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 is installed in accordance with an ASME Code Section III Design Report.	Analyses to reconcile as-built deviations to the ASME Code Design Reports (NCA-3550) will be performed.	For GWPS piping shown as ASME Code Section III on Figure 2.9.3-1, ASME Code Data Reports (N-5) exist and conclude that design reconciliation (NCA-3554) has been completed in accordance with the ASME Code Section III for the as-built system. The report(s) document the as-built condition.
3.4	Pressure boundary welds in GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 are in accordance with ASME Code Section III.	Inspections of pressure boundary welds verify that welding is performed in accordance with ASME Code Section III requirements.	ASME Code Section III Data Reports exist and conclude that pressure boundary welding for GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 has been performed in accordance with ASME Code Section III.
3.5	GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 retain pressure boundary integrity at design pressure.	Hydrostatic tests will be performed on the as-built system.	For GWPS piping shown as ASME Code Section III on Figure 2.9.3-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
3.6	GWPS piping shown as ASME Code Section III on Figure 2.9.3-1 is installed and inspected in accordance with ASME Code Section III requirements.	An inspection of the as-built piping will be performed.	For GWPS piping shown as ASME Code Section III on Figure 2.9.3-1, N–5 Data Reports exist and conclude that installation and inspection are in accordance with ASME Code Section III requirements.
3.7	Components listed in Table 2.9.3-1 as ASME Code Section III are designed in accordance with ASME Code Section III requirements.	Inspections of ASME Code Section III Design Reports and associated reference documents will be performed.	ASME Code Section III Design Reports (NCA-3550) exist and conclude that components listed as ASME Code Section III in Table 2.9.3-1 comply with ASME Code Section III requirements.

Table 2.9.3-3—Gaseous Waste Processing System ITAAC
(6 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.8	Components listed in Table 2.9.3-1 as ASME Code Section III are fabricated in accordance with ASME Code Section III requirements.	An analysis will be performed to verify that deviations to the component design reports (NCA-3550) have been reconciled.	ASME Code Section III Design Reports (NCA-3550) exist and conclude that components listed as ASME Code Section III in Table 2.9.3-1 comply with ASME Code Section III requirements and any deviations to the design report have been reconciled.
3.9	Pressure boundary welds on components listed in Table 2.9.3-1 as ASME Code Section III are in accordance with ASME Code Section III requirements.	Inspections of pressure boundary welds will be performed to verify that welding is performed in accordance with ASME Code Section III requirements.	For components listed as ASME Code Section III in Table 2.9.3-1, ASME Code Section III Data Reports (NCA-8000) exist and conclude that pressure boundary welding has been performed in accordance with ASME Code Section III.

Table 2.9.3-3—Gaseous Waste Processing System ITAAC
(6 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.10	Components listed in Table 2.9.3-1 as ASME Code Section III retain pressure boundary integrity at design pressure.	Hydrostatic tests will be performed on the components.	For components listed as ASME Code Section III in Table 2.9.3-1, ASME Code Section III Data Reports exist and conclude that hydrostatic test results comply with ASME Code Section III requirements.
3.11	Components listed in Table 2.9.3-1 as ASME Code Section III are installed in accordance with ASME Code Section III requirements.	An inspection of ASME Code Data Reports will be performed.	ASME Code Section III N-5 Data Reports exist and conclude that components listed as ASME Code Section III in Table 2.9.3-1 have been installed in accordance with ASME Code Section III requirements.
3.12	Valves listed in Table 2.9.3-1 will be functionally designed and qualified such that each valve is capable of performing its intended function for a full range of system differential pressure and flow, ambient temperatures, and available voltage (as applicable) under conditions ranging from normal operating to design-basis accident conditions.	Tests or type tests of the valves listed in Table 2.9.3-1 will be conducted to demonstrate that the pumps and valves function under conditions ranging from normal operating to design-basis accident conditions.	A test report exists and concludes that the valves listed in Table 2.9.3-1 function under conditions ranging from normal operating to design-basis accident conditions.
4.1	Displays listed in Table 2.9.3-2 are retrievable in the MCR as listed in Table 2.9.3-2.	Tests will be performed for the retrieveability of the displays in the MCR as listed in Table 2.9.3-2.	The displays listed in Table 2.9.3-2 as being retrieved in the MCR can be retrieved in the MCR.
4.2	The GWPS equipment controls are provided in the MCR as listed in Table 2.9.3-2.	Tests will be performed for the existence of control signals from the MCR to the equipment listed in Table 2.9.3-2.	The controls listed in Table 2.9.3-2 as being in the MCR exist in the MCR.

