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8.12 HAZARDOUS MATERIALS HANDLING

This section describes the hazardous materials to be used in conjunction with the construction and operation of the proposed CGS. The discussion includes information on the applicable LORS and includes an evaluation of potential public health impacts resulting from the storage and handling of hazardous materials. A list of known chemicals associated with the project is provided, as well as a description of the storage facilities and handling equipment for hazardous materials that have been designed to ensure that potential impacts will be below designated thresholds of significance, even in the unlikely event of a worst-case accidental release of a hazardous material.

To minimize the risks and offsite consequences from hazardous materials, a federal program was established in 1990 as described in Section 112 (r) of the Clean Air Act. The California Office of Emergency Services established the California Accidental Release Prevention (CalARP) Program to prevent the accidental releases of regulated substances and develop plans for minimizing the impacts of such releases should they occur. The CalARP Program specifies regulated substances, oversees the federal and state requirements, and determines the requirements for the preparation of a Risk Management Plan (RMP) and offsite accidental release consequence analysis.

The CalARP Program defines three program levels with differing requirements depending upon the complexity, accident history, and potential impact of releases of regulated substances. The program requires that the owner or operator of an affected facility coordinate closely with the local administering agency to determine the appropriate level of documentation required for an RMP.

The construction and operation of the CGS requires a number of hazardous materials to be handled and stored on the site. Only aqueous ammonia will be present in amounts greater than the State Threshold Quantity, but below the Federal Threshold Quantity. Thorough analysis of ammonia impacts is evaluated by means of an offsite consequence analysis (OCA). To fulfill the Program 1 requirements, the following actions are required:

- Analyze the worst-case release scenario and include it in the RMP.
- Document that the nearest public receptor is beyond the distance to a toxic or flammable endpoint.
- Document, and submit with the RMP, information related to any hazardous material accidents in the past 5 years.
- Ensure that response actions have been coordinated with local emergency planning and response agencies.
- Certify in the RMP that “no additional measures are necessary to prevent offsite impacts from accidental releases.”

If the facility triggers a Program 2 or Program 3 RMP, additional actions will be required, such as:

- Describe the site’s accidental release prevention program and chemical-specific prevention steps. (Ensure that response actions have been coordinated with local emergency planning and response agencies.)
- Develop and describe the facility’s prevention program, including the facility’s safety program, facility hazard review program, operating procedures, training program, maintenance program, compliance, and facility incident investigation program.
- Describe the site’s emergency response program.

Beneficial design aspects of the proposed project that will minimize impacts below a level of significance include the following:

- A concrete aqueous ammonia storage tank containment pad with a sloped surface to drain any spilled ammonia into a covered underground sump.
- A concrete pad with containment around the tanker truck unloading area and a sloped surface to drain any spilled ammonia to drain into the same underground sump.

8.12.1 Affected Environment

The CGS will be located approximately 4 miles west of I-5 in Colusa County, California. The site is currently undeveloped agricultural land used for grazing cattle. Sparse residences are located in the surrounding area. The location of the proposed CGS is shown in Figure 3.2-1.

No sensitive receptors (schools, hospitals, daycare facilities, or long-term health care facilities) are located within a 3-mile radius of the CGS; therefore a table of sensitive receptors is not required. The nearest residence is situated approximately 1.7 miles southeast of the plant site. This house is also the nearest public receptor. The PG&E Compressor Station, located immediately east of the proposed CGS site, is not considered a public receptor, because PG&E will be the owner and operator of the CGS by the time it commences operation. The site is not located within 1,000 feet of any residential area, school, general acute care hospital, long-term health carte facility, or child day care facility.

The CGS site is not within a designated floodplain. Therefore, the ammonia storage facility does not need to be designed to accommodate possible flooding.

The CGS site is located in Seismic Risk Zone 3. Construction and design of the proposed project will conform to the 2003 International Building Code, 2003 California Building Code, and the Colusa County Building Code (Colusa County, 2000).

8.12.2 Environmental Consequences

The criteria used to determine the significance of potential impacts from hazardous materials used at the CGS were based on the Environmental Checklist Form of the CEQA Guidelines and on standards and thresholds adopted by the relevant agencies involved with this AFC. Under CEQA Guidelines, an impact may be considered significant if the project would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of a hazardous material into the environment.
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or wastes within one-quarter mile of an existing or proposed school.
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and as a result, would create a significant hazard to the public or the environment.
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Operational procedures for the safe transport, use, and disposal of hazardous materials will avoid or minimize significant impacts from potential accidental releases. Potential impacts from hypothetical worst-case accidental releases of ammonia described in Section 8.12.2.2.1 have been demonstrated to be below a level of significance due to the mitigation measures incorporated in the proposed design of the facilities handling this chemical.

An accidental release can only occur if hazardous materials are handled improperly, or if a catastrophic event occurs. Although the probability of such events occurring is extremely low, passive design features have been included in the project design to minimize potential impacts in the event of a release. Hence, additional mitigation measures are not required (see Section 8.12.4, Mitigation Measures).

An Offsite Consequence Analysis must be performed to evaluate potential offsite impacts in terms of the predicted maximum ground-level concentration of each hazardous material that qualifies as a state-regulated substance under the CalARP Program, or a federal-regulated substance under Section 112(r) of the Clean Air Act. For the proposed project, aqueous ammonia is the only substance that will be stored and used on site in sufficient quantity to qualify as a state-regulated substance. Thus, an offsite consequence analysis will be required for aqueous ammonia. The model simulations of the atmospheric dispersion of ammonia during the worst-case release scenarios will partially determine which RMP Program level will be required.

In the analysis of potential offsite consequences of the hypothesized worst-case accidental releases of ammonia, a significant impact would occur if a concentration of ammonia were predicted to equal or exceed the toxic endpoint at the distance of the nearest public receptor. The toxic endpoint is designated by the U.S. EPA in 40 CFR Part 68, Appendix A, as 200 parts per million by volume (ppmv). This concentration was formerly equivalent to the Emergency Response Planning Guideline Level 2 (ERPG-2) concentration, although the current ERPG-2 concentration limit has since been reduced to 150 ppmv.

The CEC routinely uses a more stringent significance criterion for ammonia, specifically, a concentration equal to or greater than 75 ppmv averaged over 30 minutes, which corresponds to the Short-Term Public Emergency Limit (STPEL) established by the National Research Council.

Colusa County Department of Environmental Health is the designated Certified Unified Program Agency (CUPA) for the project area, and will be responsible for approving the RMP for the aqueous ammonia facilities of the proposed project.

