Air Resources Board

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August 3, 2006

Mr. Joe Lapka (AIR-3)
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105-3901

Dear Mr. Lapka:

We have reviewed the May 4, 2006 proposed Clean Air Act Authority to Construct (ATC) Permit (Permit Number LNG-VT-2006-01). The permit would grant conditional approval to BHP Billiton LNG International Inc. to construct a liquefied natural gas (LNG) facility off the coast of Ventura County, California. The proposed project consists of a floating storage and regasification unit (FSRU) consisting of eight submerged combustion vaporizers, four generators to power the FSRU, a back-up generator, three emergency fire water pumps and a diesel storage tank. Vessel emissions within California Costal waters are also attributed to the project including LNG carriers, tugs, and a crew boat. We appreciate the opportunity to provide the following comments.

General Comments

Mitigation Measures: The draft air permit does not include as a permit condition proposed emission mitigation measures to offset the oxides of nitrogen (NOx) emission increases associated with the stationary operations of the proposed project. The proposed emission mitigation measures include the re-powering of two line-haul tugs that are operated along the Coast of California with significant activity within the regions most impacted by the proposed project. According to BHP's recent estimates, NOx emissions associated with the stationary operations of the project are estimated to be 66.7 tons per year.

Although U.S. EPA is not requiring emission offsets for the project, BHP has agreed to a number of mitigation measures to be included in the draft permit. BHP has stated that while it is "somewhat irregular" to include voluntary commitments within air permits "typically reserved for applicable requirements." "There is nothing limiting the permit to applicable requirements and there are numerous situations where commitments to meet duties above and beyond the minimum legal requirements are memorialized in air

permits." BHP further recognized that "including the commitment as a permit condition will cause that commitment to be fully enforceable against the company BHP is willing to take this proactive step." (Letter dated April 15, 2005 from Thomas R. Wood to Amy Zimpfer.) Therefore, this commitment should be set forth as an enforceable permit condition.

Although not required by the draft permit, the Air Resources Board (ARB) staff believe all vessel NOx emissions within California Coastal Waters should be fully mitigated since these emissions add to the air pollution burden of downwind areas including the South Coast Air Basin. Again, although U.S. EPA is not requiring emissions offsets for the vessel emissions associated with the project, the applicant has offered and "committed to use natural gas as the fuel for all carrier vessels while in United States (U.S) waters and for all supply/crew vessels, tugs and other FSRU support vessels." (Letter dated June 29, 2005 from Amy Zimpfer to Commander Mark Prescott.) This commitment should be set forth as a permit condition to ensure its enforceability. Further, in the event carriers and vessels other than those used by BHP are permitted to utilize the facility under "open access" agreements with BHP, the permit must require that any other company's vessels be fueled by natural gas while in U.S. waters. We understand that all carrier vessels, whether steam-propelled or diesel-propelled, can run on 100 percent natural gas by forced boil off (installed on all carriers as a safety measure). BHP has the ability to require this in any contract it signs with other users of the FSRU.

BHP estimates that it will use at least eight carriers to transport the LNG to the FSRU, and one crew/supply boat will service the project locally. (Letter dated April 11, 2006 from Thomas Wood to Bob Fletcher). BHP estimates that these vessels would emit approximately 664 tons per year of NOx in federal waters, and fueling these vessels with natural gas while in federal waters will reduce NOx emissions to 163 tons per year. Further, equipping BHP's service tugs with Low-NOx engines will reduce overall vessel NOx emissions to about 96.7 tons per year. This commitment should be set forth as an enforceable permit condition.