Table 2.9.3-3—Gaseous Waste Processing System ITAAC
(6 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
5.1	The components designated as Class 1E in Table 2.9.3-2 are powered from the Class 1E division as listed in Table 2.9.3-2 in a normal or alternate feed condition.	a. Testing will be performed for components designated as Class 1E in Table 2.9.3-2 by providing a test signal in each normally aligned division. b. Testing will be performed for components designated as Class 1E in Table 2.9.3-2 by providing a test signal in each division with the alternate feed aligned to the divisional pair.	a. The test signal provided in the normally aligned division is present at the respective Class 1E component identified in Table 2.9.3-2. b. The test signal provided in each division with the alternate feed aligned to the divisional pair is present at the respective Class 1E component identified in Table 2.9.3-2.
6.1	Components in Table 2.9.3-2, that are designated as harsh environment, will perform the function listed in Table 2.9.3-1 in the environments that exist during and following design basis events.	a. Type tests or type tests and analysis will be performed to demonstrate the ability of the components listed as harsh environment in Table 2.9.3-2 to perform the function listed in Table 2.9.3-1 for the environmental conditions that could occur during and following design basis events. b. Components listed as harsh environment in Table 2.9.3-2 will be inspected to verify installation in accordance with the construction drawings including the associated wiring, cables and terminations. Deviations to the construction drawings will be reconciled to the EQDP.	a. Environmental Qualification Data Packages (EQDP) exist and conclude that the components listed as harsh environment in Table 2.9.3-2 can perform the function listed in Table 2.9.3-1 during and following design basis events including the time required to perform the listed function. b. Inspection reports exists and conclude that the components listed in Table 2.9.3-2 as harsh environment has been installed per the construction drawings and any deviations have been reconciled to the EQDP.

Table 2.9.3-3—Gaseous Waste Processing System ITAAC
(6 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
7.1	The GWPS processing equipment contains delay beds filled with the proper types and amounts of activated charcoal.	Inspections will be performed to verify the mass of activated charcoal loaded in each delay bed (tag numbers 30KPL50AT001, 30KPL50AT002, and 30KPL50AT003.)	Each delay bed (tag numbers 30KPL50AT001, 30KPL50AT002, and 30KPL50AT003) contains a minimum of 5,440 lb_m of activated charcoal.
7.2	The GWPS discharge valve closes upon receipt of a high-radiation signal from the activity monitor downstream of the delay beds.	Tests of the discharge valve closure will be performed by verifying radiation monitor operation and simulating a high-radiation signal at the activity monitor (tag number KPL83CR001) downstream of the delay beds.	Discharge valve (tag number 30KPL83AA005) closes upon receipt of a high-radiation signal from the activity monitor (tag number KPL83CR001) downstream of the delay beds.
7.3	Containment isolation valves listed in Table 2.9.3-1 close within the containment isolation response time following initiation of a containment isolation signal.	Tests will be performed to demonstrate the ability of the containment isolation valves listed in Table 2.9.3-1 to close within the containment isolation response time following initiation of a containment isolation signal.	Containment isolation valves listed in Table 2.9.3-1 close within 60 seconds following initiation of a containment isolation signal.

Next File