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June 16, 2015

Coldharbour Marine, Ltd.
Attn: Mr. Jayson Holloway, COO
Baxter House
Robey Close, Linby
Nottinghamshire
United Kingdom NG15 8AA

ALTERNATE MANAGEMENT SYSTEM ACCEPTANCE

The Coast Guard has completed its review of the Alternate Management System (AMS) application submitted by Coldharbour Marine, Ltd. for the Coldharbour GLD Ballast Water Treatment System (BWTS) incorporating types Sea Guardian™ IGG 500 to IGG 6000. This letter grants AMS acceptance in accordance with the requirements of 33 CFR 151.2026 for the Coldharbour GLD BWTS, as type approved by the Maritime & Coastguard Agency (MCA) under the authority of the government of the United Kingdom, and as detailed in MCA type approval (TA) certificate # 1500002 issued on February 6, 2015 and expiring February 5, 2017.

The following Coldharbour GLD BWTS models and associated integral equipment are accepted for AMS use in U.S. waters:

- GLD (Gas Lift Diffuser) Models 100, 150, 200, 250, and 300;
- Associated SeaGuardian IGG (Inert Gas Generator) Models 500, 1000, 1500, 2000, 3000, 4000, 5000, and 6000;
- Associated GCT (Gas Cooling Tower) Models 500, 1000, 1500, 2000, 3000, 4000, 5000, and 6000;
- Associated PVB (Pressure Vacuum Breaker) Models 500, 1000, 1500, 2000, 3000, 4000, 5000, and 6000;
- And associated High Velocity Valves, IG Compressors, IGG Control System components, GLD BWTS Control System components, and other components, as listed in the MCA type approval certificate for this BWTS.

The Coldharbour GLD BWTS is assigned the following AMS identification number:

AMS-2015-Coldharbour Marine-001

Coast Guard acceptance of the Coldharbour GLD BWTS as an AMS does not accord or imply conformance to or compliance with any other Federal, state, or local water discharge effluent limitations that may apply to the vessel on which the AMS operates or the regulatory regimes

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and locations within which it operates. The owner and operator of the vessel must comply with all applicable laws, regulations, and treaties, including the Clean Water Act and associated provisions of the Vessel General Permit (VGP); the Federal Insecticide, Fungicide, and Rodenticide Act of 1972, as amended (FIFRA); other Coast Guard safety regulations and requirements; and other applicable laws and regulations.

In accordance with 33 CFR 151.2026 (a)(5), the AMS application required the submittal of a type approval application for the BWTS. The type approval information submitted with the AMS application does not have any bearing on the type approval status of the BWTS, nor does Coast Guard acceptance of the Coldharbour GLD BWTS as an AMS indicate that the BWTS meets requirements for Coast Guard type approval.

The following conditions apply for the operation of the Coldharbour GLD AMS in U.S. waters:

1. The AMS manufacturer must comply with all the general conditions of certification stipulated in the type approval certificate issued by MCA under the authority of the government of the United Kingdom, as referenced above. Revocation of type approval by the approving authority will result in revocation of this AMS acceptance. Copies of all reports required under the stated conditions of use must be submitted to the Environmental Standards Division (OES-3) at the following address or email:

COMMANDANT (CG-OES-3)
United States Coast Guard Stop 7509
2703 Martin Luther King Jr. Ave SE
Washington DC 20593-7509
Tel: 202-372-1402
e-mail: environmental_standards@uscg.mil

2. Installation and repairs of the AMS must be performed in accordance with the manufacturer's instructions and approved by the flag administration or its representative.
3. Operation and maintenance must be conducted in accordance with all specifications and limiting conditions stipulated on the type approval certificate and with the manufacturer's instructions, including any limitations posed by the environment (for example, water quality, temperature, salinity, or other parameters) or vessel operations (for example, voyage duration, pumping rates, or other constraints). The following specific conditions apply:
 - a. **Treatment rated capacity (TRC):** This AMS is limited to the treatment rated capacity for which the installed system on a specific vessel is approved. This information is specified in a ship specific information matrix provided with each Coldharbour GLD BWTS installation. Since this BWTS treats the ballast water within the ballast tank during the vessel's voyage and not during ballasting or de-ballasting operations, treatment rated capacity (TRC) for this BWTS depends on the length of the voyage and the total volumetric capacity of the ballast tanks being treated. For a five day ballasted journey, the maximum treatment rated capacity is 57,600 m³ of ballast water, based on the use of a 6,000 m³ / hour Inert Gas Generator

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(IGG). For a ten day ballasted journey, the maximum treatment rated capacity is 345,600 m³ of ballast water, based on the use of a 6,000 m³ / hour IGG. The minimum treatment rated capacity for this BWTS on any vessel is 20,000 m³ of ballast water.

