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October 18, 2007

Mr. Scott Davies
U.S. Maritime Administration
c/o Docket Management Facility
U.S. Department of Transportation
West Building Ground Floor, Room W12-140
1200 New Jersey Ave. SE
Washington, D.C. 20590-0001

Ms. Crystal Spurr
California State Lands Commission
100 Howe Ave., Suite 100 South
Sacramento, CA 95825-8202

Submitted via Fax: 202-493-2251
Submitted electronically: <http://dms.dot.gov>

Re: Notice of Intent to Prepare an Environmental Impact Statement /Environmental Impact Report for NorthernStar Inc. Clearwater Liquefied Natural Gas Deepwater Port (Docket No. USCG-2007-28676)

Dear Mr. Davies and Ms. Spurr:

We appreciate the opportunity to review and comment on the Notice of Intent to Prepare a Joint Environmental Impact Statement/Environmental Impact Report (“EIS/EIR”) for the proposed Clearwater Liquefied Natural Gas (LNG) Deepwater Port (project) to be located approximately 10.5 miles offshore Ventura County. Clearwater’s proposed project is comprised of (1) receiving, transfer and distribution facilities at the existing offshore oil platform Grace; (2) an offset dual berth Satellite Service Platform (SSP) capable of receiving 139 LNG carriers annually and two LNG carriers daily ranging in capacity from 70,000 – 220,000 cubic meters; (3) an ambient air vaporizer (AAV) re-gasification facility atop the platform with the capability of processing an average of 1.2 billion cubic feet per day of natural gas; (4) a 36-inch subsea pipeline to transport gas from Platform Grace to a new gas receiving and metering facility adjacent to the existing Mandalay Power Generating Station near Camarillo; and (5) approximately 63 miles of new onshore pipeline expanding the existing Southern California Gas Company pipeline system throughout Ventura County.

For this project, the applicant must submit a consistency certification to the California Coastal Commission pursuant to Section 307(c)(3)(A) of the federal Coastal Zone Management Act. In addition, the applicant must obtain from the Coastal Commission a coastal development permit

to authorize project-related activities located within State waters. The project will also require coastal development permits from the City of Oxnard and the County of Ventura, pursuant to their certified Local Coastal Programs, for the project components located onshore within the coastal zone. As a major energy facility, however, the decisions by the City and County are appealable to the Coastal Commission. The Coastal Commission will rely in part on the information provided in the EIS/EIR in evaluating the proposed project's conformity with the resource protection policies of California's Coastal Management Program. Accordingly, we request that the EIS/EIR include the following information:

Project Description

1. Delineate vessel access routes, work crew launch sites, anchoring areas, stockpile areas, refueling and equipment maintenance areas, etc. that will be used for project construction activities.
2. Has a similar cryogenic pipe-in-pipe system been used at any other LNG facility? If so, where? Identify the ranges of noticeable fog from the AAV and whether/how it will alter visibility in the vicinity of the platform.
3. Conduct a structural analysis of Platform Grace with respect to the ability of the structure to remain in service for 40+ more years, or the expected life of the project. Evaluate whether any work will be needed on the platform to extend its service life. Clarify if continued use of Platform Grace will alter or extend any of the other platforms/pipelines/facilities associated with Grace.
4. Provide details on the expected methods of anchoring, foundation, etc. for the Satellite Service Platform. Identify the allowable safe operating distance between Platform Grace and the SSP, structural interactions anticipated for foundation purposes, and anticipated environmental loads on the seafloor. Assess wind and wave loading on the platform both with and without carriers at the SSP.
5. Clarify whether platform Grace has been instrumented for wave or current monitoring. If so, how will the SSP affect the utility of the platform for such measurements?

Risk of LNG Release and Public Safety

6. Identify and describe the international, federal, state and local laws and regulations that govern the design and operation of the proposed offshore LNG terminal, LNG carriers, and subsea and onshore natural gas pipelines.
7. Identify the risks, hazards, and sources of potential LNG spills from the LNG carriers, platforms (including transfer points at the terminal and the re-gasification facility), sub-sea and onshore gas pipelines. Assess operational hazards, navigational hazards, and vessel traffic patterns in the proposed project area.
8. Provide a history of accidents, if any, at other LNG deepwater ports in the world. If any accidents have occurred, how has this project been designed to prevent such an accident.

