Appendix A
Revisions to the Draft SEIR

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Executive Summary

Introduction

The Wild Goose Gas Storage Project involves past initial development and expansion, and potential future development, of a depleted and formerly abandoned underground natural gas field (the Wild Goose Gas Field, or field) in Butte County, California. The field is used for natural gas storage by Wild Goose Storage, LLC (Wild Goose, or the applicant). Initial development of the Wild Goose Gas Storage Facility (Wild Goose Facility) took place between April 1997 and April 1999 (the Base Project). An expansion (the Phase 2 Expansion) was approved and took place starting in 2002. The Base Project was approved by the California Public Utilities Commission (CPUC) through Certificate of Public Convenience & Necessity (CPCN) Decision 97-06-091, which was amended by Decision 02-07-036 for the Phase 2 Expansion. To evaluate the Base Project under the California Environmental Quality Act (CEQA), an Initial Study and Mitigated Negative Declaration were prepared in 1997; for the Phase 2 Expansion, the Wild Goose Storage, Inc. Expansion Project Environmental Impact Report (2002 EIR) was prepared; the 2002 EIR was certified in 2002.

Wild Goose is now proposing the Wild Goose Phase 3 Gas Storage Expansion (Phase 3 Expansion), to extend the Wild Goose Facility's capabilities beyond those currently certificated. The expansion would allow fuller use of the injection, withdrawal, and storage capacity of the most suitable natural gas storage reservoirs in the field. The expansion would increase cumulative total injection capacity from 450 million cubic feet per day (MMcfd) to approximately 650 MMcfd, increase withdrawal capacity from 700 to approximately 1,200 MMcfd, and increase storage from approximately 29~~0~~ billion cubic feet (Bcf) of working gas capacity to 50 Bcf.

Wild Goose submitted an Application to Amend its CPCN and an accompanying Proponent's Environmental Assessment (PEA) to the CPUC on April 24, 2009. The application and accompanying PEA identified the proposed expansion and included a preliminary assessment of potential environmental impacts. During the review of the PEA and application, the CPUC requested clarification, and through a series of responses, the applicant submitted additional data.

This supplement to the 2002 EIR (Supplemental EIR, or SEIR) has been prepared to include information and analysis for the construction and operation of the Phase 3 Expansion; present mitigation measures which, if adopted by the CPUC, will avoid or minimize adverse significant environmental impacts; and describe changes in circumstances or new information since the 2002 EIR was prepared.

Background

Phase 3 Expansion Description

The Phase 3 Expansion would increase the physical footprint and current operations at the Wild Goose Facility, and would consist of the following four components:

1. Construction, operation, and maintenance of an expansion to the Remote Facility Site (RFS) in Butte County;
2. Reconductoring of up to 6 miles of electrical distribution line east of the RFS, by PG&E, in Butte County;
3. Modifications to the Delevan Interconnect Site in Colusa County; and

4. PG&E's installation of up to ~~three~~ four new hot tapped pipeline connections between the Wild Goose Connection Pipeline and PG&E Lines 400 and 401, near the location of the Delevan Interconnect Site (in Colusa County), to increase permitted storage and operational capacity.

The Phase 3 Expansion would increase the current injection capacity of the Wild Goose Facility from 450 to 650 million cubic feet per day (MMcfd), the withdrawal capacity from 700 to 1,200 MMcfd, and the working gas storage capacity from 29 to 50 Bcf. Elements of the Phase 3 Expansion would be consistent with the 2002 facility improvements, and would extend facility operations in a similar way.

Table ES-1 Wild Goose Maximum Storage, Injection, and Withdrawal Limits for the Base Project, Phase 2 Expansion, and Phase 3 Expansion

	Initial (Base Project)	Existing	Proposed
Storage	14 Bcf	29 Bcf	50 Bcf
Injection	80 MMcfd	450 MMcfd	650 Mmcfd
Withdrawal	200 MMcfd	700 MMcfd	1,200 MMcfd

A map showing the vicinity of the Phase 3 Expansion is presented in Figure ES-1.

Objectives of Phase 3 Expansion

The continuing objective of the Wild Goose Facility is to provide highly flexible natural gas storage services to a variety of customers, which includes gas utilities, electric utilities, independent electric generators, gas marketers, gas producers, industrial gas users, and other wholesale and retail gas customers. The purpose of the Phase 3 Expansion is to capture the incremental storage, injection and withdrawal capacity of the natural gas storage facility to meet customer demands into the foreseeable future.

