

Date: March 2, 2009
To: Johanna Partin, SFE
From: Ian Austin, URS
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Subject: **Summary of Recent Agency Interaction
Use of Bay Water for Once-Through Cooling
Treasure Island Water-Source Heat Pumps Pre-Feasibility Study**

1.0 BACKGROUND

Since URS has been involved with several projects that have proposed Bay-water as a source of once-through cooling water and based on discussion of subject at a recent project meeting, the SF Department of the Environment (SFE) requested that URS summarize our experience related to permitting of once-through cooling water. This memorandum summarizes our experience, regulatory drivers, affected environment, impact to projects and recent agency discussions related to impingement and entrainment.

2.0 URS PROJECT EXPERIENCE

Our role has included providing permitting support to clients, which have included power generation companies, wastewater treatment plant operators and refineries.

3.0 REGULATORY DRIVERS

In general, the Bay Thermal Plan allows for use of Bay-water as once through cooling water if the water is returned to the Bay at a temperature difference of no greater than 4 degrees F, as compared to the ambient water temperature at the point of extraction. The Bay Thermal Plan is a subset to the Basin Plan, which is the State Water Board master water quality control document, which designates beneficial uses and water quality objectives for State waters. Documentation of compliance with the Basin Plan is required as part of the project permitting process. The Basin Plan is guidance to ensure the State is in compliance with the Clean Water Act 316(a), which governs temperature.

In addition to temperature, water quality is controlled by the Basin Plan and associated permits (e.g., National Pollution Discharge Elimination Permit (NPDES)) which must be consistent with the Basin Plan standards and is required to be routinely monitored to document compliance.

4.0 AFFECTED ENVIROMENT

Our technical support to clients interested in using Bay Water has included evaluation of chilling once-through water to conform to the Thermal Plan requirements. These projects have evaluated in detail the steps necessary to reduce discharge cooling water temperatures compliant with the Thermal Plan in conformance with 316(a). In addition to 316(a) requirements, Clean Water Act section 316(b) requires impingement and entrainment studies to demonstrate the project is utilizing the best available technology. In general, impingement is related to marine organisms caught on the outside of an intake structure. Entrainment relates to micro-organisms that are smaller than the intake screen size, which will pass through the intake structure. Studies to document best available technology is being utilized require extensive study of the local environment to identify the potentially affected species and estimate to what extent these species will be affected by the project (e.g., percent of population losses).

5.0 IMPACT TO PROJECTS

Based on detailed interaction with reviewing agencies there is consensus that recent changes to 316(b) regulations have resulted in onerous requirements that have essentially precluded use of sea water for cooling purposes by these clients and associated projects.

As discussed during our meeting, it is recognized that if a Bay-Coupled heat exchanger were utilized by Treasure Island, the discharge water would actually be chilled in comparison with ambient extracted temperatures. Although there is evidence that cooler water discharged to a marine environment may have beneficial attributes to the environment, it is acknowledged that the agencies and regulations cannot accommodate this distinction. Therefore, the duration of permitting and associated technical documentation required to support the proposed use would be similar to recent experiences of cooling water applications.

6.0 RECENT AGENCY DISCUSSIONS RELATED TO IMPINGEMENT AND ENTRAINMENT

Recent meetings involving Bay-Area water and associated resource agencies have been held to discuss the use of salt water in conjunction with underwater power generation. The agency conference calls to date have included dialogue related to specific agency concerns related to this proposed practice in the Bay Area.

While screen size and velocity limitations have been set by the State Water Board, both the NMFS and the CDFG have imposed additional screening criteria to protect listed and commercial species under their jurisdictions (NMFS-essential fish habitat (EFH), CDFG-commercial fisheries resources and species). Species identified as specifically of concern for the Bay Area include salmon species, green sturgeon and herring and smelt.

7.0 CONCLUSIONS

While use of Bay-water for heating and/or cooling is not strictly disallowed by the regulations, early planning, agency outreach and extensive supporting technical and environmental studies need to be undertaken to optimize the likelihood of success and to minimize the time involved in obtaining the necessary permits. With a well coordinated approach to preparation of the agency coordination, planning and technical and environmental studies, permitting Bay-water once-through heating or cooling, will likely require several years to complete.