

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400



Th8a

December 8, 2009

TO: Coastal Commissioners and Interested Parties

FROM: Alison J. Dettmer, Deputy Director, Energy, Ocean Resources & Federal Consistency Division
Tom Luster, Staff Environmental Scientist

SUBJECT: Addendum to Recommended Findings for E-09-010: Pacific Gas and Electric Company – Demolish and Decommission Humboldt Bay Power Plant

This addendum includes correspondence, *ex parte* forms, and several proposed revisions to staff's recommended **Special Conditions** and Findings as shown in ~~striketrough~~ and underline below. These revisions and modifications are relatively minor and do not change staff's recommendation that the Commission **approve** the proposed project, as conditioned and as modified herein.

SPECIAL CONDITION REVISIONS: PG&E requested the following minor revisions to the recommended **Special Conditions** on pages 6-8 of the Staff Report:

- **Special Condition 1**, first bullet:

~~“Post-development p~~Peak runoff rates and average volumes shall not exceed ~~pre-development-existing conditions.”~~

- **Special Condition 1**, third bullet:

~~“Post-construction s~~Structural BMPs (or suites of BMPs) ~~should~~ shall be designed to treat, infiltrate, or filter the runoff from all surfaces and activities on the development site.”

- **Special Condition 1**, fifth bullet:

“The Plan shall provide for the treatment of runoff from parking lots using appropriate structural and non-structural BMPs. ~~At a minimum, this must include a bioswale and/or filter~~ designed specifically to minimize vehicular contaminants (oil, grease, automotive fluids, and heavy metals), sediments, and floatables and particulate debris.”

- **Special Condition 2**, first sentence:

“PRIOR TO ANY PROJECT-RELATED GRADING OR FILLING, the Permittee shall ~~hire~~assign one or more Biologists to implement the approved Stormwater Management Plan.”

- **Special Condition 2**, second paragraph, first sentence:

“The Permittee shall employ or have under contract the Biologist(s) during the duration of the approved project.”

- **Special Condition 4**, first sentence:

“~~PRIOR TO STARTING APPROVED PROJECT ACTIVITIES~~ THE START OF GROUND DISTURBING ACTIVITIES, the Permittee shall submit for Executive Director review and approval an Archaeological Resources Protection Plan...”

STAFF REPORT MODIFICATIONS:

- **Page 2, last paragraph, last sentence:**

“Staff recommends the Commission determine the benefits to marine resources, water quality, and environmentally sensitive habitat areas outweigh the project’s nonconformity to Coastal Act policies regarding geologic ~~risks and visual resources~~ hazards and shoreline protective devices.”

- **Page 12, first paragraph of last bullet, last sentence:**

“DTSC has also prepared for CEQA purposes a Negative ~~Determination~~ Declaration describing the environmental effects of the proposed initial cleanup actions.”

- **Page 12, Footnote 1, second sentence:**

“DTSC published the Negative ~~Determination~~ Declaration on October 30, 2009...”

- **Page 15, second paragraph, second sentence:**

“Because site characterization is not yet complete, PG&E is not yet proposing its full remediation approach and has not yet described its planned remediation within onsite wetland areas, if necessary, or the extent of remediation that will be required to address radiological contaminants.”

- **Page 16, last paragraph, second sentence:**

“Because there are currently no available offsite facilities in which PG&E can ~~store~~ permanently dispose of this material, PG&E proposes to store the material onsite in its existing high-level storage ~~facility vault~~ until a suitable offsite ~~storage~~ disposal option is available.”

- **Page 16, last paragraph, fourth sentence:**

“The amount of waste stored, however, depends on the type of waste and its radiological state – i.e. “hotter” materials need more ~~separation when in storage~~ shielding (i.e. larger packaging), requiring more space.”

- **Page 17, second bullet, last paragraph, first sentence:**

“PG&E has anticipated that decommissioning could result in more Class B and Class C wastes than can be stored in the existing onsite high-level ~~facility storage vault.~~”

- **Page 17, second bullet, last paragraph, first sentence:**

“...ending the cooling water flow will ~~change the hydraulics and sedimentation patterns in and near Fisherman’s Channel in Humboldt Bay~~ significantly reduce water movement through Fisherman’s Channel and the PG&E intake channel and is expected to increase sediment deposition near the power plant intake structure within PG&E’s intake channel.”

- **Page 18, Regional Water Quality Control Board, second sentence:**

“In October 2008, the Regional Board issued a water quality certification for the ~~project~~ new power plant, the Humboldt Bay Generating Station, that requires PG&E prepare a post-construction stormwater management plan for the Humboldt Bay Power Plant.”

- **Page 29, Potential Project Development Not Yet Proposed, second sentence:**

“Some potential project-related activities that could affect wetlands and water quality may later be proposed as part of the project and will require additional Commission review and approval. ~~As noted above, PG&E has provided preliminary sampling results showing soil contamination within some of the onsite wetland areas; h~~ However, PG&E ~~it~~ is not currently proposing any activities, such as remediation, within ~~those wetlands.~~”

- **Page 29, Potential Project Development Not Yet Proposed, second to last sentence:**

“The power plant demolition and decommissioning allow PG&E to stop pumping up to 76 million gallons per day of cooling water from Humboldt Bay, which will ~~affect the fate and transport of contaminants and will alter sedimentation patterns in and near the channels~~ likely increase sedimentation near the intake structure within the PG&E intake channel.”

- **Page 34, third paragraph, first sentence:**

“The project will also result in increased traffic on nearby sections of Highway 101 and on King Salmon ~~Boulevard~~ Avenue...”

- **Page 34, third paragraph, last sentence:**

“...these trips will be somewhat spread out throughout the expected ~~10~~ six years of project activities.”

- **Add to Substantive File Documents:**

“Technical Memorandum: Hydrologic Impacts of Discontinuation of Cooling Water Withdrawals at the Humboldt Bay Power Plant, prepared by CH2MHill, March 27, 2009.”

DEC 07 2009

CALIFORNIA COASTAL COMMISSION

FORM FOR DISCLOSURE OF EX PARTE COMMUNICATIONS

(COP # E-09-010)

Name or description of project, LPC, etc.: Thursday 8a Pacific Gas & Electric

Date and time of receipt of communication: 12/4/09

Location of communication: La Jolla, Calif.

Type of communication (letter, facsimile, etc.): meeting

Person(s) initiating communication: Dave Nerish SR.

Detailed substantive description of content of communication:
 (Attach a copy of the complete text of any written material received.)

Applicant agrees with CCC Staff Recommendation
and all Special Conditions. And they ask
for our approval.

12/4/09
 Date

[Signature]
 Signature of Commissioner

If the communication was provided at the same time to staff as it was provided to a Commissioner, the communication is not ex parte and this form does not need to be filled out.

If communication occurred seven or more days in advance of the Commission hearing on the item that was the subject of the communication, complete this form and transmit it to the Executive Director within seven days of the communication. If it is reasonable to believe that the completed form will not arrive by U.S. mail at the Commission's main office prior to the commencement of the meeting, other means of delivery should be used, such as facsimile, overnight mail, or personal delivery by the Commissioner to the Executive Director at the meeting prior to the time that the hearing on the matter commences.

If communication occurred within seven days of the hearing, complete this form, provide the information orally on the record of the proceeding and provide the Executive Director with a copy of any written material that was part of the communication.

Tom Luster

From: manetas1@suddenlink.net
Sent: Monday, December 07, 2009 10:11 AM
To: Tom Luster
Cc: Ian Caliendo
Subject: PG&E Coastal Development Permit

December 7, 2009

California Coastal Commission
Attention: Tom Luster
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

I am writing in support of the PG&E Coastal Development Plan for the decommissioning activities at the Humboldt Bay Power Plant.

I have resided in Humboldt County for 44 years, and have been a member of the Citizen's Advisory Board on the decommissioning activities since its inception. I feel I speak for a majority of citizens in Humboldt County who would like to see the elimination of nuclear materials from close proximity to Humboldt Bay. The spent fuel is now in safe and secure dry cask storage, and the remaining radioactive materials in structures and soil need to be removed. The decommissioning plan PG&E has developed appears to be solid and efficient, and should be approved.

Sincerely,

Michael J. Manetas
1094 Birch Ave
McKinleyville, CA 95519
(707) 839-3779

Th 8a



BOARD OF SUPERVISORS
COUNTY OF HUMBOLDT
825 5TH STREET
EUREKA, CALIFORNIA 95501-1153 PHONE (707) 476-2390 FAX (707) 445-7299

December 7, 2009

California Coastal Commission
Attention: Tom Luster
45 Fremont Street, Suite #2000
San Francisco, CA 94105-2219

Email: tluster@coastal.ca.gov

Dear Commissioners:

I have been a Humboldt Bay Power Plant Community Advisory Board member for 15 years. I've worked closely with the Plant management as they pursued and completed safe storage of the plant's nuclear fuel rods and the planning and implementation of the new Humboldt Bay natural gas power generation system.

The Humboldt Bay Power Plant management and staff continue to provide updates for elected officials and members of the public. Presently, PG&E is pursuing a full decommissioning of the old nuclear facility. That project is long awaited and will increase the safety and viability of the site. The project is solid and the expertise is excellent.

I support the decommissioning project and expect the same transparent process we have enjoyed with PG&E.

Sincerely,

Jimmy Smith, 1st District Supervisor
County of Humboldt

JS:kh

Th 8a

December 7, 2009

California Coastal Commission
Attention: Tom Luster
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Dear Mr. Luster,

As the Superintendent of South Bay Union School District, and a member of the PG&E Citizens' Advisory Board, I am writing this letter of support for the decommissioning for the Humboldt Bay Power Plant.

I have been an active member of the CAB, and believe that this is a positive step for Humboldt County citizens.

If you have any further questions please feel free to contact me at 707-476-8549.

Sincerely,

Marie Twibell
Superintendent



Redwood Coast Energy Authority

517 5th Street

Eureka, CA 95501

Phone: (707) 269-1700 Toll-Free (800) 931-RCEA Fax: (707) 269-1777

E-mail: info@redwoodenergy.org Web: www.redwoodenergy.org

Th 8a

December 8, 2009

California Coastal Commission
Attention: Tom Luster
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Re: Support for PG&E's HBPP Decommissioning Efforts

Dear California Coastal Commission:

I am the Executive Director of the Redwood Coast Energy Authority, a Joint Powers Authority representing the County of Humboldt and all seven of its incorporated cities. I also serve on PG&E's Humboldt Bay Power Plant Community Advisory Board. From the perspective gained through these positions, I would like to communicate my support for PG&E's efforts to decommission the old Units 1-3 at the Humboldt Bay Power Plant.

I have been very impressed by PG&E's commitment to this effort, its extremely high level of professionalism, focus on safety, and transparency in communicating its plans to the local community.

Many in the community feel that the decommissioning of the old nuclear facility is long overdue, and are pleased that efforts are now underway to accomplish this admittedly difficult undertaking.

Therefore I urge the California Coastal Commission to approve PG&E's request for a Coastal Development Permit for this decommissioning effort.

Respectfully,

David Boyd
Executive Director

DCB:DCB

cc: Ian Caliendo, PG&E

The Redwood Coast Energy Authority (RCEA) is a Joint Powers Association, representing seven municipalities (the Cities of Arcata, Blue Lake, Eureka, Ferndale, Fortuna, Trinidad and Rio Dell), the County of Humboldt, and the Humboldt Bay Municipal Water District. RCEA's purpose is to develop and implement sustainable energy initiatives that reduce energy demand, increase energy efficiency, and advance the use of clean, efficient and renewable resources available in the region.

Th 8a

Tom Luster

From: Tuttle, Don [DTuttle@co.humboldt.ca.us]
Sent: Tuesday, December 08, 2009 10:02 AM
To: Tom Luster
Subject: Re: PG &E Humboldt Bay Power Plant Decommissioning and Demolition

Hi Tom. As a long time member of the Advisory Committee on the Decommissioning of the power plant, I support the staff recommendation.

Th 8a

December 8, 2009

California Coastal Commission
Attention: Tom Luster
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

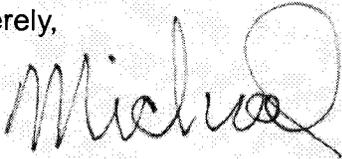
Dear Commissioners;

Redwood Alliance supports PG&E's application for a Coastal Development Permit to allow decommissioning of the old fossil fuel and nuclear plants at their Humboldt Bay plant site.

Redwood Alliance has been the main community watchdog organization for this plant since 1978, and believes that the utility is on the right track in getting the plant decommissioned, and doing it as soon as possible. We trust that PG&E and the regulating organizations will do whatever is necessary to make sure the task is done in an environmentally safe manner.

If you have any questions, please feel free to contact us at your convenience.

Sincerely,



Michael Welch, Office Coordinator



po box 293 arcata, ca 95518 • 707-822-7884

www.redwoodalliance.org

info@redwoodalliance.org

Th 8a

December 8, 2009

California Coastal Commission
Attention: Tom Luster
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Dear Sirs,

I am writing this letter in support of the PG&E Coastal Development Plan for the decommissioning activities at the Humboldt Bay Power Plant.

As a resident of Humboldt County for 30 plus years, I have watched as the plans to decommission this facility have worked their way through the public process. In June of 1998, I was invited to participate on the Citizens Advisory Board as a representative for the Building and Construction Trades Council of Humboldt and Del Norte Counties. The members of this Board have been given the unique opportunity to view the many different aspects of the decommissioning process, provide valuable input, voice community concerns and work to insure that those concerns are addressed and information is readily available to the public.

PG&E has worked diligently to create a plan that will insure the safe and efficient demolition of the existing power plant structures and responsible clean up and remediation of the site. I would urge the California Coastal Commission to approve the plan and let us begin the work of decommissioning this site.

Sincerely,

Mariann T. Hassler
Field Representative
Carpenters Local #751 Eureka
840 E Street, Suite #12
Eureka, Ca. 95501
(707) 442-4286 phone
(707) 442-3456 fax
mhassler@nccrc.org

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400



Th8a

Date Filed:	November 3, 2009
49 th Day:	December 22, 2009
Staff:	TRL-SF
Staff Report:	November 19, 2009
Hearing Date:	December 10, 2009

STAFF REPORT: RECOMMENDED FINDINGS COASTAL DEVELOPMENT PERMIT

Application File No.: E-09-010

Applicant: Pacific Gas & Electric Company

Project Location: Humboldt Bay Power Plant, adjacent to Humboldt Bay near King Salmon, Humboldt County.

Project Description: Demolish and decommission two gas-fired and one nuclear power generating units at the Humboldt Bay Power Plant.

Substantive File Documents: See Appendix A

EXECUTIVE SUMMARY

Pacific Gas & Electric Company (PG&E) proposes to demolish and decommission three power generating units at its Humboldt Bay Power Plant (HBPP), located on the shoreline of Humboldt Bay just south of the City of Eureka. Main project activities include constructing access roads, equipment laydown areas, and staging areas, demolishing the existing power plant structures and associated structures and facilities, and conducting site cleanup and remediation. The power units to be removed include two gas-fired units that have been in place since the mid-1950s and a nuclear unit that operated from 1963 to 1976. Significant elements of the project would be conducted pursuant to a Voluntary Cleanup Program pursuant to California's Department of Toxic Substances Control (DTSC) and pursuant to the federal Nuclear Regulatory Commission's (NRC's) decommissioning and license termination processes.

In these Recommended Findings, staff recommends the Commission **approve** the proposed project, as conditioned. The Commission's approval would allow PG&E to conduct initial site cleanup and remediation, to remove structures and soils at the gas-powered units' location to

about twelve feet below grade, and to remove some structures and soil associated with the nuclear unit to about 42 feet below grade. Excavation of soils and materials could total up to about 30,000 cubic yards.

The Commission's approval would not, however, permit all development likely to be needed to complete decommissioning, as key elements regarding the scope of the project, the extent of contamination, and final expected site conditions are not yet known, and will be developed through additional studies and site characterization as the project is implemented. Future development not part of the currently proposed project could include onsite soil treatment, excavation and removal of additional structures, and other similar measures that could adversely affect wetlands, environmentally sensitive habitat areas, or other coastal resources. These proposed developments will be subject to additional Commission review and approval.

Key Issues: Significant issues associated with the proposed project's conformity to Coastal Act policies include:

- **Geologic Hazards:** This report describes the seismic characteristics of the project site and surrounding area, the slope stability at the project site, and coastal erosion concerns. It addresses Coastal Act concerns related to structural stability, the stability of nearby landforms, and the potential for coastal processes to affect the proposed project.

The project site is subject to several extreme geologic hazards, such as the potential for very high levels of ground shaking during seismic events, fault rupture in several areas of the site, and tsunami runup that could inundate the entire site. Development expected to occur during the project is not designed to withstand the full range of potential hazards and the long-term presence of some project elements will likely result in the eventual need for a shoreline protective device. As a result, the proposed development does not conform to Coastal Act provisions related to geologic hazards. This inconsistency results in a conflict with other Coastal Act policies that must be resolved through application of Coastal Act Section 30007.5, as described below.

- **Conflict Resolution:** The project as proposed is inconsistent with Coastal Act Sections 30253(1)-(2) and 30251. However, denying the project to resolve these inconsistencies would result in nonconformity to other Coastal Act policies, specifically Sections 30230, 30231, and 30240 related to marine resources, water quality, and environmentally sensitive habitat areas.

