

Attachment 3

Lake Guardian Specifications

August 11, 2009

The Research Vessel Lake Guardian is the U.S. Environmental Protection Agency's (EPA) newest and largest research and monitoring vessel. The research vessel is operated by EPA's Chicago-based Great Lakes National Program Office. In its former life, Lake Guardian (ex M/V Marsea Fourteen) was an offshore oil field supply vessel. Acquired by EPA in December 1988, it was converted in 1990 to a research vessel from a design by Rodney E. Lay and Associates. The Lake Guardian's primary home port is Milwaukee, Wisconsin.

The Lake Guardian is fitted with state-of-the-art navigational, laboratory, and mechanical equipment; as well as an array of high end computer systems including satellite internet connectivity. The facilities will support the ship's primary mission of gathering data concerning the chemical and biological conditions of the Lakes and monitoring the pollutant concentrations in the water, sediment, air, and fish and other biological matter. In addition, it has been designed and equipped to support a wide range of other research activities which may be conducted by Federal, State, and local agencies and universities as well as private industry. A unique feature of the Lake Guardian is its ability to carry up to two 20-foot modular (container) laboratories, which can be used to supplement the three large interior labs.

The Lake Guardian's master and crew are provided by a contract, they are required to have significant experience in research vessel operations on the Great Lakes. A high degree of professionalism, cooperation, and efficiency in limnological work is required. Accommodations, recreation, exercise, and meal facilities are aboard the Lake Guardian.

Members of the scientific community who have research interests in the Great Lakes and connecting channels and require a research vessel with the capabilities of the Lake Guardian are encouraged to contact EPA's Great Lakes National Program Office. For more information on the ship contact:

Eda Lam
Great Lakes National Program Office
U.S. Environmental Protection Agency
77 West Jackson
Chicago, IL 60604
Phone: (312) 353-1669

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Technical Exhibit # 1 General Specifications

Dimensions:

Length 180 feet
Beam 40 feet
Depth 14 feet
Draft 11 feet
Gross Tonnage 283 tons
Displacement(light) 850 tons
Ice classed ABS C
Air conditioned & heated
Berthing - 41 bunks

Performance

Cruising Speed in excess of 11 Knots
Fuel Consumption 60 gal/hr
Range in excess of 6,000 miles
Fuel Capacity 79,000 gallons
Potable Water Capacity 29,000 gallons
Ballast Water Capacity 100,000 gallons
Holding Tank Capacity 43,500 gallons

Crew and Scientist Amenities:

- *enclosed passageways
- *accommodates 41
- *16 cabins
- *laboratory office
- *hazardous materials storage
- *internet access
- *galley and mess room seating 21
- *laboratories
- *lounge with TV, DVD, VCR, and stereo
- *exercise room equipment
- *laundry with washer and dryer

Machinery:

Main Propulsion: 2 Cummins Model QSK-38M 12- diesel cylinder engines.
Bow Thruster: 1 Caterpillar 3406 6-cylinder diesel engine developing 300 hp and driving a Schottel tunnel thruster.
Generators 3 Caterpillar 3306 6-cylinder diesel engines driving KATO generators rated at 135 kW each and isolated for vibration, shock, and noise. Any two generators may be paralleled to achieve a maximum of 270 kW.

Auxiliary Machinery:

Water maker Offshore Industries Seaquencher (2,000 gal/day)
Marine Sanitation Device Orca 11-165 (5,000 gal/day)
Oily Water Separator Nelson Bilge Boy (15 ppm discharge)
Distilled Water System Superstill S-25 (25 gal/hour and 200 gallon storage capacity)
Vacuum System GE BR Becker (331" H₂O)

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Navigation, Communication, and Survey Electronics:

VHF Radios:	Icom M 127, Raytheon 88 and Sperry T2047D.
HF SSB Radio:	Raytheon 152
Emergency Positioning	ACR Electronics:Class A Satellite Emergency Position Indicating Radio Beacon(EPIRB)
Radars	Furuno FR1510 MKII w/ARPA 3cm Furuno FR2130 S 10cm
Loran C	Northstar 800 Furuno LC 90
DGPS Receivers	Trimbel * NT200
GPS Receivers	Furuno GP500
Gyro Compass	Sperry MK27
Magnetic Compass	Ritchie SP6/B80
Fathometers	Furuno FE 881 MK-II Papergraph Furuno FCV-292 Dual Freq. Color Sounder
Chart Plotters	Chart view software
Doppler Speed Log	JRC JLN-203
Weatherfax Receiver	Furuno 214 PC-w/Weatherfax for Windows Software
Autopilot	Sperry ADG3000VT
Broadband Satellite System	Wavecall 4003
Satellite Phone and Fax	Westinghouse CDJL01021G03
Close Circuit TV Video	Pelco Wiretron,
Forward Looking Infrared System	FLIR –SeaFLIR IIC
Ship Intercom	Bogen MCP35A

