

## MEMORANDUM

September 20, 2005

**TO:** MEMBERS, PORT COMMISSION  
Hon. Wilfred Hsu, President  
Hon. Michael Hardeman, Vice President  
Hon. Sue Bierman  
Hon. Kimberly Brandon  
Hon. Ann Lazarus

**FROM:** Monique Moyer  
Executive Director

**SUBJECT:** Approval of Cruise Terminal Environmental Advisory Committee recommendations regarding the air quality conditions to BCDC Major Permit 5-03 regarding the feasibility of shoreside power and alternative air emission technologies for cruise ships berthing at the future James R. Herman International Cruise Terminal at Pier 30-32.

**DIRECTOR'S RECOMMENDATION:** APPROVE CRUISE TERMINAL ENVIRONMENTAL ADVISORY COMMITTEE RECOMMENDATIONS REGARDING THE FEASIBILITY OF SHORESIDE POWER AND ALTERNATIVE AIR EMISSION TECHNOLOGIES FOR CRUISE SHIPS BERTHING AT THE FUTURE JAMES R. HERMAN INTERNATIONAL CRUISE TERMINAL.

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### **Background**

The Port of San Francisco is developing the new James R. Herman International Cruise Terminal and Mixed Use Project at Pier 30-32 (Cruise Terminal Project). On March 25, 2003, as part of the Final Supplemental Environmental Impact Report (FSEIR) process, the Port Commission approved the transaction documents guiding the lease and development of the cruise terminal and adopted California Environmental Quality Act (CEQA) findings that discuss the significant environmental impacts of the Cruise Terminal Project. The findings indicate that proposed mitigation measures reduce some impacts to levels of insignificance and identify other certain unavoidable significant environmental impacts. The findings included a Statement of Overriding Considerations that specific economic, legal, social, and other benefits outweigh the significant effects on the environment. The CEQA findings also called for implementation of a Mitigation Monitoring and Reporting Program that includes, among other measures, establishment of air and water quality advisory groups to the Port Commission. These advisory groups would review potential additional mitigation measures for the air and water impacts of cruise ship activity at the cruise terminal and would provide recommendations to the Port Commission.

On June 11, 2003, the Port Commission adopted a resolution to establish the Cruise Terminal Environmental Advisory Committee (CTEAC). CTEAC, consisting of a wide range of stakeholders including the maritime/cruise industry, environmental organizations, regulatory agencies, and community groups, has met on a monthly basis since September 2003, to review cruise ship impacts to air and water quality and recommend additional feasible measures to the Port Commission to reduce those impacts.

On November 6, 2003, the Bay Conservation and Development Commission (BCDC) approved a resolution in regards to the Major Permit No. 5-03 for the cruise terminal project, imposing certain conditions regarding the potential cruise ship impact on San Francisco Bay air and water quality.

On September 28, 2004, the Port Commission adopted a resolution which authorized the Executive Director to enter into a contract with Environ International Corporation to conduct a feasibility study of shoreside power and alternative air emission technologies for a fee not to exceed \$50,000. On April 12, 2005, the Port Commission adopted a resolution allowing the Executive Director to amend the contract by increasing the contract amount by \$35,000.

The Port, in collaboration with CTEAC, has also been undertaking various approaches to reduce air emissions at the James R. Herman Cruise Terminal Project. The Port has developed a Cruise Ship Environmental Award program. This program promotes and recognizes vessels that reduce air and water pollution while operating in San Francisco Bay. An award will be given to cruise ships that exceed existing environmental regulations and industry standards to achieve greater protection of air and water quality. The three categories are: air emission reduction, wastewater treatment, and recycling and disposal programs for solid waste.

In February 2005, the Port submitted a grant application to the Environmental Protection Agency (EPA) requesting federal funds to cover the Port's costs of providing monetary incentives to cruise lines for using cleaner fuels on their ships in port to reduce air emissions. Cruise lines currently use cost-effective conventional Intermediate Fuel Oil while hotelling in port. This program would encourage the cruise ships that berth in San Francisco to use instead more expensive low-sulfur fuels, such as Marine Diesel Oil or Marine Gas Oil. On September 15, 2005, EPA announced an award to the Port of \$100,000 for its implementation known as the Cruise Liner Emissions Reduction Incentives Project.

In compliance with the BCDC Major Permit No 5-03 conditions, the Port Commission, on August 23, 2005, adopted a resolution approving the CTEAC recommendations regarding (1) on-shore wastewater treatment and (2) water quality monitoring for cruise ships to be berthed at future James R. Herman cruise terminal. Under this Permit, BCDC also requires submission of CTEAC's recommendations to reduce air emissions and the Port Commission's determination as to the feasibility of implementing those recommendations.