8.12.2.1 Hazardous Materials Introduced by the Construction of CGS

Hazardous materials used during the construction of the CGS would be limited to small volumes of flushing and cleaning fluids (phosphate or nitrate solutions), cleaning solvents, paint wastes, antifreeze and pesticides. The construction contractor would be considered the generator of hazardous construction waste, and would be responsible for proper handling of such wastes in accordance with all applicable federal, state, and local laws and regulations, including licensing, personnel training, waste accumulation limits and time, reporting and recordkeeping. Any hazardous wastes generated during construction would be collected in hazardous waste containers near the point of generation and moved daily to the contractor's 90-day hazardous waste storage area located on the site. The accumulated waste would be subsequently delivered to an authorized waste management facility.

Material Safety Data Sheets for each onsite chemical would be kept at the CGS site and construction employees would be aware of their location and content.

The most probable accidents involving hazardous materials during construction might occur from small-scale spills during cleaning or use of other materials in the storage areas or during refueling of machinery. Such spills would be immediately cleaned up and materials containing hazardous substances will be

properly disposed of. No additional measures beyond those described in this section are needed to reduce potential impacts during construction to a less-than-significant level.

8.12.2.2 Hazardous Materials Introduced by the Operation of CGS

A number of hazardous materials would be stored and used on the site during the operation of the new combined-cycle gas turbines and SCR systems at the CGS. Table 8.12-1 lists the hazardous materials that would be used or stored on site as a result of the proposed project. Information provided in this table for each material includes the maximum quantity stored on site, Chemical Abstract Service (CAS) number, anticipated usage quantity, location, nature of the associated hazard, and state/federal threshold quantities. Figure 8.12-1 shows the locations at which the listed hazardous materials would be stored on the CGS site.

Emergency response policies and procedures would be outlined in a Business Plan/Contingency Plan that would be prepared prior to commencement of project operations. This plan would describe the necessary actions to be taken by facility personnel in the event of a hazardous material release to the air, soil, or surface waters in the plant vicinity. These procedures would include a notification checklist with contact information for CGS qualified individuals, emergency response agencies, regulatory agencies, police, fire, hospital, and ambulance services.

Waste lubricating materials would be periodically generated during the operation and maintenance of the generating units. These materials would be collected and stored in appropriately designed and labeled storage containers. Waste lubricants would be recycled by an approved contractor in compliance with applicable regulations.

Herbicides, pesticides, and algaecides would be stored in small quantities within a suitable containment structure. The storage of such chemicals on site would be minimized. The immediate areas around these chemicals will be appropriately labeled. In the unlikely event that any of these chemicals must be disposed of, such disposal would be conducted in compliance with all local, state, and federal disposal and handling regulations.

Combustion exhaust catalysts would be used as part of the air quality control systems associated with the new generating units. These catalyst materials, which contain vanadium and other toxic materials, are expected to last approximately three to 5 years and will be replaced periodically. The manufacturer would recycle spent catalysts, if possible. If necessary, these materials would be disposed of in an appropriate manner at an approved Class I landfill.

Solvents may be used for parts cleaning and other maintenance activities. The use of solvents on site would be minimized. All solvents would be stored in appropriate containers, within labeled areas with secondary containment. Spent solvents would be recycled, if practical, or would be disposed of in an appropriate manner.

Wastewater resulting from periodic cleaning of compressors and HRSGs may contain elevated concentrations of heavy metals. All such cleaning wastewater would be collected and routed to the zero liquid discharge system, as described in Section 3.4.7.1.

Curbs, berms, and concrete pits would be used where accidental releases of hazardous and acutely hazardous materials could occur. All containment areas would be constructed in accordance with applicable laws, ordinances, regulations, and standards. Containment areas would be drained to appropriate collection areas or neutralization tanks for recycling or offsite disposal. Traffic barriers would protect piping and tanks from potential traffic hazards.

To minimize impacts from accidental releases, workers would be trained in methods for safe handling of hazardous materials, use of response equipment, procedures for mitigation of a release, and coordination with local emergency response organizations. More importantly, to avoid or minimize impacts from the accidental releases of hazardous materials, non-hazardous or less hazardous materials would be used where possible, or engineering controls would be implemented. For example, aqueous ammonia was selected for the SCR emission control system over anhydrous ammonia, because it is less hazardous.

The most probable accidents involving hazardous materials may include small-scale spills of waste oil or other chemicals from product or satellite storage areas. To avoid potential impacts, all spills would be cleaned up immediately.

The quantities of individual hazardous and acutely hazardous chemicals that trigger federal evaluation of potential offsite consequences for an accidental release are listed in 40 CFR 68.115. The corresponding state thresholds under the CalARP program are provided in the California Code of Regulations, Title 19 (Public Safety), Division 2, Chapter 4.5, Sections 2735 – 2785.

None of the chemicals a the CGS will be stored in quantities above the federal thresholds and only aqueous ammonia would be stored on the site in a more than CalARP threshold quantity. Aqueous ammonia would be used as the reagent in the SCR emission control system to reduce nitrogen oxide (NO_X) compounds from the exhaust of the gas turbine and heat recovery steam generator (HRSG) units. Figure 8.12-1 shows the proposed location of the ammonia storage facility on the site plan, as well as the storage or usage locations of other hazardous materials.

Tanker trucks with a capacity of 4,000 gallons will deliver aqueous ammonia to the CGS from a licensed supplier in Northern California. Such deliveries will be made approximately twice per week. The only feasible route for aqueous ammonia deliveries to the CGS will be from I-5 to Delevan to McDermott to Dirks, and up the access road. Upon reaching the CGS, the delivery trucks will proceed around the plant ring road to the ammonia unloading area. The route will be counter-clockwise to enter the unloading area as soon as possible after entering the plant site, and therefore, minimize the potential for collisions with site vehicles and avoid passing near chemical storage areas that may contain substances that are incompatible with ammonia with the tanker having ammonia onboard. Speed limits within the site will be strictly enforced.

8.12.2.2.1 Offsite Consequence Analysis

Aqueous ammonia would be the only hazardous substance present at the CGS site in sufficient quantity to be considered a state- or federal-regulated substance subject to the requirements of the CalARP program. Aqueous ammonia would be used in the SCR system to reduce NO_X emissions from the generating units. The 19 percent aqueous ammonia solution would be stored in one aboveground storage tank holding a maximum of 20,000 gallons. The tank will be refilled periodically by offloading from ammonia tanker trucks.

This section outlines the contents of an offsite consequence analysis (OCA) to evaluate potential acute public health impacts from an accidental release of aqueous ammonia. Details of the calculations for this analysis are included below under the heading Model Parameters.

The offsite consequence analysis was performed for two hypothetical accidental release scenarios: "worst-case," and "alternative." The U.S. EPA has specified (40 CFR §68.3) that the worst-case release scenario must be "the release of the largest quantity of a regulated substance from a vessel or process line failure that results in the greatest distance to an endpoint." The alternative scenario is considered to be "more realistic," while the worst-case scenario is so conservative as to be almost impossible. However, the probability of occurrence for the alternative scenario is also extremely low.