9. Discuss the most probable and worst case scenarios which may result in potential spills of LNG, including the following:
 - a) Rupture of either the subsea or onshore LNG pipelines.
 - b) Collision with an LNG carrier resulting in spillage of vessel contents.
 - c) A commercial or recreational craft colliding with one of the LNG carriers, either in transit or during operation as it is loading LNG to the platform.
 - d) An intentional attack on the LNG terminal, carriers, or pipelines from the sea or air.

These scenarios should discuss the hazardous footprint area and the environmental (marine and terrestrial, as applicable), cultural, and human resources potentially affected. The scenarios and impact analyses should include a discussion of the following:

- a) An on-water “rapid phase transition/flameless” explosion.
 - b) An instantaneous LNG “pool fire.”
 - c) Explosion/fire from LNG “flammable vapor clouds.”
 - d) Potential danger of asphyxiation from LNG vapor clouds.
 - e) Freezing impacts to humans, coastal and marine resources, wildlife, and equipment in immediate vicinity of LNG release.
10. Identify the physical design, equipment, operational, and human measures (*e.g.*, pressure valves, computerized shutdown systems, containment basins, drill and training programs, operational procedures, etc.) to prevent or minimize the risk of an LNG spill. These measures should reference applicable international, federal, and state regulations, as well as company Best Management Practices.
11. Identify the emergency response capability (*e.g.*, fire equipment and responders; emergency response training and drill programs; etc.) to respond to a worst case LNG/natural gas release, fire, or explosion on the LNG carrier, on the platforms, or at the subsea/onshore pipelines.

Prevention of and Response to Oil and Other (Non-LNG) Hazardous Substance Spills

12. Identify the international, federal, state, and local laws and agencies that may govern the construction, design and operation of the proposed offshore LNG terminal, LNG carriers, and the subsea and onshore natural gas pipelines. Identify each agency’s laws/regulations to prevent and protect against oil and other non-LNG hazardous substance releases.
13. Identify the risks and sources of potential oil and hazardous substance spills from the LNG carriers, support vessels, LNG platforms and sub-sea and onshore pipelines.

Information should include an assessment of navigational hazards in Santa Barbara Channel, operational hazards associated with the LNG terminal facilities, and potential hazards and risks from neighboring oil platforms and sub-sea oil pipelines.

14. Please include the following information for the LNG carriers, construction/pipe-laying vessels, and tugboats/support vessels: a) size, design and type of vessels, including the full range of possible LNG carriers to be used; b) configuration of vessel fuel tanks; and c) description of fuel type and other hazardous substances to be used onboard (e.g., will the vessels be powered by natural gas, fuel oil, bunker fuel oil, diesel, or bio-diesel? Will the vessels use lubricants or odorants?).
15. Provide the most probable and worst case scenarios which may result in oil or hazardous substance spills, including the following:
 - a. Rupture of either the subsea or onshore LNG pipelines.
 - b. An accident rupturing the fuel tanks or top-side equipment of an LNG carrier, construction vessel, or crewboat/tugboat servicing the LNG terminal.
 - c. An accident at the LNG platforms causing release of oil from neighboring oil platforms and/or sub-sea oil pipelines.
 - d. A release of odorant or other hazardous substance from the LNG re-gasification facility.
16. The most probable and worst case spill scenarios should provide spill trajectory analyses that identify the geographic range (on-water and along shoreline) of the coastal and marine resources that could be affected by an LNG spill within 2-, 6-, 24-, 36-, and 60-hour timeframes, in accordance with federal and California oil spill response regulations. Identify federal and California listed endangered or threatened species in the project range and assess potential adverse impacts to terrestrial and marine resources if a spill occurs.
17. Identify measures proposed to prevent or minimize the risk of an oil or hazardous substance spill. Provide a spill response capability analysis that identifies the response equipment, personnel, and procedures that can provide on-water response for the worst-case spill within 2-, 6-, 24-, 36-, and 60-hour timeframes, in accordance with federal and California oil spill response regulations. In particular, identify response equipment and personnel that can be at the spill site within the first 2 hours of the spill. Identify company-owned spill response equipment at the site and evidence of contracts with California certified spill response organizations that can provide primary and secondary response, containment and clean-up for a worst case oil spill. Provide information on the measures that will be used to protect, recover, and rehabilitate the shoreline and ocean resources that were identified at risk from spill impacts (include shoreline protection strategies, wildlife rehab centers, etc.).

