

# WORKER SAFETY AND FIRE PROTECTION

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## SUMMARY OF CONCLUSIONS

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Staff concludes that if the applicant for the proposed Humboldt Bay Repowering Project (HBRP) provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by proposed Conditions of Certification **WORKER SAFETY -1, -2, -3, -4, and -5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety, and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff also concludes that the proposed project would not have significant impacts on local fire protection services (Humboldt Fire District). The proposed facility location is within the service area of the local fire department. The fire risks of the proposed facility do not pose significant added demands on local fire protection services as there are already large amounts of liquid fuel stored and used on-site. In the event of a hazardous materials incident, trained plant personnel would provide the first response and the Eureka Fire Department Regional Hazardous Materials Response Team (EFD HMRT) would be available on-call. Mitigation measures proposed by staff and the applicant will ensure that the HMRT's response is adequate.

## INTRODUCTION

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Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment and procedural controls.

The purpose of this Preliminary Staff Assessment (PSA) is to assess the worker safety and fire protection measures proposed by the HBRP and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

## LAWS, ORDINANCES, REGULATION, AND STANDARDS

**WORKER SAFETY AND FIRE PROTECTION Table 1  
Laws, Ordinances, Regulations, and Standards (LORS)**

<u>Applicable Law</u>	<u>Description</u>
Federal	
29 U.S. Code sections 651 et seq (Occupational Safety and Health Act of 1970)	This Act mandates safety requirements in the workplace with the purpose of “[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources” (29 USC § 651).
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide Federal approval of California’s plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 CFR §1910.1 to 1910.1500.
State	
8 CCR all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
California Building Code Title 24, California Code of Regulations (24 CCR § 3, et seq.)	Comprised of eleven parts containing the building design and construction requirements relating to fire and life safety and structural safety. The California Building Standards Code incorporates current editions of the Uniform Building Code and includes the electrical, mechanical, energy, and fire codes applicable to the project.
Health and Safety Code section 25500, et seq.	Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.

Local (or locally enforced)	
Specific hazardous material handling requirements	Provides response agencies with necessary information to address emergencies
Emergency Response Plan	Allows response agency to integrate HBRP emergency response activities into any response actions
Business Plan	Provides response agency with overview of HBRP purpose and operations
Risk Management Plan (CUPA)	Provides response agency with detailed review of risks and hazards located at HBRP and mitigation implemented to control risks or hazards
1998 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9)	NFPA standards are incorporated into the California Uniform Fire Code. The fire code contains general provisions for fire safety, including: 1) required road and building access; 2) water supplies; 3) installation of fire protection and life safety systems; 4) fire-resistant construction; 5) general fire safety precautions; 6) storage of combustible materials; 7) exits and emergency escapes; and 8) fire alarm systems. The California Fire Code incorporates current editions of the UFC standards.
International Code Council (ICC), International Existing Building Code (IEBC)	By January 2008, the Humboldt Fire District (HFD) states that it will be operating under the new ICC IEBC codes that are currently in the process of adoption in California (Ziemer 2007).
Uniform Fire Code, Article 80 1997	Contains standards of the American Society for Testing and Materials and the NFPA. It is the United State's premier model fire code. It is updated annually as a supplement and published every third year by the International Fire Code Institute to include all approved code changes in a new edition.

## SETTING

Fire support services to the site will be under the jurisdiction of the Humboldt Fire District #1 (HFD). The closest HFD station and the first responder to the HBRP site is Fire Station #12, approximately 2.5 miles away with an estimated response time of 3-4 minutes. This station is capable of fire rescue, confined space entry, Hazardous Materials (HazMat) spill response, and emergency medical services (PG&E 2006a Section 8.10.1.7.2). The second fire station in HFD is Fire Station #11, located at 3455 Harris Street, approximately 5 miles away with an estimated response time of 7-10 minutes (CH2MHILL 2007a DR WS #54). The HFD staffs their two fire stations with 18 professional firefighters, 18 volunteer firefighters, and 2 administrative personnel. The HFD has three fire engines and one 2,000-gallon water tender. All firefighters are trained to EMT-1 level and some are trained to paramedic level. All professional firefighters are trained in using automated external defibrillators and esophageal tracheal airway devices (PG&E 2006a Section 8.10.1.7.3 and Ziemer 2007).

