Great Lakes Maritime Research Institute
A University of Wisconsin - Superior and University of Minnesota Duluth Consortium

GLMRI Task Completion Summary
Submitted to Maritime Administration with Quarterly Report
30 November 2011

Reporting Period: September thru November 2011

Project Title: MARAD/Great Lakes LNG/Repowering Study

Task 1 - Determine if there is owner interest in pursuing LNG as an alternative maritime fuel for use on the Great Lakes.

Topics for discussion include: Vessel suitability, shippers' risk, public engagement, Federal, state and local support. LNG supply chain, distribution system and availability.

Deliverable: Physically hold a meeting with a group of key shipping officials, MARAD and GLMRI representatives.

Time: August 2011.

Accomplishments:

With the assistance of the Lake Carriers' Association, GLMRI coordinated a meeting with key shipping company representatives from five companies sailing on the Lakes representing the majority of the U.S. Flag (Great Lakes) fleet, MARAD members and the GLMRI research team. The meeting was held in Cleveland, Ohio, on 23 August 2011 at the Cleveland Airport Marriott Hotel. The purpose of the meeting was to explore the interest level on possible conversion of the Great Lakes vessels to use Liquefied Natural Gas (LNG) as a primary fuel source.

The meeting commenced at 0900. Ms. Carol Wolosz opened the meeting with a welcome and a brief overview of the day's agenda. All attendees introduced themselves and identified their agency and role.

Mr. Michael Carter, MARAD, provided a brief overview and comments on the study and noted that MARAD was committed to work with industry to develop repowering alternatives. MARAD is currently looking at renewable fuels to improve air emissions and energy conservation. They are currently testing algae based bio-diesel on the T/S State of Michigan at the Great Lakes Maritime Academy to better understand how they will perform in marine applications. Mr. Carter and his staff are working to get Federal support for waterborne transportation, and the effects that it can have toward positive environmental outcomes.

Dr. Richard Stewart, GLMRI Co-Director led the discussion on LNG and other repowering possibilities.

- *Vessel Suitability: It was discussed which vessels were suitable for conversion. Some of the smaller vessels may not have the stowage space for an adequate supply of LNG. Conversions specifications need to be considered of the various power alternatives, along with the useful life of the converted vessels.*

- *Owner Interest: Will there be a favorable return on the investment to support the capital costs for vessel conversion? Will the public support LNG? A cost estimate needs to be prepared to identify the potential costs.*

- *Federal Agency Support: Will the various agencies cooperate or work at cross purposes to support the utilization of LNG, or other fuel alternatives? The effort will need to be addressed with DOT/MARAD and SLSDC, EPA, DHS/USCG, DOD/USACE, DOE and DOC/NOAA, along with the associated state agencies and governments. When and how best to do this should be addressed in the feasibility considerations.*

- *Local Support: Both government and industry will need to be supportive of LNG. Fueling ports/facilities will need to be built, with consideration for loading and discharge points. Terminals may also want to utilize LNG for their equipment, given product accessibility.*

- *Supply and Distribution: Where are/could there be liquefaction facilities? Storage locations, capacity, and hazards will need to be considered. Is the product available from pipelines, or will it have to be transported via truck/rail? How much space is necessary for a facility and how many facilities will be needed, along with the location for liquefaction and/or storage. And how much will this cost, and how will it be paid for?*

Dr. Michael Parsons provided a brief update on using LNG in Europe and the Wartsila engine. He also noted that there are over 50 ships currently using LNG, with duel fuel and diesel ignition. The possibility of tying in an Integrated Electric Plant was also discussed.

Presentation from Trans Canada pipeline: Mr. Rich Cowan from the TransCanada provided a marketing presentation on their pipeline operations in North America. This is one of several gas companies that could serve the Great Lakes region. His presentation enlightened the group on the availability of the product and possible scenarios for access.

Group Discussion:

- *The participants of the meeting agreed that there is merit in pursuing the feasibility study for using LNG as a maritime fuel for the Great Lakes. It was also agreed that a viable demonstration project would be to look at the S.S. Badger, since it has been identified as having the greatest environmental issues between air emissions from using coal and dumping coal ash into Lake Michigan. The Lake Michigan Car Ferry Service has been*

looking at natural gas alternatives (CNG and LNG), and have great concerns on the availability to make it a viable option for their route.

- *It was also agreed that the best study target for using LNG would be the existing steamships.*

- *There are still many concerns that must be addressed before moving to natural gas such as safety measures with cryogenic pressure tanks, and the BTU equivalencies between diesel and LNG.*

- *Cart before the horse analogy: Also, the participants agreed that the process needed to move forward simultaneously with moving to have access to a supply of LNG, while working toward the engine modifications to utilize LNG as the primary marine fuel.*

Meeting Conclusions:

- *MARAD agreed to move forward with the study with GLMRI to analyze the supply chain and engineering considerations for moving the existing steamships on the Great Lakes to LNG, and support a model/demonstration project of the S.S. Badger, using their fuel, consistent routes, and engineering to look at the viability of using LNG. The demonstration project will also consider training needs and shipyard implications of the power conversions.*

The results of the study should benefit the Great Lakes region, U.S.–flag vessels with the extended results benefitting other transportation modes along with the inland rivers and coastal shipping ports.

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