Sewage System Troubleshooting

TROUBLE	PROBABLE CAUSE	POSSIBLE REMEDY
Collection pipe flowing slowly	Pipe clog or scale buildup	Trace slow flowing piping back to the fixtures it serves. Determine if just one, several or all fixtures are draining slowly. If just one, then only that fixture alone is clogged. If several, then only the section of piping serving those fixtures is clogged. If all, then a clog exists in the line downstream of where all the fixtures tie together. Gas free the problematic section of pipe. Open cleanout caps, or take down sections of piping at flanged joints. Inspect piping for clogs or scale buildup. Remove any foreign objects found to be causing clogs. If the problem is scale buildup, hydroblasting or acid cleaning will be required.
A single fixture flowing slowly	Clogged fixture	If the fixture has a trap, remove the trap and inspect it for clogging or scale. Replace the trap as necessary. If the trap is clear, open and inspect the piping downstream of it, up to where it connects to other piping. If there is no trap, then open and inspect the piping downstream of the fixture, up to where it connects to other piping.

TROUBLE	PROBABLE CAUSE	POSSIBLE REMEDY
Pump operates with a high discharge pressure but fails to empty the tank; or CHT tank empties slowly		ALL PIPING SHOULD BE CERTIFIED GAS FREE BEFORE DISASSEMBLY. DON PROTECTIVE GEAR AS NECESSARY.
	Discharge valve closed.	Open discharge valve.
	Shore connection discharge hose restricted.	Ensure discharge hose is properly secured and any bends do not exceed the minimum bend radius.
	Clogged pump suction or discharge line.	Ensure all pump suction and discharge valves are fully open. Back flush discharge piping with flushing connection. Activate each CHT pump individually and determine if the problem is common to both pumps or just one. If just one pump, then the clog is somewhere between the pump's suction line penetration into the CHT tank and its discharge line where it ties together with the other pump. Disassemble piping at flanged joints in this area to locate clog. If both pumps, then the clog is somewhere downstream of where the pumps tie together. If the pumps are presently diverted overboard, disassemble discharge piping at flanged joints between the point where the pumps tie together and the overboard discharge penetration to locate clog. If the pumps are presently diverted to a deck connection, disassemble discharge piping at flanged joints between the point where the pumps tie together and the overboard discharge penetration to locate clog. All piping should be certified gas free before disassembly.
	Improper pump operation	If just one of the pumps is problematic and its suction and discharge lines are verified to be free of clogs, then the pump itself is not running properly. Troubleshoot pump per pump tech manual, or submit 2-kilo to have pump repaired/replaced. Check pump for jams, clogs or seal failure.

TROUBLE	PROBABLE CAUSE	POSSIBLE REMEDY
Sewage odors		DON PROTECTIVE GEAR AS NECESSARY. DETERMINE LEVEL OF HYDROGEN SULFIDE GAS USING AN H2S METER. ENSURE CONCENTRATIONS DO NOT EXCEED SAFE LIMITS.
	CHT piping leak	Determine location where odor is strongest, or where H2S meter registers its highest reading. Inspect piping in the area for damage or leaks. Repair as necessary.
	CHT tank leak	Determine location near CHT tank where odor is strongest, or where H2S meter registers its highest reading. Inspect tank for damage or leaks. Repair as necessary.
	Fixture(s) venting into ship vice outside the ship	Check fixture vent line. Trace the line to ensure that it vents to the weather. Check line for corrosion or breaks where odors can vent into the ship.
	Deck drain trap(s) dried out	Determine if strongest source of odors is coming from one or more deck drains. Pour water down suspect deck drains to refill their traps and determine if odors dissipate.

TROUBLE	PROBABLE CAUSE	POSSIBLE REMEDY
Fixture(s) backflooding	CHT tank full, overboard discharge closed	Locate the CHT tank overboard penetration and verify that the overboard gag scupper valve is open. Open it if not. Determine if the CHT tank high level alarm is operating properly.
	CHT tank full, fixture line check valve(s) not holding	Trace the drain line serving fixtures that are backflooding. Locate any check valves or isolation valves in the line. Open any isolation valves that are closed. Remove the cover from any check valves in the line and determine if the valve flapper is hung up in the raised position. Repair and reassemble check valves as necessary. Determine if the CHT tank high level alarm is operating properly.
	Fixture drain line clogged	See AA single fixture flowing slowly@ above.
	Fixture drain not properly venting	Check fixture vent line. Trace the line to ensure that any valves in the line are open. Check line for clogs that may be preventing the passage of air through the vent line.
Pumps not activating correctly	CHT tank level sensor malfunction	Activate pumps in manual and shut off as pumps begin to lose suction. Place both pump selector switches in automatic. Fill the CHT tank using the tank washdown nozzles. Observe that one pump activates when the 30 percent level sensor switch closes. Shut the pump off and continue filling tank. Observe that the second pump activates when the 60 percent level sensor switch closes. Shut off tank washdown flushing water and allow both pumps to operate in automatic. Observe that both pumps deactivate when the low level sensor switch activates. If any or all of these conditions are not met, the sensor(s) is not operating properly.

TROUBLE	PROBABLE CAUSE	POSSIBLE REMEDY
Pump is noisy or vibrates excessively with reduced or no discharge pressure.	Pump is air bound.	Back flush pump and or tank.
	Clogged pump suction.	Remove pump suction spool piece to access clog.
	Bent motor shaft	If possible, straighten shaft to a total indicator run out (TIR) of .002 in. or replace shaft.
	Broken or damaged impeller	Replace impeller.
Sewage leaks	Loose plugs or flange fasteners.	Tighten plugs or flange fasteners.
	Defective gaskets or preformed packing.	Replace defective gaskets or preformed packing.
	Defective shaft seal.	Replace shaft seal.
Ejector pumps do not start and stop at required vacuum levels	Vacuum pressure switches out of adjustment.	Adjust vacuum pressure switches.
	Vacuum pressure switch supply tubing clogged.	Blow down tubing by opening switch instrument valve test connection or opening blow down line cutout valve as applicable.

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Ejector pumps run excessively	System vacuum leak	Isolate system piping and components by closing applicable cut out valves and observe system vacuum gage to determine leak location.
	Ejector non-return valve not seating properly.	Open ejector inspection port and remove debris from flapper and seat area. Replace defective flapper.
	Ejector suction piping is clogged.	Back flush ejector suction piping.
	Ejector suction piping has scale build-up.	Remove suction piping and acid clean as per NSTM 593.
	Ejector nozzle is worn	Replace ejector nozzle.