For each scenario, distances to specified concentrations (end points) of ammonia were estimated through calculation of emission rates and use of a computer model to predict airborne dispersion and resulting ground-level concentrations. If a specified "level of concern" concentration were predicted to reach off site, then the corresponding potential short-term health effects would be evaluated.

Four levels of concern are used to evaluate public health impacts associated with a hypothetical release of aqueous ammonia:

- **Lethal.** The lethal concentration is 2,000 ppmv averaged over 30 minutes.

- **Immediately Dangerous to Life and Health (IDLH).** The IDLH concentration is 300 ppmv, averaged over 30 minutes (National Institute of Occupational Safety and Health [NIOSH], 1997). This concentration was chosen by the NIOSH to ensure that workers can escape without injury or irreversible health effects from an IDLH exposure. Exposure to ammonia at or above the IDLH poses a threat of death or immediate or delayed permanent adverse health effects or prevents escape from the impacted environment.

- **EPA/CalARP Toxic Endpoint.** The CalARP concentration, based on EPA 40 CFR 68, is 200 ppmv averaged over 1 hour. This concentration was formerly equivalent to the ERPG-2 concentration, and is the maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

- **CEC Significance Value.** The CEC uses a more stringent significance value of 75 parts per million (ppm) ammonia averaged over 30 minutes, based on public short term limits set by the National Research Council. The CEC uses this concentration as a screening guideline to determine the potential for significant impact. CEC has determined that exposure above this level poses a potentially significant risk of adverse health impacts on sensitive members of the general public.

The potential offsite impact of an accidental release of ammonia is considered to be less than significant if the CEC concentration does not reach a public receptor. If concentrations at the CalARP level do not extend off site, then significant concentrations cannot reach any public receptors. Accordingly, a Program 1 RMP would most likely be appropriate and the impact is considered less than significant. If concentrations greater than the CalARP level are determined to be off the site, a Program 2 RMP must be considered.

The OCA includes four components. The first is to describe the scenario, including passive features designed to minimize emissions, in enough detail to allow quantitative analysis. The second component of the OCA is to estimate emission rates associated with each scenario. The third component is to use atmospheric dispersion modeling to predict the maximum distances to the ammonia concentration levels of concern in each scenario. The fourth component assesses the potential degree and extent of offsite consequences of the concentrations computed by the dispersion modeling.

The following subsections describe: (1) the assumptions used to characterize the worst-case release scenario; (2) the assumptions used to characterize the alternative release scenario; (3) the development of input parameters for the modeling analyses conducted for these scenarios; (4) the selected atmospheric dispersion modeling methodology; and (5) the results of the modeling analysis, including an exposure assessment for potential receptors in the vicinity of the CGS.

Worst-Case Release Scenario

Potential accidental releases of aqueous ammonia at the CGS could involve a spill from the storage tank, a spill during the unloading of a tanker truck to a storage tank, or the escape of ammonia from the piping connecting the storage tank with the SCR system.

An ammonia spill resulting from either failure of a storage tank or during the unloading of a tanker truck would drain into the same underground sump. The emissions from ammonia within the sump would be based on the evaporative rate of ammonia to the atmosphere. Since the surface area of ammonia within the sump that would be exposed to the atmosphere would be identical in either spill scenario, the emission rate and resulting impacts would also be the same. To fully analyze all possible scenarios, only a spill from the storage tank is analyzed in this OCA with results assumed to represent both this spill and a worst-case spill from the unloading of a tanker truck. Emergency systems have been designed to stop the flow of ammonia during the transfer from the storage tank to the SCR system if a release were detected. Hence, the potential release quantity of ammonia from pipe failure during transport of ammonia to the SCR would be much smaller than from the rupture of a tank.

The RMP guidance developed by the U.S. EPA requires that the worst-case release be the release of the largest quantity of a regulated substance from a vessel or process line failure. At the CGS, the hypothetical worst-case accidental release of ammonia is the failure or spill from the storage tank, resulting in the immediate release of as much as 20,000 gallons. The circumstances under which this scenario was assumed to occur are so conservative as to be virtually impossible.

The underground sump would be designed to hold the entire contents of a 20,000-gallon storage tank, plus the maximum rainfall in 24 hours for the entire period of record (3.5 inches, WRCC 1948-2005). A 42-inch-diameter drain hole has been designed to enable the entire contents of the storage tank (20,000 gallons) to drain into the sump within a maximum period of 1 minute. Thus, any aqueous ammonia spill within the storage area would drain into a covered sump through the drain hole in 1 minute or less. In addition, the surface under the unloading area will be a sloped pad that will also drain into the same covered sump through a 24-inch-diameter drain hole. This passive mitigation system would limit the volatilization of an accidental aqueous ammonia release to the atmosphere. The release rate of the ammonia resulting from tank failure is estimated as the rate of evaporation from the exposed areas of ammonia.

Alternative Release Scenario

The alternative scenario is considered to be a “more realistic” accidental release event compared with the extremely conservative worst-case scenario. However, the probability of the alternative scenario actually occurring is also extremely low. The alternative scenario would involve a spill of aqueous ammonia from the pipe of the ammonia transfer line from the storage tank to the SCR. The pipe is designed to be one-inch carbon steel with one 250-foot pipe to the east SCR unit and a 400-foot pipe to the west SCR unit. For this analysis, only complete failure of the western pipe is analyzed. For complete failure of the pipe, it is assumed that the entire pipe capacity is released (16.32 gallons). In addition, it assumed that the time required for the ammonia piping system to be shut off when a release is detected in the line would be no more than 1 minute. Thus, the ammonia that is pumped during that minute is also considered to be released. Since the expected flow rate of the ammonia is 40 gallons per hour (0.67 gallon per second) per SCR, the total volume of aqueous ammonia release is 17 gallons. The emission rate of ammonia is determined from the area of ammonia exposed to the atmosphere. Assumptions and detailed calculations are described below.