The Commission must therefore apply Sections 30007.5 and 30200(b), which allow the Commission to approve projects involving these conflicts in a manner that, on balance, is most protective of significant coastal resources. Staff recommends the Commission determine the benefits to marine resources, water quality, and environmentally sensitive habitat areas outweigh the project's nonconformity to Coastal Act policies regarding geologic risks and visual resources.

This issue is similar to the Commission's Findings for PG&E's Independent Spent Fuel Storage Facility (ISFSI), which the Commission approved in 2005. For that project, the Commission found that although the project was not designed to withstand the site's geologic hazards, it was on balance more protective of coastal resources and could therefore be approved.

- **Marine Resources and Water Quality:** Because project development has the potential to adversely affect nearby coastal waters and wetlands, **Special Condition 1** would require PG&E to provide for Executive Director review and approval a Stormwater Management Plan describing measures that will be implemented to protect coastal waters, wetlands, and their associated biological resources. Additionally, **Special Condition 2** would require PG&E to hire a Biologist to implement key elements of the approved Stormwater Management Plan, and **Special Condition 3** would require PG&E submit a site restoration plan for further Commission review and approval.
- **Archaeological Resources:** The project site is located along the shoreline of Humboldt Bay, an area of rich biological resources used by past inhabitants that may have left an archaeological record. **Special Condition 4** would require PG&E to submit for Executive Director review and approval documentation that specifies how PG&E will address potential archaeological finds during the project.
- **Visual Resources:** The site is at a visually prominent location on the shoreline of Humboldt Bay. **Special Condition 5** would require PG&E to minimize potential visual impacts by using neutral tones in project-related developments and directing project-related lighting downward and inward to the extent allowed by safety requirements.

Note: Because federal law pre-empts the state from imposing requirements related to nuclear safety or radiation hazards, this report evaluates only those issues necessary to determine conformity to the policies of the Coastal Act and does not impose requirements on aspects of the proposed project pre-empted by federal law.

Staff recommends that the Commission **approve** the proposed project, as conditioned.

TABLE OF CONTENTS

1.0	STAFF RECOMMENDATION	5
2.0	STANDARD CONDITIONS.....	5
3.0	SPECIAL CONDITIONS	6
4.0	FINDINGS AND DECLARATIONS	9
4.1	PROJECT PURPOSE AND DESCRIPTION	9
4.2	COASTAL COMMISSION JURISDICTION	18
4.3	CONFORMITY TO COASTAL ACT APPLICABLE POLICIES.....	20
4.3.1	GEOLOGIC HAZARDS	20
4.3.2	MARINE RESOURCES AND WATER QUALITY	27
4.3.3	ENVIRONMENTALLY SENSITIVE HABITAT AREAS	31
4.3.4	PUBLIC ACCESS AND RECREATION	33
4.3.5	ARCHAEOLOGICAL AND PALEONTOLOGICAL RESOURCES.....	35
4.3.6	VISUAL RESOURCES.....	36
4.3.7	RESOLVING POLICY CONFLICTS.....	37
5	CALIFORNIA ENVIRONMENTAL QUALITY ACT	43

APPENDIX A: Substantial File Documents

EXHIBITS:

Exhibit 1: Location Map

Exhibit 2: Site Plan

Exhibit 3: August 12, 2005 Memorandum from Commission geologist regarding the site's geologic hazards identified during Commission review of CDP E-05-005 for PG&E's Independent Spent Fuel Storage Installation (ISFSI)

1.0 STAFF RECOMMENDATION

Motion:

*I move that the Commission **approve** Coastal Development Permit E-09-010 subject to conditions set forth in the staff recommendation specified below.*

Staff recommends a **YES** vote. Passage of this motion will result in approval of the permit as conditioned and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of Commissioners present.

Resolution:

*The Commission hereby **approves** the Coastal Development Permit for the proposed project and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.*

2.0 STANDARD CONDITIONS

1. **Notice of Receipt and Acknowledgment:** This permit is not valid until a copy of the permit is signed by the Permittee or authorized agent, acknowledging receipt of the permit and the acceptance of the terms and conditions, is returned to the Commission office.
2. **Expiration:** Construction activities for the proposed project must be initiated within two years of issuance of this permit. This permit will expire two years from the date on which the Commission approved the proposed project if development has not begun. Construction of the development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made at least six months prior to the expiration date.
3. **Interpretation:** Any questions of intent or interpretation of any condition will be resolved by the Executive Director of the Commission (hereinafter, "Executive Director") or the Commission.
4. **Assignment:** The permit may be assigned to any qualified person, provided the assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. **Terms and Conditions Run with the Land:** These terms and conditions shall be perpetual, and it is the intention of the Commission and the Permittee to bind all future owners and possessors of the subject property to the terms and conditions.

3.0 SPECIAL CONDITIONS

1. **Coastal Water Quality and Wetland Protection:** PRIOR TO ANY PROJECT-RELATED GRADING OR FILLING, the Permittee shall provide for the Executive Director's review and approval a Stormwater Management Plan that describes all structural and non-structural measures the Permittee will implement to avoid and minimize project-related impacts to wetlands and coastal waters. The Permittee shall implement the Plan as approved by the Executive Director.

The Plan shall include locations of all facilities and structures to be built during the project and the measures incorporated in each to avoid and minimize wetland and water quality impacts. The Plan shall also identify measures the Permittee will implement to store and/or contain materials, soils, and debris originating from the project in a manner that precludes their uncontrolled entry and dispersion into nearby coastal waters or wetlands. Any debris that inadvertently enters coastal waters or wetlands shall be removed immediately.

The Plan will identify Best Management Practices (BMPs) that will be implemented during project activities to protect wetlands and coastal waters in conformance with the following:

- Post-development peak runoff rates and average volumes shall not exceed pre-development conditions.
- Appropriate structural and non-structural BMPs shall be designed to treat, infiltrate, or filter the runoff from all surfaces and activities on the development site.
- Post-construction structural BMPs (or suites of BMPs) should be designed to treat, infiltrate or filter the amount of stormwater runoff produced by all storms up to and including the 85th percentile, 24-hour storm event for volume-based BMPs, and/or the 85th percentile, 1-hour storm event, with an appropriate safety factor (i.e., 2 or greater), for flow-based BMPs.
- Runoff from all structures and parking areas shall be collected and directed through a system of structural BMPs of vegetated areas and/or gravel filter strips or other vegetated or media filter devices. The filter elements shall be designed to 1) trap sediment, particulates and other solids and 2) remove or mitigate contaminants through infiltration and/or biological uptake. The drainage system shall also be designed to convey and discharge runoff in excess of this standard from the building site in a non-erosive manner.
- The Plan shall provide for the treatment of runoff from parking lots using appropriate structural and non-structural BMPs. At a minimum, this must include a bioswale and/or filter designed specifically to minimize vehicular contaminants (oil, grease, automotive fluids, and heavy metals), sediments, and floatables and particulate debris.
- All BMPs shall be operated, monitored, and maintained for the duration of project activities requiring the use of the BMPs. At a minimum, all structural BMPs shall be inspected, cleaned-out, and where necessary, repaired at least twice per month between

October 15 and April 15 of each year and at least once per month between April 15 and October 15 of each year.

- The Plan shall identify a worker training program to be implemented that will identify coastal waters, wetlands, and their associated biological resources on and near the project site, identify measures to be taken to avoid impacts to these resources, and identify the role and responsibilities of the Biologist as described in **Special Condition 2** below.
- The Plan shall include measures for reporting any events where BMPs did not prevent adverse impacts to wetlands or coastal waters and the measures taken in response to these events.

Prior to implementing any new or modified project developments, facility locations, or BMPs not included in the initial Plan, the Permittee shall submit for Executive Director review and approval proposed modifications needed to incorporate these project components into the Plan.

2. Protection of Biological Resources: PRIOR TO ANY PROJECT-RELATED GRADING OR FILLING, the Permittee shall hire one or more Biologists to implement the approved Stormwater Management Plan. The Biologist(s) are to be approved by the Executive Director and must meet the following minimum qualifications:

- At least a bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field.
- At least three years of field biology experience or current certification through a nationally recognized biological society, such as the Ecological Society of America or The Wildlife Society – and, at least one year of field experience with biological resources found in or near the project area.

The Permittee shall employ the Biologist(s) during the duration of the approved project. The Permittee shall ensure that the Biologists(s) conduct the following during any project activities involving mobilization, ground disturbance, grading, soil movement, or other activities that rely on approved Stormwater Management Plan measures to avoid or minimize impacts to coastal waters, wetlands, and their associated biological resources:

- Prior to installing BMPs, clearly mark sensitive biological resources on and near the site of planned project activities.
- Conduct monitoring at and near active construction areas pursuant to the schedule identified in the approved Stormwater Management Plan to ensure BMPs are functioning in a manner that prevents and minimizes adverse impacts.
- Provide reports as required by the approved Stormwater Management Plan regarding any failure of BMPs and the measures taken to correct those failures.
- Conduct worker training as required by the approved Stormwater Management Plan to identify the location and types of sensitive biological resources on and near the project site and the measures to be taken to avoid impacts to these resources.

The Biologist(s) shall require a halt to any project activities when he or she determines that continuing the activities would result in an unauthorized adverse impact to coastal waters, wetlands, and their associated biological resources. The Biologist(s) shall inform the Permittee what measures are needed to address the impact and may allow activities to resume after necessary measures are implemented.

3. **Site Restoration:** No later than March 31, 2015, the Permittee shall submit a coastal development permit application describing proposed measures to restore the areas affected by the development activities approved pursuant to this permit. The Permittee may request the Executive Director extend this deadline upon a showing of good cause.
4. **Archaeological Resources:** PRIOR TO STARTING APPROVED PROJECT ACTIVITIES, the Permittee shall submit for Executive Director review and approval an Archaeological Resources Protection Plan that includes the following:
 - A description of the worker training program to be implemented to assist workers in identifying potential cultural resources;
 - Monitoring to be conducted to identify potential resources that may be detected during clearing, trenching, and excavation activities;
 - Identifying the cultural resources specialist to be retained on call to investigate any potential cultural resources found during project activities; and,
 - Procedures to be implemented for halting construction and evaluating resources should they be discovered.
5. **Visual Resources:** All structures and fixtures constructed or installed as part of the project and visible from public areas, including shoreline areas of Humboldt Bay, shall be painted or otherwise finished in neutral tones that minimize their visibility from those public areas. Lighting used for project activities shall be directed downward and away from offsite areas to the extent allowed pursuant to applicable human health and safety requirements.

4.0 FINDINGS AND DECLARATIONS

The Commission finds and declares as follows:

4.1 PROJECT PURPOSE AND DESCRIPTION

The project's primary purpose is to demolish and decommission two active gas-fired electrical power generating units and one inactive nuclear unit at the Humboldt Bay Power Plant (HBPP), located along the shoreline of Humboldt Bay, just south of the City of Eureka. Pacific Gas & Electric Company (PG&E) has owned and operated the power plant since the 1950s. PG&E's intended end result of the project is to remove all structures to grade, to remove some below-grade structures, and to conduct the decommissioning and cleanup actions needed to allow industrial re-use of the site.

Note: The project, as currently proposed by PG&E and as evaluated herein, includes initial activities and some of the longer-term activities PG&E expects to conduct for completing decommissioning. Some aspects of the full decommissioning remain to be determined and will be developed based on upcoming site characterization studies. These activities will require additional Commission review and approval later in the decommissioning process.

BACKGROUND

The HBPP is located just south of Eureka along the shoreline of Humboldt Bay near the community of King Salmon (see Exhibit 1 – Location Map). The site currently includes two natural gas-powered electrical generating units and an inactive nuclear generating unit. To replace the existing gas-powered units, PG&E is constructing new power generating units at the site, just southeast of the existing units.

The two gas-fired units were constructed in the early 1950s. The nuclear unit started operation in 1963 as one of the first commercial reactors in the U.S. PG&E shut down the facility in 1976, pending review of seismic safety upgrades needed to comply with an order issued by the federal Nuclear Regulatory Commission (NRC) earlier that year. In 1983, PG&E determined it would not be cost-effective to perform the modifications necessary to re-start the unit, so it started the process to decommission the facility and put it into "safe storage" (or SAFSTOR), pursuant to NRC regulations. In 1984, PG&E published its federally required *Environmental Report* detailing the expected environmental effects of decommissioning. In 1985, the NRC amended PG&E's license to "possess but not operate" status and approved PG&E's SAFSTOR plan in 1998. Also in 1998, PG&E submitted its initial *Post-Shutdown Decommissioning Activities Report* to the NRC. More recently, in May 2009, PG&E published a revision to that report describing the major activities implemented to date and identifying activities it plans to complete the Unit 3 decommissioning. The planned activities that are part of the current proposed project are described in more detail below. The facility's current NRC license expires in 2015.

PREVIOUS COMMISSION ACTION

The Commission previously approved several CDPs for projects PG&E has implemented as part of its decommissioning or to prepare the site for demolition and decommission, including:

- CDP E-05-001: In September 2005, the Commission approved PG&E's Independent Spent Fuel Storage Installation (ISFSI) at the project site. The ISFSI is a high-security, robust storage facility for the spent fuel generated at Unit 3, and the Commission's approval allowed PG&E to move spent fuel to the ISFSI from wet storage within the Unit 3 complex, which was a necessary part of the Unit 3 decommissioning. PG&E completed the fuel transfer in December 2008.
- E-07-005: In October 2007, the Commission approved demolition of effluent ponds and placement of office buildings to be used during the decommissioning project.
- E-07-013: In October 2008, the Commission approved removal of a fuel oil pipeline as part of the retirement of Units 1 and 2.
- E-08-003: In May 2008, the Commission approved removal of a large fuel storage tank as part of project decommissioning.
- E-09-005: In June 2009, the Commission approved site modifications, such as expanding and constructing access roads, grading areas for laydown and storage, etc. to allow PG&E to prepare for decommissioning activities.

Additionally, the California Energy Commission in September 2008 approved PG&E's new power plant that is currently being built on site and is intended to replace the power units being removed through this project. The new power plant is expected to start operations in July 2010.

SITE ENVIRONMENTAL CHARACTERISTICS

The power plant site is a 143-acre parcel located on the shore of Humboldt Bay just east of the community of King Salmon (see Exhibit 2 – Site Plan). Several types of habitat exist on and near the site, with the most prominent being those associated with the Bay's open waters, tidal mudflats, and tidal marshes. Roughly half the site consists of low-lying coastal wetlands or areas of uplands with native or sensitive habitat. Developed portions of the site consist largely of former coastal terrace prairie or wetland areas that have been substantially disturbed due to the long-term presence of the power plant. Prior to the power plant being built in the 1950s, parts of the site were used for agriculture.

The site extends along about one-half mile of the Humboldt Bay shoreline, most of which includes riprap placed to protect the power plant. The site also includes an intake canal that carries water from Humboldt Bay to cool the power plant and a discharge canal that carries water from the power plant cooling system to the Bay. To the south and east of the power plant lies an extensive area of tidal marsh bisected by a rail line.

Most developed areas of the site range from about ten to forty feet in elevation, although the site also includes a coastal bluff that rises about 60 feet above Humboldt Bay. The bluff is now the site of PG&E's ISFSI. Much of the lower elevation areas of the site are underlain with

groundwater that reaches within about three to 15 feet of the ground surface, with another lower water-bearing zone from about 30 to 100 feet bgs. The two zones are separated by a low permeability layer of silt and clay. The lower portions of the site, which are mostly undeveloped areas, wetlands, or coastal waters, are below the site's Base Flood Elevation as determined by Humboldt County.

The site is subject to relatively extreme geologic hazards, due largely to its location near the "Triple Junction", an area offshore of the Humboldt/Mendocino coastline where three crustal plates converge and cause strong seismic events. The site itself is subject to strong ground shaking, liquefaction, tsunamis and tsunami runups, and coastal erosion, all of which lead to the project's nonconformity to the Coastal Act's provisions related to geologic hazards, as described later in these Findings.

MAIN PROJECT ACTIVITIES

PG&E expects project activities to occur over about six years and plans to implement the project in several phases, with some overlap among the various activities. Project activities will take place on only about 23 of the site's 143 acres, largely because of several significant site constraints, including the presence of a new power plant (built to replace Units 1 and 2) and the presence of the aforementioned extensive wetlands and sensitive habitats. The main project activities are described below.

Preparatory and support activities: PG&E will construct access roads, equipment laydown and storage areas, and construct or modify offices and buildings for use during the project. Construction-related activities could include placement of up to about twenty additional construction trailers at various locations within the already developed or disturbed portions of the project site. PG&E also plans to conduct internal renovations of an existing warehouse and possibly remove all or part of an exterior wall common to the warehouse, an office, and Unit 1. PG&E will also remove several onsite mobile emergency power units and its Liquid Fuel Oil (LFO) Tank #1 as well as the berm surrounding the tank. The LFO Tank and its containment berm are adjacent to an area of regularly mowed grasses that includes about 0.2 acres of Commission-jurisdiction wetlands (due to the presence of hydrophytic vegetation) and about 0.012 acres of Corps/Commission-jurisdiction wetland associated with a detention area. However, PG&E plans to avoid direct impacts to these areas through fencing and Best Management Practices as described in Section 4.3.2 of these Findings.

In addition to the activities occurring within the power plant site boundaries, PG&E plans to also use two nearby offsite areas in Fields Landing for equipment staging and laydown. PG&E is currently using these offsite areas during construction of its new power plant, and it plans to obtain leases to use them during the proposed decommissioning project as well. The two sites – one of about 28.3 acres located about one-half mile south of the plant and one of about 1.6 acres located just over a mile south of the plant – consist of vacant land formerly used for forest products storage and equipment/laydown areas for other construction projects. Although largely disturbed, they are adjacent to Humboldt Bay and include some areas of remnant native vegetation and habitat.

