As with any vacuum sanitary system, it was dependent on all of the flush valves being airtight. The crew usually had to be trained not to put any paper towels or other non-biological waste product into the toilets.

The remainder of the Hamworthy unit consisted of a series of treatment tanks. Sewage flows over various internal weirs. Air was also pumped into the unit through diffusers to assist in the bacterial breakdown of the sewage.

In the final stage of the treatment system, the sewage was treated with chlorine before being pumped overboard.

The Hamworthy sewage treatment plant was in poor condition. The main issue with the system was the corrosion on the sewage tank structure. This should be replaced during the next rig upgrade period.

One of the overboard discharge pumps had been removed, and both air compressors had been taken off of the plant. Regulated rig air was used to supply air to the tank diffuser system.

During interviews with the rig crew, we were informed that they were requesting that the Hamworthy treatment plant be removed and that an Evac vacuum system be installed in its place. This would provide the vacuum generating part of the system, as well as a holding tank. An additional treatment unit was also required, and this could be supplied by Evac or, as the crew requested, an Omni-Pure book cell unit could be installed to treat the sewage.

NPT records were checked for this equipment, and no significant NPT was recorded last year. Scheduled PM was being carried out on this equipment. We interviewed the crew, and they had major issues with this equipment as mentioned in the above.

At the time of this survey, the sewage treatment plant was in fair condition.

Recommendation:

- At the next shipyard upgrade period, the Hamworthy sewage treatment plant should be removed and an Evac system be installed, as well as an Omni-pure unit added to treat the sewage.

LHTG LTE **Hazardous Area Electrical Equipment**

A visual inspection of the hazardous areas of the rig was carried out. Due to ongoing operation, we focused on the shakers, mud processing area, pit room and drill floor. It was noted that additional third-party mud processing equipment had been added to the main deck/moonpool area.

None of the EX electrical equipment had been tagged with an ID number, and there was no HAER on this rig.

The shaker motor starters were found to be extremely dirty and covered in mud. Several were missing certification labels.

Several of the agitators in this area had severely corroded frames, and the nameplates were not legible. These required cleaning and painting. If the nameplates could not be cleaned to the point of being legible, the motor required replacing.

During this assessment, we tested the differential pressure alarms for the hazardous areas, which included the mud pit room and shaker room, as well as the lower mud process area.

Third-party equipment installed in the moonpool area was also inspected and was in poor condition.

There were no ABS-approved hazardous area drawings on the rig at the time of this assessment.

This equipment was in bad condition.

Recommendations:

- Request a third-party company to perform a hazardous area equipment inventory, label the equipment and compile an HAER spreadsheet. A survey can then be carried out to establish the true condition of all of the electrical equipment installed in the hazardous areas on the rig.
- Third-party equipment must meet Transocean standards as well.
- There were no ABS-approved hazardous area drawings posted on the rig.

HVAC **HVAC Systems**

With the electrical technician, we visually inspected the HVAC systems on the vessel. Each space with major equipment, including the switchroom, had chiller units and a dedicated air handling unit installed. We also visually inspected the units for the main accommodation, and all of the system appeared to be working satisfactorily, with controls and readouts indicating that temperatures appeared to be in good working order for each system. There was no corrosion on any of the piping that we inspected, including the air handling units. We observed that the condenser unit for the bridge, which was not working at the time of this assessment, was also severely corroded.

It was reported that several tubes in the cooling system were plugged and that the rig was waiting on a third-party company to come to the rig to address the issue.

We were also informed that the A/C unit for switchroom No. 5 was waiting for a new expansion joint.

In the port third deck AHC room, we noted that the ducting was corroded. This should be repaired or replaced.

The various workshops, office and switchboard rooms at the stern superstructure areas were fed from numerous AHUs supplied from reciprocating refrigeration compressors. The refrigeration plants were inspected, and no abnormal vibration or unusual noises were apparent at this time. Instrumentation and controls were intact, parameters were as normal and the spaces were adequately cooled.

RST PIPE **Vent Lines and Checks**

Upon inspection of the vents and checks, they were in good condition; however, it was noted that one vent for the sludge oil tank did not have a containment area around the vent. Oil was accumulating around the top part of the vent and, therefore, starting to drip off of the vent. The vent was located on the port forward side of the rig and on the outside of the handrail.