As noted above, the Port contracted with Environ International Corporation to determine the feasibility of shoreside power and alternative air control measures. The objectives of the Environ study were to (1) analyze the current and planned cruise ship operations and berth facilities; (2) identify four candidate (or "frequent flyer") cruise ships to evaluate the feasibility, emissions benefits and associated costs of the use of shoreside power, and (3) explore alternative air

emissions control technologies while cruise ships are at berth to reduce hotelling and transit emissions. The Environ study examined the technical and cost feasibility of the shoreside power and discussed alternative air emission reduction measures. Because this was a conceptual study, Environ did not perform a detailed engineering study, but derived costs and general descriptions based on similar Princess Cruise Line installations in Juneau and Seattle. In assessing the overall cost effectiveness of shoreside power, the provider of the energy, the cost of that energy, and the allocation of the construction and operating costs are preliminary estimates. A summary of Environ's conclusions and recommendations are attached (Attachment A).

The complete Environ study is available on the Port's website ([www.sfport.com](http://www.sfport.com)) and at Port offices for review upon request.

**Proposed CTEAC Recommendations to the Port Commission:**

CTEAC supports the conclusions reached by Environ, the Port's technical consultant, that the shoreside power and alternative air emission technologies are technically feasible at the James R. Herman Cruise Terminal. Besides the inclusion of on-site shoreside power infrastructure, the Environ study did not identify any other feasible technologies requiring the incorporation of infrastructure with the project site.

CTEAC agrees that the air emission recommendations, noted below, be approved by the Port Commission in the permittees' report to BCDC. These recommendations include the feasibility of using lower emission fuels, cold-ironing (i.e., shoreside power hook-up), the prohibition of on-board incineration, and the identification, reservation and incorporation of infrastructure within the project site for emerging technology.

The Environ study did not include feasibility of on-board incineration since state law was enacted, effective January 1, 2005, to prohibit such incineration in California coastal waters. Accordingly, CTEAC agrees that a recommendation regarding on-board incineration is unnecessary.

CTEAC will be reviewing other additional measures to reduce air emissions at Pier 30-32 to determine whether such measures are feasible and may accordingly provide recommendations for consideration by the Port Commission.

CTEAC unanimously recommended that the Port take the following measures to reduce air emissions:

1. Support proposed California Air Resource Board (CARB) proposal to require use of (low sulfur) marine fuel containing 0.5% or less sulfur. Facilitate the use of low-sulfur fuel on cruise ships while in San Francisco Bay through the Port's EPA-funded Cruise Liner Emissions Reduction Incentives Project, and continue to pursue federal and/or state incentive grant funds to reduce transit emissions as an interim measure until there are state or federal regulations requiring such low-sulfur content fuel. If CARB does not regulate the use of alternative fuels, the Port and SFCT will require the use of low-sulfur fuel at the dock if available and financially feasible.

2. Recognize and promote cruise lines that are committed to environmentally responsible operations through the Port's Cruise Ship Environmental Award program. The program recognizes cruise lines that install the best available engine, using emission reduction technologies, and/or the use of cleaner burning fuel so that emission reductions occur not only at berth but in transit between ports. Recognize and promote cruise lines that retrofit their ships to utilize shoreside power and commit to explore grant funding for these retrofits.
3. Coordinate with other West Coast cruise ports on their ability and timing to install shoreside power and their ability to provide a financial incentive to cruise lines to retrofit ships for shoreside power. Develop an incentive program that would ensure maximum usage of the shoreside facility for cruise ships that can hook-up to shoreside power.
4. Acknowledge that while shoreside power is technically feasible and the most effective method to reduce Nitrogen Oxides (NOx), Sulfur Oxides (SOx), and Particulate Matter (PM) emissions while at berth, further analysis--relating to the cost of the shoreside power infrastructure, the uncertainty of the price of electricity, and the limited number of ship calls able to use shoreside power--is required to determine economic feasibility.
5. Commit SFCT to study implementation of shoreside power at the James R. Herman cruise terminal. As part of the Scope of Development in the Lease Disposition and Development Agreement between the Port and SFCT, SFCT must commit to an engineering analysis that will determine the infrastructure cost of electrical transmission to the mixed-use portions of the project. SFCT will commit in this analysis to include the incremental cost of providing cruise terminal shoreside power and complete this analysis no later than June 30, 2006, and when completed the CTEAC will reconvene to review this analysis and provide a recommendation to the Port Commission.
6. Instruct Port staff to make the pursuit of funding (federal, state and private) one of the Port's highest priorities. Prepare a funding plan and aggressively pursue federal grant funding and other sources to fund the implementation of shoreside power at the James R. Herman cruise terminal, and report periodically to CTEAC and provide a recommendation to the Port Commission and report progress to BCDC by June 30, 2006.
7. Commit SFCT to include adequate space in all utility trenching, ductwork and other civil engineering work to bring electrical service to the Pier 30-32 project site and in designing and installing the electrical distribution system at the James R. Herman cruise terminal to allow for the installation of a shoreside power connection at a future date, in the event that adequate funds are not identified prior to the initial commencement of project construction.
8. Initiate negotiations immediately with San Francisco Public Utilities Commission and other direct stakeholders with regard to the price of shoreside power electricity from provider and resolve outstanding issues relating to the transmission and price of shoreside electric power; commit to the resolution of transmission and pricing issues such that there is an incentive to the cruise lines to utilize shoreside power usage prior to occupancy of the James R. Herman cruise terminal and report to the Port Commission and the Bay Conservation and Development Commission by June 30, 2006.