- b. **Treatment processes and criteria:** The primary method by which this BWTS disinfects ballast water is de-oxygenation, which is accomplished through inert gas injection into the ballast water. This process occurs within the ballast tanks during the vessel's voyage. Treatment starts after the ballast tanks are filled. Since this is an in-tank treatment system, performance capability of this BWTS is not related to the ballast water flow rate, but rather the size and the shape of the ballast tank being treated. Treatment is accomplished through the injection of inert gas supplied by an IGG (Inert Gas Generator) into each ballast tank through a GLD (Gas Lift Diffuser) network consisting of in-tank piping equipped with micro-bubble generator nozzles and ultrasonic wave generating devices. This inert gas contains a maximum of 0.2% oxygen (O₂). The inert gas also contains carbon dioxide (CO₂), which temporarily lowers the pH of the ballast water. De-oxygenation in combination with a lowered pH environment is one component of the disinfectant treatment process. The second component is physical in nature and consists of the formation and subsequent bursting of micro-bubbles during the diffusion of the inert gas into the ballast tank through specially designed micro-bubble generators and ultrasonic wave generators. The bursting of these micro-bubbles produces kinetic (pressure) and thermal (heat) energy, which disrupts the cellular structure of adjacent micro-organisms. Prior to the discharge of the treated ballast water, the ballast water is aerated in order to elevate pH and oxygen levels to environmentally safe values. Since this BWTS uses shipboard (i.e., an installed Inert Gas Generator and associated equipment) systems during the de-oxygenation process to treat the ballast water, the salinity and the temperature of the intake ballast water are not limiting factors.

According to the TA certificate for this BWTS, the ballast water treatment process employed by this system is divided into 5 phases. The time devoted to each of these 5 phases is ship specific and will vary depending upon the size (ballast water capacity) and the shape of the tanks being treated. Details related to each of the phases are provided in a ship specific information matrix developed by Coldharbour Marine for each vessel upon which the system is installed. In all cases, ballast tank treatments are to be grouped according to the ship specific treatment regime required by the minimum length ballast leg journey. Each tank grouping will be treated sequentially or concurrently, with the BWTS providing an indication of successful completion of each treatment phase. Treatment Phase 1 is "Dwell" (minimum 24 hours). During Phase 1, the ballast water remains in the tanks without any treatment. Phase 2 is "De-Aeration" (minimum 12 hours). During Phase 2, tank de-aeration is accomplished by routing inert gas from the IGG into the tanks being treated through the GLD network with its micro-bubble generators and ultrasonic devices. Phase 3 is "Dwell / Hold" (minimum 60 hours). During Phase 3, the treated ballast water in the tanks is held in a de-aerated condition. Phase 4 is "Re-Aeration" (minimum 12 hours). During Phase 4, air is introduced into the treated tanks through the GLD network in order to re-aerate the ballast water. Phase 5 is "Post Dwell" (minimum 12

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hours). During Phase 5, the re-aerated ballast water is allowed to remain in the tanks prior to de-ballasting.

The MCA type approval certificate specifies certain performance requirements which must always be met during all Coldharbour GLD BWTS treatments. They are:

- Maximum inert gas (IG) oxygen content: **0.2%**
- Minimum inert gas (IG) pressure, measured at the GLD ultrasonic devices: **3.5 bar**
- Maximum acceptable dissolved oxygen content of treated ballast water: **0.6 mg/L**
- Minimum pH level of treated ballast water (i.e., the lowest pH value the system will achieve): **5.7**
- Minimum effective holding time of ballast water in tanks: **05 days (120 hours)**

- c. **Other conditions of AMS acceptance for this BWTS:** As specified in the MCA type approval certificate, the following conditions of type approval are also applicable as conditions of AMS acceptance:

Coldharbour Marine is to issue a ship specific information and instruction matrix for each installation of this BWTS. This matrix shall include, but not be limited to, information on the inert gas (IG) flow rate, treatment sequence for the vessel's ballast tanks, and treatment profile for the operational performance of the Coldharbour GLD BWTS installed upon the vessel.

Scrubber effluent and effluent from the cooling water drain associated with the Inert Gas Generator (IGG) shall be disposed of in accordance with U.S., state, and local water quality regulations. Ballast water discharged after treatment with the Coldharbour GLD BWTS shall comply with U.S., state, and local water quality standards / criteria, including those related to permissible pH levels for discharges into marine waters.

The Pressure Vacuum Breaker (PVB) inlet capacity and the PVB's positioning for installation must be in accordance with relevant classification rules.