The fuel vents were installed with containment areas around them, and all were in good condition. In review of the history on the vents and checks, it was noted that the PMs were performed on regular bases.

The vents and checks were in good condition.

Recommendation:

- Install a containment area around the sludge tank vent (located on the port forward side of the rig) as needed.

WTD WTDR **Manual Watertight Doors/Hatches**

The manual watertight doors were in good condition and operated well. The gaskets were in good condition, and the dogs (locks) were in good order and adjusted as needed. In review of the history, the PMs were showing to be completed on regular bases and up to date.

The manual watertight hatches were in fair condition. The main hatch for the welding area needed the gasket replaced due to age. The gasket was hard, and this would not let the gasket seal correctly when closed. The hand winch for raising the hatch cover was in bad condition. The safety cover that goes over the teeth of the winch was missing, and the teeth on the gears were severely worn. The teeth on the winch for the sack room hatch cover were worn to the point of needing to be replaced as well.

The watertight hatch covers for the vents on the port and starboard side of the rig located behind the cranes were in bad condition. The gaskets were dry and cracked due to age. The hatch covers were corroded and would not let the hatch cover seal when closed.

The manual watertight doors and hatches were in fair condition.

Recommendations:

- Replace the gaskets as needed on the hatches.
- Repair or replace the hand-operated winches for the hatches as needed.
- Repair or replace the hatch covers on the vents located on the starboard and port sides of the rig.

RST STRU **Drill Floor**

The drill floor was visually inspected. The structure was in good condition. The area was free from any major damage, and no structural defects were noted. The work areas were fitted with studded non-slip matting, and this was in good condition. The area was kept clean during the course of the survey, and the housekeeping was good.

WTD WTDR **Hydraulically Operated Watertight Doors & Hatches**

The hydraulic watertight doors were in fair condition. The rig had two of the hydraulic doors not working correctly at the time of this assessment. The doors had to be manually opened with the hand pump. One of the doors was located on the 28½ and a half meter deck level and one located on the 24 meter deck level on the starboard side of the rig in the column. In review of the history, it was noted that the crew had been working on some of the doors and repairing the tracks for the doors as needed. It was also noted that the PMs for the doors were being completed on regular bases and that they were up to date in the system.

During interviews with the crew members, no major problems with the doors were noted. During the assessment, it was noted that three of the hydraulic doors in the port aft column were in need of being adjusted due to the doors dragging on the track at the bottom.

The hydraulic doors and hatches were in fair condition.

Recommendations:

- Adjust the hydraulic doors in the port aft column as needed.
- Repair or replace the hydraulic cylinders for the two doors that were being opened manually. Repair the doors as needed.

FDS ALRM **Fire Detection System**

The Kongsberg/Autronica combination fire and gas detection system was visually inspected with the electronics department. It was divided into three separate marshalling cubicles, with one located aft and two forward. All of the cubicles were inspected and found in good condition. A status check via the VMS system found no detectors inhibited or any in alarm.

We conducted a spot check of the detectors, heat, smoke and manual call stations. All were found to be secure and well labeled, with no visible signs of damage. The system was backed up by a UPS, which we tested and found to be satisfactory.

A review of maintenance history showed records being up to date and good comments being made in the work order notes.

The equipment was in good condition.

FFS **Fixed Fire Suppression System**

The fixed fire suppression systems were in good condition. The CO2 systems throughout the rig were clean. At the time of assessment, Total Safety was on the rig conducting the annual third-party testing and recertification of the systems. The piping and alarm systems for the units were in good condition and were being tested by Total Safety during the assessment. However, we did note that the piping for the CO2 in the emergency generator room was painted white. The regulations state that the fire fighting lines are to be painted red.

The CO2 systems located on the deck next to both cranes were in good condition. However, minor corrosion was starting to show on the top of the bottles and on the rack in which the

At the time of the inspection, the riser tensioners were in fair condition.