Unit 1 and 2 Demolition: PG&E will demolish and remove to about three feet below grade all structures associated with the two gas-powered power units, including the units themselves, an unused liquid fuel oil tank, an intake pump, backup power engines, and other similar facilities or equipment. Because of the limited space on site, after demolishing Units 1 and 2, PG&E will use the newly cleared area to decommission Unit 3. PG&E will conduct most of the Unit 1 and 2 demolition after the new power plant is operating, which is expected to be July 2010.

Unit 3 Decommissioning: PG&E will remove many of the Unit 3 systems, including the refueling building, turbine building, pipe gallery and tunnel, and associated tanks, pumps, condensers, and ancillary systems, the reactor vessel, suppression pools, caisson sump, reactor equipment drain tank, and other associated components. It will also remove the existing liquid rad waste processing facility and replace it with a temporary system for use during decommissioning. Most of these activities will occur within the facility's Radiological Controlled Area (RCA), which is the high-security area surrounding the nuclear unit. As noted above, however, some work will be done in the former Unit 1 and 2 footprint.

Site Cleanup: Significant project elements involve cleanup and remediation of contaminants related to power plant operations. The facility has been on the site since the 1950s and has created areas of soil and groundwater contamination. During the project, PG&E will conduct different types of hazardous materials abatement and waste management and will salvage or recycle materials as feasible. It will also use several existing facilities during the cleanup, such as a concrete containment pad and the power plant's sand-blasting facility. Most of the project's cleanup activities will involve remediating part of the site contamination through two main processes – a Voluntary Cleanup Program in conjunction with the state's Department of Toxic Substance Control (DTSC) and the federal Nuclear Regulatory Commission's (NRC's) decommissioning and license termination process:

- **DTSC Voluntary Cleanup Program:** To guide its initial cleanup activities, PG&E has prepared a proposed Interim Measures Removal Action Work Plan (IM/RAW) pursuant to Division 20, Chapter 6.8 of the state's Health and Safety Code, which allows entities to conduct voluntary cleanups subject to regulation and oversight by DTSC. This proposed IM/RAW, currently under DTSC review, identifies site-specific interim measures needed to meet cleanup objectives. DTSC has also prepared for CEQA purposes a Negative Determination describing the environmental effects of the proposed initial cleanup actions.¹

The proposed IM/RAW describes how PG&E plans to manage soils containing "constituents of potential concern" (COPCs), which include contaminants such as asbestos, metals, and petroleum-related hydrocarbons, and may include radiological constituents. PG&E proposes to manage, treat, and/or transport soils based on several hazardous waste and regulatory

¹ As of the date of this staff report, DTSC has not yet completed the CEQA process; however, staff anticipates that it will be completed prior to the Commission's scheduled December 10, 2009 hearing. DTSC published the Negative Determination on October 30, 2009 with a comment period running until December 4, 2009, and DTSC anticipates that it will certify the document by December 7, 2009. Staff will inform the Commission about the status of the necessary CEQA review at the Commission's December hearing.

thresholds, including the California Human Health Screening Levels (CHHSLs), the Regional Water Quality Control Board's Environmental Screening Levels (ESLs) and the U.S. EPA Regional Screening Levels (RSLs). These levels determine whether soils will remain in place, may be used for fill, grading materials, or other purposes, or will require special cleanup, handling, or transport to approved disposal facilities. Part of the intent of the IM/RAW is to ensure the initial short-term site cleanup activities are consistent with the long-term site cleanup objective of preparing the site for industrial re-use. To guide site cleanup after this initial phase, PG&E will later develop a final remedial action plan consistent with DTSC regulations and guidance; however, final remedial actions and cleanup levels have not yet been established. Development necessary to conduct the final remediation actions will be subject to additional Commission review and approval.

- **Cleanup associated with NRC License Termination:** Unit 3's permanent closure is subject to NRC requirements for terminating PG&E's approvals to operate the facility and to possess nuclear materials. These NRC requirements guide plant decommissioning, cleanup of radioactive structures and systems, and removing and storing radioactive materials.

The NRC's decommissioning process includes three main phases – initial activities, major decommissioning and storage activities, and license termination activities. As noted previously, PG&E has conducted most of the required initial activities and is now entering the major decommissioning phase, which involves permanent removal of major facility components, such as the reactor vessel, steam generators, large piping systems, and pumps.

PG&E described some of its planned decommissioning activities in its May 2009 *Revision of the facility's Post-Shutdown Decommissioning Activities Report*. The *Revision* notes that the facility has experienced greater radionuclide dispersal within Unit 3 systems than was evaluated in the NRC's generic decommissioning documents, but that PG&E will implement additional radiological controls to ensure the project does not exceed allowable occupational or public doses.² Controls and measures related to this aspect of decommissioning are subject to NRC jurisdiction only.

During this phase, PG&E must additionally file its License Termination Plan at least two years before expected termination of the license. PG&E expects to file that Plan in 2013. That Plan is to provide updated environmental information, describe site characterization, identify activities needed to dismantle remaining structures and remediate the site, and describe proposed final radiological surveys that will be conducted to determine whether the site can be released for other uses. Activities PG&E proposes to conduct pursuant to this Plan will be subject to additional Commission review and approval.

² The NRC published in 1988 its *Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities* and in 2002 published *Supplement 1* of that document. Those documents establish allowable occupational and public doses from decommissioning activities. PG&E noted that the initial construction of Unit 3 with stainless steel fuel rod assemblies instead of more recently developed alloys resulted in greater radionuclide dispersal within the Unit 3 systems than is addressed in the NRC's generic decommissioning documents. PG&E states that it will use best management practices to minimize exposures, and notes that the 20+ years of SAFSTOR status has allowed some level of radioactivity decay expected to reduce occupational doses.

Note: The NRC generally has exclusive jurisdiction over radiological aspects of projects associated with licensed nuclear power plants, and the Commission is usually prohibited from imposing conditions related to radiological concerns. However, because this project is meant to terminate NRC involvement with the facility and establish post-license site conditions, PG&E will be subject to state cleanup and remediation standards through the DTSC. While the NRC has primary jurisdiction for the handling and disposition of radiological materials associated with Unit 3, DTSC may establish the post-license standards for the remaining onsite contaminants.

Site Contaminant Characteristics and Proposed Remediation Measures: PG&E's completed site characterization studies include:

- 2009 *Asbestos Survey and Limited Lead, Chromium, and PCB Paint Survey*: identifies the presence of those contaminants in several power plant structures and will be used in implementing necessary protective measures during demolition and decommissioning.
- 2009 *Draft Current Conditions Report*: identifies the presence of Constituents of Potential Concern (COPCs) in both upland and wetland soils on site. The Report identifies the following contaminants in upland soils – asbestos, Cesium-137, arsenic, total petroleum hydrocarbons (TPHs) (primarily in the form of diesel), semivolatile organic compounds (SOVs), polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) – and the following in wetland soils – Cesium-137, arsenic, chromium, copper, lead, mercury, nickel, and zinc.
- November 2008 *Radiological Characterization Report*: identifies some level of radiological contamination throughout surveyed areas of the HBPP site.

The proposed IM/RAW identifies several areas where PG&E will conduct initial cleanup activities, mostly for areas with identified soil contamination primarily in the form of petroleum hydrocarbons and metals. These include the area around Liquid Fuel Oil (LFO) Tank #1 and its surrounding berm, with about 1000 to 1200 cubic yards of contaminated soil, an area around a mobile emergency power unit, with about 200 cubic yards, and an access road near LFO Tank #1, with about 600-700 cubic yards. PG&E anticipated that about another 3000 cubic yards of soil may also be excavated around some other similar structures within the project site.

The IM/RAW proposes to conduct initial soil remediation either through on-site reuse, which would result in using soils with acceptably low contaminant levels as fill or as subgrade materials in parking lots or staging areas, or through off-site disposal, which would require the soil be transported by truck to approved facilities. PG&E considered, but eliminated from further consideration, the use of on-site treatment methods. PG&E will sample soils based on the total volume to be excavated from each area³ and based on its proximity to likely

³ For soil volumes up to 1000 cubic yards, PG&E would take a sample for each 250 cubic yards; for soil volumes from 1000 to 5000 cubic yards, 4 samples would be taken from the first 1000 cubic yards, plus one sample for each additional 500 cubic yards; and for volumes greater than 5000 cubic yards, 12 samples would be taken for the first 5000 cubic yards with one sample for each additional 1000 cubic yards.

contaminant sources.⁴ PG&E has identified four possible sites if offsite disposal is required, with site selection depending on the type of waste involved.⁵ Trucks used to transport material offsite will cover and contain the soil and be subject to the *HBPP Hazardous Materials/Waste Release During Off Site Transportation* document, pursuant to applicable requirements of the California Health and Safety Code and Department of Transportation and California Highway Patrol regulations regarding emergency response procedures. Trucks will use an entrance and exit along King Salmon Avenue and may require short-term traffic controls – e.g., flaggers, warning cones, etc. PG&E is considering transporting some project components offsite by ship or barge; however that option is not part of the currently proposed project and development associated with that option would require additional Commission review and approval.

Because site characterization is not yet complete, PG&E is not yet proposing its full remediation approach and has not yet described its planned remediation within onsite wetland areas or the extent of remediation that will be required to address radiological contaminants. Based on additional characterization results (including those described below) and the determination by DTSC and the NRC of necessary cleanup levels, PG&E may be required as part of a future Remedial Action Plan to conduct cleanup activities that will affect coastal resources such as wetland areas and groundwater. As described in these Findings, any such activities will be subject to future Commission review and approval.

Additional contaminant characterization: As the project progresses, PG&E plans to conduct additional characterization, including the studies described below:

- **Unit 1 and 2 footprint area:** As noted previously, PG&E will use the footprint of the demolished Units 1 and 2 during Unit 3 decommissioning. After decommissioning is complete, PG&E will review site conditions within this area to determine whether remaining below-grade structures or other materials need to be remediated. Based on currently available information, PG&E expects it will remove soils at a depth of up to three feet; however, it has also considered a “worst-case scenario” that would involve removal of all soil and below grade structures within this Unit 1 and 2 footprint area to 12 feet below the ground surface. This would require removal of about 20,000 cubic yards of material (about 1,000 20-yard truckloads) over the 1.5-acre Unit 1 and 2 footprint. Removing this type and amount of material is included in the description of the proposed project and is therefore authorized by issuance of this permit.

⁴ Soil would be analyzed for metals, Total Petroleum Hydrocarbons (TPHs), Polycyclic Aromatic Hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), asbestos, Cesium-137, and other materials based in part on their location and potential contaminant pathways.

⁵ The IM/RAW identifies the following landfills (and types of wastes accepted) as possible disposal sites:

- Kettleman City, CA – Class I (RCRA Hazardous and Non-RCRA Hazardous), Class II, and Class III Nonhazardous.
- Clive, UT – Class A Low-level radioactive waste.
- Livermore, CA – Class II and Class III Nonhazardous.
- Anderson, CA – Class III Nonhazardous.

- **Unit 3:** Much of Unit 3 is below ground level and demolition will require PG&E to remove several below grade structures and some as-of-yet unknown amount of soil and other materials. The extent and amount of removal has not yet been determined, and will depend on additional site characterization results and development of the “Derived Concentration Guideline Levels” (DCGLs), which are site-specific and radionuclide-specific levels of residual radioactivity based on concentration, dose, or risk criterion. Once defined, they will establish the allowable levels for remaining radiological components in the soil. PG&E proposes as part of its CDP application to remove most of the structures and materials associated with Unit 3 to about 42 feet below ground surface, which would total about 7070 cubic yards of materials. The description for the proposed project includes this type and amount of remediation, so such development would be authorized by issuance of this permit. PG&E is not currently proposing to remove several of the below-grade structures, as their eventual disposition will depend on future site characterization. These include the spent fuel pool, pipe tunnel, and reactor caisson, which would require removing about 11,000 additional cubic yards of material down to about 92 feet below ground surface. This potential work would likely require significant additional excavation, treatment, and remedial measures that are not addressed in this staff report and would require additional Commission review and approval.

Long-term presence of radioactive wastes: A significant project element is how PG&E proposes to handle and store some of the radioactive materials that will result from Unit 3 decommissioning. The project will generate “Class B”, “Class C”, and “Greater Than Class C” (GTCC) wastes, which are materials that require special handling and treatment pursuant to NRC requirements.⁶ PG&E plans to store the relatively high-level GTCC wastes within the onsite ISFSI, which is designed to hold such materials. In planning the ISFSI, PG&E included sufficient storage area for the GTCC waste it expected to generate during decommissioning.

However, the ISFSI does not have sufficient storage to hold the as-of-yet undetermined amounts of “Class B” and “Class C” waste to be generated during decommissioning. Because there are currently no available offsite facilities in which PG&E can store this material, PG&E proposes to store the material onsite in its existing high-level storage facility until a suitable offsite storage option is available. This facility is located near Unit 3 and its associated structures and has three compartments totaling about 1150 cubic feet of potential storage space. The amount of waste stored, however, depends on the type of waste and its radiological state – i.e., “hotter” materials need more separation when in storage. The facility is not designed for permanent storage, so PG&E must at some point establish an alternative storage method for these wastes. However, without a currently available alternative, the Commission must assume that these wastes will

⁶ Pursuant to 10 CFR 61.55, the NRC classifies low-level radioactive waste into four classes, based on their radioactivity levels and their half-life longevity. In order of increasing hazard, they are Class A, Class B, Class C (all of which are considered relatively low-level wastes), and Greater Than Class C Waste. The classes have different standards for storage and disposal – for example, Class B storage standards are based on the materials decaying sufficiently within 100 years to not cause a hazard; Class C wastes are assumed to not present a hazard within 500 years; and Greater Than Class C wastes require longer protection times.

remain on site in perpetuity. When a suitable offsite option becomes available, PG&E would then submit an application for a new or amended permit requesting the Commission approve the measures needed to transport the materials.⁷

Other Activities and Development Anticipated But Not Part of the Currently Proposed

Project: In addition to the potential activities described above that will require future Commission review and approval, PG&E has identified the following potential activities:

- **Additional Class B and/or Class C Wastes:** PG&E has anticipated that decommissioning could result in more Class B and Class C wastes than can be stored in the existing onsite high-level facility. If PG&E needs additional storage, it will submit for additional Commission review and approval a proposal to use Secure Environmental Containers (SECs), which are made of steel-reinforced concrete and which would be placed near the ISFSI site. Any such proposed storage would require new or amended Commission approval.
- **Project effects on the facility's intake/discharge canals:** For the past several decades, the project has relied on cooling water pumped from Humboldt Bay through Fisherman's Channel in King Salmon to an inlet channel at the project site. The typical water flow has been about 76 million gallons per day (MGD). By the end of decommissioning, and with the new air-cooled power plant currently under construction, PG&E will no longer need this cooling water supply.

PG&E is not currently proposing to modify or fill in the inlet channel; however, discontinuing use of this cooling water and the intake channel will require future attention for at least two reasons: first, PG&E has identified contamination within the channel that will likely be subject to cleanup measures to be developed in an upcoming remedial action plan; and second, ending the cooling water flow will change the hydraulics and sedimentation patterns in and near Fisherman's Channel in Humboldt Bay. In 2010, PG&E plans to conduct additional characterization within the channel to determine necessary remediation measures. These issues will also be subject to future Commission review and approval.

⁷ PG&E describes one potential site that may be available at some future date. In January 2009, Texas granted a license to a facility in Andrews County, Texas that would allow it to accept for permanent disposal low-level nuclear wastes. However, that license approval has been appealed, and the facility has not yet met pre-construction conditions. If the appeal is dismissed and the facility is constructed, Texas would also have to agree to accept imported wastes, and the Southwest Compact, of which both California and Texas are members, would have to agree to accept wastes from PG&E. PG&E would then have to identify acceptable methods to handle and transport the wastes to the facility.

4.2 COASTAL COMMISSION JURISDICTION

COMMISSION PERMIT JURISDICTION

The project site is entirely within the coastal zone and within the Commission's retained jurisdiction. Although the project consists primarily of demolition and decommissioning (rather than constructing new buildings), most of the project activities are considered "development" as defined in the Coastal Act.⁸

OTHER STATE AND LOCAL PERMITS

Department of Toxic Substances Control: The project is subject to cleanup requirements of the California Department of Toxic Substances Control (DTSC), which is also serving as the CEQA Lead Agency.⁹ DTSC is the lead regulatory agency for investigating, assessing, and remediating onsite contaminants associated with past power plant operations, and PG&E is conducting the necessary site cleanup through a Voluntary Cleanup Agreement with DTSC. DTSC is reviewing a proposed Interim Measures Removal Action Work Plan (IM/RAW), which describes measures needed to conduct initial cleanup activities associated with the project. The proposed IM/RAW has identified about 5,000 cubic yards of soils with contaminant levels requiring treatment or special handling. DTSC will also guide development of PG&E's final remediation plan, which will be based in part on additional site surveys and characterization planned over the next several years.

Regional Water Quality Control Board: The project is subject to approvals by the Regional Water Quality Control Board (RWQCB) for proposed changes to the power plant discharges and for discharges related to demolition and decommissioning. In October 2008, the Regional Board issued a water quality certification for the project. PG&E will also be subject to conditions of a construction stormwater permit to be issued by the Board and a modified NPDES permit to address the changes in discharges during demolition and decommissioning.