Model Parameters

The calculations to determine the emission rate of ammonia vapor from an aqueous solution used the following equation, as recommended by the U.S. EPA in the *RMP Guidance for Offsite Consequence Analysis* (1999):

$$QR = \frac{0.284U^{0.78}MW^{2/3}A \times VP}{82.05T} \qquad \text{(Equation 8.12-1)}$$

where:
- QR = emission rate of ammonia (pounds per minute)
- U = wind speed (meters per second)
- MW = molecular weight of ammonia (grams per gram-mole)
- A = surface area of spilled liquid pool (square feet)
- VP = vapor pressure of ammonia above solution (millimeters of mercury)
- T = temperature of liquid (degrees Kelvin)

This equation is valid for analysis at 25º Celsius. In order to adjust for the parameters given in the worst-case and alternate scenarios, a temperature correction equation is used for the emission rate of ammonia:

$$QR_c = QR \times TCF \qquad \text{(Equation 8.12-2)}$$

The temperature correction factor (TCF) is determined by the following equation:

$$TCF = \frac{VP_T \times T_S}{VP_{T_S} \times T} \qquad \text{(Equation 8.12-3)}$$

where:
- VP = vapor pressure of ammonia at standard temperature (millimeters of mercury)
- VP_T = vapor pressure of ammonia at temperature analyzed (millimeters of mercury)
- T = standard temperature (degrees Kelvin)
- T_S = temperature at which given scenario is analyzed (degrees Kelvin)

This equation determines the emission rate of the ammonia alone; the evaporative rate of the water in the solution is ignored. The emission rate per unit area required for the selected dispersion model was calculated using the following equation:

$$E = \frac{QR_C}{A} \qquad \text{(Equation 8.12-4)}$$

where:
- E = emission rate of ammonia (grams second^{-1} meter^{-2})
- QR_C = temperature corrected emission rate of ammonia (grams second^{-1})
- A = surface area of spilled liquid pool (square meters)

The surface area of the spilled pool used in Equations 8.12-1 and 8.12-4 is the area of ammonia that is exposed to the atmosphere through the two drain holes in the worst-case scenario, and the area of the pooled ammonia, assumed to have a depth of 1 centimeter, that is exposed to the atmosphere for the alternative scenario.

The wind speed used in Equation 8.12-1 is taken from CalARP RMP guidance to be 1.5 m/s for the worst-case scenario and 3.0 m/s for the alternative scenario. Low wind speed results in a low volatilization rate, as can be seen in Equation 8.12-1, but also corresponds to a low rate of dispersion of the vapor as it is carried downwind.

The temperature of the released aqueous ammonia is assumed to be 9°F warmer than the air temperature to compensate for the maximum potential increase of temperature within the tank. The CalARP guidance requires the maximum air temperature observed on site in the previous 3 years; however, to be conservative, the maximum temperature over the entire period of record at the Colusa 2 SSW meteorological station (1948-2005) was used. The maximum temperature (111°F observed during 1978) was used for the worst-case scenario modeling (WRCC, 1948-2005). The mean air temperature of 61.4°F (observed during 1948-2005) was used in the alternative scenario modeling per the CalARP guidance requirements (WRCC, 1948-2005).

Atmospheric stability is an important meteorological parameter used in modeling the dispersion of the ammonia vapor that vaporizes from the liquid. The worst-case scenario requires stability Class F, which is the most stable classification. In a stable atmosphere there is little turbulent motion, hence very little mixing occurs, so the ammonia concentration in the plume from a spill would remain high as the vapor is carried downwind under these conditions.

The combination of the maximum observed temperature and extreme atmospheric stability that was assumed for the worst-case modeling scenario is so conservative that it never occurs. Maximum temperature occurs during the mid-afternoon hours when the air is typically unstable or neutral (stability Classes A through D). In contrast, F stability occurs during nighttime or early morning before sunrise. Atmospheric stability Class D (neutral stability) is used in the alternative scenario.

Table 8.12-2 shows the parameters used to model the ammonia dispersion for the worst-case and alternative release scenarios.

Modeling Methodology

To examine the impacts from a hypothetical spill of aqueous ammonia, the U.S. EPA-approved atmospheric dispersion model SCREEN3 was employed. SCREEN3 is a Gaussian plume model that incorporates continuous source and meteorological parameters.

An accidental aqueous ammonia release would pool in the covered sump where ammonia gas will evaporate via laminar mass transfer through the drain holes in the worst-case scenario or from the exposed pool of ammonia that spilled from the pipe in the alternate scenario. Ammonia gas is lighter than air—it has a molecular weight of 17.03 g/g•mole, whereas air has a molecular weight of about 29 g/g•mole. For the ammonia release scenarios examined, a dense gas model, such as SLAB or DEGADIS, would be inappropriate. Only one meteorological condition, a single stability class and wind speed, needs to be examined per scenario. The greatest distance to the toxic endpoint must be determined regardless of wind direction; hence, SCREEN3 is an appropriate model for the required analysis.

In the area source mode of SCREEN3, the ammonia source resulting from a storage tank rupture is represented by a rectangular area, the area of which is equal to the total area of the two drain holes located in the storage area and tanker truck unloading area. The use of the larger combined area in the modeling analysis will result in a slightly more conservative predicted impact on the surrounding area than a representation of the two drain holes as separate sources. In the alternate scenario, the effective area of the ammonia source will be represented by a single area with the ammonia spread to a 1 centimeter depth.

Receptor distances in the dispersion model simulations were measured from the center of the ammonia tank enclosure for the Worst-Case Scenario and from the western edge of this enclosure for the Alternate Scenario. Since the piping from the storage tank would be routed toward the west, and the residence that constitutes the nearest public receptor is to the southeast, this latter location was selected to ensure that the maximum possible impacts at the Compressor Station due to a pipe rupture would be evaluated.

Modeling Results

It has been assumed that there is an equal probability of the ammonia dispersing in any direction. Thus, the model results in Figures 8.12-2 and 8.12-3 are shown as circles of equal predicted ammonia concentration around the source. The radii of the circles represent the distances to each "level of concern" concentration used as public health effects thresholds. The following table summarizes the modeling results:

Scenario	Nearest Public Receptor (PG&E Compressor Station)	Nearest Residence/Nearest Public Receptor
Worst-Case Scenario Concentration (Storage tank spill into underground sump)	46.64 ppmv	1.48 ppmv
Alternative Scenario Concentration (Pipe failure)	132.06 ppmv	3.80 ppmv
Distance from Ammonia storage facility	1,025 feet	8,860 feet

Neither the worst-case nor alternative release scenario would cause an impact that exceeds the toxic endpoint concentration of 200 ppm (CalARP toxic endpoint) at a public receptor. In addition, the maximum predicted ammonia concentration at the nearest public receptor (a residence 1.7 miles to the southeast) is only 3.80 ppmv, far below the CEC significance threshold of 75 ppmv.

The Colusa facility will be eligible for the CalARP Program 1 level of analysis because it will meet the following requirements:

> The distance to a toxic endpoint or flammable endpoint for an ammonia release is less than the distance to any public receptor. The toxic endpoint (i.e., EPA/CalARP concentration) is 200 ppmv for ammonia.
>
> For the 5 years prior to the submission of a RMP, the existing facility has not had an accidental release of a regulated substance in which exposure to the substance, its reaction products, overpressure generated by an explosion involving the substance, or radiant heat generated by a fire involving the substance has led to any of the following offsite consequences:
>
> - Death;
> - Injury; or
> - Response or restoration activities for an exposure of an environmental receptor.
>
> Emergency response procedures have been coordinated between the stationary source and local emergency planning and response organizations.
>
> No significant consequences are expected to occur at offsite receptors from either of the analyzed release scenarios, due to the design features of the proposed project, which will reduce the likelihood and potential consequences of accidental ammonia releases. Workers at the facility will be trained to avoid and respond to accidental releases of hazardous materials, including ammonia. Hence, proposed project design and worker training will limit the safety hazard due to an accidental aqueous ammonia release to an acceptable level.