Due to a mutual aid agreement with the City of Eureka Fire Department, the second responder to the proposed HBRP would be Eureka Station #3, located about 4 miles away with an estimated response time of 5-6 minutes. The third closest station to the HBRP is Eureka Station #1, located about 5 miles away with an estimated response time of 7-8 minutes (Ziemer 2007).

The HFD has indicated that their stations, along with those of the City of Eureka Fire Department (due to the mutual aid agreement between them) are together adequately equipped and staffed to deal with any incident at the proposed facility. The HFD has handled the existing Humboldt Bay Power Plant (HBPP), and feels that the new equipment and design of the proposed HBRP are safer than those of the existing HBPP units 1 and 2. Therefore the proposed HBRP does not present an added burden on the local fire department (Ziemer 2007).

In the event of a hazardous materials incident, the Eureka Fire Department Regional Hazardous Material Response Team (EFD HMRT) may be called, with a response time of about 45 minutes. At staff's request, the applicant has engaged in discussion with the HFD and EFD regarding potential impacts the HBRP may have on their capability to respond to incidences. The applicant has stated that the dialogues have been very productive and that an agreement was reached that PG&E will provide EFD HMRT with new hand-held ammonia detectors and assist them in the preparation of a FEMA grant application for a new hazmat response vehicle (CH2MHILL 2007c, WSQ 22). These measures will enhance the HMRT's ability to respond. Staff therefore concludes that with the fulfillment of the agreement between PG&E and the EFD, the HMRT will be adequately equipped to respond in a timely manner.

In addition to construction and operations worker safety issues, construction of this facility will occur simultaneously with decommissioning activities of Humboldt Bay Power Plant Unit 3. Unit 3 had stopped operating in 1976 and is now in the process of decommissioning and demolition under a Nuclear Regulatory Commission (NRC) SAFSTOR license. The decommissioning process may take up to 12 years and includes the construction of an Independent Spent Fuel Storage Installation (ISFSI) on the Unit 3 property prior to demolition of Unit 3 structures (PG&E 2006a Section 8.16.1).

According to the applicant, radiological monitoring has shown that the HBRP site meets the NRC's standards for public use, and therefore workers at HBRP would not have to take special measures to mitigate radiological exposure. In addition, a detailed radiological contamination study would be conducted for the HBRP site and any contaminated soil would be removed before construction of HBRP begins. In the event soil contamination is encountered during construction of the HBRP, proposed conditions of certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **Waste Management** for a more detailed analysis of this topic.

## **ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION**

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### **METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE**

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and
2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are essentially a LORS compliance matter and if all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal-OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities in each area, the response time, and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff would recommend that the applicant mitigate this impact by providing increased resources to the fire department.

### **DIRECT/INDIRECT IMPACTS AND MITIGATION**

#### **Worker Safety**

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for HBRP to have well-defined policies and procedures, training, and hazard recognition and control at their facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers would be adequately protected from health and safety hazards.

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

## **Construction Safety and Health Program**

HBRP encompasses construction and operation of a natural gas fired-facility. Workers would be exposed to hazards typical of construction and operation of a gas-fired simple cycle facility (see Table 8.16-1 of the AFC for a list of potential hazards).

Construction Safety Orders are published at title 8 California Code of Regulations (CCR) sections 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509)
- Construction Fire Protection and Prevention Plan (8 CCR § 1920)
- Personal Protective Equipment Program (8 CCR §§ 1514 - 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) would include, but are not limited to:

- Electrical Safety Program
- Motor Vehicle and Heavy Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Protection Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Heat and Cold Stress Monitoring and Control Program;
- Pressure Vessel and Pipeline Safety Program;
- Hazardous Waste Program;
- Lead and Asbestos Program;

- General LO/TO Program;
- Subcontractor/External Visitor HSP;
- Hot Work Safety Program; and
- Permit-Required Confined Space Entry Program;

The AFC includes adequate outlines of each of the above programs (PG&E 2006a, Section 8.16.2.3.1) and the outline of a Construction Training Program covering all aspects of construction safety (Table 8.16-3). Prior to the start of construction of HBRP, detailed programs and plans would be provided to the Energy Commission pursuant to the Condition of Certification **WORKER SAFETY-1**.