⁸ "Development" as defined in Coastal Act Section 30106 means "on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practice Act of 1973 (commencing with Section 4511).

As used in this section, 'structure' includes, but is not limited to, any building, road, pipe, flume, conduit, siphon, aqueduct, telephone line, and electrical power transmission and distribution line."

⁹ As noted previously, DTSC expects to certify its CEQA document before the Commission's hearing on December 10, 2009.

FEDERAL PERMITS

Nuclear Regulatory Commission (NRC): The nuclear unit's decommissioning is subject to regulation and oversight by the federal NRC. The NRC has exclusive jurisdiction over radiological aspects of licensed nuclear reactors, storage of materials generated by those reactors, and reactor decommissioning. For projects involving those aspects of the NRC's jurisdiction, the state is preempted from imposing upon nuclear facility operators any regulatory requirements concerning radiation hazards and nuclear safety, though the state may impose requirements related to other issues.¹⁰ The facility's current and proposed possession, handling, storage, and transportation of nuclear materials are therefore precluded from state regulation.

The Coastal Commission findings herein address only those state concerns related to conformity to applicable policies of the Coastal Act, and do not evaluate or condition the proposed project with respect to nuclear safety or radiological issues during the term of NRC's regulatory oversight. However, because the project will result in termination of PG&E's NRC-licensed activities for Unit 3, the state has jurisdiction over post-license site conditions, including those related to radiological concerns. Part of the expected DTSC review will include establishing allowable levels of remaining radiological components at the site and developing remedial actions needed to meet those levels. The Commission expects that those actions will constitute "development", thereby requiring additional Commission review and approval.

¹⁰ The U.S. Supreme Court, in *Pacific Gas and Electric Company v. State Energy Commission*, 461 U.S. 190, 103 S.Ct. 1713 (1983), held that the federal government has preempted the entire field of "radiological safety aspects involved in the construction and operation of a nuclear plant, but that the states retain their traditional responsibility in the field of regulating electrical utilities for determining questions of need, reliability, costs, and other related state concerns."

4.3 CONFORMITY TO COASTAL ACT APPLICABLE POLICIES

4.3.1 GEOLOGIC HAZARDS

Coastal Act Section 30253 states, in relevant part:

New development shall:

- (1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
- (2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs...*

The project site is located on the shoreline of Humboldt Bay directly opposite the mouth of the Bay. Most of the site is relatively level and consist primarily of current or former wetlands and developed or landscaped areas. The coastal bluff on the site consists largely of a marine terrace deposit made up of poorly cemented sands and interbedded clays.

The site is subject to several geologic hazards, including seismic activity, coastal erosion, tsunamis, and tsunami runup, each of which is briefly summarized below. Following the summary, the Findings describe whether components of the proposed project conform to the requirements of Coastal Act Section 30253. Most of the review described in these Findings is based on the analysis conducted by the Commission's geologist and adopted by the Commission in its 2005 approval of PG&E's ISFSI project at this same site. Exhibit 3 of these Findings provides the Geotechnical Review Memorandum the Commission staff geologist prepared for the Commission's review of that project, including an assessment of documents from PG&E and others describing geologic hazards of the site and area, and recommendations regarding the ISFSI's conformity to Coastal Act policies related to geologic hazard risks. That Review is pertinent to this project because both the ISFSI and the current project involve the potential long-term presence of structures that will be subject to the range of geologic hazards identified at the site. As noted previously, because there are no available alternatives for permanent storage of some of the wastes PG&E expects to generate during decommissioning, the Commission must assume for purposes of Coastal Act conformity that parts of the project will remain on site in perpetuity.

SITE GEOLOGIC HAZARDS

The project site is near the southern end of the Cascadia Subduction Zone and near a location known as the "Mendocino Triple Junction" where three crustal plates converge – the Pacific Plate to the south; the Gorda Plate and its extension, the Juan de Fuca Plate to the north; and, the North American Plate to the east. Due to its location, the site is subject to substantial levels of geologic hazards, as described below.

Site seismic characteristics: The Humboldt Bay area has been subject to very large earthquakes of a magnitude of about 9.0 that occur roughly every 300 to 400 years,¹¹ with the last such earthquake occurring in 1700. The area has also experienced more than 120 earthquakes greater than magnitude 5 recorded within 100 miles of the site and 10 over magnitude 7. The immediate project area includes at least two active faults, with the Buhne Point Fault directly under the onsite bluff and surfacing about 300 feet to the southwest, and the Discharge Canal Fault about 500 feet further east. These two faults create a wedge, which is uplifted during fault movements, and which is largely responsible for the topography and elevation of Buhne Point. About two miles away is the surface trace of another fault – the Little Salmon Fault – that underlies the site and which is thought to rupture concurrently with the Cascadia Subduction Zone.

Earthquakes may be rated by the amount of ground shaking they cause.¹² The Humboldt Bay Power Plant has experienced six earthquakes with ground motion of greater than 0.10 g. The relationship between an earthquake's magnitude and its rate of ground shaking is not linear. For example, the two quakes producing the largest recorded ground motions at the site (0.30 g and 0.55 g) were of magnitude 5.3 and 5.4, respectively, while a recent magnitude 7.2 quake in June 2005 produced ground motion of less than 0.1 g. Additionally, earthquakes affect structures based on the frequency (in cycles per second) of the seismic waves they generate. Generally, high frequency shaking is more damaging to smaller, more rigid structures, and low frequency shaking is more damaging to larger or more flexible structures.

Liquefaction: Liquefaction can occur during ground shaking when loosely consolidated soils are saturated with water. Much of the site may be subject to liquefaction, as parts of it are underlain with relatively loose and poorly consolidated sands, silts, and organic materials, and a groundwater table that extends to within about three feet of the surface. However, the site's higher elevations are underlain with dense, stiff clays and sands of a type not subject to liquefaction, and tests PG&E conducted during its ISFSI project design showed that these soils were unlikely to liquefy. It is therefore likely that liquefaction may occur on parts of the lower site elevations, but the Commission concurs with both its staff geologist and PG&E that liquefaction will not occur in these higher elevation areas on site.

Slope stability: Most of the site, except for the Buhne Point bluff, is relatively level and does not raise concerns about slope stability. The bluff's north and west slopes are relatively steep, and those on the east and south are relatively gentle. During the ISFSI review, PG&E assessed slope stability under static conditions and determined the factor of safety to be 2.69 for the north side

¹¹ An earthquake's magnitude is a measure of energy released by an earthquake, as expressed on a logarithmic scale measuring the horizontal displacement caused by an earthquake and detected on a seismograph. A magnitude 6 earthquake, for example, produces ten times the amount of ground shaking as a magnitude 5 earthquake.

¹² Ground shaking is a measure of the movement caused by the earthquake compared to the rate of acceleration caused by gravity. "Peak ground acceleration" (PGA) can be measured as a vertical or horizontal movement. For example, a PGA of 0.1 g means that the ground accelerated at one-tenth the rate of acceleration resulting from gravity (9.81 meters per second squared). PGA depends not only on the intensity or magnitude of an earthquake, but on the distance from the quake and on characteristics of the site – for example, ground acceleration will vary based on the depth and firmness of soil or bedrock at the site.

of the site (the coastal bluff) and 4.94 for the southern slope. For most coastal developments, a safety factor of at least 1.5 is considered necessary to ensure slope stability for the life of a proposed project. As discussed under “coastal erosion”, however, this level of stability cannot be assured in perpetuity if coastal erosion impinges on the site.

The slope stability analyses indicated yield accelerations—the level of ground shaking needed to instigate landslides—to be 0.69g and 0.66g for the coastal bluff and the southern slope, respectively. Since these levels of ground shaking are less than the design basis earthquake, it is likely that the slopes will fail during such an earthquake. The amount of displacements of the slide masses was calculated using a Newmark sliding block approach to be about one foot during the design basis earthquake, which far exceeds the 50 mm (about two inches) usually considered acceptable for new construction.

Surface fault rupture: As noted above, several active faults underlie the site. The Little Salmon Fault, the Bay Entrance Fault and the Buhne Point fault all dip to the northeast and underlie the site at various depths. The surface trace of the Buhne Point fault lies only about 300 feet south of the ISFSI site, and the surface trace of the Discharge Canal fault lies about 500 feet to the north. Through movement on these faults, the wedge formed by these two faults is gradually uplifted and tilted. During ISFSI site design, PG&E conducted geotechnical studies that included trenching across the site. The trenches encountered sand-filled fractures, though none showed detectable offset and so were not considered active faults. PG&E proposed that future deformation from displacement on the Little Salmon fault will be minor tilting with no differential displacements. The Commission’s staff geologist agreed that this is likely, but additionally believed it is possible that one or both of these faults will shift position and that future fault movement could occur at the site. It is quite common for faults to rupture along traces offset from previous ruptures, defining a “fault zone” rather than a single fault plane. This is, in fact, the case for these two faults, although the zone of fracturing does not appear to be more than a few tens of feet wide. It is also possible that future movement along these faults could result in a different style of faulting. Overall, the Commission concurred with the staff geologist’s position that during the perpetual presence of the ISFSI at this site, it could be subjected to fault rupture.

Tsunami: The project site is within an area identified as subject to tsunami hazards. It is on the shoreline of Humboldt Bay and directly opposite the mouth of the Bay, so it could readily be subject to direct or indirect tsunami wave energy. As noted previously, the site has experienced a series of very large earthquakes, many of which resulted in tsunamis.

During the Commission’s 2005 ISFSI review, PG&E calculated that the maximum tsunami runup resulting from a Cascadian Subduction Zone earthquake during Mean Higher High Water would be from about 23 to 38 feet, which would inundate the lower elevation portions of the site but would not affect the higher parts of the bluff, including the ISFSI site at 44 feet elevation. PG&E therefore proposed that the ISFSI would not be inundated, and because the ISFSI is below grade, also proposed that it would not be damaged by debris carried by the tsunami.

For several reasons, however, the Commission concluded that the site would not be safe from tsunami hazards either during the relatively short-term or in perpetuity. First, similarities between the expected Cascadian Subduction Zone earthquakes and the December 2004 Sumatran earthquake raise doubts as to the validity of the expected tsunami runup height at the ISFSI site. The Sumatran quake and its resulting tsunami were caused by mechanisms similar to those causing Cascadian subduction quakes, but its tsunami runups were as high as 130 feet, about three times higher than PG&E's predicted runup levels. Additionally, PG&E's predicted 38-foot runup is based only on the height above Mean Higher High Water and does not include the customary additional height provided if the tsunami occurred during a 100-year storm surge. Further, the project site is on a peninsula made up of poorly consolidated soils, and it would be subject during a tsunami to wave energy from both incoming and retreating waves, which could result in substantial erosion and damage.

During the ISFSI review, because the ISFSI is expected to remain in perpetuity, Commission staff requested PG&E additionally evaluate the longer-term potential for tsunami effects. PG&E applied the rate of tectonic uplift at Buhne Point (estimated at about 1.3 feet per 100 years) to several scenarios for anticipated rates of sea level rise. The analyses found that during the next several thousand years, overtopping of the site would be likely.

Coastal Erosion: Section 30253(2) of the Coastal Act requires, in part, that new development not require construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. The proposed project site is in an area where past coastal erosion rates have been among the highest in the state, due in part to the site's location across from two jetties built to maintain the mouth of Humboldt Bay that direct wave energy towards the site. PG&E's assessment of historical shoreline retreat in the area between 1858 and 2000 shows a shoreline retreat of from about 1250 to 1500 feet. Since 1952, however, the site has been protected by a riprap revetment built to protect the power plant. The revetment was enlarged in 1956-57 and repaired in 1989 after being damaged in winter storms. The revetment has essentially halted retreat of the shoreline; however, the bluff above the revetment has continued to retreat, at a rate of about one to four inches per year, a rate likely to continue until it attains a stable slope angle.

APPLYING SECTION 30253 TO SITE CHARACTERISTICS AND THE PROPOSED PROJECT

Most of the project development will be temporary in nature, as it is meant to support the demolition and decommissioning activities PG&E expects to conduct over the next six years. However, although temporary, these developments will be subject to several of the site's aforementioned geologic hazards during that time, including potential ground shaking, surface fault rupture, liquefaction, and tsunami runup. Project development associated with longer term onsite storage would additionally be subject to potential coastal erosion and sea level rise.

Ground shaking and surface fault rupture: The Commission found in its review of PG&E's ISFSI project that PG&E had designed the ISFSI to withstand the "maximum credible earthquake" at the site, and therefore found that project was consistent with Coastal Act Section

30253(1) with respect to the ground motion hazard.¹³ However, the ISFSI is one of the few structures in the world expected to withstand that force. The temporary structures and development for this current project – e.g., modular offices, structures with standard foundations, etc. – are designed to withstand a far lower level of ground motion, which is reasonable for most sites and uses, but does not result in conformity to this Coastal Act provision. Similarly, this project’s temporary structures and developments are not designed to withstand the expected levels of surface fault rupture at this site. We note that the Commission found during its review of PG&E’s ISFSI project that the comparatively robust design of the ISFSI was also not found adequate to withstand expected surface fault ruptures at this location. Accordingly, the Commission finds that the current project is not consistent with the requirement of Coastal Act Section 30253(1) to minimize risk with respect to surface fault rupture.

Liquefaction: As noted above, liquefaction is not likely on the higher elevation parts of the project site though it could occur in the lower elevation areas. The liquefaction potential is likely less on those project site areas with paved surfaces and soils compacted over years of use, which is where most activities will occur.

Tsunami runup: As noted previously, the entire site is subject to tsunami runup levels that could result from feasibly expected seismic activity at or near the site. Based on the analyses herein, the Commission finds that this project is not consistent with the requirement of Section 30253(1) to minimize risks associated with tsunamis and tsunami runup.

Coastal erosion: During the approximately six years of expected project activities, coastal erosion is not expected to substantially affect the site; however, coastal erosion is likely to be significant during the period of perpetual material storage on site and is likely to result in the eventual need for a shoreline protective device. Additionally, as the Commission determined in the ISFSI project, the existing rate of bluff retreat resulted in an inadequate static factor of safety for the site. To partially address these issues, the long-term portions of the project would benefit from two **Special Conditions** established in the Commission’s ISFSI approval, which require PG&E to monitor and report to the Executive Director the rates of change on the bluff slopes and the rate of shoreline erosion along the project site.¹⁴ Those conditions are meant to provide

¹³ PG&E designed the ISFSI in part using a probabilistic assessment of the “maximum credible earthquake” likely to occur at the site during a 2000-year return period. This design earthquake is of magnitude 9.1, roughly equivalent to the recent Sumatra earthquake of December 2004, and has a peak acceleration of almost 2.9 g, which is equivalent to the force near the upper limit of any earthquake anywhere in the world.

¹⁴ **Special Condition 1** of CDP #E-05-001 states : “*Monitoring Bluff Slopes:* Prior to starting construction, the Permittee shall survey the bluff slopes adjacent to the ISFSI structure to establish the location of the bluff edge and shall set permanent monuments sufficiently far back from the bluff edge to allow their use during future surveys. Thereafter, and no less than every five years, the Permittee shall monitor those bluff slopes for sliding, ground movement, or other motion. Monitoring shall be done using the measures and monitoring devices described in the project’s *Safety Analysis Report*. No later than June 30 of each subsequent fifth year, the Permittee shall submit a report, prepared by a licensed Civil Engineering Geologist, to the Executive Director describing the results of the monitoring. If during any five-year period, monitoring shows any horizontal or vertical movement of the bluff slope or edge of two feet or greater, monitoring and reporting shall then be done on an annual basis, with the report described above being submitted no later than June 30 of each year. If during five consecutive annual monitoring periods, movement of the bluff slope and edge totals less than two feet, monitoring and reporting may return to a

adequate time to plan for, design, and implement any necessary modifications to the site or to site storage; however, they do not allow the project to conform sufficiently to Section 30253(2).

CONCLUSION

To reduce potential risks, PG&E will locate most new structures on previously developed areas of the project site and at elevations where liquefaction and tsunami runup risks are lower. The temporary structures PG&E will place to provide office space and to support decommissioning will be designed to meet the 2007 California Building Code and will be sited based in part of a soils report to be prepared by a licensed Civil Engineer that will describe any known geotechnical concerns and identified needed mitigation measures. Structures located outside the facility's Radiological Controlled Area will be subject to building permits from Humboldt County. PG&E states in its application that it will also provide to the Commission the design and location of its proposed liquid rad waste treatment facility once the information is available. **Special Condition 1** (discussed in more detail in the following Section) ensures that PG&E will provide that information for Executive Director review and approval.

Even with these measures, however, the site and proposed development are likely to be subject to severe ground shaking, surface fault rupture, liquefaction, slope failures, tsunamis, and coastal erosion, either during the relatively short-term duration of the planned decommissioning activities (during the next six years) or during the expected long-term storage of materials on site. Neither the short- nor expected long-term project elements are designed to withstand the

five-year period. The Permittee shall notify County staff and the Executive Director immediately in the event of slope failure or movement that may indicate imminent slope failure. If monitoring results for any reporting period indicate slope movement that may require additional measures to protect the development, the Permittee shall submit a coastal development permit application or request for an amendment to this permit."

