

**APPENDIX F.1****Summary of Workshop Test Infrastructure Supporting Equipment**

(see APPENDIX F.2 for Data Acquisition Equipment details)

**USCG Test Line****Tanks**

Test Tank:	130 bbl custom built with two tapered sides (All Fabrications Inc.)
Backup Tank:	500 bbl Safety Vapor Type with special built baffle section (Baker rental)
Buffer Tank:	200 bbl open top type (Magnum Mud rental)
Water Receiving Tank:	36 bbl open top type (Magnum Mud rental)

**Work Platforms**

Test Tank:	Wood platform w. hand rails, custom built by CCG personnel
Buffer Tank:	Wood platform w. hand rails, custom built by CCG personnel

**Containment Berms**

Test Tank	2 ply Plastic Tarp
Backup Tank:	10 x 50 ft. Safeguard Berm (Baker Tank)

**Hose Ramps**

Test Tank:	4 ft. x 16 ft steel frame and plywood (USCG)
Buffer Tank:	(2 pc) 8 ft. x 16 ft steel frame and plywood (USCG)

**Mix/Transfer Pumps**

Backup Tank	DOP-250 pump w. OMTS 315 motor
Buffer Tank	DOP-160 pump with standard motor

**Oil/Water Separator**

Lamor Brush Chain Conveyor mounted above Backup Tank.

**Hydraulic Power Units (HPUs)**

Test Pumps and  
Mix/Transfer Pump: (2 pcs) USCG HVPU "Mod 8" or "HighStar"

Diesel Engine: Detroit Diesel Corp.  
Type: Inline 6 Cylinder, 4-cycle  
Model: Series 40-8.7 LT  
HP: 225  
Max RPM: 2200  
Idle RPM: low 800 +-25 / high 2375 +-50

Hydraulic Pump: Sunstrand  
Type: Axial Piston  
Model: Series 90, Open Loop  
Max. Operating Press: 4000 PSI  
Max Flow: 71 GPM / 290 LPM

Lamor Skimmer: Hyde H11D-4 Power Unit with Yanmar

**CCG Test Line****Tanks**

Test Tank: 70 bbl custom built with tapered side and baffles, (All Fabrications Inc.)

Water Receiving Tank: 12 bbl open top type (Magnum Mud rental)

**Work Platforms**

Test Tank: Steel platform w. safety rails, provided by test tank manufacturer (All Fabrications Inc.)

Container Top: Wood platform w. hand rails, custom built by CCG personnel

**Containment Berms**

Test Tank 12 x 12 ft. Safeguard Berm (Baker Tanks)

**Hose Ramps**

Test Tank: (2 pc) 8 x 20 ft steel frame and plywood (built by USCG)

**Mix/Transfer Pump**

Test tank: CCG GT-185 pump w. high pressure/high temperature plate wheel (CCG)

**Hydraulic Power Units (HPUs)**

Test Pump and Mix/Transfer Pump: CCG Universal Hydraulic Power Pack 100

Diesel Engine: Lister Petter  
Type: 1.4.39T  
Diesel Output: 100 HP @ 2300 RPM

Hydraulic Pump: Samhydraulik  
Model: H1V/75 LS  
Max. Hydraulic Flow: 40 USGPM  
Max. Hydr. Pressure: 4500 psi

Overall Dims: 76" x 48" x 58" (L x W x H)  
Weight: 3100 lbs

ERE Skimmer: ERE Diesel Hydraulic Power Pack

**Common Functions****Water Lubrication System****Water Lubrication Control Stand**

Water Lubrication Control Stand (WLCS), custom built by Hyde Marine after a flemingCo concept:

(4 pcs) Gate Valve for inlet side and discharge side injection flow control and flow on/off

Lube water temperature gauge f. data logger (discharge side)

Lube water temperature gauge f. data logger (inlet side)

Lube water flow gauge f. data logger (discharge side)

Lube water flow gauge f. data logger (inlet side)

**Water Lubrication Pumps**

Hot Water

High Pressure: Grundfos CR5-20 with 7.5 HP motor

Low Pressure: Scot Ardox Pump 50 with 5 Hp motor

Cold Water

High and Low  
Pressure: (2 pcs) Comet BP105 3-stage diaphragm  
pump with hydraulic motor (CCG)

### **Lube Water Supply/Return Hoses**

Hot Water (4 pcs) 1.5 x 25 ft.  
(2 pcs) 1.5 x 50 ft.  
(4 pcs) 1.25 x 75 ft.

Cold Water Used existing 2" hoses from USCG VOPS

### **Lube Water Tanks**

Tempered water tank, 24 bbl open top type (Magnum Mud rental)

Hot water tank, 24 bbl open top type (Magnum Mud rental)

Cold water tank, 12 bbl open top type (Magnum Mud rental)

### **Swift Hose Add-on System (SHAS)**

SHAS, custom built by Hyde Marine after a JVOPS Workgroup concept: Four parallel 6 inch "through" and "by-pass" valve systems, each with 6 inch Hydrasearch female on inlet and 6 inch Hydrasearch male on outlet.