8.12.2.2.2 Fire and Explosion Risk

Two highly flammable substances, hydrogen and natural gas, would be used at CGS. Hydrogen gas used for generator cooling would be on site in quantities not to exceed 24,000 standard cubic feet.

Natural gas would be used exclusively as the fuel for this facility, and would be delivered to the gas turbines and HRSGs by means of a new natural gas pipeline. The pipeline would be buried except for small, essential portions that would be aboveground at the pressure metering station, the HRSG duct burners, and gas turbine generators. Keeping the pipeline underground reduces the risk of the line being struck by a vehicle. In addition, a relief valve would be provided on the line to prevent against breakage due to overpressure. Because of these passive mitigation measures, the potential impacts presented by the use of the natural gas pipeline would be less than significant.

No regulated substances will be used or stored at the project site in a liquefied gas form.

The risk of a fire or explosion on site would continue to be reduced through adherence to applicable codes and the development and implementation of effective safety management practices.

8.12.3 Cumulative Impacts

The hypothetical accidental releases of aqueous ammonia that have been identified for the proposed project are described in the offsite consequence analysis, Section 8.12.2.2.1. The PG&E Compressor Station east of CGS is the only nearby industrial site that could contribute to potential impacts from hazardous materials. Only a natural disaster such as a major earthquake could cause simultaneous accidental releases at both facilities. Nominal quantities of oils, cleaners, gases, and other hazardous materials are stored at the PG&E Compressor Station (Colusa County Office of Emergency Services). The majority of these materials are stored inside buildings, which would provide containment in the event of a release. The risk of a significant hazardous material release from the PG&E Compressor Station is unlikely enough to be considered negligible.

It was determined in this analysis that no probable significant offsite impacts would occur from potential aqueous ammonia releases at CGS. Due to the negligible risk of a release from the PG&E Compressor Station, there is virtually no potential for hazardous materials from both facilities to produce combined impacts off site.

8.12.4 Mitigation Measures

The passive mitigation features included in the project design are the concrete containment area around the aqueous ammonia tank, and the containment area around the tanker truck unloading facilities. These design features will reduce potential offsite impacts in the event of an accidental ammonia release to a less-than-significant level; therefore, additional mitigation measures will not be required.

8.12.5 Laws, Ordinances, Regulations, and Standards

A summary of applicable LORS related to hazardous material handling is provided in Table 8.12-3. The proposed project will be in compliance with applicable LORS during construction and operation of the proposed facilities, because the following will be accomplished before aqueous ammonia will be stored or used at the CGS:

- Workers handling aqueous ammonia for the proposed project will be thoroughly trained.
- The RMP will be prepared by the Applicant
- The RMP will be approved by the appropriate local designated agency.

Emergency response procedures will be coordinated between facility personnel and local emergency planning and response organizations.

8.12.6 Involved Agencies and Agency Contacts

Issue	Agency/Address	Contact/Title	Telephone
Risk Management Plans	Colusa County Department of Environmental Health 144 East Market Street Colusa, CA 95932	Rob Kostlivy, Program Manager	(530) 458-0398
Hazardous Materials Business Plans	Colusa County Office of Environmental Health 144 East Market Street Colusa, CA 95932	Robert Kostlivy, Program Manger Director	(530) 458-0398
Risk Management Plans	State Department of Toxic Substances Control, State Regulatory Programs Division 1001 I Street Sacramento, CA 95814	Sonia Low, Supervising Hazardous Materials Scientist Watson Gin, Deputy Director	(916) 323-9757 (916) 324-7193
Administering agencies for Colusa County	California Office of Emergency Services P.O. Box 419047 2800 Meadow View Road, Sacramento, CA 95832	Pat Leary, Senior WRC Engineer Enforcement Coordinator	(916) 464-4623
CCSD Contacts MVFD for Response	Maxwell Volunteer Fire Department (MVFD) 231 Oak Street Maxwell, CA 95955	David Wells, Fire Chief	(530) 438-2320
Protect workers by meeting the requirements for equipment to store and handle hazardous materials.	CalOSHA 1515 Clay St., Suite 1103 Oakland, CA 94612	Redding District Office 381 Hamstead Drive Redding, CA 96002	(530) 224-4743

8.12.7 Permits Required and Permit Schedule

Responsible Agency	Permit/Approval	Schedule
Colusa County Office of Environmental Services	Risk Management Plan	To be submitted prior to CGS operations.
Colusa County Office of Environmental Services	Hazardous Material Business Plan	To be obtained before all hazardous materials have arrived on site.

The applicant will be responsible for completing a Risk Management Plan, as described by CalARP guidelines, and submitting it to the Certified Unified Program Agency (CUPA) for Colusa County and to the U.S. Environmental Protection Agency.

8.12.8 References

California Office of Emergency Services. 1998. *California Code of Regulations, Title 19. Public Safety, California Accidental Release Prevention Program*, November 1998

Colusa County Office of Emergency Services. 2001. Hazardous Materials Business Plan for PG&E Delevan Compressor Station, December 7, 2000.

Lees, Frank P. 1980. *Loss Prevention in the Process Industries, Hazard Identification, Assessment and Control*. Vol. 3, 2nd Ed., Butterworth Heinmann.

NIOSH (National Institute of Occupational Safety and Health). 1997. *NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140*. U.S. Government Printing Office. Washington, D.C.

Tyler, Rick. 2001. Personal communication between Rick Tyler of the California Energy Commission and Leslie Fischbein of URS, May 18, 22, and 24 2001.

U.S. EPA (U.S. Environmental Protection Agency). 1999. *Risk Management Program Guidance for Offsite Consequence Analysis*, April 1999, EPA 550-B-99-009.

U.S. EPA (U.S. Environmental Protection Agency). 1998. *Chemical Accident Prevention Provisions, Appendix A 40 CFR Part 68*, July 1, 1998, 59 FR 4493.

U.S. EPA (U.S. Environmental Protection Agency). 1998. *Emergency Planning and Notification, Appendix A 40 CFR Part 355*, July 1, 1998, 52 FR 13395.

U.S. EPA (U.S. Environmental Protection Agency). 1996. *Federal Register, Part III Accidental Release Prevention Requirements: Risk Management Programs Under the Clean Air Act Section 112(r)(7)*, June 20, 1996, 40 CFR Part 68, FRL-5516-5.

WRCC (Western Regional Climate Center), 1948-2005. Climate Historical Summaries, Daily Records for Station 041948, COLUSA 2 SSW.