**Recommendation**

Port staff recommends that the Port Commission approve CTEAC recommendations regarding the feasibility of reducing air emissions at the James R. Herman International Cruise Terminal and authorize that the Executive Director forward these recommendations to the Bay Conservation and Development Commission for its consideration as required under Major Permit 5-03.

Prepared by: John Doll  
Project Manager  
Planning & Development Division

## ATTACHMENT A

### **Feasibility Study of Shoreside Power and Alternative Air Emission Technologies**

Environ provided the following conclusions:

- (1) Shoreside auxiliary electrical power demand is estimated to be less than 12.5 MW for a single shoreside connection. This is consistent with demands at Juneau and Seattle.
- (2) Hotelling with shoreside power is technically possible. Certain provisions could be incorporated into the facility design, principally the under-pier electrical conduit and provision of adequate space for future step-down transformer expansion and electrical reel placement to accommodate a shoreside power system.
- (3) The technical aspects of shoreside power have been examined and Environ found that Pier 30-32 does not present any unique issues to San Francisco; these issues have been addressed in actual installations in the Princess berths in Juneau and Seattle. However, aesthetics and space management (i.e., installation of a transformer) need to be addressed at Pier 30-32.
- (4) Only one cruise line has vessels equipped to receive shoreside power – Princess Cruises. Of the Princess ships that frequent the Port of San Francisco, only the Dawn Princess is currently equipped for hook-up to shoreside power. It is estimated that other Princess cruise ships and ships from other cruise lines could be retrofitted at a cost of \$500,000-700,000 per ship.
- (5) The shoreside capital cost for electricity supply for a single berth to be in the range of \$1.5 million to \$3.0 million, with an approximate range of \$600,000 to \$1.5 million for on-pier electrical supply fixed costs. Within the cost estimates for the on-pier electric supply, the capital cost for a substation with a 12.5 MW transformer, and a double cable reel tower assembly was estimated to be about \$300,000. However, this cost would be increased accordingly if more than 2 cables and/or larger transformer are used. The shoreside annual operation and maintenance cost, which would be mainly labor cost, was estimated to be approximately \$140,000.
- (6) The main cost to cruise ship operators is the increased cost of the electrical power provided by the local utility as opposed to providing their own auxiliary power by way of at dock hotelling with their own engine/generator system. This study showed that this cost ranged up to 2 to 3 times self-generated electrical costs. In other words, it costs the cruise industry more to use shoreside power while at berth than shipboard generated electrical power. The study found that the “break-even” point for this portion of the electrical cost was in the range of \$0.05-0.10/kW-hr of provided electrical load.
- (7) Depending on ship size and frequency of visits, the study estimated that an annual cost of approximately \$150,000 to \$300,000 per ship for purchase of utility provided electricity.
- (8) A key determinant of any future shoreside power system must include a thorough examination of electrical rate structures available to the cruise ships. For the Environ study, nominal rate structures of 0.141 \$/kW-hr and 0.220 \$/kW-hr provided by PG&E were used for the four candidate ship scenario and for one ship scenario, respectively. For comparison, other

ports that have implemented or are implementing shoreside power report or anticipate energy rates in the range of 0.03 to 0.085 \$/kW-hr. This is made possible through a subsidy provided by ports and/or city owned utilities.

(9) Current methods of evaluating the “cost effectiveness” of various air pollutant emissions reductions control options in California often rely upon the “Carl Moyer” program guidance. Cost effectiveness is usually expressed in terms of tons of air pollutant emissions reduced divided by the cost of the measure to accomplish that reduction. The upper end of the “acceptable” ratio for this metric under the Carl Moyer program is approximately \$14,000/ton of combined oxides of nitrogen and particulate matter.