Marine Resources/Water Quality

Entrainment/ Impingement

18. Identify potential adverse impacts to marine species from entrainment/ impingement due to the intake of seawater at the platforms and tankers and ballast water exchange. Details regarding the size, location and type of seawater intake structures on all project related facilities should be discussed and estimates of seawater intake velocity and average daily and annual total seawater use should also be provided.
19. Perform a site-specific biological characterization of the planktonic environment in and around the project area. Data collected by these surveys should be used to conduct empirical transport modeling to obtain baseline data on the number and type of larval fish, invertebrates, and ichthyo-, zoo-, and phytoplankton that are likely to be entrained and impinged as a result of the project's use of seawater. The results of this modeling should provide a factual basis for determining actual loss of marine resources from entrainment/impingement due to the proposed project, as well as an opportunity to develop suitable mitigation measures, in the EIS/EIR. Additional details regarding the recommended methodology for plankton sampling and entrainment modeling are included in Attachment A.

Underwater Noise/Marine Mammals

20. Gather comprehensive baseline data on the composition, abundance, frequency, and seasonality of marine mammals in the project areas, developed by conducting site-specific surveys that target the project area and are capable of adequately determining the marine mammal concentrations during all times of the year.
21. Assess the potential adverse impacts of underwater noise on marine mammals. Gather baseline data on underwater noise levels up to 10 miles from the project area and up to 120 dB for continuous noise (such as that generated by traffic in the traffic separation zone TSZ) and 154 dB for intermittent noise. Provide site-specific characteristics on the physical oceanography of the project area as well as ambient sound levels at varying depths and in different sea-state conditions that takes into account anomalies such as bottom bounce, surface ducts, salinity changes, haloclines, etc. Include measures of sound pressure at the project site from various vessels passing through nearby shipping lanes within the Santa Barbara Channel.
22. Identify direct impacts to marine mammals caused by the proposed construction and tankering of LNG (i.e. impacts to marine species from entanglement in mooring lines, vessel collisions with marine mammals, etc.).
23. Identify maximum speeds to be used by LNG carriers and support vessels and assess the likelihood of marine mammal strikes. Include projected changes in range and number of species and abundance of individual species due to ocean warming. Analyze feasible measures to reduce ship speed, and thereby reduce engine noise levels, throughout the LNG carrier routes where marine mammals may be present.

24. Calculate and assess the project's effects on the potential biological removal (PBR) of each marine mammal species found in the project area for species identified under the Endangered Species Act, on the list of low PBR species, and schooling species that may be vulnerable to large takes. Explain how the project would avoid these take levels with regard to low PBR species.
25. Develop appropriate mitigation measures to minimize adverse impacts from tankering and construction activity within the Santa Barbara Channel (e.g., establishing a 1000-foot safety zone around activities for marine mammals or sea turtles, installing passive acoustic monitoring buoys in the Channel to detect marine mammals, limiting project construction to the months outside of the various (i.e. blue, gray, fin and humpback) whale migration seasons, establishing slower vessel speed limits and implementing ship quieting techniques developed to reduce propeller cavitation). In addition, we strongly recommend incorporating the following plans into the EIS/EIR:
 - Acoustic Monitoring Plan – Include long term scientific study, meaningful observations and analysis of ambient acoustics and reliable long term population estimates for sensitive marine species in the project area.
 - Marine Mammal Observation Plan – Include the following: pre-operations observations using aerial surveys and passive acoustic monitoring; measures to delay the start of and suspend operations in the presence of marine mammals; and independent marine mammal monitors on all vessels.

Night Lighting

26. Identify potential impacts from night lighting of the terminal structure on seabirds (and other relevant marine species) in the project area (i.e. alteration of feeding, foraging, predation, or breeding behavior). Conduct a site-specific baseline survey of the type, distribution and abundance of seabirds, including nocturnal species, within and around the project area to determine likely impacts.
27. Quantify the level, area and effects of illumination of surface and sub-surface waters.
28. Develop and assess adequate mitigation measures, including a lighting plan that estimates the project's overall lighting requirements (i.e. the number, location, magnitude and operating hours of lights to be used on the existing platform, satellite service platform and LNG tankers) and evaluates the potential use of directional, motion-activated or restricted wavelength lighting, light shielding, and other measures to minimize the duration and size of the project's overall light footprint. Such measures should minimize adverse effects of lighting on seabirds while maintaining levels needed for safety and security.

