 TORUS	· Owner DESIGN REVIEW RECORD			Document No.	GEN-RPT-002	
				Revision / Date	A · September 29, 2026	
				Issue purpose	Issued for Review	
GENERAL · DESIGN REVIEW RECORD						
Rev.	Date	Revision description	Prepared	Reviewed	Approved	
A	2026-09-29	Issued for Review				

Notes

1. This record lists the design decisions TORUS made when the discipline designs were reconciled for Revision A, with the reason for each. Every decision is incorporated in the Basis of Design GEN-DB-001 and in the documents listed.
2. “Raised by” names the discipline whose calculation or review prompted the decision.

Table 1: Layout

Item	Decision and reason	Raised by	Documents
DR-01	The mechanical plot plan governs equipment positions, footprints, pipe routes and the internal roads. One layout is needed so that civil, electrical, area classification and cathodic protection all work from the same positions.	Mechanical	MEC-DWG-001, CIV-DWG-002, ELE-DWG-002
DR-02	T-101 stays at its original position, served by a truck stand and the pig handling lane. The internal road was arranged around it rather than moving the tank.	Mechanical, Civil	MEC-DWG-001, STR-DWG-001
DR-03	SDV-101 and V-101 move east, with the V-101 inlet at the east end, to make room for the pig receiver’s barred tee and the filter separator bypass.	Mechanical	MEC-DWG-001
DR-04	The outlet riser moves to X 220 so that all above-grade process piping stays south of the north road, and the road crosses only buried pipe. The buried outlet lateral becomes about 96 ft long.	Mechanical	PIP-DWG-004
DR-05	The line heater keeps its position. Its burner end is 46 to 48 ft from the outlet valves, but valves are not fired, storage or occupied equipment, and every spacing criterion in the basis is met.	Instrumentation	SAF-RPT-004
DR-06	The vent stack drain line to T-101 is deleted, because it cannot drain by gravity. The stack base has a plugged drain valve and a portable collection pan.	Mechanical, P&ID	PRO-DWG-109
DR-07	The antenna mast is a 50 ft breakpoint monopole at (150, 22), with a fall radius of 20 ft or less. Its first position, 6 ft from the control building, was inside its own fall zone.	Mechanical	MEC-DWG-001

Table 2: Equipment

Item	Decision and reason	Raised by	Documents
DR-10	V-101 grows to 42 in ID, with an NPS 24 two-compartment liquid barrel. At 36 in the vane section loading exceeded the high-capacity limit.	Process	PRO-CAL-005, MEC-DS-001
DR-11	The line heater firebox is 6.0 MMBtu/h with a three-path NPS 6 coil. The winter duty is 3.96 MMBtu/h absorbed, and a single coil path exceeded the erosional velocity. The coil nozzles are Class 900, because Class 600 is rated below 1,440 psig at the 250 °F coil design temperature.	Process, Mechanical	PRO-CAL-004, MEC-DS-003
DR-12	An electric fuel gas preheater, E-161 (5 kW), is added upstream of the first-cut regulator, set at 105 °F. Without it the regulator would chill the fuel gas to about -32 °F, below the metal temperature limit.	P&ID, Process	PRO-CAL-010
DR-13	T-101 gets a 16 in emergency vent, and a 7/16 in restriction orifice RO-104 limits gas blow-by from the liquid dump. The pressure-vacuum valve alone cannot pass the fire or blow-by cases.	Process, Instrumentation	PRO-CAL-007
DR-14	The vent stack stays NPS 8 x 25 ft, with helical strakes on the top 8 ft to suppress vortex shedding. Sections are blown down one at a time; simultaneous blowdown would need a 43 ft stack.	Process, Civil	PRO-CAL-008
DR-15	The outlet check valve is an axial nozzle type. A swing check would hang partly open at normal flow.	Mechanical	MEC-DS-007
DR-16	The pig receiver kicker is a reducing tee with guide bars, and its barrel vent gets a 3/16 in restriction orifice.	Mechanical, Process	MEC-CAL-007
DR-17	The control valve branches are NPS 12 with reducers at the NPS 8 valves, because NPS 8 outlet piping exceeded the erosional velocity. The valves take three-stage low-noise trim and acoustic insulation (predicted 86 dBA).	Process	PRO-CAL-006
DR-18	The composite sampler uses a 500 cm³ constant-pressure cylinder.	Measurement	MEA-CAL-004
DR-19	A 50 ft antenna mast and a demarcation panel for the receiving pipeline operator at the north fence are added.	Instrumentation	INS-RPT-002

Table 3: Piping and Materials

Item	Decision and reason	Raised by	Documents
DR-20	The vent and blowdown system is Class 150 stainless steel (new piping class S1), rated to -150 °F. Gas downstream of the blowdown orifices reaches -65 °F in normal blowdown and about -120 °F after a heater outage.	Process	PIP-SPC-001
DR-21	Fuel line 1051 grows to NPS 2, the liquid line downstream of LCV-104 to NPS 3, and two blowdown outlets to NPS 4, each for velocity or flashing flow. A new NPS 2 outlet serves PSV-161.	Process	PRO-CAL-002
DR-22	The buried outlet lateral is 0.500 in wall to carry the road crossing load.	Mechanical	MEC-CAL-001
DR-23	Class 600 piping is rated 1,440 psig up to 133 °F and 1,420 psig at 150 °F, per ASME B16.5.	Mechanical	MEC-CAL-006
DR-24	Forgings and valve bodies are impact tested at -20 °F. Class 150 flanges use graphite gaskets. Manual ball valves NPS 2 and larger have gear operators.	Mechanical	PIP-SPC-001
DR-25	The liquid drain piping is Class 150 (285 psig). With the blow-by orifice and shutoff valve installed, it cannot be overpressured.	Mechanical, Process	PIP-SPC-001