### **Operations and Maintenance Safety and Health Program**

Prior to the start of operations at HBRP, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program will include the following programs and plans:

- Injury and Illness Prevention Program (8 CCR § 3203);
- Fire Protection and Prevention Program (8 CCR § 3221);
- Personal Protective Equipment Program (8 CCR §§ 3401 to 3411); and
- Emergency Action Plan (8 CCR § 3220); and
- First Aid, CPR, and Automated External Defibrillator.

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§ 2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) would be applicable to the project. Written safety programs for HBRP, which the applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the programs mentioned above (PG&E 2006a, Section 8.16.2.3.2) and the outline of an Operations Training Program covering all aspects of safety during operations (Table 8.16-4). Prior to operation of HBRP, all detailed programs and plans would be provided to the Energy Commission CPM pursuant to Condition of Certification **WORKER SAFETY-2**.

### **Safety and Health Program Elements**

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both Safety and Health Programs are as follows:

### ***Injury and Illness Prevention Program (IIPP)***

The IIPP will include the following components as presented in the AFC (PG&E 2006a, Section 8.16.2.3.2):

- Identity of person(s) with authority and responsibility for implementing the program;
- Establish safety and health policy of the plan;
- Define work rules and safe work practices for construction activities;
- System for ensuring that employees comply with safe and healthy work practices;
- System for facilitating employer-employee communications;
- Procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- Methods for correcting unhealthy/unsafe conditions in a timely manner;
- Specify safety procedures; and
- Training and instruction

### ***Fire Protection and Prevention Plan***

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR § 3221). The AFC outlines a proposed Fire Protection and Prevention Plan, which is acceptable to staff (PG&E 2006a, Section 8.16.2.3.2). The plan will include the following topics and will address the large amount of diesel fuel that will be stored on-site:

- Determine general program requirements;
- Determine fire hazard inventory, including ignition sources and mitigation;
- Develop good housekeeping practices and proper materials storage;
- Establish employee alarm and/or communication system(s);
- Provide portable fire extinguishers at appropriate site locations;
- Locate fixed fire fighting equipment in suitable areas;
- Specify fire control requirements and procedures;
- Establish proper flammable and combustible liquid storage facilities;
- Identify the location and use of flammable and combustible liquids;
- Provide proper dispensing and determine disposal requirements for flammable liquids;
- Establish and determine training and instruction requirements and programs; and
- Identify personnel to contact for information on plan contents.

Staff proposes that the applicant submit a final Fire Protection and Prevention Plan to the California Energy Commission Compliance Project Manager (CPM) for review and approval and to the HFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

### ***Personal Protective Equipment Program***

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation or physical contact (8 CCR sections 3380 to 3400). The HBRP operational environment will require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to protective clothing and equipment:

- Proper use, maintenance, and storage;
- When the protective clothing and equipment are to be used;
- Benefits and limitations; and
- When and how the protective clothing and equipment are to be replaced.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

### ***Emergency Action Plan***

California regulations require an Emergency Action Plan (8 CCR § 3220) for all employments and places of employment in California. The AFC contains a satisfactory outline for an emergency action plan (PG&E 2006a, Section 8.16.2.3.2).

The outline lists the following features:

- Establish emergency escape procedures and emergency escape route for the facility;
- Determine procedures to be followed by employees who remain to operate critical plant operations before they evacuate;
- Provide procedures to account for all employees after emergency evacuation of the plant has been completed;
- Specify rescue and medical duties for assigned employees;
- Identify fire and emergency reporting procedures to regulatory agencies;
- Develop alarm and communication system for the facility;
- Establish a list of personnel to contact for information on the plan contents;
- Provide emergency response procedures for ammonia release; and
- Determine and establish training and instruction requirements and programs.

### ***Written Safety Program***

In addition to the specific plans listed above, additional LORS apply to the project, called "safe work practices." Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs listed under the heading Construction Safety and Health Program in this section.

In addition, the project owner would be required to provide personal protective equipment and exposure monitoring for workers in the event they are involved in activities on sites where contaminated soil and/or contaminated groundwater exist as per staff's proposed Conditions of Certification **WORKER SAFETY-1** and-**2**. In addition, staff's proposed conditions of certification found in the **Waste Management** section of this staff assessment would require:

- the project owner to have an experienced Registered Professional Engineer or Geologist available for consultation during soil excavation and grading activities in the event that contaminated soils are encountered, and
- if potentially contaminated soil is unearthed during excavation at either the proposed site or linear facilities, the Registered Professional Engineer or Geologist shall inspect the site, determine the need for sampling and analysis, file a written report, and seek guidance from the CPM and the appropriate regulatory agencies.