The Phase 3 Expansion would work towards achieving several goals related to the statewide need for additional natural gas supplies, as articulated by the CPUC. These goals include:

1. Ensuring the reliability of natural gas supplies to the State;
2. The development of in-state natural gas storage facilities, identified as a "key action" in the CPUC's Energy Action Plan II (2005); and
3. Ensuring the availability in the State of low-carbon fossil fuels, as a means of working towards the goals of California Assembly Bill 32 (the California Global Warming Solutions Act of 2006).

Approach to Environmental Review

As lead agency, the CPUC must determine through the CEQA process whether the Phase 3 Expansion would result in significant impacts to the environment, and whether those impacts could be avoided, eliminated, compensated for, or reduced to less than significant levels. This SEIR will become part of a body of evidence that the CPUC will use in deciding whether to approve Wild Goose's application.

1. Introduction

The Wild Goose Gas Storage Project involves past initial development and expansion, and potential future development, of a depleted and formerly abandoned underground natural gas field (the Wild Goose Gas Field, or field). The field is used for natural gas storage by Wild Goose Storage, LLC (Wild Goose or the applicant). The Wild Goose Gas Storage Project consists of the initial development between April 1997 and April 1999 (the Base Project) and a later expansion (the Phase 2 Expansion) of the Wild Goose Gas Storage Facility (Wild Goose Facility). The Base Project was approved by the California Public Utilities Commission (CPUC) through Certificate of Public Convenience and Necessity (CPCN) Decision 97-06-091. Decision 02-07-036 approved the Phase 2 Expansion. To evaluate the Base Project under the California Environmental Quality Act (CEQA) and CEQA Guidelines, an Initial Study and Mitigated Negative Declaration were prepared in 1997; for the Phase 2 Expansion, the Wild Goose Storage, Inc. Expansion Project Environmental Impact Report (2002 EIR) was prepared; the EIR was certified in 2002.

Wild Goose is proposing to expand its existing natural gas storage facility beyond the capabilities currently certified to more fully use the injection, withdrawal, and storage capacity of the most suitable natural gas storage reservoirs in the field, resulting in a cumulative total of approximately 650 million cubic feet per day (MMcfd) of injection, 1,200 MMcfd of withdrawal, and 50 billion cubic feet (Bcf) of storage capacity. This expansion is called the Wild Goose Phase 3 Gas Storage Expansion (Phase 3 Expansion).

Wild Goose submitted an Application to Amend its CPCN and an accompanying Proponent's Environmental Assessment (PEA) to the CPUC on April 24, 2009. The application and accompanying PEA identified the proposed expansion and included a preliminary assessment of potential environmental impacts. During review of the PEA and application, the CPUC requested clarification, and through a series of responses, the applicant submitted additional data.

1.1 Purpose of this Supplemental EIR

This document supplements the 2002 EIR and is therefore a Supplemental EIR (SEIR). It provides information and analysis for the Phase 3 Expansion and describes changes in circumstances or new information available since the 2002 EIR was prepared. According to CEQA Guidelines Section 15162, a lead agency may prepare an SEIR if modifications to a previous project would require inclusion of new information, or changes to the circumstances under which the project is undertaken occur, such that new, potentially significant impacts are identified and must be addressed. According to CEQA Guidelines Section 15163, an SEIR may be prepared when only minor additions or changes would be necessary in order for the previous EIR to adequately apply to the project in the changed situation. Considerations in preparing an SEIR include the following CEQA Guidelines from Section 15163:

- The supplement to the EIR need contain only the information necessary to make the previous EIR adequate for the project as revised;
- A supplement to an EIR will be given the same kind of notice and public review as is given to a draft EIR under the CEQA Guidelines;
- A supplement to an EIR may be circulated by itself without recirculating the previous draft or final EIR; and

- When the agency decides whether to approve the project, the decision-making body will consider the previous EIR as revised by the SEIR. A finding will be made for each significant effect shown in the previous EIR as revised.

As required by CEQA, this SEIR examines the expected additional individual and cumulative impacts of the proposed expansion, and identifies ways to minimize potential adverse impacts (mitigation measures).