Water Quality

29. Identify potential adverse impacts to marine water quality caused by construction of the proposed LNG terminal, satellite platform, transfer system and pipeline as well as ongoing terminal operations. Describe the amount, type and location of additional

proposed discharges, including stormwater, fire system test water runoff, sewage, greywater and cooling water.

30. Identify existing hardbottom habitat/seafloor features in the project area. Discuss adverse impacts to benthic habitat and resident species due to the placement of the pipeline, anchors, and any additional terminal support structures on the seafloor. Include an analysis of sediment suspension and turbidity for the entire water column due to pipeline lay-down and platform construction activities on the seafloor. Sample sediment for suspended toxins in the construction footprint of the pipeline and near-shore HDD bore and include the results in the EIS/EIR.
31. Assess the potential for and extent of ocean temperature changes due to platform outfall and vessel ballast water exchange. Identify potential impacts of thermal change on resident and migratory marine species in the project area. Discuss whether the project will meet the California Thermal Plan limits enforced by the State Water Resources Control Board and the Regional Water Quality Control Board.
32. Quantify all ballast water releases that would take place in the project area by all vessels associated with the project. Discuss measures to avoid, reduce, or eliminate the introduction of invasive species due to ballast water exchange in accordance with the International Convention of the Prevention of Pollution from Ships (MARPOL) and State of California and USCG requirements.

Terrestrial Biology/Environmentally Sensitive Habitat Areas (“ESHA”)

33. Assess the potential impacts to onshore coastal zone species and habitats (i.e. dune, estuarine, or wetland habitats), particularly ESHA, from an offshore spill of LNG, petroleum products or hazardous waste from the proposed LNG tankers, terminal, or subsea pipeline.
34. Assess potential impacts to terrestrial species and habitats from an onshore spill of LNG, petroleum, or hazardous waste at the Southern California Gas pipelines or Reliant Energy Mandalay Power Generating Station. Survey for the presence and distribution of ESHA and any federally- or state-listed species or species of special concern within proximity of the onshore pipeline. Identify any project-related effects on sensitive plant and animal species and any feasible measures (e.g. project relocation alternatives, conducting onshore construction activities outside of nesting seasons and using methods to minimize the construction footprint) to avoid, reduce, or eliminate identified adverse terrestrial impacts from LNG spills.
35. Identify the duration, timing, location and type of pipeline installation or construction activities that may occur on or within close proximity to sensitive habitats, such as the beach portion, located within the proposed onshore project area. Assess potential impacts to terrestrial species and sensitive habitats from construction of the pipeline as well as mitigation measures to avoid, reduce, or eliminate identified adverse terrestrial impacts.

Geologic/Erosion/Tsunami Hazards

36. Provide a site-specific seismic hazard modeling study including worst-case scenarios of seismic effects on all project components and activities.
37. Provide information on wave and current conditions, including frequency of extreme conditions, which have been recorded or identified anecdotally within the project area.
38. Assess the bluff and beach erosion rates at the location of the proposed pipeline landfall.
39. Provide historic and prehistoric records of tsunamis within the general region of the proposed LNG terminal and evaluate the site relative to recent State Office of Emergency Service and NOAA maps of tsunami risk zones.
40. Identify feasible measures to avoid, reduce, or eliminate potential adverse impacts from severe wave conditions (e.g., LNG terminal structural design measures, advance-warning notification systems, a Tsunami Response Plan that would include an employee education program, etc.) on all project components and activities.
41. A geotechnical report addressing geologic conditions along the proposed horizontal directional drilling (HDD) bore will be necessary for the Coastal Commission evaluation of this project. Please incorporate this report into the EIS/EIR. Such a report should, at a minimum include the following:
 - a) Provide any and all geological information that may be useful to the drilling contractor in preventing frac-outs or other inadvertent return of drilling fluids to the sea floor or beach.
 - b) Make use of at least three geotechnical borings—one at either end of the bore, and at least one in the middle.
 - c) If necessary, additional work (seismic reflection, seismic refraction, ground penetrating radar, etc.) should be undertaken to further characterize the stratigraphy along the proposed bore.
 - d) Provide recommendations on suitable drilling horizons.
 - e) Provide a geologic cross section based on the above data, showing the proposed bore.
 - f) Provide a discussion of special drilling conditions that may be encountered (cobbles, unconsolidated sands, etc.).
42. Provide a discussion of existing fractures, and make recommendations on how to minimize the risk of inadvertent return of drilling fluids to surface. An HDD monitoring and spill contingency plan will be required by the Coastal Commission as part of its review of the project. We recommend this plan be included in the EIS/EIR. Such a plan should cover all HDD activities within the coastal zone, and contain the following:
 - a) A training program.