These proposed Conditions of Certification would ensure that workers are properly protected from any hazardous wastes presently at the site.

### ***Safety Training Programs***

Employees will be trained in the safe work practices described in the above-referenced safety programs.

### ***Additional Mitigation Measures***

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90% employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980-1993, an average of 1,079 construction workers were killed on the job each year, more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6%) between 1980 and 1993.
- 15% of workers' compensation costs are spent on construction injuries.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.

- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large complex industrial type projects such as the construction of power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. This has been evident in the audits of power plants under construction conducted by the staff in 2005 and 2006. The Federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors to improve their safety and health performance; to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections; to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal-OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal-OSHA regulations do, however, require that safety be provided by an employer and the term “Competent Person” is used in many OSHA and Cal-OSHA standards, documents, and directives. A “Competent Person” is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3**, which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 and 2006 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- Lack of posted confined space warning placards/signs;
- Confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;

- Confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- Dangerous placement of hydraulic elevated platforms under each other;
- Inappropriate placement of fire extinguishers near hotwork;
- Dangerous placement of numerous power cords in standing water on the site thus increasing the risk of electrocution;
- Construction of an unsafe aqueous ammonia unloading pad;
- Inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- Lack of adequate employee or contractor written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on- or off-site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a safety professional monitor on-site compliance with Cal-OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A monitor, hired by the project owner yet reporting to the Chief Building Official (CBO) and Compliance Project Manager (CPM), will serve as an “extra set of eyes” to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged them in questions about the team’s findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a “fresh perspective” of the site.

## **Fire Hazards**

During construction and operation of the proposed HBRP, a potential exists for both small fires and major structural fires to occur. Electrical sparks, combustion of diesel fuel oil (a large amount – 634,000 gallons -- will be stored on-site), natural gas, hydraulic fluid, mineral oil, insulating fluid or flammable liquids, explosions, and over-heated equipment, may cause fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS will be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the Humboldt Fire District to determine if available fire protection services and equipment would adequately protect workers, and to determine the project’s impact on fire protection services in the area. The project would rely on both onsite fire protection systems and local fire protection services. The onsite fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be

provided by the HFD and the EFD through a mutual aid agreement between these jurisdictions (PG&E 2006a, Section 8.16.2.4 and Ziemer 2007).

## **Construction**

During construction, portable fire extinguishers would be located throughout the site no more than 100 feet from any working area, and within 50 feet of locations where flammable or combustible materials are stored. Safety procedures and training will be implemented. In the event of a larger fire that cannot be extinguished using the portable suppression equipment, the HFD would be called (CH2MHILL 2007c, DR WS #52).

## **Operation**

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric power generating plants), and all Cal-OSHA requirements (PG&E 2006a, Section 10C.6). Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire water would be supplied from a water main on King Salmon Avenue, and would be stored in an onsite storage tank capable of holding the water required for 8-hours of fire suppression. From the firewater storage tank an underground loop system would connect to all fire hydrants and fixed fire suppression systems, with one electric, one Jockey, and one diesel fired pump maintaining water pressure (PG&E 2006a, Section 2.5.12 and Section 10A3.11.2.2). Fire hydrants would be located throughout the site with no more than 250 feet apart in accordance with NFPA 24.

An automatic fire protection system (water spray) would be provided for the control room administrative/maintenance building and a deluge system will be installed at the generator step-up for transformer protection. Portable carbon dioxide extinguishers would be located in areas with sensitive electrical equipment and one portable wheeled dry-chemical extinguisher would be located in the engine area (PG&E 2006a, Section 10C3.9.9). The fire detection system would have fire detection sensors that would trigger alarms and automatically actuate the sprinkler system (see PG&E 2006a Appendix 10C for a detailed description of fire detection and protection equipment).

In addition to the fixed fire protection system, smoke detectors, flame detectors, temperature detectors, and appropriate class of service portable extinguishers and fire hydrants must be located throughout the facility at code-approved intervals. These systems are standard requirement by the NFPA and the UFC and staff has determined that they would ensure adequate fire protection.