Special Condition 2 of CDP #E-05-001 states: "*Monitoring Shoreline Erosion*: Prior to starting construction, the Permittee shall survey the shoreline of the ISFSI site to establish the location of the existing riprap and the lower toe of the bluff. Thereafter, and no less than every five years, the Permittee shall conduct surveys of the shoreline and lower toe of the bluff of the ISFSI site. Surveys shall be conducted by a licensed Surveyor or Civil Engineer. Each survey shall be performed in the early spring when the beach level is lowest and the lower bluff face is most exposed, or as close to that time as is feasible. Each survey shall record the position of the lower toe of the bluff using conventional survey techniques (total station, rod and level, plane table, etc.), differential Global Positioning System (GPS), photogrammetry (with current ortho-rectified aerial photographs), by ground Light Detection and Ranging (LIDAR), or other comparable technique. Survey techniques used shall be consistent throughout the survey period or shall allow consistent comparison of yearly data. Survey measurements shall be accurate within 0.5' horizontal and 1.0' vertical.

The Permittee shall report the results of each survey to the Executive Director by June 30 of every fifth year. Each report shall include narrative and mapped analysis of the survey data, a determination of the average retreat rate for the full survey area, identification of any locations where the bluff change rate is more than two standard deviations from the average. Bluff change shall be calculated at 50' intervals (or smaller) to determine the average retreat, standard deviation and to identify areas of outlier retreat rates.

If monitoring results for any survey indicate the development may be threatened by coastal erosion in less than five years, the Permittee shall submit within sixty days of the annual survey report a coastal development permit application or request for an amendment to this permit to relocate the ISFSI or other project components as needed."

range of potential geologic hazards at the site, and the Commission therefore finds that the project does not fully conform to the Section 30253(1) requirement that new development minimize risks to life and property, and that it not require shoreline protective devices during its anticipated operating life, pursuant to Section 30253(2). Although the long-term aspects of the project will benefit from CDP #E-05-001's Special Conditions 1 and 2, those conditions do not result in full conformity to Section 30253.

Nonetheless, although conducting the project in the proposed manner at this location results in inconsistencies with Sections 30253(1) and (2), to deny the proposed project or to modify it to remove these inconsistencies would result in effects on coastal resources that conflict with other Chapter 3 policies. The Commission must resolve these inconsistencies by applying Coastal Act Section 30007.5, as is described below in Section 4.3.7 of this report.

4.3.2 MARINE RESOURCES AND WATER QUALITY

Coastal Act Section 30230 states:

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Coastal Act Section 30231 states:

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

BACKGROUND AND ANALYSIS

The Coastal Act generally requires that coastal waters and wetlands and their associated biological productivity be maintained and protected. Without necessary mitigation measures, many of the proposed project activities could adversely affect these coastal resources.

Most of the project will occur at the power plant site adjacent to Humboldt Bay and involve activities that could affect water quality and biological productivity in and near the Bay and in nearby wetlands. Habitat at or near the site is considered suitable for several special-status fish species, including Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss*), coastal cutthroat trout (*Oncorhynchus clarki clarki*), and tidewater goby (*Eucyclogobius newberryi*). Project activities include grading and excavation, soil removal and stockpiling, handling and treatment of contaminated soils, placement of new structures, and construction-related activities associated with each, all of which could alter runoff and sedimentation characteristics at the site. PG&E also proposes to use for equipment laydown and storage two sites in Fields Landing that are adjacent to the Bay and include areas with wetland vegetation.

Avoiding direct wetland impacts: As noted above, the project site includes extensive areas of wetlands and Bay shoreline. Although the project as currently proposed does not anticipate direct wetland impacts, many of the project activities could affect wetlands and water quality through runoff, sedimentation, or inadvertent use of equipment in or near those areas. At the power plant site, PG&E has identified about 0.3 acres of relatively low-quality wetlands near the

liquid fuel oil tank and containment berm it plans to remove as part of the project. It has also identified an area of native wetland vegetation and habitat near one of the two areas it plans to use in nearby Fields Landing for equipment staging and laydown. That area supports wetland species such as alder (*Alnus rubra*), brass buttons (*Cotula coronopifolia*), pennyroyal (*Mentha pulegium*), and rabbit's foot (*Polypogon monspeliensis*), and includes potential habitat for the Northern red-legged frog (*Rana aurora*), although none have been observed. Both laydown areas are also adjacent to the Humboldt Bay shoreline. Activities at these laydown sites would occur near, but not directly on, the shoreline, which is rip-rapped and supports primarily ruderal species. The protective measures described below are intended in part to avoid direct impacts and to minimize any adverse impacts in each of these wetland areas.

Protecting wetland and water quality: The project involves excavating, testing, and transporting several thousand cubic yards of both clean and contaminated soil, generating significant amounts of construction waste, and using numerous motor vehicles and types of heavy equipment, all of which could cause contaminated runoff and sedimentation into coastal waters or nearby wetlands. During the project, PG&E will be conducting various cleanup activities, including sand-blasting, operating a liquid radwaste facility, and other similar activities that could result in additional runoff and sedimentation effects.

To minimize potential adverse effects, PG&E will be required to control and treat some runoff and sedimentation through its existing NPDES permit issued by the North Coast Regional Water Quality Control Board, which includes conditions limiting the allowable volumes and types of discharges from several facilities at the site. Many of the project activities will take place within areas already covered by the NPDES permit and where PG&E has already installed water quality control measures as part of its ongoing operations. As noted earlier, the Regional Board will modify this permit later in the project to address changed site conditions. PG&E will also be subject to a construction stormwater permit from the Regional Board meant to avoid and minimize adverse effects to nearby waterbodies.

For the currently proposed project, PG&E has proposed several stormwater Best Management Practices (BMPs) to minimize the potential effects of construction-related runoff into nearby wetlands or other coastal waters. These BMPs will include measures such as installing and maintaining temporary fencing to prevent vehicles and equipment from entering biological sensitive areas, installing and maintaining barriers and filters to prevent untreated runoff from entering wetlands or coastal waters, seeding and revegetating disturbed areas, and other similar measures. The project will be also subject to a Construction Stormwater Permit from the Regional Water Quality Control Board to ensure it meets the state's water quality requirements. To ensure the project BMPs are adequate to protect coastal resources and will result in conformity to applicable Coastal Act policies, **Special Condition 1** requires PG&E to submit for Executive Director review and approval a Stormwater Management Plan that describes the BMPs it will implement to ensure conformity to Coastal Act provisions. **Special Condition 1** includes provisions to ensure PG&E includes measures in that Plan to minimize runoff and sedimentation from excavated soils, to identify the location and BMPs incorporated into each

new facility used during the project, and other similar requirements.¹⁵ Additionally, **Special Condition 2** requires PG&E to hire a designated project biologist to implement many of the protective measures needed to ensure project activities do not cause adverse effects in the nearby wetlands or coastal waters. These measures include conducting biological monitoring during project-related activities that have the potential to affect wetlands or water quality, and providing worker awareness training on how to avoid wetland and water quality impacts. To ensure project development results in long-term protection of these resources and does not create conditions that would adversely affect coastal waters and habitat, **Special Condition 3** requires PG&E to submit a site restoration plan for Commission review and approval.

Potential project development not yet proposed: Some potential project-related activities that could affect wetlands and water quality may later be proposed as part of the project and will require additional Commission review and approval. As noted above, PG&E has provided preliminary sampling results showing soil contamination within some of the onsite wetland areas; however, it is not currently proposing any activities, such as remediation, within those wetlands. Part of the ongoing cleanup effort will include additional testing and contaminant characterization within those areas, and any resulting remediation activities will be subject to further Commission review and approval. PG&E has also identified contamination within the power plant intake channel, but will conduct additional characterization to determine what remediation measures are needed to address the types and levels of contaminants. PG&E has also not yet identified whether it will fill or modify the intake and discharge channels. The power plant demolition and decommissioning allow PG&E to stop pumping up to 76 million gallons per day of cooling water from Humboldt Bay, which will affect the fate and transport of contaminants and will alter sedimentation patterns in and near the channels.¹⁶ Development proposed to address these issues will require additional Commission review and approval.

¹⁵ As noted earlier, transporting contaminated soils offsite is subject to applicable provisions of the California Health and Safety Code and regulations of the Department of Transportation and California Highway Patrol.

¹⁶ Pursuant to a condition of the October 2008 water quality certification issued by the Regional Board, PG&E submitted a hydrology report assessing the hydraulic and sedimentation effects of the changed pumping rate. The report was to identify the expected amount and extent of transport of contaminated sediments from the intake channel to Humboldt Bay. A primary concern was to identify whether ending the unidirectional flow caused by pumping in cooling water would allow the sediment contamination to be transported into the Bay.

PG&E submitted in March 2009 a Technical Memorandum to the Regional Board that included a hydraulic analysis and sediment transport analysis. PG&E modeled the expected water movement based on site conditions and tidal flows and conducted grain size sampling in the intake channel sediments. The Memorandum concluded that currents within the intake and Fisherman's Channel were due primarily to the existing cooling water intake flows, and that ending these flows would result in tidal currents dominating the water flow. Water velocities due to the area's tidal currents average from about 0.004 to 0.01 feet per second and the peak velocities range from about 0.01 to 0.03 feet per second. Regarding sediment transport, the Memorandum concluded that the contaminants of concern were associated with sediments consisting of about 90% silt or clay, and that mobilizing these sediments would require velocities of about one to three feet per second, well above the velocities expected when PG&E stops its use of cooling water. The Memorandum also identified the potential that other disturbances – such as a stormwater discharge within the channel, or bioturbation by organisms within the channel – could mobilize the sediments. However, because this area of the project site will undergo additional characterization, PG&E is not at this time proposing any activities within the channels. Activities proposed in the future to address contamination or to modify the channels will be subject to additional Commission review and approval.

CONCLUSION

Based on the above, the Commission finds that the project, as conditioned, conforms to the policies of Coastal Act Sections 30230 and 30231.



4.3.3 ENVIRONMENTALLY SENSITIVE HABITAT AREAS

Coastal Act Section 30240 states:

a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

BACKGROUND AND ANALYSIS

Much of the HBPP site is former coastal prairie terrace, although the power plant's presence during the past fifty years has resulted in significant areas of development, impervious surfaces, and other disturbances on the site. Vegetation occurring within the developed areas of the site is primarily ruderal or introduced species. Nearby, however, are extensive coastal marshes and the waters and shoreline of Humboldt Bay, all with associated upland areas that provide known or potential habitat for a variety of native or sensitive species.

Recent literature reviews and biological surveys have identified several sensitive species at or near the HBPP site. In 1999 and 2002, PG&E conducted site surveys for sensitive species, including terrestrial and marine plants and animals, and several areas of the overall power plant site could provide suitable habitat for such species. Habitat at or near the site is considered suitable for several special-status freshwater aquatic species, including northern red-legged frog (*Rana aurora*), foothill yellow-legged frog (*Rana boylei*), tailed frog (*Ascaphus truei*), southern torrent salamander (*Rhyacotriton variegatus*), and the northwestern pond turtle (*Actinemys marmorata marmorata*); however, none of these species were observed on site during these surveys. More recent surveys in 2006 identified sensitive animal species at or near the site including the Western snowy plover (*Charadrius alexandrinus nivosus*), California brown pelican (*Pelecanus occidentalis californicus*), bald eagle (*Haliaeetus leucocephalus*), and Northern red-legged frog, and plant species including the Humboldt Bay owl clover (*Castilleja ambigua ssp. humboldtiensis*) and Point Reyes bird's beak (*Cordylanthus maritimus ssp. palustris*). Of these, however, only the Northern red-legged frog has been identified in the area where project activities would occur, though it appears the project area does not provide critical areas for the frog, as it does not include breeding habitat, water sources, or similar higher quality habitat characteristics.

Project effects on ESHA: Project activities would occur on previously developed or previously disturbed areas of the site and are not expected to result in direct effects on ESHA. The project may cause indirect impacts to the nearby environmentally sensitive habitat areas due to runoff, sedimentation, and noise; however, these are not expected to be significant, in part due to

mitigation measures PG&E has included in the project. Additionally, the measures required through **Special Conditions 1, 2, and 3** described in Section 4.3.2 of these Findings would also result in protection of nearby ESHA by ensuring both short- and long-term project impacts are avoided and minimized.

CONCLUSION

Based on the above, the Commission finds that the project conforms to the policies of Coastal Act Section 30240.

4.3.4 PUBLIC ACCESS AND RECREATION

Coastal Act Section 30211 states:

Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

Coastal Act Section 30212(a) states:

Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where: (1) It is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, (2) Adequate access exists nearby, or, (3) Agriculture would be adversely affected. Dedicated accessway shall not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability of the accessway.

Coastal Act Section 30214 states, in relevant part:

- (a) *The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following:*
- (1) Topographic and geologic site characteristics.*
 - (2) The capacity of the site to sustain use and at what level of intensity.*
 - (3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses.*
 - (4) The need to provide for the management of access areas so as to protect the privacy of adjacent property owners and to protect the aesthetic values of the area by providing for the collection of litter.*

Coastal Act Section 30221 states:

Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.

BACKGROUND AND ANALYSIS

Coastal Act policies generally require that development located adjacent to the shoreline in an area with ongoing public use not interfere with that use and provide access to the shoreline. Public access to the Humboldt Bay shoreline is currently available adjacent to the power plant

site. As part of its approval of PG&E's ISFSI project, the Commission required PG&E to improve and protect through a deed restriction an existing pathway along the shoreline. This pathway primarily provides horizontal access along the shoreline, but allows vertical access across the riprap lining the shore. The pathway is used primarily for low-intensity recreational uses, such as saltwater fishing, bird and wildlife watching, and scenic enjoyment of the Bay. This section of shoreline is described in the Redwood Community Action Agency's 2001 *Humboldt Bay Trails Feasibility Study* as an important link in a planned system of trails around Humboldt Bay. The trail adjacent to the power plant would connect with trails planned in King Salmon to the west and to the railroad right-of-way to the south and east of the plant.

Although the project as currently proposed would not directly affect this accessway – e.g., there are no proposed trail closures or other access limitations – it may result in a minor reduction in public use during parts of the project due to noise and nearby construction activities. However, because the project site and accessway are already subject to these activities, this would likely represent only a minor change in existing conditions. If PG&E later requests project modifications that would affect this accessway or would otherwise interfere with public access to the shoreline, the Commission would then consider the need to amend this approval.

The project will also result in increased traffic on nearby sections of Highway 101 and on King Salmon Boulevard, both of which are routes used for public access to the shoreline. Both roads are currently operating at “Level of Service A” (LOS A),¹⁷ and additional project-related traffic is not expected to cause substantial changes to the current conditions. The project will require up to several hundred additional workers; however, this additional traffic is not expected to cause more than minor delays along either of the routes above. The project will also result in up to several thousand truck trips, depending on the amount of soil to be removed from the project site; however, these trips will be somewhat spread out throughout the expected 10 years of project activities and are not expected to cause more than minor delays along these routes.

CONCLUSION

Based on the discussion above, the Commission finds that the project will conform to the public access and recreation policies of the Coastal Act.

¹⁷ “Level of Service” describes a road’s operating conditions, with LOS A representing free-flowing conditions with little or no delay and LOS F representing saturated conditions with substantial delays. In this area of Humboldt County, the minimum acceptable condition is LOS C.

4.3.5 ARCHAEOLOGICAL AND PALEONTOLOGICAL RESOURCES

Coastal Act Section 30244 states:

Where development would adversely impact archaeological or paleontological resources by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

BACKGROUND AND ANALYSIS

The project site, located on the resource-rich shoreline of Humboldt Bay, has the potential to contain archaeological remains. Although an April 2006 archaeological survey at the site did not identify any such resources, the potential exists for previously unrecorded archeological resources to be located beneath power plant structures or beneath fill placed on the site during power plant construction.

In recognition of the potential presence of these resources, and as described in the project's CEQA document, PG&E will institute a construction worker training program to help identify cultural resources, conduct monitoring to identify potential resources that may be identified during clearing, trenching, and excavation activities, and will retain a cultural resources specialist on call to investigate any potential cultural resources found during project activities. PG&E will also implement procedures for halting construction and evaluating resources should they be discovered. To ensure these measures conform to Section 30244 requirements, **Special Condition 4** would require PG&E to submit for Executive Director review and approval documentation that specifically describes how PG&E will implement these measures.

CONCLUSION

Based on the discussion above, the Commission finds that the project, with the inclusion of **Special Condition 4**, will conform to the archaeological resource protection policies of Coastal Act Section 30244.

4.3.6 VISUAL RESOURCES

Coastal Act Section 30251 states, in relevant part:

The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas...

BACKGROUND AND ANALYSIS

The Coastal Act generally requires that permitted development protect views to and along the coast. Although the proposed project's demolition and decommissioning activities will cause some visual impacts due to movement of large equipment, presence of lighting, etc., the site's visual characteristics after project completion are expected to be an improvement over existing conditions.

Project activities would occur on and near an area of the Humboldt Bay shoreline visible from publicly-accessible shoreline areas, recreational areas, and a wildlife refuge. Part of the project would occur on the onsite bluff at an elevation of about 40 feet above the Bay in areas that may be visible from the nearby community of King Salmon, the North and South Spit along the outer shore of Humboldt Bay, and the coastal waters of the Bay itself. These areas are valued in part for their views of the Bay, for wildlife and bird watching, for recreational activities, and for visual enjoyment of Humboldt Bay. Portions of the project would also be visible from a nearby stretch of Highway 101, which is described by CalTrans as "an eligible state scenic highway, not officially designated."

The main project activities affecting visual resources include equipment staging and movement, lighting needed during the project, and the actual demolition and decommissioning. There would also be new structures and buildings placed for use during the approximately six years of project activities. Many of these activities are similar to those already occurring at the power plant, but some would represent an intensification of some of the existing visual impacts. To reduce potential project impacts on visual resources, **Special Condition 5** would require PG&E to use neutral tones on all visible structures erected as part of this project and would require PG&E to direct all necessary lighting downward and inward to the extent allowed by NRC security requirements.