In addition to including the use of natural gas fueling in vessels while in federal waters to reduce NOx (and diesel PM) emissions, additional vessel emissions mitigation is being proposed by BHP by re-powering two line-haul tugs that operate within California Coastal Waters. BHP's tug re-powering proposals are discussed in the reports "Line Haul Tug M/V Klihyam Low-NOx Repower Project, May 19, 2006" and "Line Haul Tug M/V Pacific Falcon Low-NOx Repower Project, May 29, 2006." In these reports, BHP estimates that the tug re-powers will achieve a total of about 211 tons per year of NOx emissions reductions. These reductions compare to about 163.4 tons per day of NOx emissions from the total project operations (vessels and FSRU). BHP has submitted

their proposal in detail to ARB staff, and we are in the process of evaluating BHP's estimates and methodologies. However, in the meantime, all of the commitments made by BHP regarding the tug repowers should be set forth as legally enforceable conditions in the U.S. EPA permit. Moreover, in the event that the anticipated emission reductions from the tug repowers are not as great as promised, or if the tugs leave service and are not replaced with equally low-emission boats, the return of the funds BHP is providing for these emission reductions must be legally obligated, in an enforceable document included in the U.S. EPA air permit, to be used for NOx mitigation.

Therefore, to ensure that the proposed emission reductions are achieved, the mitigation measures described above should be in a legally enforceable form in the draft air permit and U.S. EPA should require the following:

1. The proposed emission mitigation measures will completely offset NOx emissions from both stationary and vessel emissions within California Coastal Waters;
2. The operations of the tugs shall be conducted in a manner to maintain the mitigation of emissions within the regions affected by the project;
3. The operations of the tugs shall be maintained for a definite period of time; and
4. Enforceable contingency measures are included that address possible failure of the tug operators and BHP to meet their obligations to achieve the estimated emission reductions.

Gas Quality: We understand that although BHP has identified a source of LNG that would be comparable to the natural gas consumed in California, BHP has not ruled out the possibility of importing LNG with a quality approaching 1400 Wobbe number. Similarly, under an "open access" scheme, there is no guarantee that other companies would carry gas of the appropriate heat content for the California market. ARB staff believes that significant adverse impacts on California's air quality may potentially occur if LNG imports are allowed to substantially increase the historical quality (Wobbe number) of natural gas that has been used in California.

For the South Coast Air Basin (SCAB), the historical average weighted Wobbe number of natural gas is about 1330 Wobbe. Available information indicates that increasing the Wobbe number from this level to 1400 Wobbe can significantly increase NOx emissions.

In 2005, the Southern California Gas Company completed a test program that evaluated possible emissions impacts associated with varying natural gas quality on selected residential and commercial/light industrial equipment (13 units were tested).[1] The

[1] "Final Report, Gas Quality and Liquefied Natural Gas Study", April 2005, Southern California Gas Company, P.O. Box 513249 SC723B, Los Angeles, CA 90051.

results from this evaluation indicate that although most mass marketed residential equipment were minimally affected, commercial and industrial equipment were significantly affected when burning high energy content natural gas (e.g. 1400 Wobbe number). Our analysis of this evaluation indicates that NOx emissions from these units can increase up to 40 percent or more when comparing natural gas with a 1400 Wobbe number versus a 1330 Wobbe number.

In evaluating the stationary NOx inventory in the SCAB, 60 to 75 percent of this inventory comes from commercial and industrial equipment. Depending on the penetration of natural gas within SCAB, increases in the stationary NOx inventory could be significant. We understand that the California Public Utilities Commission is working on this issue, but it has not yet issued a decision.

Based on this, we believe that the draft permit should contain conditions that limit the importation of LNG by BHP or other companies who contract to use the FSRU to prevent any significant increase in the Wobbe number of natural gas from historical levels. The South Coast Air Quality Management District has proposed that an appropriate gas quality Wobbe limitation would be a 1330 Wobbe plus/minus 2 percent. We recommend that U.S. EPA consider a gas quality specification based on this level within the draft permit.

Ongoing Best Available Control Technology (BACT) Requirements: BHP has committed to meet BACT for all equipment that emit air contaminants in this application. However, there is no requirement or commitment from BHP to install BACT for any subsequent modifications that may occur at this proposed facility (except for what is federally required). We believe that any future modifications should be required to install BACT and recommend that the draft permit include such a requirement.