The applicant would be required by **Worker Safety-1** and-**2** to provide the final Fire Protection and Prevention Program to staff and to the HFD prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

## **Emergency Medical Services**

A state-wide survey was conducted by staff to determine the frequency of emergency medical services (EMS) response and off-site fire-fighter response for natural gas-fired

power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer fire-fighting staff. However, staff has determined that the potential for both work-related and non-work related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work related incidences, including visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site defibrillator; the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on-site in order to convert cardiac arrhythmias resulting from industrial accidents or other non-work related causes. Therefore, an additional COC (**WORKER SAFETY-5**) is proposed which would require that a portable automatic cardiac defibrillator be located on site.

## **CUMULATIVE IMPACTS AND MITIGATION**

Staff reviewed the potential for the construction and operation of HBRP combined with existing industrial facilities and expected new facilities to result in impacts on the fire and emergency service capabilities of the HFD, and determined that cumulative impacts were insignificant. The HFD stated that together with the City of Eureka Fire Department they feel adequately staffed and equipped to deal with any incident at the proposed facility (Ziemer 2007). Given the isolated area where the project is proposed to be built, and the lack of unique fire hazards associated with a modern gas-fired power plant, staff concludes that this project will not have any significant incremental burden on the department's ability to respond to a fire or medical emergency.

## **CONCLUSIONS**

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Staff concluded that if the applicant for the proposed HBRP provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY -1**, and **-2**; and fulfils the requirements of **WORKER SAFETY-3** through-**5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the proposed project would not have significant impacts on local fire protection services.

## PROPOSED CONDITIONS OF CERTIFICATION

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**WORKER SAFETY-1** The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Injury and Illness Prevention Program;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable Safety Orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Humboldt Fire District for review and comment prior to submittal to the CPM for approval.

**Verification:** At least thirty (30) days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Humboldt Fire District stating the Fire Department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

**WORKER SAFETY-2** The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Program (8 CCR § 3221); and;
- Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the program with all applicable Safety Orders. The Operation Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Humboldt Fire District for review and comment.

**Verification:** At least thirty (30) days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Humboldt Fire District stating the Fire Department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

**WORKER SAFETY-3** The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards, is capable of identifying workplace hazards relating to the construction activities, and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have over-all authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- Assure that the safety program for the project complies with Cal/OSHA & federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations, emergency response reports for injuries, and inform the CPM of safety-related incidents; and
- Assure that all the plans identified in Worker Safety 1 and 2 are implemented.

**Verification:** At least thirty (30) days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement (CSS) shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

**WORKER SAFETY-4** The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO, and will be responsible for verifying that the Construction Safety Supervisor, as required in Worker Safety 3, implements all appropriate Cal/OSHA and Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

**Verification:** Prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

**WORKER SAFETY-5** The project owner shall ensure that a portable automatic cardiac defibrillator is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on-site whenever the workers that they supervise are on-site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

**Verification:** At least thirty (30) days prior to the start of site mobilization the project owner shall submit to the CPM proof that a portable automatic cardiac defibrillator exists on site and a copy of the training and maintenance program for review and approval.

## REFERENCES

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California Fire Code 1998. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

CH2MHILL 2007a – CH2MHill/D. Davy (tn: 38912). Applicant's Responses to CEC Staff's Data Requests 1 - 57. 1/12/2007. Rec'd 1/12/2007.

CH2MHILL 2007c – CH2MHill/D. Davy (tn: 39225). Applicant's Responses to CEC Staff's Data Requests 58 – 78 and Workshop Queries 1 - 22. 2/13/2007. Rec'd 2/13/2007.

PG&E 2006a – PG&E/R. Kuga (tn: 38050). Humboldt Bay Repowering Project AFC Vol. 1 & 2, 1 AFC CD and 1 Air Modeling CD. 9/29/2006. Rec'd 9/29/2006.

Uniform Fire Code 1997, Vol. 1. Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

USOSHA (United States Occupational Safety and Health Administration). 1993. Process Safety Management / Process Safety Management Guidelines For Compliance. U.S. Department of Labor, Washington, DC.

Ziemer, Glenn. Fire Chief, Humboldt Fire District. Personal communications with Shon Greenberg, Risk Science Associates. February 13, 2007.