CONCLUSION

Based on the above, the Commission finds that the project, with the inclusion of **Special Condition 5**, will conform to the visual resource protection policies of Coastal Act Section 30251.

4.3.7 RESOLVING POLICY CONFLICTS

Coastal Act Section 30007.5 states:

The Legislature further finds and recognizes that conflicts may occur between one or more policies of the division. The Legislature therefore declares that in carrying out the provisions of this division such conflicts be resolved in a manner which on balance is the most protective of significant coastal resources. In this context, the Legislature declares that broader policies which, for example, serve to concentrate development in close proximity to urban and employment centers may be more protective, overall, than specific wildlife habitat and other similar resource policies.

Coastal Act Section 30200(b) states:

Where the commission or any local government in implementing the provisions of this division identifies a conflict between the policies of this chapter, Section 30007.5 shall be utilized to resolve the conflict and the resolution of such conflicts shall be supported by appropriate findings setting forth the basis for the resolution of identified policy conflicts.

As noted previously in this report, two main elements of the proposed project are inconsistent with Coastal Act Sections 30253(1)-(2) related to geologic hazards, as described in Section 4.3.1 of these Findings – first, the project is not designed to withstand the site’s potential geologic hazards; and second, and the project potentially results in the long-term presence of hazardous materials on this unsuitable site. However, as explained below, denying the proposed project to eliminate these inconsistencies would lead to nonconformity with other Coastal Act policies, namely Sections 30230, 30231 (marine biology and water quality), and 30240 (environmentally sensitive habitat areas).

Regarding the inconsistency, even though the project site is subject to these hazards, it is the only location on which decommissioning can occur, and the project itself will result in reducing the potential for these hazards to adversely affect coastal resources. However, designing and constructing short- and long-term project components to be sufficiently robust to withstand the range of potential hazards would likely not be possible, given the extreme range of those hazards. This results in an inconsistency with the requirements of Section 30253(1) to minimize those risks. The longer-term project components – i.e., the potential for perpetual waste storage on site – would result in the eventual need for a shoreline protective device, which is not allowed pursuant to Section 30253(2). We note that the Commission made similar findings for the comparatively robust ISFSI, based on the site’s relatively extreme potential for geologic hazards.

However, denying this part of the project on the basis of these inconsistencies would result in the continued presence of the power plant and its inherent hazards at its currently unsuitable location. The power plant is at a relatively low elevation close to coastal waters, environmentally sensitive habitat areas, and coastal wetlands. As designed and sited at its current location, the facility is subject to geologic hazards such as ground shaking, tsunamis, and

liquefaction, whereas removing it and most of its hazardous materials from the site would substantially reduce the potential for significant adverse effects to coastal resources associated with marine biology, water quality, and environmentally sensitive habitat areas. Further, completing the project will result in the cessation of the need for the facility to use about 76 MGD of estuarine water from the Bay and will reduce the amount of discharges to the Bay. In such a situation, when a proposed project is inconsistent with a Chapter 3 policy, and denial or modification of the project would be inconsistent with another policy, Section 30007.5 of the Coastal Act provides for resolution of such a policy conflict.

APPLYING SECTION 30007.5 TO THE PROPOSED PROJECT

As indicated previously, the standard of review for the Commission's decision on a coastal development permit in the Commission's retained jurisdiction is whether the proposed project is consistent with the Coastal Act's Chapter 3 policies. A proposal must generally be consistent with all relevant policies in order to be approved. If inconsistent with one or more policies, the proposal must normally be denied or conditioned to make it consistent with all relevant policies.

However, the Legislature recognized through Sections 30007.5 and 30200(b) that conflicts can occur among those policies. It therefore declared that when the Commission identifies a conflict among the policies of Chapter 3, the conflict is to be resolved "in a manner which on balance is the most protective of significant coastal resources", pursuant to Coastal Act Section 30007.5.

Resolving conflicts through application of Section 30007.5 involves the following seven steps:

- 1) The project, as proposed, is inconsistent with at least one Chapter 3 policy;
- 2) The project, if denied or modified to eliminate the inconsistency, would affect coastal resources in a manner inconsistent with at least one other Chapter 3 policy that affirmatively requires protection or enhancement of those resources;
- 3) The project, if approved, would be fully consistent with the policy that affirmatively mandates resource protection or enhancement;
- 4) The project, if approved, would result in tangible resource enhancement over existing conditions;
- 5) The benefits of the project are not independently required by some other body of law;
- 6) The benefits of the project must result from the main purpose of the project, rather than from an ancillary component appended to the project to "create a conflict"; and,
- 7) There are no feasible alternatives that would achieve the objectives of the project without violating any Chapter 3 policies.

Each step is explained below in greater detail and applied to the proposed project.

1) The project, as proposed, is inconsistent with at least one Chapter 3 policy.

For the Commission to apply Section 30007.5, a proposed project must be inconsistent with an applicable Chapter 3 policy. In the case of this proposed project, the inconsistency is with Sections 30253(1)-(2).

- 2) The project, if denied or modified to eliminate the inconsistency, would affect coastal resources in a manner inconsistent with at least one other Chapter 3 policy that affirmatively requires protection or enhancement of those resources.**

A true conflict between Chapter 3 policies results from a proposed project which is inconsistent with one or more policies, and for which denial or modification of the project would be inconsistent with at least one other Chapter 3 policy. Further, the policy inconsistency that would be caused by denial or modification must be with a policy that affirmatively mandates protection or enhancement of certain coastal resources. Denial of the project would be inconsistent with three policies of this type –Section 30230, which requires, in part, that “Marine resources shall be protected for such uses”; Section 30231, which requires, in part, that biological productivity “shall be maintained”; and Section 30240, which requires, in part, that environmentally sensitive habitat areas “shall be protected against any significant disruption of habitat values” [*emphasis added in each*]. In most cases, denying a proposed project will not cause adverse effects on coastal resources for which the Coastal Act mandates protection or enhancement, but will simply maintain the status quo. Where denial of a project would result in such effects, as with this project, a conflict between or among two or more Coastal Act policies is presented.

- 3) The project, if approved, would be fully consistent with the policy that affirmatively mandates resource protection or enhancement.**

For denial of a project to be inconsistent with a Chapter 3 policy, the proposed project would have to protect or enhance the resource values for which the applicable Coastal Act policy includes an affirmative mandate. That is, if denial of a project would conflict with an affirmatively mandated Coastal Act policy, approval of the project would have to conform to that policy. If the Commission were to interpret this conflict resolution provision otherwise, then any proposal, no matter how inconsistent with Chapter 3, that offered a slight incremental improvement over existing conditions could result in a conflict that would allow the use of Section 30007.5. The Commission concludes that the conflict resolution provisions were not intended to apply to such minor incremental improvements.

Because the project decommissioning is designed to prevent releases that would adversely affect the biological resources mentioned above, the project, as proposed and conditioned, is therefore fully consistent with Coastal Act Sections 30230, 30231, and 30240.

- 4) The project, if approved, would result in tangible resource enhancement over existing conditions.**

This aspect of the conflict between policies may be looked at from two perspectives – either approval of the project would result in improved conditions for a coastal resource subject to an affirmative mandate, or denial or modification of the project would result in continued degradation of that resource.

Project approval would result in most hazardous materials being removed entirely from the project site and some of those materials being relocated to a more protected part of the site, resulting in site conditions less susceptible to potential hazardous releases that would violate the Coastal Act's marine resource, water quality, and ESHA policies. Most of the materials would be removed from the site and stored at protected and secure inland locations. Some of the materials – Class B and Class C wastes, as previously described in these Findings – would be stored securely onsite at the high-level facility at a higher elevation, making them less susceptible to the site's geologic risks – e.g., the wastes would be less susceptible to tsunamis and not subject to liquefaction.

Denial of the project would result in the continued presence of hazardous materials and the continued higher risks associated with potential geologic events, including tsunamis and seismic movement. But for the project, the facility and the full range of hazardous materials could be expected to remain at the site for at least several more decades. During that time, it is probable that any of several events could occur that would be of sufficient magnitude to adversely affect the facility – an earthquake above the design limits of the facility, a tsunami, liquefaction, etc. Any of these events would likely result in damage or destruction of the facility and release of materials to the marine waters, tidal wetlands, and ESHA adjacent to the power plant, which would be inconsistent with Coastal Act policies established to protect marine life, water quality, and sensitive habitat areas. Therefore, denial of the project would conflict with the policies of Sections 30230, 30231, and 30240.

5) The benefits of the project are not independently required by some other body of law.

The benefits that would cause denial of the project to be inconsistent with a Chapter 3 policy cannot be those that the project proponent is already being required to provide pursuant to another agency's directive under another body of law. In other words, if the benefits would be provided regardless of the Commission's action on the proposed project, the project proponent cannot seek approval of an otherwise-unapprovable project on the basis that the project would produce those benefits – that is, the project proponent does not get credit for resource enhancements that it is already being compelled to provide. In the case of this project, PG&E is proposing to decommission the facility well in advance of the NRC's required time limit for decommissioning (which must occur no more than sixty years after the end of facility operations, or about 2036 for this facility). While PG&E must obtain project approvals from both the Coastal Commission and the NRC, decommissioning is not being immediately mandated by the NRC or any other regulatory body and PG&E could choose to maintain its existing system.

6) The benefits of the project must result from the main purpose of the project, rather than from an ancillary component appended to the project to “create a conflict”.

A project's benefits to coastal resources must be integral to the project purpose. If a project is inconsistent with a Chapter 3 policy, and the main elements of the project do not result in the cessation of ongoing degradation of a resource the Commission is charged with enhancing, the project proponent cannot “create a conflict” by adding to the project an

independent component to remedy the resource degradation. The benefits of a project must be inherent in the purpose of the project. If this provision were otherwise, project proponents could regularly “create conflicts” and then request that the Commission use Section 30007.5 to approve otherwise unapprovable projects. The balancing provisions of the Coastal Act could not have been intended to foster such an artificial and easily manipulated process, and were not designed to barter amenities in exchange for project approval. In this case, the project purpose is to demolish and decommission structures that present a risk to coastal resources; the benefits are therefore integral to the project.

7) There are no feasible alternatives that would achieve the objectives of the project without violating any Chapter 3 policies.

Finally, a project does not present a conflict among Chapter 3 policies if at least one feasible alternative would meet the project’s objectives without violating any Chapter 3 policy. Thus, an alternatives analysis is a condition precedent to invocation of the balancing approach. If there are alternatives available that are consistent with all of the relevant Chapter 3 policies, then the proposed project does not create a true conflict among those policies.

As noted above, the “no action” alternative would result in the continued presence of the facility and associated materials on site and the continued risks resulting from that presence. Additionally, and as explained in Section 4.3.1 of these Findings, there are no available alternative offsite facilities for some of the materials to be generated – i.e., the Class B and Class C wastes – so PG&E’s proposal to use its higher elevation onsite high-level facility provides the best feasible alternative. Finally, as discussed above, the extreme range of potential geologic hazards at this site makes it impractical to design and implement the temporary project developments and activities – e.g., the short-term facilities such as office buildings and temporary structures – in a way that would withstand those hazards.

Existence of a Conflict Between Chapter 3 Policies: Based on the above, the Commission finds that the proposed project presents a conflict between Sections 30253(1)-(2), on the one hand, and Sections 30230, 30231, and 30240 on the other, that must be resolved through application of Section 30007.5, as described below.

CONFLICT RESOLUTION

After establishing a conflict among Coastal Act policies, Section 30007.5 requires the Commission to resolve the conflict in a manner that is on balance most protective of coastal resources. As noted previously, the project would reduce but not minimize risks due to geologic hazards and it would eventually require shoreline protection during its anticipated life, thus making it inconsistent with Coastal Act Sections 30253(1)-(2). However, denying the project because of its inconsistency with these policies would result in significant adverse effects on biological resources due to the greater geologic risks associated with the existing storage area.

In sum, the Commission finds that while the project would not adequately minimize risks due to geologic hazards and would eventually require a shoreline protection structure, it would also, over the long-term significantly reduce most of those risks, since most of the facility and associated materials would be removed from the site and the remaining material would be placed at a safer onsite location. This would both reduce the risks associated with those geologic hazards and increase protection of coastal biological resources. The required Special Conditions are necessary to ensure the project's adverse impacts are minimized and its benefits are fully realized. Therefore, the Commission finds that approval of the proposed project notwithstanding its inconsistencies with several Coastal Act policies is "most protective of coastal resources" for purposes of the conflict resolution provisions of Coastal Act Section 30007.5.

5 CALIFORNIA ENVIRONMENTAL QUALITY ACT

Note: As of the date of this staff report, DTSC has not yet completed the CEQA process; however, staff anticipates that it will be completed prior to the Commission's scheduled December 10, 2009 hearing. DTSC published the Negative Determination on October 30, 2009 with a comment period running until December 4, 2009, and DTSC anticipates that it will certify the document by December 7, 2009. Staff will inform the Commission about the status of the necessary CEQA review at the Commission's December hearing.

Section 13096 of the Commission's administrative regulations requires Commission approval of coastal development permit applications to be supported by a finding showing the application, as modified by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits approval of a proposed development if there are feasible alternatives or feasible mitigation measures available that would substantially lessen any significant impacts that the activity may have on the environment. As discussed above, the proposed project has been conditioned to be found consistent with the policies of the Coastal Act. Mitigation measures that will minimize or avoid all significant adverse environmental impacts have been required. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, that would substantially lessen any significant adverse impact that the activity would have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, can be found consistent with the requirements of CEQA.

APPENDIX A: SUBSTANTIVE FILE DOCUMENTS

California Coastal Commission. *Final Adopted Findings for Coastal Development Permit #E-05-001 – PG&E’s Independent Spent Fuel Storage Installation (ISFSI) Project*. September 15, 2005.

California Energy Commission. *Application for Certification, Humboldt Bay Generating Station, Petition for Modification No. 1 for Fields Landing Laydown Area*. January 2009.

Nuclear Regulatory Commission. *Fact Sheet on Decommissioning Nuclear Power Plants*, January 2008 (accessed November 2, 2009 via <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html>)

Pacific Gas & Electric Company. *Final Draft Interim Measures/Removal Action Work Plan PG&E Humboldt Bay Power Plant – Eureka, California*, prepared by Arcadis Consulting, October 29, 2009.

_____. *Draft Current Conditions Report*, prepared by Arcadis, June 2009.

_____. *Post-Shutdown Decommissioning Activity Report*, May 2009.

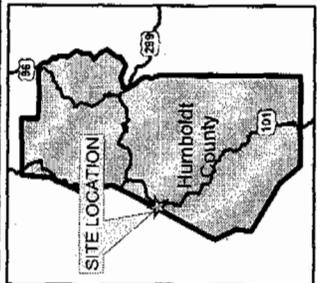
_____. *Fields Landing Laydown Area for the Humboldt Bay Generating Station, Humboldt County California*, prepared for the California Energy Commission’s Application For Certification #06-AFC-7C, January 2009.

_____. *Asbestos Survey and Limited Lead, Chromium, and PCB Paint Survey, PG&E Power Plant, Eureka, California*, by Winzler and Kelly, 2009.

_____. *Radiological Characterization Report, Humboldt Bay Power Plant, Eureka, California*, by Eneron, 2008.

_____. *Safety Analysis Report, Environmental Report, and Emergency Plan* from application to Nuclear Regulatory Commission for 10 CFR 72 ISFSI License, 2003.