- b) A monitoring program to detect possible frac-out or other inadvertent release of drilling fluids to the surface. Such a monitoring program may make use of monitoring of drilling fluid pressures and return volumes, use of dyes to aid detection in marine waters (coupled with a sampling program), or direct inspection by ROV or divers.
- c) An evaluation of the worst-case spill scenario.
- d) A list of equipment to be kept on site (or nearby) to address the worst-case spill scenario.
- e) A response plan, using a decision tree approach, for various contingencies including loss of drilling fluid returns, detection of dye/and or bentonite in marine waters, up to and including the worst case spill scenario.
- f) A call down list for prompt agency notification in the event of a spill.
- g) MSDS sheets for all materials.

Air Quality

- 43. Describe the Deepwater Port Act's requirements to comply with the Clean Air Act. Since the project's design includes the use of an oil and gas platform, evaluate whether Section 328 of the Clean Air Act applies to this project. If Section 328 applies, describe how the applicant proposes to meet its requirements.
- 44. Quantify all construction and operational stationary and mobile criteria pollutant emissions within the boundary of California Coastal Waters¹.
- 45. Describe the project area's designation as either attainment, non-attainment, or unclassifiable with respect to the National Ambient Air Quality Standards (NAAQS) on a pollutant-specific basis.
- 46. We understand that the applicant has committed to the US Environmental Protection Agency (EPA) to meet the stationary source emission requirements of Ventura County Air Pollution Control District's (VCAPCD) Rule 26.2. Rule 26.2 requires that Best Available Control Technology (BACT) and emission offsets be provided. Please describe in detail how the applicant proposes to satisfy the requirements of Rule 26.2. Evaluate the adequacy of the applicant's proposal to meet Rule 26.2.
- 47. Please identify any mobile sources of air emissions occurring within California Coastal Waters that will not be regulated by an air permit issued by the EPA. Through the CEQA process, the applicant should be required to mitigate mobile emissions occurring within California Coastal Waters that will not be regulated by the EPA.

¹ The California Air Resources Board (CARB) defines California Coastal Waters as the area offshore California within which pollutants are likely to be transported ashore and affect air quality in California's coastal air basins, particularly during the summer. California Coastal Waters extend 25 to 100 miles from the California coastline (17 CCR § 70500).

Greenhouse Gas (GHG) Emissions

48. Include in the EIR/EIS a GHG life-cycle analysis. Please describe how the applicant proposes to offset its GHG emissions.

Visual

49. Evaluate the visual impacts of the proposed project from public coastal viewing areas, including onshore areas within Ventura, Santa Barbara and Los Angeles Counties and offshore areas at the Channel Islands. Evaluate impacts to the coastal viewshed from the addition of the proposed Satellite Service Platform as compared to the existing platform (Platform Grace) and new onshore pipeline segments, including night-time lighting impacts. Include nighttime and clear weather simulations from both shoreline and elevated sites.
50. Identify any feasible measures to avoid, reduce, or eliminate any adverse visual impacts from the proposed project.

Commercial Fishing

51. Identify the types of fishing that occur in the project area. Quantify the area of ocean waters associated with the project that would be off-limits or pose any kind of risk to commercial fishermen. Include a discussion of the U.S. Coast Guard's vessel exclusion zone requirements² and how they will apply to the proposed project.
52. Analyze the financial impacts of the exclusion/avoidance zones on commercial fishing and identify any feasible measures to avoid, reduce, or eliminate any adverse impacts to commercial or recreational fishing in the project area. Also identify impacts on commercial or recreational fishing from temporary exclusion of vessels from fishing grounds along the proposed pipeline route during pipeline construction and placement. Provide mitigation measures to minimize or offset these impacts (i.e. compensation due to lost fishing opportunities).
53. Describe the hazards to commercial fishermen and their equipment introduced by the components of the project. Discuss the impacts of and potential mitigation for loss of fishing gear due to entanglement with the proposed subsea natural gas pipeline and/or terminal support vessels. Identify any areas designated as trawl or bottom longline fishing grounds which the proposed pipeline route or support vessel traffic corridors would traverse.

