**Memo**

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| **To:** | Prepared for Hudson West  3 Columbus Circle, New York, NY |
| **Date:** | November 10, 2017 |
| **Re:** | Overview of LNG Limited (Magnolia LNG) |

Summary Talking Points

1. Magnolia LNG is a fully permitted LNG project. However, they have been unable to attract any LNG buyers to sign binding LNG contracts, which raises significant concerns for their current and future investors.
2. Magnolia LNG has elected to use their own unproven LNG technology, OSMR, for their LNG export project, which has never been built or put into operations. Their investors have multi-billion dollar risk by financing a first-of-a-kind LNG technology.
3. LNG buyers are sophisticated and will not risk their future LNG supply on first-of-a kind technologies. According to Magnolia LNG’s website, 10 separate independent reviews of the OSMR technology have been completed[[1]](#footnote-1). To date, not one LNG buyer has signed a binding LNG contract based upon the OSMR technology.
4. Using a proven LNG liquefaction technology is the #1 factor LNG buyers consider when signing a long-term binding sales contract.
5. Magnolia LNG and its parent company (LNG Limited) have proposed their OSMR LNG technology on 100% of their proposed projects, and 100% of have failed to sign binding LNG sales contracts[[2]](#footnote-2).
6. Magnolia LNG is located approximately 25 miles from the Gulf of Mexico, which means LNG buyers will have to pay approximately $300MM more for shipping over the term of their contract compared to projects located closer to the Gulf of Mexico. As a comparison, MILNG is only 2 miles from the Gulf of Mexico.
7. The Magnolia LNG project includes 20 LNG processing modules to produce eight million tonnes of LNG per year (MTPA). This is ½ of the capacity of the Monkey Island LNG project. In comparison, MILNG will use 6 LNG processing modules to produce double the amount of LNG.
8. Magnolia LNG is proposing a mid-scale 2 MTPA LNG train configuration compared to MILNG’s large-scale 5.25 MTPA LNG train configuration. When reviewing points 6 & 7, it is safe to say the efficiencies of the MILNG project are greater than those of the Magnolia LNG project.
9. The Magnolia LNG technology uses Ammonia, one of the most highly toxic gasses, to super cool natural gas to LNG. However, using Ammonia to safely super cool natural gas has yet to be proven in an LNG facility and many consider it very dangerous.

**Conclusion:** Magnolia LNG’s unproven LNG liquefaction technology has been proposed on multiple LNG liquefaction projects and 100% of them have failed to advance to the construction phase. The LNG industry has been unwilling to sign binding LNG contracts based upon their unproven OSMR technology and the associated risks. Many LNG Buyers have said they don’t have to buy from unproven LNG technologies because there are other projects offering proven and reliable LNG technologies, such as Air Products and Chemicals, Inc.