Applicability of Ventura County Air Pollution Control District (VCAPCD) Rules: The draft permit does not include requirements based on rules that are applicable and currently adopted in VCAPCD. These include District Rule 74.9 – Stationary Internal Combustion Engines; Rule 74.10 – Components at Crude Oil and Natural Gas Production and Processing Facilities, and Rule 74.15 – Boilers, Steam Generators and Process Heaters. We recommend that U.S. EPA review these rules and include pertinent requirements.

Comments Specific to the Authority to Construct

1. Page 2 - Equipment List
    A. The description of the eight submerged combustion vaporizers (SCV's) (D1- D8) is listed as a Sub-X rated at 155 MMBtu/hr. These should be

listed as 115 MMBtu/hr. In addition, Selas Corporation describes these units as “SUB-X-120’s”.

B. The description of the SCV’s should note that the SCV’s are equipped with a pre-mix low NOx burner.

C. The four Wartsila model 9L50DF’s are listed as being rated at 8,250 kW each. The product specification for these engines submitted with the ATC application states the maximum continuous rating for these engines is 8,550 kW. ARB staff requests that you clarify this discrepancy.

D. The equipment descriptions for the emergency standby engine and the three emergency fire pump engines should include that they are Tier II engines.

2. Page 4 - Emission limits for NOx and Carbon Monoxide (CO):

A. The permit states that the SCV will incorporate low NOx burners to achieve 20 parts per million by volume (ppmv). In a conversation on June 5, 2006 with Edward Vogel, LNG Senior Product Manager of Selas Fluid Processing Company, ARB staff learned that Selas Corporation does not currently have a low NOx burner commercially available. Mr. Vogel stated that a pre-mix burner will be available for installation on this facility and will be guaranteed to meet 15 ppmv NOx and 25 ppmv CO. Though the limits for these burners have not been demonstrated, U.S. EPA should specify that the pre-mix burner meet 15 ppmv NOx and 25 ppmv CO guaranteed by the vendor. If the vendor cannot meet the stated limits, then the ATC should meet the lower of the limits of either that demonstrated by the vendor, the limits specified by the applicant, or at a maximum, the currently demonstrated SUB X-120 emission limits which (although do not utilize a pre-mix burner) have been demonstrated to meet 30 ppmv NOx and 40 ppmv CO (corrected to 3 percent O2) at the Elba Island facility.

B. The table states that the emission limits apply to the post-controlled emissions from <u>each</u> emissions unit listed below while operating on boil-off gas (BOG). The pound/hour limit listed for units D1 through D8 (11.17 lbs/hr for NOx and 34.0 lbs/hr for CO) is a combined emission limit when four units are operating at once. Based on 115 MMBtu/Hr with a controlled emission rate of 0.0243 lbs/MMBtu NOx, the pound per hour emission rate should be 2.79 lbs per hour each. The CO emissions rate for each unit based on a controlled emission rate of 0.0739 lbs/MMBtu at 115 MMBtu/Hr is 8.50 lbs/hr. ARB staff recommend that the permit be corrected to include this updated information.

C. ARB staff questions why the pound per hour limits included in this table are in parenthesis. Please clarify if these emission limits are considered to be enforceable.
D. The emissions for Units D9 through D12 operating on BOG in this table state an emission limit of 5.94 lbs/hr NOx. However, the errata data sheets submitted to U.S. EPA (dated April 7, 2006 and entitled "Appendix A revised 4/6/06") Table FSRU 5: Wartsila 9L50DF Controlled Emissions Summary, utilize an hourly emission rate of 5.46 lbs/Hr NOx. The CO emission rate is listed in the Table is listed at 8.04 lbs/hr, yet the errata sheet lists an emission rate of 9.28 lbs/hr. ARB staff recommend that these limits be updated to reflect the errata. Further, because these engines utilize a diesel pilot, please clarify when these limits apply.
E. The emissions for Units D9 through D12 in this table operating on diesel fuel state an emission limit of 38.68 lbs/hr at 15 percent O2, and list the NOx limit at 150 ppmv. The pound per hour limit is independent of an oxygen concentration. Instead the 150 ppmv NOx limit should have an oxygen correction factor listed (at 15 percent O2).
F. The emission limits for the three emergency fire water pumps and one emergency standby engine should be listed as enforceable permit conditions in the table.