Details of the location of the Coldharbour GLD BWTS, and its connection into the ship's ballast system are to be shown on the ship's plans, which are to be submitted for approval to the appropriate classification society / administration.

This BWTS is to be used in conjunction with the Inert Gas Generator (IGG) and Gas Cooling Tower (GCT) arrangements described in Coldharbour Marine document CHM-14-014.

The Coldharbour GLD BWTS is type approved and AMS accepted for installation and use on double-hulled vessels with a typically "J" type ballast tank configuration, as normally found on tankers, bulkers, and LPG/LNG carriers.

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A historical record documenting that the system has been operated within the criteria specified above, including a record of any alarm conditions, shall be made available for review onboard the vessel.

4. The Coldharbour GLD BWTS has not been fully tested in freshwater and the system is not type approved for freshwater use. Therefore, its use as an AMS is limited to the treatment of marine and brackish water with a practical salinity unit (PSU) concentration greater than 1.
5. If installed on a U.S. flag vessel, it must be shown that the system and installation comply with or provide an equivalent level of safety to the requirements of 46 CFR Subchapter F (Marine Engineering) and Subchapter J (Electrical Engineering). All electrical equipment located within hazardous areas must be explosion proof or intrinsically safe as certified by an independent laboratory recognized by USCG per 46 CFR 111.105-7.
6. Use of the AMS is specified in the ship's ballast water management plan (BW plan), required by 33 CFR 151.2050(g). The BW plan must identify the following: (1) the ballast water management practices to be used in the event the AMS cannot be used, and (2) the personnel responsible for the operation, maintenance, and repair of the BWTS. An up-to-date record of the operation, maintenance, and repair of the BWTS must be maintained onboard the ship.
7. Any change in design, materials, manufacturing, or intended operational conditions of this BWTS without prior notification to, and acceptance by, the U. S. Coast Guard will automatically invalidate this AMS acceptance. Prior to any such change, the manufacturer of an AMS must notify the Commanding Officer, U. S. Coast Guard Marine Safety Center (MSC), at the following address or e-mail:

Commanding Officer (MSC)
Attn: Marine Safety Center
U.S. Coast Guard Stop 7410
4200 Wilson Blvd, Suite 400
Arlington VA 20598-7410
e-mail: msc@uscg.mil

The notification must include the following: (1) a description of the change, the reason it is required, and its intended advantages; (2) an explanation of any effect of the change on installation, operation, maintenance, or repair requirements; and (3) an indication of whether or not the original configuration of the BWTS will be discontinued.

8. If the installed AMS does not operate properly when treating ballast water intended for discharge in U.S. waters, the person directing the movement of the vessel must ensure that the problem is reported to the nearest Coast Guard Captain of the Port (COTP) or District Commander as soon as practicable. The Coast Guard shall be notified of any treatment system or component failures, irreparable damage to components of the AMS, frequent process upsets or out-of-bounds operating conditions, or other situations or process-related conditions that may reduce treatment effectiveness. The vessel may

continue to the next U.S. port of call, subject to the directions of the COTP or District Commander, as provided by 33 CFR 160.

9. All transport and handling of chemicals required for proper operation of the AMS must be conducted in accordance with 46 CFR 147 (Hazardous Ships' Stores), 49 CFR 171-180 (Hazardous Materials Regulations), and 46 CFR 98.30 (portable tanks), as appropriate.
10. Use of the AMS must be reported in the ship's ballast water management reports submitted to the National Ballast Information Clearinghouse, as required by 33 CFR 151.2060, as follows:
 - a. In Section 4, report the number of tanks treated by the AMS in the space labeled "Underwent Alternative Management";
 - b. In Section 4, write the AMS identification number (AMS-2015-Coldharbour Marine-001) in the space labeled "Please specify alternative method(s) used, if any", and;
 - c. In Section 5, in the middle section titled "BW MANAGEMENT PRACTICES" identify the management method as "ALT" under the heading "Method (ER/FT/ALT)" for each tank for which the AMS was used.

The Coast Guard may suspend, withdraw or terminate the acceptance of this BWTS as an AMS in accordance with 46 CFR 2.75-40, 2.75-50(a) and 2.75-50(b), respectively.

A copy of this letter shall be provided to each vessel with this installed AMS and shall be available for review when the vessel is operating in U.S. waters.

I thank you for your dedicated efforts to seek out AMS acceptance, and we look forward to working with you throughout the type approval process. If you have any questions concerning this letter, you may contact Mr. John Meehan of my staff at John.A.Meehan@uscg.mil.

Sincerely,



S. J. KELLY
Captain, U.S. Coast Guard
Office of Operating and Environmental Standards
By direction