Table 8.12-1
Anticipated Hazardous Materials Used at the Operational Colusa Generating Station
(Page 1 of 3)

Material	Label on Figure 8.12-1	CAS Number	Location/ Application	Hazardous Characteristics[a]	Maximum Quantity On Site	Regulatory Thresholds (lbs)			
							Federal RQ	Federal TPQ	Federal TQ
Hydrogen	A	1333-74-0	Generator Cooling	Acute, fire, pressure, reactive	24,000 scf		-	-	10,000
Sulfuric Acid 29.5 wt%	B	7664-93-9	Station and Gas Turbine Batteries	Acute, chronic, reactive	1,500 US gal		1,000	1,000	-
Carbon Dioxide gas	C	124-38-9	Generator Purging	Acute, chronic, pressure	25,200 scf		-	-	-
Carbon Dioxide liquid	D	124-38-9	Fire Suppression	Acute, chronic, pressure	25,000 lbs		-	-	-
Nitrogen gas	E	7727-37-9	Blanketing	Pressure	200 lbs		-	-	-
Propylene Glycol (Antifreeze)	F	57-55-6	Closed Cooling Water System	Acute, chronic, fire	25 US gal		-	-	-
Alkaline Phosphate Solution (Scale Inhibitor) e.g., Trisodium Phosphate[f]	G	7601-54-9	Boiler Feedwater Scale Control	Acute, chronic	5 × 55 US gal Containers 30 days storage[b]		[5,000]	-	-
Aqueous Ammonia 19.0 wt%	H	7664-41-7	NO_X Emissions Control	Acute, chronic, fire, pressure	20,000 US gal		100	500	20,000
Mineral Insulating Oil	I	None	Electrical Transformers	Acute, chronic, fire	55,000 US gal[c]		-	-	-
Lubricating Oil	J	None	Mechanical Equipment	Acute, chronic, fire	12,400 US gal[c]		-	-	-
Hydrochloric Acid[d]	Stored offsite	7647-01-0	HRSG Chemical Cleaning	Acute, chronic	Temporary Only[e]		5,000	-	15,000

Table 8.12-1
Anticipated Hazardous Materials Used at the Operational Colusa Generating Station
(Page 2 of 3)

Material	Label on Figure 8.12-1	CAS Number	Location/ Application	Hazardous Characteristics[a]	Maximum Quantity On Site	Regulatory Thresholds (lbs)			
							Federal RQ	Federal TPQ	Federal TQ
Ammonium Bifluoride	Stored offsite	1341-49-7	HRSG Chemical Cleaning	Acute, chronic	Temporary Only[e]		100	-	-
Citric Acid	Stored offsite	77-92-9	HRSG Chemical Cleaning	Acute, chronic	Temporary Only[e]		-	-	-
EDTA Chelant	Stored offsite	62-33-99	HRSG Chemical Cleaning	Acute	Temporary Only[e]		100	-	-
Sodium Nitrate	Stored offsite	7632-00-0	HRSG Chemical Cleaning	Acute	Temporary Only[e]		-	-	-
Diesel Fuel Oil	K	68476-34-6	Diesel Firewater Pump and Diesel Generator	Acute, chronic, fire	880 US gal		-	-	-
Natural Gas	L	None	Gas Turbine Generator and Duct Burner Fuel	Acute, fire, pressure	1,300 lbs Temporary		-	-	-
Sulfuric Acid 93 wt%	M	7664-93-9	Water and Waste-water Treatment	Acute, chronic, reactive	12,000 US gal		1,000	1,000	
Sodium Hydroxide 50 wt%	N	1310-73-2	Water and Waste-water Treatment	Acute, chronic, reactive	6,000 US gal		1,000	500	
Sodium Hypochlorite 12 wt%	O	7681-52-9	Water and Waste-water Treatment	Acute	12,000 US gal				
Aluminum Sulfate, 50 wt%	P	10043-01-3	Water and Waste-water Treatment	Acute	3,000 US gal		5,000		

Table 8.12-1
Anticipated Hazardous Materials Used at the Operational Colusa Generating Station
(Page 3 of 3)

Material	Label on Figure 8.12-1	CAS Number	Location/ Application	Hazardous Characteristics[a]	Maximum Quantity On Site	Regulatory Thresholds (lbs)			
							Federal RQ	Federal TPQ	Federal TQ
Hydrazine 35 wt%	Q	302-01-2	Boiler Feedwater Corrosion Control	Acute, chronic	2 × 400 US gal containers		1	1,000	-
Aqueous Ammonia 19.0 wt%	R	7664-41-7	Boiler Feedwater Corrosion Control	Acute, chronic, fire, pressure	2 × 400 US gal containers		100	500	20,000
Hydrated Lime	S	471-34-1	Water and Wastewater Treatment		25 ton silo				
Soda Ash	T	497-19-8	Water and Wastewater Treatment		25 ton silo				
Sodium Bisulfite, 38 wt%	U	7631-90-5	Water and Wastewater Treatment	Acute, reactive	2 × 400 US gal containers				

CAS Number = Chemical Abstract Services
Federal RQ = Reportable Quantity
Federal TPQ = Threshold Planning Quantity
Federal TQ = Threshold Quantity

lbs = pounds
scf = standard cubic feet
US gal = US gallons

Notes:

All quantities are approximate.
Demineralizer regeneration chemicals for makeup water are not included

[a] Health hazards include acute (immediate) and chronic (delayed). Physical categories include fires, sudden release of pressure, and reactive.
[b] Chemicals are pre-mixed in portable containers.
[c] In the equipment and pipelines.
[d] Hydrochloric Acid assumed to be aqueous with a concentration greater than 27%.
[e] Gas turbine water wash cleaning chemicals are not stored on site, cleaning is by a contractor.
[f] Trisodium Phosphate is one possible alkaline phosphate solution that may be used.