CITY: San Francisco DIV/GROUP: 85 DB: ME LD: PIC: PM: M. Blanchette TM: TR:
 Project #: 92316.0000.0001
 Q:\PG&E\HumboldtBay\Interim_Rem_Measures_WP\MXD\Site_Location_Map.mxd - 8/27/2008 @ 1:02:29 PM



LEGEND:
 PG&E PROPERTY BOUNDARY

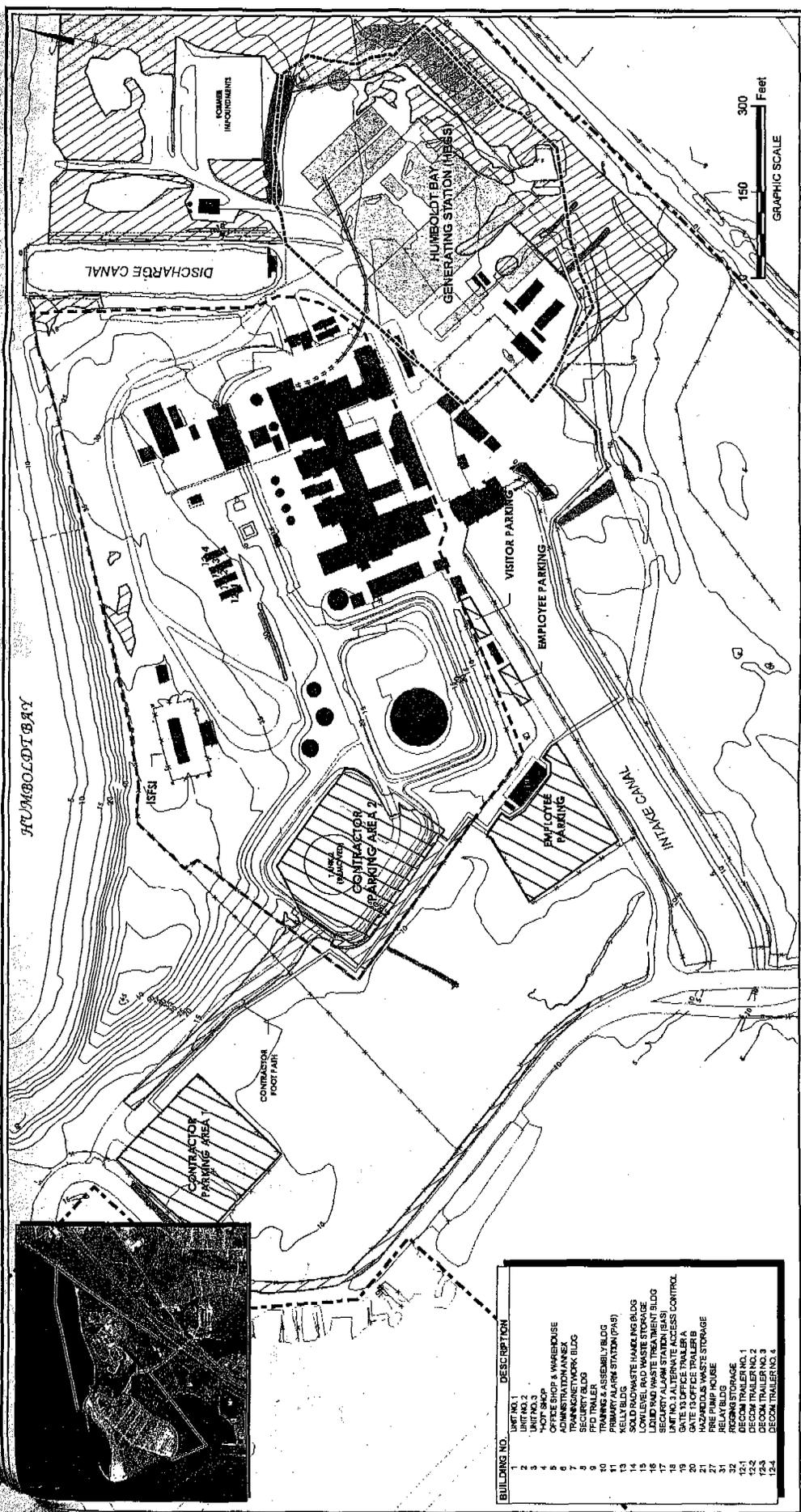
EXHIBIT NO. 1
APPLICATION NO.
E-09-010
 California Coastal Commission

PACIFIC GAS AND ELECTRIC COMPANY
 HUMBOLDT BAY, CALIFORNIA

INTERIM MEASURES REMOVAL ACTION WORK PLAN

SITE LOCATION

 **ARCADIS** | **FIGURE 1**



PACIFIC GAS AND ELECTRIC COMPANY
HUMBOLDT BAY, CALIFORNIA
INTERIM MEASURES REMOVAL ACTION WORK PLAN

SITE LAYOUT

FIGURE
2

EXHIBIT NO. 2

APPLICATION NO.

E-09-010

California Coastal Commission

5-FOOT TOPOGRAPHIC CONTOUR FENCE ROAD
 --- RAILROAD-REMOVED --- ROAD
 --- RAILROAD-SPUR

LEGEND:

PG&E PROPERTY BOUNDARY
 RESTRICTED AREA
 HUMBOLDT BAY GENERATING STATION (H-BGS)
 CONCRETE PAD
 PARKING AREA
 WATER BODY

WETLAND OR MARSH AREA
 DRAINAGE DITCH
 WETLAND AREA TO BE REMOVED
 WETLAND AREA TO BE RESTORED
 WETLAND AREAS WITH POTENTIAL HUMAN EXPOSURE
 DEVELOPED UPLANDS
 UNDEVELOPED UPLANDS

NOTES:

1. WETLAND AREAS FROM CH2M HILL, JULY 2007 SUPINE POINT WETLANDS PRESERVE MITIGATION AND MONITORING PLAN FOR HUMBOLDT BAY REPOWERING PROJECT, HUMBOLDT COUNTY, CALIFORNIA.
 2. NAIP 2005 AERIAL PHOTO PUBLISHED BY USDA-FSA AERIAL PHOTOGRAPHY FIELD OFFICE.

BUILDING NO.	DESCRIPTION
1	UNIT NO. 1
2	UNIT NO. 2
3	UNIT NO. 3
4	HOT SHOP
5	OFFICE SHOP & WAREHOUSE
6	TRAINING NETWORK BLDG
7	SECURITY BLDG
8	PG&E TRAILER
9	PG&E TRAILER
10	PG&E TRAILER
11	PG&E TRAILER
12	PG&E TRAILER
13	KELLY BLDG
14	SOLID RO/WASTE HANDLING BLDG
15	LOW LEVEL RAD WASTE STORAGE
16	SECURITY ALARM STATION (SAS) BLDG
17	SECURITY ALARM STATION (SAS) BLDG
18	UNIT NO. 3 ALTERNATE ACCESS CONTROL
19	GATE NO. 3 OFFICE TRAILER A
20	GATE NO. 3 OFFICE TRAILER B
21	HAZARDOUS WASTE STORAGE
22	FIRE PUMP HOUSE
23	RELAY BLDG
24	RELAY BLDG
25	DECON TRAILER NO. 1
26	DECON TRAILER NO. 2
27	DECON TRAILER NO. 3
28	DECON TRAILER NO. 4
29	DECON TRAILER NO. 5
30	DECON TRAILER NO. 6
31	DECON TRAILER NO. 7
32	DECON TRAILER NO. 8
33	DECON TRAILER NO. 9
34	DECON TRAILER NO. 10
35	DECON TRAILER NO. 11
36	DECON TRAILER NO. 12
37	DECON TRAILER NO. 13
38	DECON TRAILER NO. 14
39	DECON TRAILER NO. 15
40	DECON TRAILER NO. 16
41	DECON TRAILER NO. 17
42	DECON TRAILER NO. 18
43	DECON TRAILER NO. 19
44	DECON TRAILER NO. 20
45	DECON TRAILER NO. 21
46	DECON TRAILER NO. 22
47	DECON TRAILER NO. 23
48	DECON TRAILER NO. 24
49	DECON TRAILER NO. 25
50	DECON TRAILER NO. 26
51	DECON TRAILER NO. 27
52	DECON TRAILER NO. 28
53	DECON TRAILER NO. 29
54	DECON TRAILER NO. 30
55	DECON TRAILER NO. 31
56	DECON TRAILER NO. 32
57	DECON TRAILER NO. 33
58	DECON TRAILER NO. 34
59	DECON TRAILER NO. 35
60	DECON TRAILER NO. 36
61	DECON TRAILER NO. 37
62	DECON TRAILER NO. 38
63	DECON TRAILER NO. 39
64	DECON TRAILER NO. 40
65	DECON TRAILER NO. 41
66	DECON TRAILER NO. 42
67	DECON TRAILER NO. 43
68	DECON TRAILER NO. 44
69	DECON TRAILER NO. 45
70	DECON TRAILER NO. 46
71	DECON TRAILER NO. 47
72	DECON TRAILER NO. 48
73	DECON TRAILER NO. 49
74	DECON TRAILER NO. 50
75	DECON TRAILER NO. 51
76	DECON TRAILER NO. 52
77	DECON TRAILER NO. 53
78	DECON TRAILER NO. 54
79	DECON TRAILER NO. 55
80	DECON TRAILER NO. 56
81	DECON TRAILER NO. 57
82	DECON TRAILER NO. 58
83	DECON TRAILER NO. 59
84	DECON TRAILER NO. 60
85	DECON TRAILER NO. 61
86	DECON TRAILER NO. 62
87	DECON TRAILER NO. 63
88	DECON TRAILER NO. 64
89	DECON TRAILER NO. 65
90	DECON TRAILER NO. 66
91	DECON TRAILER NO. 67
92	DECON TRAILER NO. 68
93	DECON TRAILER NO. 69
94	DECON TRAILER NO. 70
95	DECON TRAILER NO. 71
96	DECON TRAILER NO. 72
97	DECON TRAILER NO. 73
98	DECON TRAILER NO. 74
99	DECON TRAILER NO. 75
100	DECON TRAILER NO. 76
101	DECON TRAILER NO. 77
102	DECON TRAILER NO. 78
103	DECON TRAILER NO. 79
104	DECON TRAILER NO. 80
105	DECON TRAILER NO. 81
106	DECON TRAILER NO. 82
107	DECON TRAILER NO. 83
108	DECON TRAILER NO. 84
109	DECON TRAILER NO. 85
110	DECON TRAILER NO. 86
111	DECON TRAILER NO. 87
112	DECON TRAILER NO. 88
113	DECON TRAILER NO. 89
114	DECON TRAILER NO. 90
115	DECON TRAILER NO. 91
116	DECON TRAILER NO. 92
117	DECON TRAILER NO. 93
118	DECON TRAILER NO. 94
119	DECON TRAILER NO. 95
120	DECON TRAILER NO. 96
121	DECON TRAILER NO. 97
122	DECON TRAILER NO. 98
123	DECON TRAILER NO. 99
124	DECON TRAILER NO. 100

CALIFORNIA COASTAL COMMISSION

45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200
FAX (415) 904-5400



12 August 2005

GEOTECHNICAL REVIEW MEMORANDUM

To: Tom Luster, Coastal Program Analyst
From: Mark Johnsson, Staff Geologist
Re: E-05-001 (Pacific Gas and Electric Company, Humboldt Bay Power Plant Independent Spent Fuel Storage Installation)

In regard to the above referenced Coastal Development Permit Application, I have reviewed the following documents submitted by the applicant to the Nuclear Regulatory Commission in support of their license from that Commission:

- 1) Pacific Gas and Electric Company, 2004, "Humboldt Bay Independent Spent Fuel Storage Installation Environmental Report" dated October 2004.
- 2) Pacific Gas and Electric Company, 2004, "Humboldt Bay Independent Spent Fuel Storage Installation Safety Analysis Report" dated October 2004.

After reviewing these documents, I had several remaining concerns regarding the potential for coastal erosion at the site. In addition, because the Commission previously has determined that there is no reasonable expectation that a Federal spent nuclear fuel repository will ever be licensed to receive wastes from commercial nuclear power plants (see appeal A-3-SLO-04-035, Pacific Gas and Electric Company, Diablo Canyon Power Plant Independent Spent Fuel Storage Installation, December 2004), I asked the applicant to consider the effects of geologic hazards at the site on the proposed development over perpetuity, rather than over the 50-year design life cited by the applicant. These applicant addressed these questions with the following documents.

- 3) Pacific Gas and Electric Company 2004, "Assessment of erosion at Buhne Hill, Humboldt Bay ISFSI", 32 p. report dated 10 September 2004 and signed by W. D. Page (CEG 1432).
- 4) Pacific Gas and Electric Company 2005, "Implications of long-term global warming and tectonic displacements at Buhne Hill, Humboldt County, California", 86 p. report dated 18 July 2005 and signed by W. D. Page (CEG 1432).

During the review of this application a major earthquake occurred in the vicinity of the proposed development. The applicant prepared the following report on the earthquake and its effects on the existing infrastructure at the Humboldt Bay Power Plant:

- 5) Pacific Gas and Electric Company 2005, "Report on the M7.2 Offshore Northern California earthquake of June 14, 2005", 9 p. report dated and signed by M. McLaren, S. Nishenko, N. van der Elst and M. Stanton.

EXHIBIT NO. 3**APPLICATION NO.**

E-09-010



California Coastal Commission

To help address the tsunami hazard at the site, the applicant submitted the following documents, which I also have reviewed:

- 6) Abramson, H., 1998, Evidence for tsunamis and earthquakes during the last 3500 years from Lagoon Creek, a coastal freshwater marsh, Northern California [Masters thesis]: Arcata, California, Humboldt State University.
- 7) Anonymous, 1981, E.A. White, The Union.
- 8) Gardner, H.W., Lindberg (CEG 1895), D.N., Bickner, F.R., and Manhart, G.L., 1999, Final report of seismic study phase 3 at College of the Redwoods Eureka Campus: Eureka, California, LACO Associates, p. 24.
- 9) Garrison-Laney, C.E., 1998, Diatom evidence for tsunami inundation from Lagoon Creek, a coastal freshwater pond, Del Norte County, California [Masters thesis]: Arcata, California, Humboldt State University.
- 10) Kroeber, A.L., 1976, Yurok Myths: Berkeley, California, University of California Press, 488 p.
- 11) Kroeber, A.L., and Gifford, E.W., 1949, World Renewal: A cult system of native northwest California: Anthropologic Records, v. 13, p. 1-155.
- 12) LACO Associates, 1999, Site evaluation for the Child Development Center, fault rupture hazard, Phase C investigation, College of the Redwoods, 7351 Tompkins Hill Road, Eureka California: Eureka, California, LACO Associates, p. 15.
- 13) Leroy, T.H., 1999, Holocene sand dune stratigraphy and paleoseismicity of the north and south spits of Humboldt Bay, northern California [Masters thesis]: Arcata, California, Humboldt State University.
- 14) Patton, J.R., 2004, Late Holocene coseismic subsidence and coincident tsunamis, southern Cascadia Subduction Zone, Hookton Slough, Wigi (Humboldt Bay), California [Masters thesis]: Arcata, California, Humboldt State University.
- 15) Waterman, T.T., 1920, Yurok Geography: University of California Publications in American Archeology and Ethnology, v. 16, p. 177-314.
- 16) Witter, R.C., Patton, J.R., Carver, G.A., Kelsey, H.M., Garrison-Laney, C., Koehler, R.D., and Hemphill-Haley, E., 2002, Upper-plate earthquakes on the western Little Salmon Fault and contemporaneous subsidence of southern Humboldt Bay over the past 3,600 years, northwestern California, U.S. Geological Survey National Earthquake Hazards Reduction Program, p. 19.

I also have made use of a number of other references from the scientific literature on the Cascadia Subduction Zone, its seismic potential, and potential consequences of a major earthquake in the zone. These include:

- Atwater, B.F., Stuiver, M., and Yamaguchi, D.A., 1991, Radiocarbon test of earthquake magnitude at the Cascadia subduction zone: *Nature*, v. 353, p. 156-158.
- Clague, J.J., 1997, Evidence for large earthquakes at the Cascadia subduction zone: *Review of Geophysics*, v. 35, p. 439-460.
- Gulick, S.P.S., and Meltzer, A.S., 2002, Effect of the northward-migrating Mendocino triple junction on the Eel River forearc basin, California: *Structural evolution: Geological Society of America Bulletin*, v. 114, p. 1505-1519.
- Gulick, S.P.S., Meltzer, A.S., and Clarke, S.H., Jr., 2002, Effect of the northward-migrating Mendocino triple junction on the Eel River forearc basin, California: *Stratigraphic development: Geological Society of America Bulletin*, v. 114, p. 178-191.
- Leonard, L.J., Hyndman, R.D., and Mazzotti, S., 2004, Coseismic subsidence in the 1700 great Cascadia earthquake: Coastal estimates versus elastic dislocation models: *Geological Society of America Bulletin*, v. 116, p. 655-670.
- Peterson, C.D., Barnett, E.T., Briggs, G.G., Carver, G.A., Clague, J.J., and Darienzo, M.E., 1997, Estimate of coastal subsidence from great earthquakes in the Cascadia subduction zone, Vancouver Island, B.C., Washington, Oregon, and northernmost California: *Portland, Oregon, Oregon Department of Geology and Mineral Industries*, p. 44.

- Polenz, M., and Kelsey, H.M., 1999, Development of a Late Quaternary marine terraced landscape during on-going tectonic contraction, Crescent City coastal plain, California: *Quaternary Research*, v. 52, p. 217-228.
- Stewart, R.J., and Brandon, M.T., 2004, Detrital zircon fission-track ages for the "Hoh Formation": Implications for late Cenozoic evolution of the Cascadia subduction wedge: *Geological Society of America Bulletin*, v. 116, p. 60-75.
- Topozada, T., Borchardt, G., Hayden, W., and Petersen, M., 1995, Planning scenario in Humboldt and Del Norte Counties, California, for a great earthquake on the Cascadia Subduction Zone: Sacramento, California, California Division of Mines and Geology Special Publication 115, 151 p.
- Witter, R.C., Kelsey, H.M., and Hemphill-Haley, E., 2003, Great Cascadia earthquakes and tsunamis of the past 6700 years, Coquille River estuary, southern coastal Oregon: *Geological Society of America Bulletin*, v. 115, p. 1289-1306.

I have visited the site on three occasions over the past two years. On each of these visits, I examined the site itself and the current facilities. In addition, in March 2004 I participated, together with members of the Nuclear Regulatory Commission, in a field trip to examine rock units and the trace of the Little Salmon Fault in the Humboldt Bay area. The applicant's geotechnical team also prepared a two-day field for me in May 2005 to examine the sites of tsunami investigations in the Humboldt and Del Norte County area. I have had numerous meetings and conversations with Lloyd Cluff, director of the Geoscience Department at PG&E, and with members of his staff including Drs. William Page, Joseph Sun, Marcia McLaren, AND Norm Abrahamson.

This memo will not be a point-by-point review of each of the documents cited above. Instead, after briefly describing the geologic and tectonic setting, I will summarize the geologic hazards at the site and indicate whether, in my opinion, the development can be found consistent with section 30253 of the Coastal Act, that states, in part:

New development shall:

- (1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.
- (2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

...

Geologic and Tectonic Setting

The Humboldt Bay Power Plant lies on the eastern shore of Humboldt Bay, directly opposite the inlet between North and South Spits. The proposed site for the ISFSI is near the top of Buhne Point, a hill that rises some 60 feet above the bay. The point is made up of the Hookton Formation, a marine terrace deposit approximately 80,000 years old that consists of poorly cemented sands and interbedded clays.

