Don Searles Check List For Dredging Equipment Surveys

1. **General**
   1.1. Take pictures of everything important. **Take pictures showing the side of the dredge**
   1.2. Inspect logs and maintenance records. Get copies or request copies or take pictures of logs and maintenance records.
   1.3. Measure the size of suction and discharge pipes
   1.4. Record hour meter readings of all hour meters.
   1.5. Record, make, model and serial members, of the dredge, engines, dredge pump, gear boxes, and hydraulic pumps.
   1.6. Record barge dimensions and ladder length.
   1.7. Evaluate general appearance. Windows, operator's seat, paint, etc.
   1.8. Record the brand, name and ID numbers of the oil used in Engines, Hydraulic systems, Gearboxes: If possible look at containers and get API rating.
   1.9. Does vessel have zinc's, for rust prevention? Will dredge be used in saltwater? Does it need them?
   1.10. **Run crackle tests on all oil samples.**

2. **Diesel Engines**

   2.1. Remove oil filler cap and look at the underside of the cap and look in the engine for mayonnaise type gunk. If there is some, there is water or antifreeze in the oil.

   2.2. With oil filler cap removed, use a flash light and look for black sludge and varnish. Sludge means wrong type of oil, or not changed regularly.

   2.3. Inspect the air cleaner element.

   2.4. Inspect air intake system hoses and connectors.

   2.5. Start engines and watch exhaust at start up. White smoke means low compression. Observe if white smoke goes away when engine warms up. If exhaust is puffy a cylinder is not firing. Could be a leaking valve or injector problem. To test, short out the injector's one at a time to isolate the cylinder causing the problem.

   2.6. If you can load the engines. Blue smoke, indicates oil consumption. Black smoke indicates a dirty air cleaner, bad injector tip or injector.

   2.7. Hold hand over exhaust stack and look for oil and smell for diesel fuel on your hand.

2.8. Remove crankcase breather and check for blow by. Excessive blow by means worn piston rings Puffs in blow by means 1 or 2 cylinders bad

2.9. If you can get the engine hot and loaded, measure the temperature of each exhaust manifold runner. Should be equal.

2.10. Record oil pressure at low and high idle and determine if OK.

2.11. Record engine high idle speed. Use hand held laser tack.

2.12. Hold hand on turbocharger and feel for vibration.

2.13. Get oil sample.

2.14. Do blotter spot test with business card.

2.15. Smell oil and observe color.

2.16. If possible remove and cut open a filter and look for metal debris.

2.17. Inspect all belts and sheaves

2.18. Check for noise and vibration during operation.

3. **Fuel System**

3.1. Drain primary fuel filter water trap and check for water and dirt.

3.2. Test fuel tank for water and algae.

3.3. Record fuel pressure if gauge.

4. Engine Cooling System

4.1. Inspect water hoses, radiator/ heat exchanger for leaks,

4.2. Inspect water pump seal for leaks.

4.3. Inspect fan bearings for noise and looseness.

4.4. With radiator full, watch for bubbles in coolant. See how fast pressure builds in radiator. Attach hose to overflow and put end under water and watch for bubbles.

4.5. Look at coolant color.

4.6. Use anti-freeze tester and check freeze temp

4.7. Test the PH of coolant

4.8. Look for oil in coolant.

4.9. Inspect hose clamps for rusted screws.

5. **Engine Clutch:** Remove access cover and :