The CPUC is the lead agency in preparing this SEIR, and has principal responsibility for approving or denying the Phase 3 Expansion. The CPUC has prepared this SEIR to provide the public and responsible agencies with information about the potential effects of the additional expansion on the local and regional environment. This SEIR was prepared in compliance with CEQA and the CEQA Guidelines.

1.2 Project Overview

1.2.1 Background

Initial development and construction of the Base Project was completed in April 1999. The Base Project included the following components:

- Construction and operation of a new Well Pad Site (including the injection and withdrawal of natural gas) atop the depleted Wild Goose Gas Field,
- Construction of a bi-directional pipeline ~~(Storage Loop Pipeline)~~ from the Well Pad Site to a new remote operating facility (Remote Facility Site [RFS]),
- Construction of the RFS, from which all operations of the storage field could be managed and monitored (see Figure 1.2-1).

The CPUC's initial approval authorized use of one of the Wild Goose Gas Field's 12 gas storage zones (zone L-4), with a maximum storage of 14 Bcf of natural gas. The CPUC also required that the daily injection and withdrawal of gas into and from the Field be limited to 80 Mmcfd and 200 Mmcfd, respectively.

For the Phase 2 Expansion, Wild Goose completed construction or expansion of four main components:

- Expansion of the Well Pad Site,
- Construction of the Storage Loop Pipeline adjacent to the bi-directional pipeline ~~a second Storage Loop Pipeline~~,
- Expansion of the RFS, and
- Construction of the Wild Goose Connection Pipeline and Delevan Interconnect Facility.

Wild Goose's permitted storage capacity was increased to 29 Bcf, with daily injection and withdrawal rates of 450 Mmcfd and 700 Mmcfd, respectively.

1.2.2 Phase 3 Expansion Project

The Phase 3 Expansion would result in an increase in the physical footprint and current operations at the Wild Goose Facility, and would primarily consist of the following four components:

1. Construction, operation, and maintenance of an expansion to the Remote Facility Site (RFS) in Butte County;
2. Reconductoring of up to 6 miles of electrical distribution line east of the RFS, by PG&E, in Butte County;
3. Modifications to the Delevan Interconnect Site in Colusa County; and
4. PG&E's installation of up to ~~three~~ four new hot tapped pipeline connections between the Wild Goose Connection Pipeline and PG&E Lines 400 and 401, near the location of the Delevan Interconnect Site (in Colusa County), to increase permitted storage and operational capacity.

The Phase 3 Expansion would increase the current injection capacity of the Wild Goose Facility from 450 to 650 MMcfd, the withdrawal capacity from 700 to 1,200 MMcfd, and the working gas storage capacity from 29 to 50 Bcf, as shown in Table 1-1. Elements of the Phase 3 Expansion would be consistent with the 2002 facility improvements, and would extend facility operations in a similar way.

Table 1-1 Wild Goose Maximum Storage, Injection, and Withdrawal Limits for the Base Project, Phase 2 Expansion, and Phase 3 Expansion

	Initial (Base Project)	Existing	Proposed
Storage	14 Bcf	29 Bcf	50 Bcf
Injection	80 MMcfd	450 MMcfd	650 Mmcfd
Withdrawal	200 MMcfd	700 MMcfd	1,200 MMcfd

The vicinity of the Phase 3 Expansion and the location of the RFS and the Delevan Site are shown in Figures 1-1 and 1-2, respectively.

1.2.3 Objectives of Phase 3 Expansion

The continuing objective of the Wild Goose facility is to provide highly flexible natural gas storage services to a variety of customers, which includes gas utilities, electric utilities, independent electric generators, gas marketers, gas producers, industrial gas users, and other wholesale and retail gas customers. The purpose of the Phase 3 Expansion is to capture the incremental storage, injection and withdrawal capacity of the natural gas storage facility to meet customer demands into the foreseeable future.

The Phase 3 Expansion would work towards achieving several goals related to the statewide need for additional natural gas supplies, as articulated by the CPUC. These goals include:

1. Ensuring the reliability of natural gas supplies to the State;
2. The development of in-state natural gas storage facilities, identified as a "key action" in the CPUC's Energy Action Plan II (2005); and
3. Ensuring the availability in the State of low-carbon fossil fuels, as a means of working towards the goals of California Assembly Bill 32 (the California Global Warming Solutions Act of 2006).