See below for additional details…

Additional Details

1. LNG Limited is a publicly traded company based in Perth, Australia, and was founded in 2004. LNG Limited claims their own LNG technology offers higher efficiencies than traditional and proven liquefaction technologies, as well as lower development costs and shorter construction timelines. These claims have never been proven.
2. Despite proposing multiple projects over the past decade, LNG Limited has yet to bring any project to fruition. The company’s past performance has led to 100% project cancellations, which include projects in northwest Australia, Iran, Indonesia and Papua New Guinea. LNG Limited was unable to complete any of the above projects and was unable to secure any LNG Buyers to support these projects on a technical or financial level2.
3. The company has now shifted its focus to Magnolia LNG, which it views as its flagship project, to promote its own LNG liquefaction technology, OSMR. Since that change, the stock has plummeted and now trades at $0.342.
4. Magnolia LNG’s OSMR liquefaction technology has never been built. Therefore, any “guarantees or promises” are highly speculative.
5. Despite Magnolia LNG’s claims, calculations by respected LNG engineers estimate Magnolia LNG’s OSMR liquefaction technology will actually use 18% more power and 54% more fuel gas per tonne of LNG when compared to Air Products and Chemical’s (APCI) LNG proven liquefaction technology.
6. The APCI LNG liquefaction technology being used by MILNG represents 75% of the world’s LNG liquefaction technology. Magnolia’s OSMR technology represents 0%.
7. In addition, Magnolia LNG is using a mid-scale LNG train (2 MTPA) design. To produce the same amount of LNG as the larger LNG Trains, Magnolia LNG will require a considerable amount of additional equipment, which drastically increases the difficultly and costs associated with operations and maintenance, installation, and construction of the facility.
8. Due to the high equipment count associated with mid-scale LNG trains, the Magnolia LNG project will have increased civil construction costs (i.e. piling, foundations, concrete).
9. Magnolia LNG (LNG Limited) has tried desperately to convince LNG buyers their technology will produce LNG. According to their website, the following third-party companies have “independently evaluated” their OSMR LNG liquefaction technology. Even though these evaluations have been completed, LNG Buyers globally have yet to sign a binding long-term LNG sales contract based upon the OSMR LNG liquefaction technology1.
   1. CH-IV Evaluation of OSMR LNG Process
   2. Merlin Review - Magnolia LNG
   3. Foster Wheeler - Gladstone LNG OSMR Study Report
   4. Arrow Energy Interim Review of Fisherman’s Landing LNG Plant
   5. Technical Review Group Gladstone LNG Project
   6. SKE&C Evaluation of OSMR Process for Gladstone
   7. QRA for LNG Plant, Storage and Loading
   8. Evaluation Report of LNGL's OSMR®Process by I. Aoki
   9. OSMR Evaluation by WorleyParsons
   10. OSMR Evaluation by SKE&C
10. Despite the fact that Magnolia LNG is completely permitted by the U.S. Government, the project is unable to attract LNG Buyers globally. Typical LNG Buyers are very educated on LNG technologies and avoid “first-of-a-kind” technology risks.
11. The Magnolia LNG technology uses Ammonia, one of those most highly toxic gasses, to super cool natural gas. However, using Ammonia to safely super cool natural gas has yet to be proven in an LNG facility and many consider it very dangerous.
12. Ammonia gas in the presence of moisture, such as high relative humidity that is present in southern Louisiana, can form vapors that are heavier than air. In the event of a leak, these vapors may spread to areas with poor airflow where people may become exposed.
13. Ammonia is highly toxic to humans, and a small concentration in the bloodstream is associated with coma and convulsions.
14. Despite Magnolia LNG’s low-cost claims, it is believed among LNG industry experts that if the OSMR process is successful, it will be 38% or more expensive than projects in the Gulf of Mexico that use the APCI technology (on a like-for-like comparison). Unlike the industry proven APCI technology, the challenge with Magnolia’s OSMR process is that it has never been utilized in an LNG facility, therefore making it’s impossible to know what the actual results will be.
15. LNG Buyers factor in the risks associated with “first-of-a-kind” technologies like Magnolia’s OSMR process. It is extraordinarily rare for an LNG Buyer to take the risks associated with a first-of-a-kind technology. Typically, first-of-a-kind technology risks are developed by major oil companies prepared to risk billions of dollars for the potential of future upside.
16. Magnolia LNG is approximately 25 miles to the Gulf of Mexico. Over the term of a typical LNG sales contract, LNG Buyers will pay approximately $300MM or more for LNG Shipping costs to transit LNG ships across arguably the busiest energy river in the United States.

1. “Magnolia LNG’s website: OSMR© technology,” as seen on November 10th, 2017 at: <http://www.lnglimited.com.au/irm/content/osmr-technology1.aspx?RID=346&RedirectCount=1> [↑](#footnote-ref-1)
2. “Magnolia LNG Liquefaction Project Profile.” PFC Energy (IHS Markit), 18 August 2015 [↑](#footnote-ref-2)