Meteorological Sensors (including NOAA weather reporting station hardware):

NOAA Air Temperature	Max/Min Temperature System (°F)
Air Temp/w Radiation Shield	Young * Model 41342 VC/VF /Model 41002
Barometric Pressure/w Pressure Port	Young * Model 61201 /Model 61002
Windspeed and Direction	Young* Wind Monitor –MA Model 05106
NWS Analogue Anemometer	Electric Speed Indicator Co. F-420C-M4
NWS Recording Barometer	Belfort Instrument Co. Marine Barograph
Horizontal Wind speed/dir	Young * Wind Monitor-MA Model 05106
Sampling Platforms	1-17' Horizontal Boom (4'x8' Scaffolding Frame about 10ft from ship) NMEA 0183 Data Output from these devices

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Scientific Work spaces and Equipment

Winches, Cranes, and "A" Frames:

Rosette Winch	Sea-Mac 207 EHLWRS (208 VAC 3-phase electric/hydraulic 500 lbs line pull)
Pumping Winch	Sea-Mac 107 EMHAL (208 VAC 3-phase electric/hydraulic 500 lbs line pull)
Coring Winch	Sea-Mac 3540 EHLW (480 VAC -3-phase electric/hydraulic, 6,000 lbs line pull)
Ponar Winch	Sea-Mac 8305EH(480 VAC, 250 lbs line pull)
Zooplankton Winch	Interocean 1673-3 (208 VAC 3-phase, 500 lbs line pull)
Triaxus Winch	MacArtney (440VAC, 3 phase, 60Hz, or 400 VAC, 3 phase, 50Hz)
Crane	HIAB 450 Sea Crane (5,000 lbs)
Crane	HIAB 80 Sea Crane (2,500 lbs)
Mechanical Arm Davot	Dayton-monorail (1000 lbs)
2 Starboard "A" Frames	hydraulic, maximum capacity 4,000 lbs
Stern "A" Frame	hydraulic, maximum capacity 25,000 lbs with Tulsa Winch 30,000 lbs line pull

Boats:

Rigid Hull Inflatables	Ambar 550 Rescue Boat, two Mercury 50 hp outboards. Avon Work Boat, one 50hp Evinrude outboard.
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Sampling Equipment:

Rosette sampling gear with capability to sample at 11 discrete depths using Niskin bottles of varying volumes.
Pumps for high volume samples.

Phytovib gear for extraction of biomass

Electric Power:	110/208 VAC available at several deck locations.
Hydraulic Power:	Hydraulic power take-offs (2,500 psi, 260 gal/min) available at two deck locations.

Auxiliary Scientific Equipment:

Uninterruptible Power	Exide UPS equipment 800 - 6000 "W" depending on lab
HEPA Filter Modules	Environmental Air Control, Inc.
Walk-In Refrigerator	410 cubic feet for sample storage.
Walk-In Freezer	308 cubic feet for sample storage.

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Internal Laboratories:

Chemistry	360 ft ² - 2 Hamilton fume hoods, canopy hood, deionized water hot and cold water, vacuum, LAN (Ethernet), uninterruptible power supply (3,000 W), HEPA (air filtration), eye wash, refrigerator, phone, compressed air, purified air.
Biology	208 ft ² - Hamilton fume hood, canopy hood, DI water, vacuum, LAN, video, UPS refrigerator, freezer, phone, eye wash, HEPA
Wet Lab	650 ft ² - Hamilton fume hood, DI, hot and Cold water, vacuum, LAN, UPS, refrigerator, freezer, phone, eye wash, HEPA
Office	128 ft ² - two desks, phone, laptops, LAN devices, UPS

Limnology Sensors

SEACAT SBE 19CTD

- . Pressure (depth) sensor
- . Conductivity sensor
- . Temperature sensor
- . Dissolved Oxygen sensor
- . Transmissometer
- . Li-Cor PAR

SBE 911 plus CTD

- . Pressure (depth) sensor
- . Conductivity sensor
- . Temperature sensor
- . Dissolved Oxygen sensor
- . Transmissometer (Sea Tech)
- . Biospherical PAT
- . pH sensor
- . Fluorometer (Sea Tech)
- . Altimeter (Tritech) bottom sensor

Triaxus sensors

- . Laser Plankton Optical Counter (LOPC)
- . Turner Designs - PhytoFlash
- . BBE Fluorometer
- . EdgeTech Sidescan Sonar
- . Trios UV Hyperspectral process Photometer ProPS
- . Seabird SBE 25-03