Recommendations:

- Perform protective coating maintenance on the riser tensioner cylinders.
- Replace tensioner No. 5 HP air supply hose as planned.
- Perform NDT inspection of riser tensioners and support structure to determine the need for repairs and/or replacements.
- Repair the leaking rod end seal on tensioner No. 2.
- Replace damaged and discolored gauges and recalibrate.
- Perform protective coating maintenance on flanged connection on standby bottle.
- Reroute discharge lines in a safe direction away from walkway.
- Replace two missing ball valve handles on bottle in bank of five for tensioner No. 6, and replace all valves once they have arrived.
- Recalibrate the pressure relief valves.

RTS CTRU **Riser Recoil System**

The rig was equipped with a Hydralift riser recoil system. At the time of the inspection, the riser recoil system was in operation and inaccessible. A non-intrusive visual inspection was conducted on the riser recoil system. Upon discussion with the subsea engineer on board, it was explained that the riser recoil system was not functioning in an automatic state as designed. The riser recoil system is a critical system used for slowing the ascent of the riser and LMRP to prevent damage to the rig, riser and LMRP in the event of an emergency disconnect situation. The riser recoil system works off of the tensioner rod position indication, which is achieved through transducers and machined groves in the rods. It was explained that some of the tensioner rods had been changed out with new rods that do not have the machined groves, which in turn have disabled the automatic function of the riser recoil system.

At the time of the inspection, the riser recoil system was considered to be in bad condition.

Recommendation:

- Restore the riser recoil system to operate as designed.

WCS BOPR **BOP Rams (Various)**

The rig was equipped with two Cameron double 18-3/4" X 15K and one Cameron single 18-3/4" X 15K ram BOPs. At the time of the inspection, the ram BOPs were subsea and inaccessible. A non-intrusive limited visual inspection (via ROV) was conducted on the ram BOPs. Upon inspection, it was noted that the last date of certification of the BOP bodies and bonnets was 13 December 2000. This was beyond the five-year inspection, overhaul and re-certification requirement. While on board, pressure tests to 250 psi and 6500 psi were carried out on all rams. The tests were witnessed and acceptable. Upon discussion with the subsea engineer on board, it was explained that the ram BOPs were operating correctly and that there were no outstanding issues.

API RP 53

Date of last certification

BOP body	S/N	Last date of Certification
Upper Double Body	11367000-1	04 October 2000
Single Body	11360580-1	13 December 2000
Lower double Body	11369619-1	13 December 2000
BSR Left Bonnet		04 October 2000
BSR Right Bonnet		04 October 2000
VSR Left Bonnet		13 December 2000
VSR Right Bonnet		13 December 2000
UPR Left Bonnet		13 December 2000
UPR Right Bonnet		13 December 2000
MPR Left Bonnet		13 December 2000
MPR Right Bonnet		13 December 2000
LPR Left Bonnet		13 December 2000
LPR Right Bonnet		13 December 2000

At the time of the inspection, the ram BOPs were in good condition.

Recommendations:

- Replace the two double ram cavity BOPs and the one single ram cavity BOP with new or re-certified ram BOPs; send the currently installed ram BOPs for the five-year inspection, overhaul and re-certification.
- Perform protective coating maintenance on the spare ram blocks and store out of weather.

WCS ANNU **BOP Annulars**

The rig was equipped with a Cameron DL 18-3/4" upper annular BOP and a Cameron DL 18-3/4" lower annular BOP. At the time of the inspection, the annular BOPs were subsea and inaccessible. A non-intrusive limited visual inspection (via ROV) was conducted on the Annular BOPs. Upon inspection, it was noted that the last date of certification for the upper and lower annulars was 13 December 2000. This was beyond the five-year inspection and re-certification requirement. Upon discussion with the subsea engineer on board, it was explained that, every time maintenance was required and carried out (which entailed removing the lower annular head), extraordinary difficulties were experienced in replacing the head. While on board, pressure tests were performed on the upper and lower annulars. The upper annular was tested to 250 psi and 3500 psi. The tests were all acceptable. The lower Annular was pressure tested to 250 psi and 5,000 psi. The tests were all acceptable. After the pressure tests were completed, the annulars were function tested.

During the lower annular operator hydraulic function test, while watching the flow meter an indication of a small leak was noted. Upon discussion with the subsea engineer, it was believed that the hose/fitting on the surge bottle was leaking.

Upon review of certification documentation, it was noted that the date of last manufacturer's certification was 13 December 2000.