### **Boiler System**

US Navy Steam Generator type Clayton E-60 Van (US Navy ESSM)

Manufacturer: Clayton Industries  
Heat Output: 2,008,500 Btu/h (588 kW)  
Operating Pressure: 200 psi

400 ft. Steam Hose (US Navy ESSM)

(2 pcs) Large Steam heating coils (US Navy ESSM)

(3 pcs) tube type heat exchangers (Titan Maritime LLC)

**Chiller System**

Chiller System (Universal Industrial Refrigeration rental),  
consisting of:

Air cooled chiller, 180,000 Btu/h (53 kW) chilling effect

400 gal buffer tank with circulation pump

Heat exchanger

480V Generator Set Magnum Products, Inc. (rental from Grand  
Rental Station) Model: MM6566E, 3 PH 56KW, 480V, 84A  
1 PH 50KW, 208V, 194A

**Test Hoses**

2000 ft 6 inch Titan layflat rubber hose with Hydrasearch Couplers  
(US Navy)

1300 ft 6 inch Titan layflat rubber hose with Hydrasearch Couplers  
(USCG Gulf Coast Strike Team)

Additional 200 ft 6 inch Titan layflat rubber hose and a number of  
Hydrasearch Couplers (CCG and Hyde Marine) were used to make  
drop hoses for test pumps and other uses. Hoses were cut to length,  
fitted with couplers, and hydrostatic tested on site.

Portable Hydrostatic tester and Hydrasearch adapter (Hyde Marine)

**Hydraulic Power Units**

Cold Water Pumps: LAMOR LPP 30D (Clean Caribbean &  
Americas)

**Electrical Power Units**

25kW Generator power supply to Steam Generator and Data  
Acquisition Container (US Navy ESSM)

**Ancillary Water Pump Systems for circulating chilled water**

(2 pcs.) 158 USgpm Honda Water Pumps (Grand Rental)

**Light Masts**

(2 pcs.) 1000W Portable Light Stands (Grand Rental)

**Cranes**

Heavy Lift Mobile Crane and Operators (Cenac Towing)

Cherry Picker and Operators (Cenac Towing)

**Fork Lift**

Cenac Towing Fork Lift and Operators (Cenac Towing)

**Decontamination Area****Hose Cleaning System**

US Navy Hose Pigging System, including Pig Launcher, Pig Catcher, various hose scraping and cleaning pigs, ACO330 Air Compressor, Mod 9 HPU, Pressure Washer, various Pumps, hoses, fittings, and machinery containment berms. (US Navy ESSM)

Fine Cleaning was done with hot water pressure sprayer and manually, with brushes and rages (ASC)

**Tanks**

200 bbl open top for hose and pump cleaning (Magnum Mud)

Roll-off for Solid Waste Material

**Containment Berms**

Hose Cleaning: 100 ft x 20 ft (ASCO)

Hose Pigging: 75 ft x 30 ft (US Navy ESSM)

Personnel: 20 ft x 20 ft (ASCO)

**Data Acquisition Container**

14 Container with light strips and ventilation. Tables and chairs were set up inside for data acquisition team office, data logger, laptop computers, etc. (Hyde)

**Shop Van with Electric Generator**

20 ft. Container with workbenches, tools, miscellaneous parts proved to be extremely helpful in the relatively remote location of the test site. (US Navy ESSM)

**Storage and Shipping Containers**

(2 pcs) US Navy Containers were placed beside the CCG Test tank and Backup tank to extend the safe working area around these tanks. Wooden platforms with hand rails were erected on top of these containers. (US Navy ESSM)

**Office Trailers with Electric Generator**

(2 pcs) Office Trailers were used by Test Engineers for planning and meetings and by the Logistics team. (O'brien's)

**List of Test Infrastructure Equipment Suppliers**

U.S. Coast Guard Gulf Strike Team  
U.S. Coast Guard Aviation Training Center  
Mobile, AL 36608  
(251) 441 6623

Canadian Coast Guard  
Rescue, Safety and Environmental Response  
1 Queen Street, P.O. box 1236  
Charlottetown, PE C1A 7M8  
(902)368-0204

U.S. Navy Supervisor of Salvage  
GPC-ESSM Operations  
P.O. Box JK  
Williamsburg, VA 23187  
(757) 887-7402

Hyde Marine, Inc.  
28045 Ranney Parkway  
Cleveland, OH 44145  
(440) 871-8000

Cenac Towing Co.  
141 Bayou Dularge Rd.  
Houma, LA 70363  
(985)872-2413

All Fabrications Inc.  
4472 Shrimpers Row  
Houma, LA 70363  
(985) 851-3527

Magnum Mud Equipment Co., Inc.  
PO box 4258  
Houma, LA 70361  
(985) 872 1755

Baker Tanks, Inc.  
Baton Rouge Branch-39  
35173 hwy. 30  
Geismar, LA 70734  
(225) 673 4955