2. Page 5 - Emission limits for reactive organic compounds (ROC), oxides of sulfur (SOx), and particulate matter less then 10 microns (PM10).
   A. The table lists the emission limit for units D1 through D8 for ROC operating on BOG at 0.08 lbs/hr. The erratum lists the ROC emission limit at 0.80 lbs/hr. ARB staff recommend that these be updated to include the information from the errata.
   B. The table lists the emission limit for units D1 through D8 for SO_2 operating on BOG at 0.08 lbs/hr at 3 percent O2. The pound per hour limit is independent of an oxygen concentration.
   C. The table lists the emission limit for units D9 through D12 for ROC operating on BOG at 9.19 lbs/hr. The erratum lists the ROC emission limit at 10.91 lbs/hr. ARB staff recommends that the permit be corrected to include this updated information.
   D. The table lists the emission limit for units D9 through D12 for SO_2 operating on BOG at 0.03 lbs/hr at 15 percent O2. The pound per hour limit is independent of an oxygen concentration.
   E. The table lists the emission limit for units D9 through D12 for PM10 operating on BOG at 3.45 lbs/hr. The erratum lists the PM10 emission limit at 3.61 lbs/hr. In addition, the pound per hour limit is independent of

an oxygen concentration. ARB staff recommend that the permit be corrected to include this updated information.

F. The table lists the emission limit for units D9 through D12 for ROC operating on diesel at 5.38 lbs/hr at 15 percent O2. The pound per hour limit is independent of an oxygen concentration. Instead, the 60 ppmv limit should have an oxygen correction factor listed (at 15 percent O2).

G. The table lists the emission limit for units D9 through D12 for SO_2 operating on diesel at .01 lbs/hr at 15 percent O2 and 0.3 ppmv. The erratum lists the controlled SO_2 limit at 0.29 ppmv.

H. The table lists the emission limit for units D9 through D12 on diesel at 2.83 lbs/hr at 15 percent O2. The erratum lists the PM10 emission limit at 2.80 lbs/hr. In addition, the pound per hour limit is independent of an oxygen concentration. The 0.0092 ppmv limit is listed in the errata as 0.0091 ppmv. ARB staff recommends that the permit be corrected to include this updated information.

I. The emission limits for the three emergency fire water pumps and one emergency standby engine should be listed in the table.

3. Page 12 - BOG Sulfur Content:

   The ATC requires that the sulfur content of the BOG be analyzed annually. Because the LNG arrives at the FSRU as batches and because the supply of the LNG may not be consistent, the sulfur content may be different for each batch. Therefore, we recommend that each batch be analyzed for sulfur content.

4. Page 14 - Performance Tests

   The Table on Page 14 for the subsequent performance tests does not list the requirements to perform annual source testing for NOx and CO for Units D1 through D12. As listed on Page 9, “B. Monitoring Requirements,” the ATC requires that a relative accuracy test audit be performed annually as required by Appendix F, Procedure 1. Further, the initial source testing and associated source test methods are listed on Page 13. The ATC could be made clearer by requiring annual source testing for NOx and CO in the performance testing section and include the appropriate source test methods.

Thank you for the opportunity to provide comments on the draft Authority to Construct. If you have any questions concerning these comments, please contact Mr. Michel Tollstrup, Chief, Project Assessment Branch, at (916) 322-6026 or Mr. Gary Yee, Manager, Industrial Section, Criteria Pollutants Branch, at (916) 327-5986.

Sincerely,

/S/

Robert D. Fletcher, Chief
Stationary Source Division

cc: Mr. Michael Tollstrup, Chief
Project Assessment Branch

Mr. Gary M. Yee, Manager
Industrial Section