5.1. Inspect mounting bolts for tightness.

5.2. Inspect clutch plates for wear.

5.3. Inspect linkage for wear.

5.4. Smell inside the housing for burned clutch plates.

5.5. Check clutch adjustment.

5.6. Check for noise and vibration during operation.

6. Hydraulic System:

6.1. Get oil sample

6.2. Smell oil and observe the color of the oil.

6.3. Stick tank with pipe, with paste to test for water and for contamination in bottom of tank.

6.4. Record the part numbers of filter elements. Research and determine the micron rating of the elements.

6.5. If filters have a condition indicator, check to see if they are in bypass.

6.6. If possible remove and cut open a filter and look for metal debris.

6.7. Inspect tank breather.

6.8. Inspect for hydraulic system leaks

6.9. Inspect hydraulic hoses for cracks and abrasive wear.

6.10. Inspect hydraulic pipes for leaks and signs of weld repairs

6.11. Inspect hydraulic valves

6.11.1. Do solenoid valves shift?

6.11.2. Inspect for wear in manual valve controls and linkage.

6.12. Inspect hydraulic cylinders for:

6.12.1. Leaks at the packing gland.

6.12.2. Bend rods.

6.13. If possible, lock a component from turning and determine the maximum system pressure.

6.14. Hydraulic pump gear box if it has one.

6.14.1. Get oil sample

6.14.2. Smell oil and observe the color of the oil.

6.14.3. Inspect mounting bolts for tightness.

6.14.4. Check for noise and vibration during operation.

7. <u>Electrical.</u>

7.1. Inspect battery water,

7.2. Check battery voltage to determine amount of charge. Chart in front of Nigel Calder's diesel book.

7.3. Inspect battery post and cables for corrosion.

7.4. Stating system voltage drop tests. Page 78 of Nigel Calder's diesel book

7.5. Inspect battery age.

7.6. Test voltage drop between battery and starter.

7.7. Test alternator to see that it is charging. Chick wiring

7.8. Inspect alternator belts and sheaves.

7.9. Inspect alternator for bearing looseness

7.10. Inspect all wiring on the dredge. Rate it on scale of 1 to 10

7.11. Inspect lights in cab and outside cab to make sure they work.

7.12. If dredge has a 120 volt generator determine if it works

7.12.1. Check voltage output.

7.12.2. Inspect belts and pulleys or drive coupling.

7.13. Inspect and test all electrical and electronic components for proper operation.

7.14. Inspect all gauges for proper operation.

7.15. Inspect cab heater for proper operation.

7.16. Inspect air-conditioner for proper operation

8. <u>Dredge Pump.</u>

8.1. Inspect mounting bolts for tightness.

8.2. Inspect drive coupling.

8.3. Inspect vacuum system for proper operation.

8.4. Remove cleanout door and inspect the inside of the pump for:

8.4.1. Impeller wear.

8.4.2. Side liner wear.

8.4.3. Case wear.

8.4.4. Clearance between impeller and front liner.

8.5. Inspect discharge pipe for patches.

8.6. Get oil sample if oil lubricated.

8.7. Smell oil and observe color.

8.8. Check for noise and vibration during operation.

9. <u>Gear Box Between Engine And Dredge Pump.</u>

9.1. Inspect mounting bolts for tightness.

9.2. Get oil sample.

9.3. Smell oil and observe the color of the oil.

9.4. If it has a filter and if possible, remove the filter, cut it open and look for metal debris.

9.5. Inspect for noise and vibration when in operation.

10. <u>Service Water Pump.</u>

10.1. Inspect mounting bolts for tightness.

10.2. Inspect belts and pulleys or drive coupling.

10.3. Inspect front bearing for looseness.

10.4. Inspect all hoses and pipes.

11. <u>Bilge Pump</u>

11.1. Inspect and determine that it is working.

11.2. Inspect wiring, hoses and pipes.

12. <u>Cutterhead:</u>

12.1. Inspect mounting bolts for tightness.

12.2. Get oil sample.

12.3. Smell oil and observe the color of the oil.

12.4. Run crackle test, which tests for water in the oil.

12.5. Inspect cutterhead basket for wear.

12.6. Inspect front seal for leaks.

12.7. Inspect suction pipe for wear at mouth.

12.8. Check for noise and vibration during operation.

13. <u>Hull and Flotation.</u>

13.1. Remove hatch covers and inspect all compartments for water.

13.2. Inspect the vessel for rust, crevasse and seam rust

13.3. Inspect for cracks in welds and plates at ladder grunions, ladder braces, cutterhead mount, engine mount, dredge pump mounts, spud wells, and other critical places.

13.4. Measure and record the freeboard at 4 corners with ladder raised.