ASCO Environmental  
1801 Peters Rd.  
Harvey, LA 70058  
(504) 366 6557

Grand Rental Station  
605 Barataria Ave.  
Houma, LA 70360  
(985) 876 3107

Universal Industrial Refrigeration Inc.  
39222 Hwy. 621  
Gonzales, LA 70737  
(504) 647 8125

Bluewater Rubber & Gasket Co.  
1131 Barrow Street  
Houma, LA 70360  
(985)851-2400

Shannon Hardware Houma  
1386 Grand Caillou Rd  
Houma, LA 70363

Clean Caribbean & Americas  
2381 Stirling Rd.  
Ft. Lauderdale, FL 33312  
(954)983-9880

O'Briens Oil Pollution Service, Inc.  
645 Codifer St  
Slidell, LA 70458-4023  
(504)781-0804

Instrumentation and Sensors

APPENDIX F-2 DATA ACQUISITION EQUIPMENT						
Function	Description	Unit	Sensor Type	Sensor Manuf.	Sensor Range	Sensor Accuracy (+ / -) No. Sensors
<b>Data Logger</b>	<b>Electronically Recorded Key Data</b>					
Q(hydr)	Hydraulic flow to pump (pump rpm equivalent)	USgpm	FLMH-114050A In-Line w/display & transmitter	Omega	5-50 gpm	1.5 gpm 1
P(pump)	Test Pump discharge pressure (= hose pressure drop)	psi	PX543-300GI Press Transducer w/diaphragm	Omega	0-300 psi	3 psi 1
T(WL in)	Temperature of inlet side lubrication water	Degr. F	T-Type thermocouple	Omega	0-300 deg F	3 deg. F 1
T(WL out)	Temperature of outlet side lubrication water	Degr. F	T-Type thermocouple	Omega	0-300 deg F	3 deg. F 1
Q(WL in)	Flow rate of inlet side lubrication water	USgpm	P51530-T0 flow sensor	Signet	0-50 USgpm	0.5 gpm 1
Q(WL out)	Flow rate of outlet side lubrication water	USgpm	P51530-T0 flow sensor	Signet	0-50 USgpm	0.5 gpm 1
Q(WL out)	ProcessPro Flow Transmitter, dual input, dual output	USgpm	3-8550-3P flow meter	Signet	0-50 USgpm	0.50% 1
T(oil/inlet) A	Temperature of test oil at pump intake	Degr. F	T-Type thermocouple	Omega	0-300 deg F	3 deg. F 1
T(oil/inlet) B	Temperature of test oil at pump intake (backup)	Degr. F	T-Type thermocouple	Omega	0-300 deg F	3 deg. F 1
T(oil/bulk) A	Temperature of bulk of test oil in safe distance from the test pump_low	Degr. F	T-Type thermocouple	Omega	0-300 deg F	3 deg. F 1
T(oil/bulk) B	Temperature of bulk of test oil in safe distance from the test pump_high	Degr. F	T-Type thermocouple	Omega	0-300 deg F	3 deg. F 1
	* with visual display and 4-20ma output					
	Back up Q(Hyd) OMEGA In-Line Flow meter Canadian CG					1.5 gpm 1
	Notes: Temperature signal accuracy for Data Logger is +/- 1% of signal reading					
	Back up P(Pump) PX543-150GI 0-150 psi accuracy=1.5 psi (Canadian Coast Guard Test Tank Tests)					1.5 psi 1
<b>Backup Data</b>	<b>Manually Recorded Key Data</b>					
Q(hydr BU)	Hydraulic flow to pump (pump rpm equivalent)	USgpm	Visual Display from In-Line Flow Meter Omega	Omega	5-50 gpm	1.5 gpm 1
P(pump BU)	Test Pump discharge pressure (= hose pressure drop)	psi	Bourdon tube Gauge w/diaphragm stem	Omega	0-300 psi	3 psi 1
T(WL in)	Temperature of inlet side lubrication water	Degr. F	Bi-metal Thermometer	Wika	0-250	2.5 deg 1
T(WL out)	Temperature of outlet side lubrication water	Degr. F	Bi-metal Thermometer	Wika	0-250	2.5 deg 1
Q(WL in)	Flow rate of inlet side lubrication water	USgpm	Visual Display from electronic Flow Meter	Signet	0-50 USgpm	0.5 gpm 1
Q(WL out)	Flow rate of outlet side lubrication water	USgpm	Visual Display from electronic Flow Meter	Signet	0-50 USgpm	0.5 gpm 1
T(oil/bulk)CCG	Bulk oil temperature in CCG test tank, at tank side	Degr. F	T-Type thermocouple using hand held multimeter as reader	Omega	0-300 deg F	3 deg. F 2
T(oil/bulk) C	Bulk oil temperature in USCG test tank, at tank side	Degr. F	T-Type thermocouple using hand held multimeter as reader	Omega	0-300 deg F	3 deg. F 2