Shoreside power would provide about 8 to 20 tons per year of NO<sub>x</sub> emission reductions, and 0.05 to 1.3 tons per year of PM emission reductions per vessel, which was about 80% and 75% of the hotelling NO<sub>x</sub> and PM emissions, respectively, from the four candidate ships examined in the study. The total shoreside power emission reduction from the example vessels was estimated to be about 50 tons/year of combined NO<sub>x</sub> and PM emission reductions or about 50% of the total hotelling emissions from all the cruise ships—if they could hook-up to shoreside power--berthed at the Port in 2004. In addition to NO<sub>x</sub> and PM emissions, the SO<sub>x</sub> emission reduction from shoreside power from these vessels was estimated to be about 30 tons/year.

Shoreside power provision examined in this study produced cost effectiveness values of 5,500 to 7,000 \$/ton if all four ships examined are assumed to participate. However, if only one ship, or several ships with infrequent rates of call, is assumed, this cost effectiveness becomes much less attractive, quickly exceeding the State’s Carl Moyer limit. Therefore, it is important that the program, to be cost effective, result in use by as many frequently visiting ships as possible.

(10) Alternative air emission control technologies, in tandem with one another or separately, were also evaluated for feasibility and cost effectiveness to reduce hotelling emissions. While they are technically feasible, the Environ study demonstrated that these methods, used alone, are not as effective in emissions reduction as shoreside power. Environ noted that because the sulfur in marine fuel can be responsible for a large portion of Particulate Matter emissions, the California Air Resources Board is considering a program to encourage the use of low sulfur fuel for ship auxiliary diesel engines in California waters.

Environ concluded that shoreside power implementation is technically feasible, but requires further study to ensure its economic feasibility. Environ recommends that the following five steps be undertaken to determine feasibility:

- (1) PG&E should prepare a detailed electrical cost study to determine the cost of implementing shoreside power.
- (2) The electrical rate structure must be fully vetted with the participation of the Port, SFCT, PG&E, and the San Francisco Public Utilities Commission as this is a crucial element in determining actual cost-effectiveness.
- (3) A re-examination of future ship use of shoreside power should be undertaken to assure that assumptions made in the Environ study hold as implementation becomes more certain.

(4) The Port should work with other West Coast port to better assure equity of treatment of cruise ships so that no port is penalized (through loss of business) for implementing progressive air pollution control measures, such as shoreside power.

(5) The Port and other stakeholders should explore the availability of potential government-funding options to subsidize shoreside power.

**PORT COMMISSION  
CITY AND COUNTY OF SAN FRANCISCO**

**RESOLUTION NO. 05-**

- WHEREAS, on March 23, 2003, by Resolution No. 03-27, the Port Commission adopted findings, including a statement of overriding considerations and a mitigation and monitoring program, pursuant to the California Environmental Quality Act (CEQA) and the State CEQA guidelines in connection with the Mixed-Use Cruise Terminal Project (also known as the James R. Herman International Cruise Terminal); and,
- WHEREAS, on March 23, 2003, by Resolution No. 03-28, the San Francisco Port Commission approved transaction documents to allow the development of a new Mixed-use Cruise Terminal at Pier 30-32; and
- WHEREAS, on June 12, 2003, by Resolution No. 03-39, the Port Commission approved a San Francisco Cruise Terminal and Environmental Policy and Program which included creation of the Cruise Terminal Environmental Advisory Committee (CTEAC) which serves as an advisory group to the Port Commission; and,
- WHEREAS, on November 6, 2003, the Bay Conservation and Development Commission (BCDC) approved a resolution that requires that by September 30, 2005, the permittees report to BCDC on CTEAC's recommendations to reduce air emissions and on the Port Commission's determination as to the feasibility of implementing those recommendations. The recommendations should address, at a minimum, the feasibility of using lower emission fuels, cold-ironing (i.e., shoreside power hook-up), the prohibition of onboard incineration, and the identification, reservation, and incorporation of infrastructure within the project site for emerging technology; and,
- WHEREAS, on behalf of the Port, Environ International Corporation prepared a feasibility study of shoreside power and alternative air emission technologies for cruise ships berthing at the future James R. Herman International Cruise Terminal; and
- WHEREAS, CTEAC has reviewed the Environ study and endorsed its recommendations; and
- WHEREAS, CTEAC unanimously agreed on the air quality recommendations outlines in the staff memorandum for this Agenda item; and
- WHEREAS, the Port staff recommends to the Port Commission adopt CTEAC's air quality recommendations; NOW, THEREFORE, BE IT

RESOLVED, that the Port Commission hereby approves the CTEAC recommendations regarding the feasibility of reducing air emissions at the James R. Herman International Cruise Terminal; and

RESOLVED, that the Port Commission authorizes the Executive Director forward CTEAC's recommendations to the Bay Conservation and Development Commission for its consideration as required under Major Permit 5-03.

*I hereby authorize that the foregoing resolution was adopted by the San Francisco Port Commission at its meeting of September 27, 2005.*

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Secretary