ELEMENTS

Upon inspection, two packing elements were located on the main deck port side. The 5,000 psi rated element was under the roof; however, it was still not stored in a controlled environment and out of harmful UV rays.

The 10,000 psi rated element was covered with black UV protective packaging, but was sitting on the main deck outside in the weather. Upon discussion with the subsea engineer, the element will be moved under the roof of the BOP house. However, it will still not be in a controlled environment.

Upon review of certification documentation, it was noted that the date of last manufacturer's certification was 13 December 2000.

At the time of the inspection, the BOP annulars were in good condition.

Recommendations:

- Replace the upper and lower annulars with new or re-certified annulars and send the currently installed annulars for the five-year inspection, overhaul and re-certification.
- Investigate the leak and repair as necessary.
- Move elements to a controlled environment area.

WCS BOPS BOP Stack Frame (General)

The rig was equipped with a Cameron 18-3/4" X 15K BOP stack frame. At the time of the inspection, the BOP stack frame was subsea and inaccessible. A non-intrusive limited visual inspection (via ROV) was conducted on the BOP stack frame. Upon inspection, the stack frame was found to be moderately corroded and in need of protective coating maintenance. There was also minor damage to the frame legs and decks of the stack. Upon discussion with the subsea engineer on board, it was explained that there were no outstanding issues with the BOP stack frame.

At the time of the inspection, the BOP stack frame was in good condition.

Recommendation:

- Perform protective coating maintenance.

WCS VLV Failsafe Valves

The rig was equipped with ten 3-1/16" X 15K Cameron MCS failsafe valves. At the time of the inspection, the failsafe valves were subsea and inaccessible. A non-intrusive limited visual inspection (via ROV) was conducted on the failsafe valves. Upon inspection, it was noted that the last date of certification was 13 December 2000. This was beyond the five-year inspection, overhaul, and re-certification requirement. It was also noted that there

Recommendations:

- Acquire and retain valid manufacturer's certification documentation on board the rig.
- Maintain a log of valve serial numbers and location of installation on board the rig to accurately track equipment maintenance.

WCS CTRU **BOP Control Panels**

The rig was equipped with one Cameron remote BOP control panel located on the bridge and one Cameron remote BOP control panel located in the driller's cabin. At the time of the inspection, the BOP control panels were installed and in operation. A non-intrusive visual inspection was conducted on the BOP control panels. The driller's control panel was operated during the pressure tests using the Blue pod. All operations were satisfactory. The toolpusher's control panel was operated during the function tests on the stack using the Yellow pod.

During the functioning of the toolpusher's control panel on Yellow side, the "Pod Mismatch" light was on. The error message read "Valve Mismatch (50)." Upon inspection, it was noted that the purge air system on the driller's panel was not working properly. The door seal was leaking, and the purge air pump needed a new diaphragm. Upon discussion with the subsea engineer on board, it was explained that the crew was aware of the purge air pump issue, as well as the door seal, and had ordered the parts. It was also explained that the toolpusher's panel, which was located in the bridge, was an issue. The surface flow meter light blinked, indicating flow while the standpipe hole fill valve was closed. A Cameron field technician had informed the subsea engineer that one of the cards needed to be replaced. However, the Cameron technician did not specify which card. The crew had been in contact with Cameron personnel and was still awaiting their answer as to which card needed to be replaced.

At the time of the inspection, the BOP control panels were in fair condition.

Recommendations:

- Replace the diaphragm on the purge pump and replace the door seal on the driller's control panel.
- Investigate which card needed to be replaced and install in the panel to fix the light.
- Investigate why "Pod Mismatch" was on and correct the valve mismatch error message.

WCS PMP **BOP Mixing Unit**

The rig was equipped with a Cameron electronic BOP mixing unit with a 1200-gallon mix tank. At the time of the inspection, the BOP mixing unit was installed and in operation. A non-intrusive visual inspection was conducted on the BOP mixing unit. Upon inspection, no discrepancies were noted. Upon discussion with the subsea engineer on board, it was explained that the system was operating correctly and that there were no outstanding issues with the BOP mixing unit. The crew took weekly samples and used Stack Magic 200 mixed at a three percent ration for their fluid.

At the time of the inspection, the BOP mixing unit was in good condition.