

Ocean Thermal Energy Conversion (OTEC) Workshop

Assessing Potential Physical, Chemical and Biological Impacts and Risks

June 22-24, 2010
Honolulu, HI

As a step in ascertaining the regulatory thresholds for the authorization of ocean thermal energy projects, the National Oceanic and Atmospheric Administration (NOAA) and Department of Energy (DOE) are planning to hold a workshop discussing the biological impact and risk assessments to be conducted under the *Endangered Species Act*, *Magnuson-Stevens Fisheries Conservation and Management Act* and *Marine Mammal Protection Act*.

The workshop will serve as one of several forums for information gathering to assist NOAA and DOE in preparing to meet their OTECA licensing and permitting responsibilities to ensure that the development of a commercial scale OTEC facility is environmentally acceptable prior to an awarded license. It will assist NOAA and DOE in identifying the baseline environmental studies and monitoring strategies needed for OTEC development, and where further research is needed. The information developed at this workshop also will be useful to potential OTEC developers or users (e.g. the Navy) in developing a reasonable time line for deployment of commercial scale plants. The workshop is also another step in federal and state agency collaboration and coordination which is critical as industry actions advance towards commercial development.

Need and Purpose

With the renewed interest in OTEC development, regulations need be re-established for the authorization of OTEC facilities. Under the *Ocean Thermal Energy Conversion Act (OTECA)*, NOAA is tasked to expedite the development of OTEC in an environmentally acceptable manner.

In rebuilding its licensing capacity, NOAA is reviewing the former OTECA regulations, the environmental impact statement developed for the issuance of those regulations, and numerous studies on the potential environmental impacts of OTEC facilities. In developing new regulations and preparing an environmental impact statement for the regulations, the validity and adequacy of the OTECA environmental analyses conducted in the 1980s needs to be understood, along with new information sources and outstanding questions identified.

A critical need for OTEC developers and project reviewers is a clear understanding of the regulatory thresholds for project approval. While, those impact and risk thresholds derive largely from other statutes, the specific baseline information, monitoring and modeling strategies that are needed to assess the impacts of OTEC projects should be described as fully as possible in the OTECA regulations. Given that OTECA mandates a statutory deadline of 356 days to reach a decision following the receipt of a license application, project proponents would be greatly disadvantaged without knowing these requirements in advance.

Although OTEC demonstration projects authorized by the DOE may not require an OTECA license from NOAA, nonetheless, potential impacts will need to be considered. Much of this environmental data will also likely be required by DOE.

The Workshop

The OTEC Assessing Potential Physical, Chemical and Biological Impacts and Risks Workshop is intended to look at a narrow but crucial aspect of baseline information, monitoring and modeling strategies needed to assess the potential impacts of OTEC facilities on endangered or threatened marine organisms, fisheries, marine mammals, and their habitats. Those impacts may be direct such as entrainment and noise, or indirect such as alteration of biological, physical or chemical parameters within local environments. While the information needs are not limited to the potential impacts at potential OTEC sites offshore of Hawai'i, where the workshop will be held, the workshop will primarily focus on the ocean environment offshore of Hawai'i to provide a more specific context for the discussions. The workshop discussions are intended to be limited to experts in the field of biology, oceanographic processes, regulatory analysis, and OTEC design with a limited number of agency and local observers.

The workshop is being conducted as part of a continuum of information gathering that is preceding the formal development of OTECA regulations. It will not be a decision forum nor will the information gathered from the workshop be used exclusively in reaching any conclusions. A report on the workshop proceedings will be developed by the Coastal Response Research Center (CRRRC). NOAA recognizes that environmental impact considerations must go far beyond biological impacts including cultural, archeological, historical, socioeconomic and potential climatic impacts among others, and that these considerations are particularly acute in island environments. Discussions that precede and follow this workshop will develop information on these environmental aspects.

Goals

The goals of this workshop are twofold: first, to determine the baseline and monitoring data necessary to evaluate the biological impacts resulting from the operation of an OTEC facility, including the how, when and where this data can be obtained, and second, how can the facility design be adjusted to avoid, minimize or mitigate these impacts without endangering the functional viability of the facility. In order to obtain this goal the following questions need to be addressed:

- 1) What are the potential biological impacts and what are the most critical receptors (i.e., species, life stages) likely to be impacted by OTEC system activities (i.e., installation, operations and maintenance including permitted discharge, and accidental releases)?
- 2) Given the advancements of environmental monitoring, modeling, and knowledge of the marine environment since the OTEC program in the 1980's, are the analyses of OTEC impacts developed in the 1980s adequate for the development of regulatory guidelines and criteria?
- 3) What baseline assessments, monitoring strategies, modeling methods are needed to develop quantifiable levels of impact and risk for OTEC facilities?
- 4) What is the geographic extent of the population to which impacts should be related (e.g., Pacific Ocean, U.S. waters surrounding Hawai'i, waters around Oahu, or waters between Barbers Point and Diamond Head)?
- 5) What additional research is needed in regards to biological impact regulatory thresholds?
- 6) How can the potential physical, chemical and biological impacts be avoided, minimized or mitigated within the necessary design and operational parameters of an OTEC system, and can we develop a rubric to provide the ability to rank potential tradeoffs between biological impacts and operational efficiency?

Outcomes

As a result of its responsibilities assigned under OTECA, NOAA will not only need to understand OTEC technology but will also need to understand the potential environmental impacts and risks posed by OTEC facilities. The report detailing the discussions at this workshop will enable NOAA to make better informed decisions in developing OTEC commercial license requirements and DOE in developing permitting requirements for pilot and demonstration facilities. Also, the workshop is a step towards increased federal agency collaboration and coordination which is crucial to the advancement of the industry towards commercial development.

Workshop Structure

The workshop will be organized by the Coastal Response Research Center and facilitated by the National Ocean Service Special Projects Office. Prior to the workshop, participants will be supplied with information on potential physical, chemical and biological impacts from OTEC and data needs to evaluate these impacts. The morning of the first day will consist of a plenary session with overview presentations on the potential physical, chemical and biological impacts and the current status of OTEC technology. The afternoon session will follow with 5-8 breakout groups focusing on specific issues to be determined by the organizing committee with report outs to the entire group at the end of the day. The second day will be primarily break out group sessions with report outs. The third day will be a plenary session with presentations and discussions of findings and next steps.

Breakout Sessions

- Warm Water Intake (entrainment & impingement)
- Cold Water Intake (entrainment & impingement)
- Discharge (physical, thermal, compositional difference between deep water and receiving water)
- Chemical Impacts (Heat exchanger biocide, antifouling paint, corrosional & erosional products, leaks & spills)
- Attractant and construction impacts of hard structures (platform, anchors, cabling) and lighting
- Operational Acoustic & Electromagnetic Effects

Organizing Committee

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|-----------------|-------------------|---------------------|
| Don MacDonald | Kerry Kehoe | Whitney Blanchard |
| Helen Farr | Dwight Trueblood | Alan Everson |
| Michael Parke | Alison Hammer | Stephanie Kavanaugh |
| Tom Street | Eugene Bromley | Michael Reed |
| Doug Miller, LT | George Detweiler | Scott Madeiros, LT |
| Nancy Kinner | Joseph Cunningham | Zachary Magdol |