Table 8.12-2
Dispersion Model Parameters

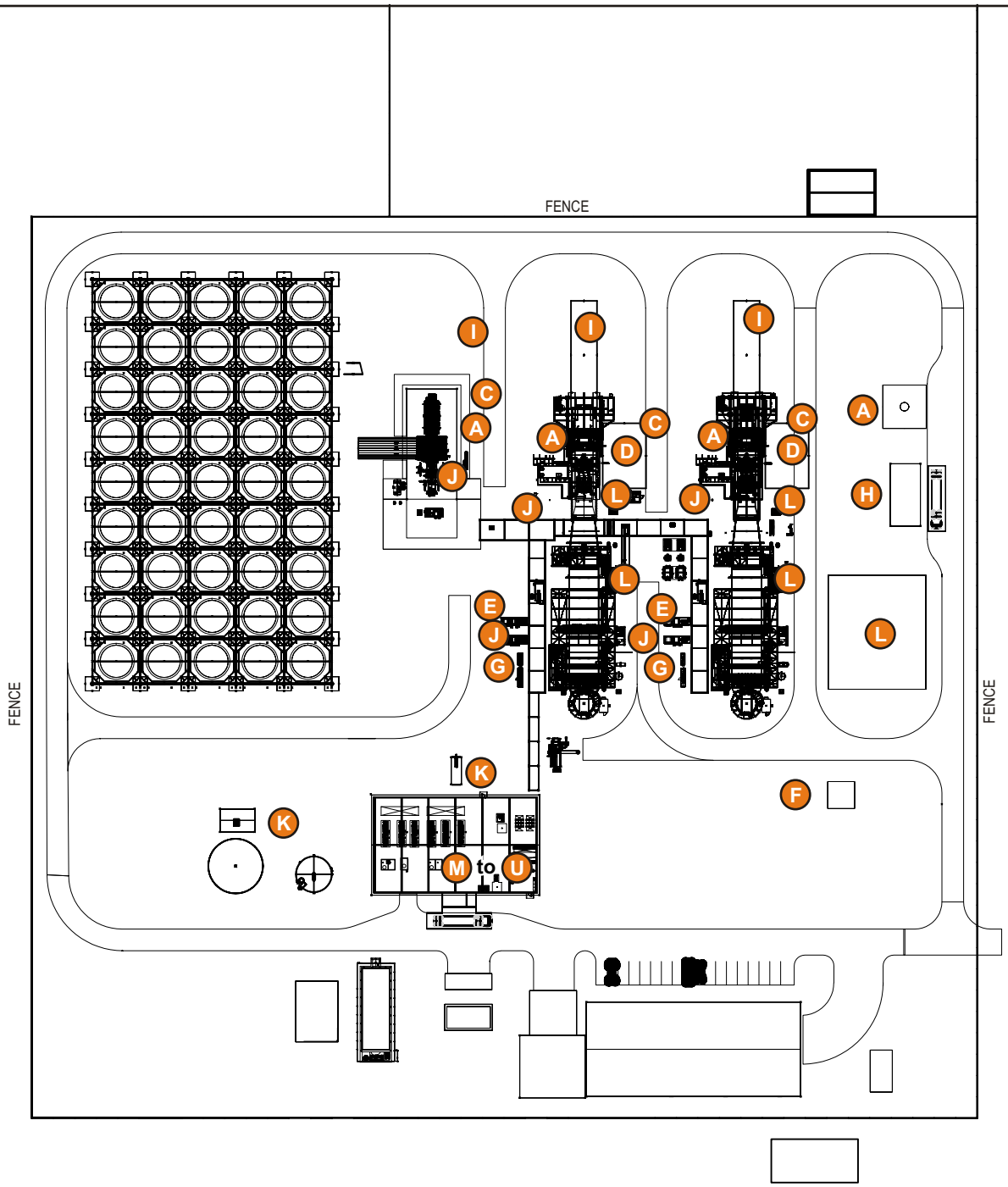
Parameter	Worst-Case Scenario	Alternative Scenario
Ambient Temperature (°F)	111	61.28
Aqueous Ammonia Release Temperature (°F)	120	70.28
Atmospheric Stability Class[a]	F	D
Wind Speed (meters per second)	1.5	3.0
Ammonia Gas Release Area (square feet)	19.03	66.08
Calculated Emission Rate (g / s m^2)	5.896	3.730

Notes:

[a] Atmospheric Stability Class D = Neutral
Atmospheric Stability Class F = Stable

Table 8.12-3
Applicable Hazardous Materials Handling Laws, Ordinances, Regulations and Standards

Laws, Ordinances, Regulations, and Standards	Administering Agency	Applicability	AFC Section
Federal			
Clean Air Act, Section 112(r)	U.S. EPA	Risk Management Plan requirements	Section 8.12.2
CERCLA/SARA 40 CFR Part 68.115	U.S. EPA	Reporting requirements for storage, handling, or production of significant quantities of hazardous or acutely hazardous materials.	Section 8.12.2
29 CFR Sections 1910 and 1926	U.S. EPA, Cal-OSHA	Protect workers by meeting the requirements for equipment to store and handle hazardous materials.	Section 8.12
State			
California Health and Safety Code 25531-25543.3, Final Cal-ARP Regulations, Title 19, Division 2, Chapter 4.5, Sections 2735-2785	State Department of Toxic Substances Control, State Regulatory Programs Division	Preparation of a Risk Management Plan for regulated substances onsite and a Hazardous Materials Plan.	Section 8.12
Local			
California Code of Regulations Title 8 Section 5189	Colusa County Environmental Health; Colusa County Dept. of Emergency Services	Develop and implement safety management plans and risk management plans.	Section 8.12
Uniform Fire Code Articles 79 and 80	Maxwell Volunteer Fire Department (MVFD) 231 Oak Street Maxwell, CA 95955	Requires secondary containment, monitoring and treatment for accidental releases of toxic gases.	Section 8.12.3