² It is our understanding that the U.S. Coast Guard requires a Safety Zone within 500 meters of an LNG terminal or anchorage area as well as a Precautionary Area within 1.2 nautical miles of a terminal.

Offshore Recreation

54. Identify recreational opportunities in the project area, including the waters around the nearby Channel Islands, as well as the estimated number of recreational users.
55. Assess the navigational hazards to recreational vessels presented by an increase in tug, crew boat and tanker traffic in the project area. Discuss whether the presence of the terminal, support vessels and LNG tankers is likely to reduce the public's recreational use of the water.
56. Quantify the extent of any exclusion zones or areas to be avoided at the project sites. Quantify the total number of days per year, and under which conditions, exclusion and avoidance zones would be in effect.
57. Identify any feasible measures to avoid, reduce, or eliminate any adverse impacts to recreational activities in the project area.

Onshore Recreation/Public Access

58. Identify coastal recreational uses as well as designated parks and recreation areas onshore that are within proximity to the proposed pipeline or generating station to be affected by potential LNG spills. Evaluate potential impacts and possible prevention and mitigation measures to avoid, reduce or eliminate any adverse impacts to coastal recreational users.
59. Determine whether the proposed onshore pipeline system will affect public access to coastal areas and if alternative adequate access points exist nearby.

Agricultural Resources

60. Discuss impacts to agriculture, if any, due to construction activities and the permanent conversion of agricultural land for expansion of the Southern California Gas onshore pipeline system within the coastal zone.

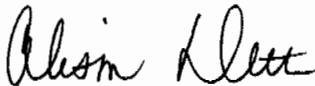
Archaeological Resources

61. Identify any prehistoric and/or historic archaeological sites or areas of cultural significance known to be within the project area that may be disturbed by construction activities (search results from the California State Lands Commission's Shipwreck database, the California Register of Historical Resources, the California Historical Landmarks list, the Native American Heritage Commission database and the National Register of Historic Places).
62. Survey the construction footprint to identify whether cultural resources pose any hazards and/or constraints.

63. Detail mitigation measures to avoid, reduce, or eliminate any adverse impacts if an object of archaeological/cultural significance is present in the construction area. If the EIS/EIR concludes that human remains or other archaeological materials may be encountered during pipe-laying and other activities, an Unanticipated Discoveries Plan should be developed as part of the EIS/EIR and include the following.
- a) Immediate actions to take place should a discovery be made.
 - b) Authority to halt construction.
 - c) Procedures when skeletal remains are found.
 - d) Protection of remains while awaiting recommendation from most likely descendants.
 - e) Reporting and treatment of find.
 - f) Curating of archaeological material not associated with human remains.

Thank you for considering our request for information. If you have any questions about these comments, please call me at 415/904-5205. We look forward to working with you closely on this project.

Sincerely,



ALISON J. DETTMER
Deputy Director
Energy, Ocean Resources, and Federal Consistency Division

ATTACHMENT A ENTRAINMENT STUDY DESIGN

The entrainment study should include the following elements:

Study Design

- Design developed by a qualified contractor
- An independent technical advisory group formed to meet regularly during each of the study steps listed below.
- Sampling and data collection, data compilation, and modeling designed to provide credible estimates of entrainment losses caused by the proposed project.
- Protocols based on those used in several recent entrainment studies done at California coastal power plants, including Diablo Canyon, Huntington Beach and others.
- Entrainment samples taken at location of proposed entrainment once per week for at least a year, and source water samples taken once per month for at least a year.
- Sampling extended for an additional year if an oceanographic anomaly (e.g., an El Nino Southern Oscillation, or ENSO) coincides with the initial year of sampling.
- Technical advisory group responsible for determining whether ocean conditions warrant an additional year of sampling.
- Sampling done using the same type of equipment and similar protocols.
- Samples taken using a 333 um mesh plankton net attached to a bongo frame fitted with 71-centimeter diameter rings and with a Dacron sleeve and cod-end container to retain the organisms.
- Nets equipped with a calibrated flowmeter to calculate the amount of water filtered during sample collection.
- Entrainment samples taken as close as feasible to the proposed entrainment site.
- Source water samples taken within a 10 kilometer by 5 kilometer rectangle centered on the site of the proposed entrainment.
- Entrainment sampling events to consist of a 24-hour period broken into six four-hour blocks. The monthly source water sampling event to occur during, immediately before, or immediately after a weekly entrainment sampling event.
- Technical advisory group to recommend any other necessary sampling protocols in addition to those listed above (e.g., determining random locations for source water sampling, appropriate sampling depths, additional target species, etc.) and recommend modifications to the study protocols if deemed necessary to improve sampling results.
- Provide quarterly data reports for ongoing technical advisory group review.

