

STANDARD OPERATING PROCEDURE

Procedure for Maintaining Solids Suspension in the GSI Land-Based RDTE Facility's Retention Tanks

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RECORD OF AMENDMENTS:

No.	Date	Type	No.	Date	Type
1			7		
2			8		
3			9		
4			10		
5			11		
6			12		

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BACKGROUND

The Great Ships Initiative (GSI) is a regional effort devoted to ending the problem of ship-mediated invasive species in the Great Lakes-St. Lawrence Seaway System and globally. In support of that goal, the GSI has established superlative freshwater ballast treatment evaluation capabilities at three scales—bench, land-based, and on board ship. Each scale is dedicated to addressing specific evaluation objectives. These include:

GSI Bench-Scale Tests

- Range finding for effective treatment dose against diverse freshwater taxa and water quality conditions;
- Generation of freshwater relevant chemical degradation curves; and
- Estimation of residual toxicity given diverse freshwater taxa and water quality conditions.

GSI Land-Based Tests

- Pre-certification testing, i.e., operational and biological performance (including residual toxicity) status-testing given scale-up and a range of challenge conditions; and
- Certification/verification testing, i.e., formal assessment of performance against IMO and other discharge standards.

GSI Shipboard Tests

- Confirmation of biological and operational treatment performance as expected in the ship environment;
- U.S. Coast Guard Shipboard Technology Evaluation Program (STEP) testing;
- Shipboard type approval testing;
- Ship discharge monitoring; and
- Methods development.

The GSI awards its independent status-testing services to developers of ballast treatment systems and processes determined to be promising. GSI status-testing is performed at the scale appropriate to the state of development of the target treatment system. GSI has no involvement, intellectual or financial, in the mechanics, design or market success of the actual treatment systems it tests. To ensure that GSI tests are uncompromised by any real or perceived individual or team bias relative to test outcomes, GSI test activities are subject to rigorous quality assurance/quality control (QAQC) procedures and documentation. This attention to QAQC assures high quality and credible evaluation of GSI and its findings.

INTRODUCTION

This GSI Standard Operating Procedure (SOP) describes the procedure used to maintain solids suspension in the four 200 m³ cylindrical retention tanks located at the GSI Land-Based RDTE Facility in Superior, WI. Each tank is fitted with two agitators used to mix water in the tanks to prevent organisms from being entrained in settling solids. The agitators are installed horizontal to the floor and set 45 degrees from the wall.

EQUIPMENT

- Retention Tanks
- ABS Mixer 2821
- HMI

PROCEDURE

1. Set the agitators to 20 % of their full capacity via the HMI.
2. During a fill, start each agitator when the capacity of the retention tank reaches 50 %. The agitator remains active until the tank is drained.
3. During a drain, stop each agitator when the capacity of the retention tank is below 40 %.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

1. Conduct all quality assurance/quality control procedures according to *GSI/QAQC/QAPP/LB/1 - Quality Assurance Project Plan for Great Ships Initiative (GSI) Land-Based Tests (2010)*.
2. Follow all procedures outlined in this SOP. Any deviations known ahead of time must be approved by the GSI Principal Investigator and Project Manager. Deviations must also be communicated to a GSI QAQC Officer and recorded on *GSI/FORM/G/1 - GSI Standard Operating Procedure Deviation Form*.
3. Note: There is no routine maintenance for the agitators. They are factory lubricated and sealed for life.

DATA STORAGE AND ARCHIVING

1. Data from the agitators, in the form of the amount of Amps being used, is transmitted to the HMI and recorded every 5 seconds in real-time. This information is then transferred to a database and can be viewed in Excel. The GSI Land-Based RDTE Facility Engineer/Operations Manager is responsible for the storage and archiving of these files,

in accordance with *GSI/QAQC/QAPP/LB/1 - Quality Assurance Project Plan for Great Ships Initiative (GSI) Land-Based Tests (2010)*.

2. Archive all hard- and electronic-copies of data and records generated for a period of five years.

REFERENCES AND RELATED DOCUMENTS

GSI/FORM/G/1 - GSI Standard Operating Procedure Deviation Form

GSI/QAQC/QMP/1 – Great Ships Initiative Quality Management Plan, Revision 1 (2011).

GSI/QAQC/QAPP/LB/1 - Quality Assurance Project Plan for Great Ships Initiative (GSI) Land-Based Tests (2010).

GSI/SOP/LB/G/1 - Procedure for Operating the GSI Land-Based RDTE Facility.

Great Ships Initiative website: www.greatshipsinitiative.org.

Great Ships Initiative Standard Operating Protocols: <http://www.nemw.org/GSI/protocols.htm>