LEGEND

X Hazardous Material Location

See Table 8.12-1 for key to Hazardous Materials

N

0 75 150

Scale in Feet

LOCATIONS OF HAZARDOUS MATERIAL

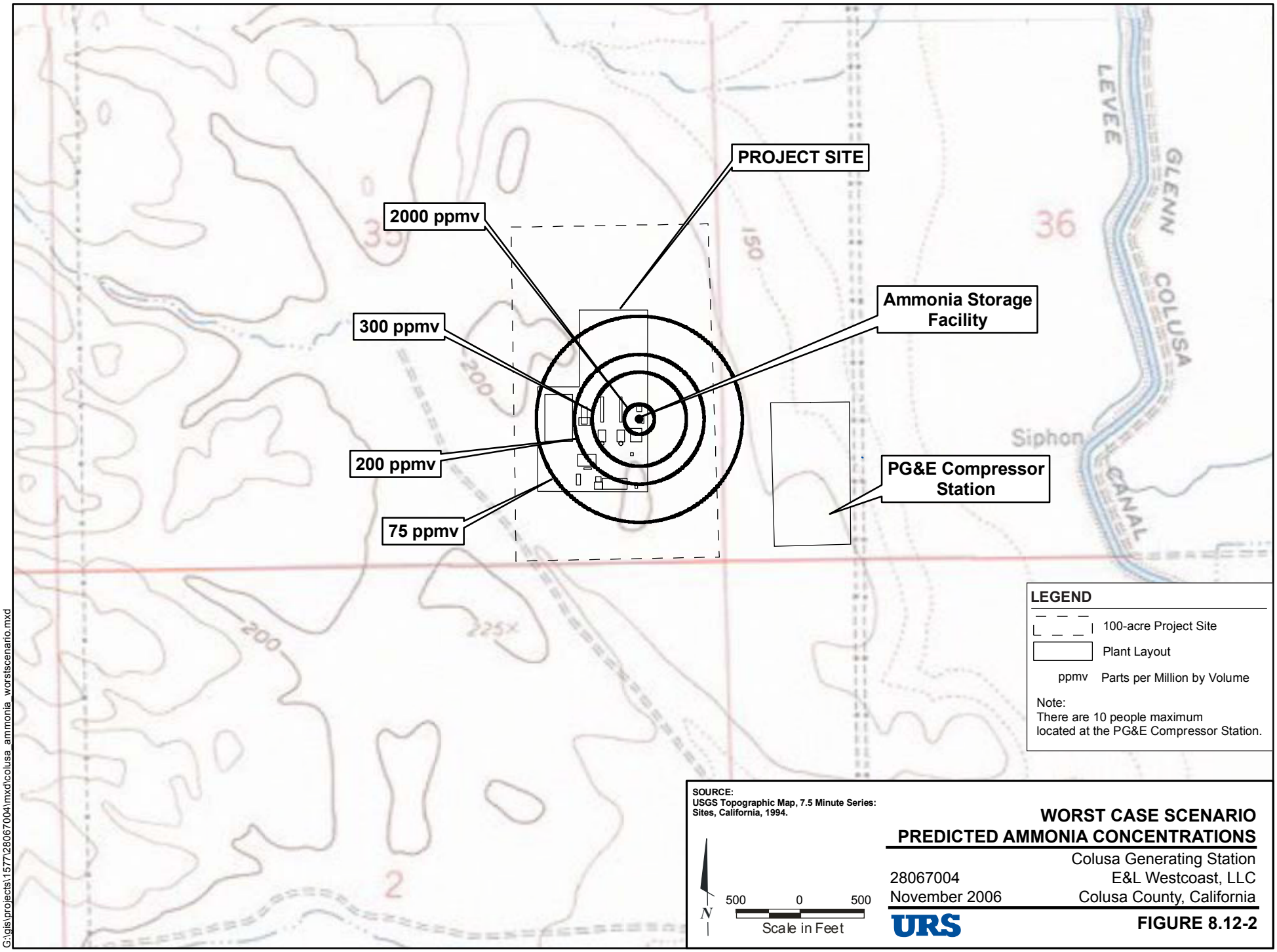
Colusa Generating Station
E&L Westcoast, LLC
Colusa County, California

28067004
November 2006

URS

FIGURE 8.12-1

Source:
Bechtel Corporation; Colusa Power Plant, Dwg. No. P1-0100-00001
General Arrangement With Air Cooled Condenser (COL_GA05 RevOc) October 4, 2006



WORST CASE SCENARIO
PREDICTED AMMONIA CONCENTRATIONS

Colusa Generating Station
E&L Westcoast, LLC
Colusa County, California

28067004
November 2006

URS

FIGURE 8.12-2

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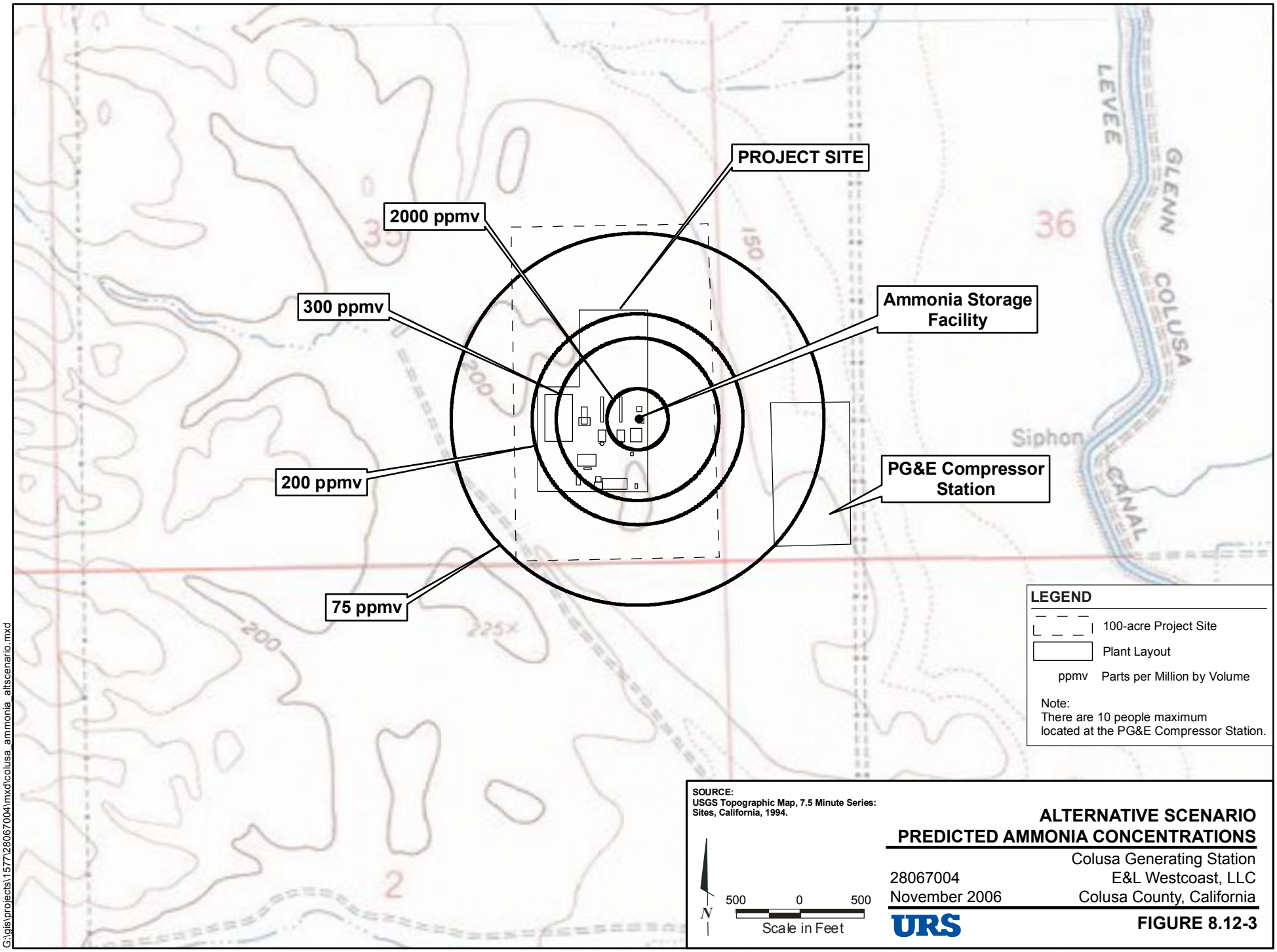

ALTERNATIVE SCENARIO
PREDICTED AMMONIA CONCENTRATIONS

Colusa Generating Station
E&L Westcoast, LLC
Colusa County, California

28067004
November 2006

URS

FIGURE 8.12-3

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11/02/06 vsa ..\28067004 CPV Colusa\8.12 Haz Mat\8.12-3_alt scen.ai