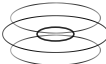
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Item	Decision and reason		Raised by		Documents	
DR-26	Hydrotest is 2,160 psig minimum at each section's high point, and must not exceed the 2,220 psig Class 600 flange test limit at the low point.		Mechanical, Specifications		MEC-CAL-003, SPC-SPC-011	

Table 4: Control and Safety

Item	Decision and reason	Raised by	Documents
DR-30	The 49 CFR 192.201 accumulation limit for the assumed trunkline is 1,290 psig, because the 75 % SMYS pressure governs over MAOP plus 10 %. The overpressure trip moves from 1,250 to 1,225 psig: with the station flow calculated at the real gas density, a 1,250 psig trip leaves 5.8 s, less than the 6.0 s response of the safety function. At 1,225 psig the process safety time is 8.9 s, and the trip is 45 psi above the highest override setting.	Process, Instrumentation	PRO-CAL-009, SAF-CAL-001
DR-31	SDV-102 strokes fully in 4 s or less, which holds the peak to about 1,260 psig with both control valves failed open. A 1,250 psig trip with a 3 s stroke was rejected: it left 13 psi of margin and a surge risk from the fast closure.	Process	PRO-CAL-009, INS-DS-006
DR-32	The overpressure trip is SIL 2. It reaches SIL 2 only with quarterly partial-stroke testing of SDV-102. It also closes SDV-103.	Instrumentation	SAF-CAL-001
DR-33	An independent shutoff SDV-106 is added on the V-101 liquid line, because the dump valve cannot also be its own protection against gas blow-by.	Process, Instrumentation	PRO-CAL-005
DR-34	The burner management system uses two diverse flame detectors (needed for SIL 2), a heater-area fire detector, and a high-high gas outlet temperature trip at 140 °F.	Instrumentation, Process	SAF-CAL-001
DR-35	The heater outlet setpoint rises with pressure, from 43.5 °F to 51.1 °F. A fixed 40 °F setpoint would not keep a 10 °F margin above the hydrate temperature at high outlet pressure.	Process	PRO-CAL-003
DR-44	After a heater-out upset, the outlet section is not blown down until its pipe skin is at or above 40 °F, because blowdown would chill the wall to -21 °F. A note is added at BDV-183.	Process	PRO-CAL-008, PRO-DWG-108
DR-36	The standby meter run is kept with its outlet valve open, because a run blocked in at both ends reaches 1,570 psig in sun.	Process	PRO-CAL-007
DR-37	Equalizing bypasses (NPS 1 forged globes) are added around the three shutdown valves. A sample line shutoff with a restriction orifice, and a relief valve at the sample probe regulator, protect the analyzer shelter.	Instrumentation, Interdiscipline check	PRO-CAL-007, INS-LST-001
DR-38	PSV-161 is set at 250 psig.	Process	PRO-CAL-007
DR-39	The meter run pressure transmitters measure absolute pressure.	Measurement	MEA-DS-008

Table 5: Measurement

Item	Decision and reason	Raised by	Documents
DR-40	The uncertainty targets apply from 20 to 120 MMSCFD. Below 20 MMSCFD the expected uncertainty is 0.53 % on volume and 0.62 % on energy.	Measurement	MEA-CAL-002
DR-41	Series verification is run at normal flow or less, because it adds about 4 psi of pressure drop at full flow.	Measurement	MEA-PRC-001
DR-42	Sample tubing, heated regulators and heat tracing are measurement scope, on two heat tracing circuits.	Measurement	MEA-CAL-004
DR-43	The meter tube geometry follows the meter run drawing: flow conditioner at 5 pipe diameters from the tube inlet, meter at 10.1 diameters.	Measurement	MEA-DWG-001

Table 6: Regulatory and Construction

Item	Decision and reason	Raised by	Documents
DR-50	T-101 is limited to 350 bbl/yr of liquids by an enforceable limit (4.9 tpy VOC). With the flash factor of 1,000 scf/bbl from PRO-CAL-007, the tank reaches the 6 tpy threshold of Subpart OOOOb at about 435 bbl/yr, above the expected 52 to 260 bbl/yr. Tank vapor control remains a bid alternate. PVRV-193 and FA-193 are NPS 6, and line 1060 downstream of LCV-104 is NPS 4.	Regulatory, Process	REG-CAL-001, PRO-CAL-007
DR-51	The emissions inventory is based on the 6.0 MMBtu/h heater, the analyzer vents and the calculated blowdown volumes.	Regulatory	REG-CAL-001
DR-52	Construction stormwater coverage will come from EPA Region 6 or the DEQ, depending on the facility's jurisdiction (HOLD H-17). The pollution prevention plan satisfies both.	Regulatory	CIV-RPT-002
DR-53	The station is designed to transmission requirements whatever its final classification (HOLD H-18).	Regulatory	REG-RPT-001
DR-54	Gas-in follows a nitrogen purge and nitrogen pre-pressurization, because throttled winter gas would reach -52 °F.	Specifications	SPC-SPC-018
DR-55	The deep anode well may need Water Resources Board registration (HOLD H-19).	Electrical	CP-CAL-001
DR-56	A 1.5 kVA, 8-hour 120 VAC UPS is added for the liquid dump valve and other critical AC loads. The generator stays 60 kW.	Electrical	ELE-CAL-003
DR-57	The analyzer shelter has two 250 cfm fans, duty and standby, for at least 12 air changes per hour.	Interdiscipline check	SAF-RPT-003