Source water identification/oceanographic data:

- Before and during the sampling year, compile data from existing sources (e.g., buoys or meters used by the NOAA Ocean Observing System, Scripps Institution of Oceanography, California Cooperative Oceanic Fisheries Investigations (CalCOFI), etc.).
- Data to include wind and water speed and direction, water temperature, and the historic type and frequency of planktonic blooms and plumes in the proposed project area.

Deploying additional buoys or meters to fill data gaps may be determined necessary by the technical advisory group.

Data compilation:

- Organisms collected during sampling to be identified to the lowest possible taxa.
- Species to be enumerated include, but are not limited to, those identified below in a list derived from the CalCOFI dataset and other sources that includes species known to be in the area that are commercially valuable, subject to Essential Fish Habitat protections, or are otherwise significant species.
- Enumeration to include noting the length and/or age of the identified organisms.
- Identify, to the extent feasible, the natural history of the planktonic life stages of the species subject to entrainment, including their range and dispersal, their location in the water column, vertical and horizontal migration patterns, and the habitat of adult populations.

Modeling:

- Above data to be applied to the Empirical Transport Model, a modeling method used to determine the probability that organisms within the source water will be subject to entrainment mortality. This method to be used to estimate the amount of habitat needed to replace the production lost to entrainment (Habitat Production Foregone).
- In addition to the Empirical Transport Model method, Fecundity Hindcasting and Adult Equivalent Loss modeling to be conducted to provide verification of the Empirical Transport Model results and to provide a more robust assessment of project-related impacts.

Note: Because the above protocols were developed for use at nearshore locations, some may need to be modified to address different conditions offshore. Clearwater may request modifications; however, any proposed modifications would be subject to review by the independent technical advisory group and approval by the Executive Director of the California Coastal Commission.

Partial List of Species

Fish

Fish eggs

Cabazon, *Scorpaenichthys marmoratus* (EFH)

California Halibut, *Paralichthys californicus*

California tonguefish, *Symphurus atricauda*

Longspine Thornyhead, *Selastolobus altivelis*

Northern Anchovy, *Engraulis mordax* (EFH)

Pacific Hake, *Merluccius productus* (EFH)

Pacific mackerel, *Scomber japonicus* (EFH)

Pacific Sardine, *Sardinops sagax* (EFH)

Shortspine Thornyhead, *Sebastolobus alascanus*

Rockfish species, *Sebastes* spp. (EFH)
Aurora Rockfish, *Sebastes aurora* (EFH)
Bank Rockfish, *Sebastes rufus*
Black Rockfish, *Sebastes melanops*
Blue Rockfish, *Sebastes mystinus*
Bocaccio, *Sebastes paucispinis* (EFH)
Brown Rockfish, *Sebastes auriculatus*
Calico Rockfish, *Sebastes dalli*
Canary Rockfish, *Sebastes pinniger*
Chilipepper Rockfish, *Sebastes goodei* (EFH)
Copper Rockfish, *Sebastes caurinus*
Cowcod, *Sebastes levis* (EFH)
Gopher Rockfish, *Sebastes carnatus*
Grass Rockfish, *Sebastes rastrelliger*
Kelp Rockfish, *Sebastes atrovirens*
Mexican Rockfish, *Sebastes macdonaldi*
Olive Rockfish, *Sebastes serranoides*
Shortbelly Rockfish, *Sebastes jordani*
Speckled Rockfish, *Sebastes ovalis*,
Splitnose Rockfish, *Sebastes diploproa* (EFH)
Starry Rockfish, *Sebastes constellatus*
Widow Rockfish, *Sebastes entomelas*
Yellowtail Rockfish *Sebastes flavidus*

Invertebrates

Spiny Lobster, *Panulirus interruptus* - commercially valuable
Sand crabs, *Emerita analoga* - ecologically important
Yellow rock crab, *Cancer anthonyi*
Brown rock crab, *Cancer antennarius* - commercially valuable
Red rock crab, *Caner productus*
Squid paralarvae, *Loligo opalescens* - commercially valuable
Other cancer crabs, *Cancer sp.*
Other crab megalope and zoea larvae

*EFH denotes those species with designated Essential Fish Habitat.