The site lies near the southern end of the Cascadia Subduction Zone, marking the junction of the North America plate and the Gorda Plate to the west. The Gorda Plate, and its northern extension, the Juan de Fuca Plate are being thrust beneath the North America Plate as the latter moves relatively westward. This movement is manifested in periodic very large earthquakes—best estimated at about magnitude 9.0 with a recurrence interval of about 300-400 years. These earthquakes usually result in large tsunamis, and it is in fact deposits left from tsunamis that has been most useful in identifying past Cascadia Subduction Zone earthquakes. The last such earthquake occurred in the year 1700, and resulted in a tsunami that was recorded in historical Japanese documents of the era.

The Little Salmon Fault is a thrust fault likely originating at the Gorda/North America plate interface at depth along the Cascadia Subduction Zone, and continuing to the surface of the North America Plate. The fault passes within two miles of the ISFSI site. This fault is thought to rupture concurrently with the Cascadia Subduction Zone.

Two other active faults lie even closer to the ISFSI site, and also likely rupture concurrently with the Cascadia Subduction Zone. The Buhne Point Fault is a thrust fault dipping to the northeast that directly underlies the ISFSI site and reaches the surface some 300 feet southwest of the site. The Discharge Canal Fault is a high angle fault with a surface trace approximately 500 feet northeast of the ISFSI site. Together these two faults define a wedge, containing the ISFSI site, that is uplifted during fault movement. It is this uplift that is responsible for the topographic high that is Buhne Point. Despite extensive trenching across the ISFSI site, no signs of faulting within this wedge have been detected.

Ground Shaking

Historical Seismicity:

The Humboldt Bay region is an area of high seismic activity. There have been over 120 recorded earthquakes greater than magnitude 5 within 100 miles of the ISFSI site, including 10 that have exceeded magnitude 7. Most of these earthquakes have occurred in the offshore region within and along the southern margin of the Gorda plate and on the Mendocino fault zone at its southern margin. Only one of these earthquakes occurred on the actual interface of the Gorda and North American plates (The M 7.2 1992 Petrolia earthquake); most of the others have occurred on the overriding North America plate.

Six earthquakes have produced ground motions $>10\%$ g at the Humboldt Bay Power Plant. Two moderate earthquakes, ML 5.3 in 1975 and ML 5.4 in 1994, produced relatively large ground motions of 0.30g and 0.55g, respectively, the largest ground motions recorded at the site to date.

In June 2005 there was a magnitude 7.2 earthquake in the middle of the Gorda Plate, approximately 60 miles offshore, approximately 50 miles from the proposed ISFSI site. This was a strike-slip event in a fault on the North America Plate, above the Gorda Plate descending in the Cascadia Subduction Zone. Despite the large magnitude of this quake, ground shaking at the ISFSI site was less than 0.1 g, and the tsunami that was generated was measured in inches and only detectable by careful examination of tide gages.

Ground Shaking in Future Earthquakes

An earthquake of a given magnitude will produce different levels of ground shaking at different locations, depending on the distance of the location from the earthquake hypocenter, the nature of the soil or rock between the location and the earthquake, and soil and rock conditions at the site. The level of shaking is expressed by a term called "intensity", and is quantified by the Modified Mercalli Index, whereby intensities ranging from I (not felt) through XII (near total destruction) are assigned based on the level of damage sustained by human structures. Better quantification of the level of shaking also is possible; and the standard measure is peak ground acceleration (PGA), usually expressed as a fraction of the acceleration due to gravity (9.81 m/s², or 1.0 g). Other measures, such as peak ground velocity, also may be used but these are more rarely tabulated. Peak ground acceleration is typically measured in horizontal and vertical directions. It can be expressed deterministically ("a given earthquake can be expected to produce a peak horizontal ground accelerations at the site of X g"), or probabilistically ("given the seismic environment at the site, there is a 10% chance that a peak ground acceleration of X g will be exceeded in 50 years"). The current trend is to express seismic risk in probabilistic terms.

Peak ground accelerations depend not only on the intensity of the causative earthquake and the distance of the site from the hypocenter of the earthquake, but also on site characteristics. Most important is the depth and firmness of the soil and/or bedrock underlying the site. All of these parameters are evaluated in producing a seismic shaking hazard assessment of a site. In evaluating the response of structures to ground shaking, the frequency (cycles per second) of that shaking is important—higher frequency shaking is more damaging to smaller, more rigid structures, whereas lower frequency shaking is more damaging to larger, or more flexible structures. The proposed ISFSI facility fits into the latter category. Different ground acceleration values apply to seismic waves with different frequencies or periods. Thus, an earthquake with a peak ground acceleration of 0.7 g may have a peak "spectral acceleration" (SA) of 1.1 g for waves of 0.3 second period, but only 0.5 g for waves with periods of 1 second. A typical earthquake produces seismic waves with many different periods, and a plot of spectral accelerations for an earthquake shows the ground accelerations for waves of all periods.

The applicant has assessed the ground shaking that would occur at the site using a probabilistic seismic hazard analysis. The probabilistic analysis assumed a 2000 year return period; a lesser standard than the 10,000 year return event required for nuclear power plants. This is allowable because of a rule change made by the Nuclear Regulatory Commission in 2003, lowering the design standard for ISFSI's to a 2000 year return event. At the time this rule change was proposed, Commission staff provided comments to the Nuclear Regulatory commission objecting to the reduction in standards largely because the choice of a lower standard was arbitrary. A copy of this comment letter is attached to this memo.

Part of developing a probabilistic seismic hazard assessment is identifying the maximum earthquake likely on any faults that could provide ground shaking at the site. The applicant has modeled this "maximum credible earthquake" as the simultaneous rupture of the entire length of the Cascadia Subduction Zone (some 600 miles long) coupled with the rupture of the Little Salmon Fault. Because of the size and locations of these faults a very large earthquake is assumed—up to a magnitude 9.1. This is roughly equivalent to the 26 December 2004 Sumatran

earthquake, and near the upper bound of any earthquake likely anywhere on Earth. The seismic potential of this area is as large as any spot on Earth.

In order to assess the ground shaking at the site, the seismic energy is propagated from the presumed epicenter to the site, accounting for directivity effects and attenuation of energy that occurs through distance. The soil characteristics of the site are then used to judge any amplification effects. The final probabilistic seismic hazard assessment resulted in a seismic spectra peaking at nearly 2.9g at a period of 0.25 seconds. At the longer periods most important for influencing large structures such as the ISFSI, spectral accelerations were still over 1g. These values of ground shaking were then used to derive design criteria for the construction of the ISFSI.

These very high ground accelerations would seem to provide a conservative design basis for the ISFSI. Although I do object to the use of the 2000 year return period in the calculation of the probabilistic seismic hazard assessment, the analysis is so dominated by the M9.1 Cascadia event that it is essentially such an event that is being modeled. It is therefore my opinion that the ground shaking possible at the site has been adequately characterized, and designing to this standard will result in a project that is consistent with Coastal Act section 30253 with respect to the ground motion hazard.

Liquefaction

Liquefaction of soils can occur during strong ground shaking if soils are water saturated and consist of loosely consolidated, well sorted sands. At the ISFSI site the water table lies at about six feet above sea level, or some 35 feet below ground level. In addition, there may be temporary perched ground water on clay layers within the Hookton. A relatively shallow ground water table coupled with the subterranean nature of the ISFSI indicates that liquefaction is a concern.

Borings at the site show that the top 23 ft of soils consists of clayey sands and clays, followed by very dense sands and silty sands to depth of 50 to 53 ft. Very stiff to hard sandy silts/silts and very dense sand extend from 50 ft to below 400 ft. A standard means of testing for the liquefiability of soils is to perform a Standard Penetration Test, in which the number of blows it takes a hammer of standard weight to drive a standard sampling tube a distance of 12 inches. Empirically, it is found that for soils with blow counts of more than about 30, liquefaction never occurs, and it is indeed rare in soils with blow counts between 20 and 30. The results of various Standard Penetrometer Tests in borings at the ISFSI site indicated that nearly all blowcounts are above 30. The few blowcounts that are below 30 are typically above 20 (dense) and are spatially isolated. From these data the applicant concludes, and I concur, that liquefaction will not occur in these soils.

Slope Stability

The applicant assessed slope stability under static conditions by calculating the factor of safety against sliding, using soil strength parameters measured at the site. They found that the factor of

safety at the ISFSI location was 2.69 with regard to the western slope (the coastal bluff) , and 4.94 with respect to the more gentle eastern slope towards the plant. These values are far in excess of the industry standard for new development of 1.5. As discussed under "coastal erosion," however, this level of stability cannot be assured in perpetuity if coastal erosion impinges on the site.

The slope stability analyses indicated yield accelerations—the level of ground shaking needed to instigate landslides—to be 0.69g and 0.66g for the coastal bluff and the eastern slope, respectively. Since these levels of ground shaking are less than the design basis earthquake, it is likely that the slopes will fail during such an earthquake. The amount of displacements of the slide masses was calculated using a Newmark sliding block approach to be about one foot during the design basis earthquake. This is far in excess of the 50 mm usually considered acceptable for new construction, but the applicant has indicated that the design of the ISFSI can accommodate this amount of displacement. Accordingly, it is my opinion that overall global stability of the slopes adjacent to the site is sufficient that the ISFSI will not be subject to landslide hazards unless the slope configurations change as a result of coastal erosion.

Surface Fault Rupture

Several active faults underlie the site. The Little Salmon Fault, The Bay Entrance Fault and the Buhne Point fault all dip to the northeast and underlie the site at various depths. The surface trace of the Buhne Point fault lies only about 300 feet south of the ISFSI site, and the surface trace of the Discharge Canal fault lies about 500 feet to the north. These two faults define a wedge, on which the ISFSI site is located. Through movement on these faults, the wedge is gradually uplifted and tilted. Although trenches across the site did encounter sand-filled fractures, none of them showed detectable offset and so are not considered active faults. The applicant believes that future deformation from displacement on the Little Salmon fault will be minor tilting with no differential displacements. I agree that this is likely, but I believe that it is certainly possible that one or both of these faults will shift position and that future fault movement could occur at the ISFSI site. It is quite common for faults to rupture along traces offset from previous ruptures, defining a "fault zone" rather than a single fault plane. This is, in fact, the case for these two faults as well, although the zone of fracturing does not appear to be more than a few tens of feet wide. Further, it is possible that a future movement along these faults could result in a different style of faulting. Given the proximity of the ISFSI to these active faults, I do not feel that it can be assured over perpetuity that the ISFSI will not be subjected to fault rupture.

The applicant has shown evidence that large, massive structures (including ammunition bunkers, bank vaults, and buildings with massive foundations) have performed well in previous earthquakes in Taiwan, Turkey, and Nicaragua. Although these anecdotal observations are encouraging, there also are many examples of quite large, massive buildings being damaged by surface faulting. Accordingly, I cannot find that the site will be safe from fault rupture hazard.

Tsunami

The applicant has sponsored extensive study of ancient tsunami deposits in Humboldt and Del Norte Counties; studies that have demonstrated repeated inundation by tsunamis during Cascadia Subduction Zone earthquakes. Most of these deposits were discovered in sheltered locations at relatively low elevation and give very little information regarding the maximum elevation to which tsunamis can run up. One exception is that tsunami deposits were not found behind North Spit, suggesting that the line of dunes, here about 40 feet high, is sufficient to protect that part of the bay from direct tsunami influence. In addition, Yurok oral legends tell of the tsunami of 1700, and indicate that the maximum run-up was just to the lower portion of a village site at Orick, which lies at 40 feet elevation. In addition, the applicant has modeled the tsunami height expected from a Cascadia Subduction Zone earthquake, and also arrived at estimated runup heights of 30 to 40 feet on the open coast. The tsunami would be partly attenuated as it entered Humboldt Bay, and the modeled runup elevation at the ISFSI site is 21 to 36 feet. Even at Mean Higher High Water, the modeled runup is only 23 to 38 feet. Accordingly, the applicant concludes that the ISFSI site, at an elevation of 44 feet, would not be inundated. Further, the ISFSI site is below ground level and not subject to damage by missiles carried by the tsunami. Finally, the ISFSI would be unaffected by inundation.

There are three reasons, however, that I cannot conclude that the site will be safe from a Cascadia Subduction Zone tsunami hazards in perpetuity. First, and perhaps most significant, is the comparison between the expected runups at this site and the observed runups of as much as 130 feet that occurred in Indonesia as a result of the 26 December 2004 Sumatran Earthquake. As indicated above, both the earthquake mechanism and the mechanism of tsunami generation for that earthquake is very similar to that expected for a Cascadia Subduction Zone earthquake and it is unclear why the near-source tsunami runups would be so different for the two earthquakes. Second, it is customary when assessing tsunami inundation to model the tsunami at not only high tide, but also with a storm surge (usually a 100-year storm) as well. If a Cascadia Subduction Zone tsunami were to hit during a period of high storm surge, the ISFSI site may well be damaged. Finally, the ISFSI site comprises a peninsula-like terrace that is underlain by poorly consolidated sands, silts, and clays. During a tsunami, this peninsula would be attacked from two directions. Erosion resulting from both incoming and retreating waves could, in my opinion, compromise the integrity of the ISFSI site.

Because it is anticipated that the ISFSI will occupy the site in perpetuity, I asked the applicant to address what role sea level rise might have on the site. They prepared an analysis superimposing the tectonic uplift of Buhne Hill (estimated at about 1.3 feet per 100 years) on sea level rise under several scenarios for time periods of 100, 1000, 10,000 and 100,000 years. Their analysis of sea level rise, although necessarily poorly constrained, indicates that overtopping of the ISFSI by sea level rise in the next several thousand years is possible. Under such conditions, overtopping by a tsunami is likely. Sometime between 1000 and 10,000 years, however, it is likely, based on our understanding of driving forces of glacial cycles, that the Earth will enter another glacial period. The resulting spread of polar ice will lock up large amounts of water, resulting in a lowering of sea level. Given continued uplift of Buhne Hill, the ISFSI site actually will become safer from such effects as tsunamis and coastal erosion.

Coastal Erosion

The subject site, like a long stretch of Humboldt Bay to the north, is armored by a rip-rap revetment. In the vicinity of the power plant, the revetment dates to 1952, when rip-rap was first placed to protect Unit 1. The rip rap was enlarged and modified in 1956-7, to protect Unit 2. After suffering storm damage in the 1980's, the revetment was repaired in 1989. This rip-rap has been very effective in protecting the site from coastal erosion. For some perspective in how erosion might effect the site if the revetment is not maintained at the site, the applicant examined historic shoreline retreat in reference (3)

The applicant assessed historic shoreline retreat by reviewing 16 aerial photographs and maps (U.S. Coast Guard Charts and USGS maps) spanning the time interval 1852 to 2000. Eight of these were deemed to be of sufficient accuracy and scale to provide estimates of the shoreline position. From 1858 until 2000 total shoreline retreat has amounted to 1248 to 1485 feet. Prior to construction of the jetties at the mouth of Humboldt Bay, South Spit overlapped North Spit and, at least for the early 19th century, Buhne Hill was not exposed to attack by ocean waves. With the construction of the jetties, erosion was rapid. Between 1858 and 1870, the shoreline retreated at a rate of 24-35 feet. Between 1870 and 1942 the rate of retreat was 4 to 9 feet, but between 1942 and 1959 the bluff retreated at an average rate of 44 to 65 feet per year. The actual rate was somewhat higher than this, because the revetment was at least partially in place by 1952.

Since the construction of the revetment, the bluff above the revetment has continued to retreat, but at a much lower rate (estimated at 1-4 inches per year). Much of this retreat has been by shallow landslides, and the bluff has been flattening through time. The bluff will continue to retreat, at least until a stable slope is attained., at which time one would expect the rate of bluff retreat to slow further or stop.

What is clear from this analysis, however, is that in the absence of shoreline protection, coastal erosion will threaten the ISFSI on a decadal time span. The slope stability analyses assume the current configuration of the bluff. Even with modest bluff retreat, such as is predicted even in the presence of the current revetment, the static factor of safety and the expected seismic displacement will be lower and higher, respectively, than the calculations presented above. This site has experienced one of the highest coastal erosion rates documented in the state, is only protected from that erosion by a revetment that has required extensive maintenance in the past, and will only remain safe in the future with continued maintenance and, perhaps, expansion of the coastal armoring.

Further, given future sea level rise discussed in reference (4), overtopping of the existing revetment and erosion of the upper bluff by direct wave attack is likely within the next several hundred years. Accordingly, it seems likely that stability of the ISFSI will require the construction of some type of upper bluff shoreline protection device, in clear violation of Section 30253 of the Coastal Act.

Summary

The applicant is to be commended in presenting a candid analysis of the geologic hazards at the site. They have demonstrated that the site is likely to be subjected to severe ground shaking, slope failures, tsunami, and coastal erosion. In addition, I believe that the site may be subject to surface fault rupture hazard as well. The applicant believes that all of these hazards can be mitigated for. On the other hand, the tsunami, surface fault rupture hazard, and coastal erosion hazard at this site, coupled with an essentially infinite design life, lead me to believe that it is not possible to assure that the proposed development will not be significantly affected by these geologic hazards, as required by section 30253 of the Coastal Act.

I hope that this review is helpful. Please contact me with any questions or concerns.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Johnson", with a long horizontal flourish extending to the right.

Mark Johnson, Ph.D., CEG, CHG
Staff Geologist