1.3 CPUC CPCN Application Process

In response to Wild Goose's application, the CPUC must decide whether to amend the existing CPCN to allow Wild Goose to expand its storage and operational capacity. The CPUC conducts two parallel processes when considering any application for a CPCN: an application process similar to a court proceeding, in which the CPCN considers whether the expansion is needed and is in the public interest,

and an environmental review process under CEQA. The CPCN application process focuses on utility ratepayer and public benefit issues. Through this process, the CPUC determines whether a project meets the criteria for approval. An Assigned Commissioner (one of the CPUC's five appointed commission members) and an Administrative Law Judge (ALJ) supervise the process. The Commission's Natural Gas Policy Statement (R. 98-01-011) and related prior orders favor development of gas storage facilities by non-utility companies. However, Wild Goose must demonstrate, during the application process, that the project would clearly provide public benefit. The application process is further described in the 2002 EIR.

1.4 EIR Process

As lead agency, the CPUC must determine through the CEQA process whether the Phase 3 Expansion would result in significant impacts to the environment, and whether those impacts could be avoided, eliminated, compensated for, or reduced to less than significant levels. This SEIR will become part of a body of evidence that the CPUC will use in deciding whether to approve Wild Goose's application.

1.4.1 Notice of Preparation

In accordance with the CEQA Guidelines, the CPUC prepared a Notice of Preparation (NOP) for this SEIR (see Appendix B). The NOP was mailed on October 7, 2009, to local, state, and federal agencies (see Appendix B for mailing list) and the State Clearinghouse for a 30-day review period. The NOP provided a general description of the Phase 3 Expansion and a summary of the main regulations and permit conditions applicable to its development and operation. The comment letter that was received is presented in Appendix B.

1.4.2 Public Agency Participation

The CPUC consulted with other affected agencies and jurisdictions to gather information related to the possible environmental effects of Wild Goose's application, making early contact and opening a line of communication with key public agencies that would be directly affected by the Phase 3 Expansion, and, as part of this process, obtaining insight and information for this SEIR. The outreach program for the Phase 3 Expansion included consultations with more than 10 public agencies, and was conducted primarily by telephone and during visits by agency personnel to the Wild Goose Facility site in Butte and Colusa counties. Local agency representatives provided background information on the local setting, permitting requirements, regulatory requirements, land use information, community perceptions, and local environmental concerns. Chapter 7, Report Preparation, lists all agencies consulted during preparation of this SEIR.

1.4.3 Public Scoping

Given the limited scope of the Phase 3 Expansion environmental review, no public scoping meetings have been conducted by the CPUC to explain the environmental review process and receive public comments on the scope of this SEIR.

1.4.4 Draft EIR

This document is the Draft SEIR for the CPUC's Application for the Phase 3 Expansion. It describes the Phase 3 Expansion and the environmental setting, and identifies direct and cumulative impacts as well as mitigation measures for impacts found to be significant. Because the 2002 EIR included an adequate range of alternatives to the expansion of the Wild Goose Facility, additional alternatives are not included in this SEIR for evaluation.

2. Description of Phase 3 Expansion

2.1 Introduction

The Wild Goose Gas Storage Facility (Wild Goose Facility), located in Butte County, California, began commercial operations in April 1999, underwent a significant facility expansion in 2002, and currently has approximately 29 billion cubic feet (Bcf) of storage capacity. The facility is owned by Wild Goose Storage, LLC (Wild Goose or the applicant), a subsidiary of Niska Gas Storage. Most of the facility is on land leased from adjacent agricultural landowners under a long-term agreement. The Wild Goose Facility is interconnected with Pacific Gas and Electric's (PG&E's) Transmission System Line 167, a local natural gas transmission system, as well as PG&E's Transmission System Line 400 via the Wild Goose Connection Pipeline (as shown in Figure 2.1). The expansion of the facility in 2002 included construction of a 25.5-mile natural gas pipeline (Wild Goose Connection Pipeline) from the main facility site (Remote Facility Site, or RFS) to PG&E Line 400. This pipeline passes through the Delevan Interconnect Site just before it reaches PG&E Line 400. The Delevan Interconnect Site was installed for monitoring, metering, and controlling gas flow from the RFS to PG&E Line 400. It is owned by PG&E but includes easements for Wild Goose Facility interconnect components.

The Wild Goose Phase 3 Gas Storage Expansion (Phase 3 Expansion) would result in an increase in the physical footprint and current operations at the Wild Goose Facility, and would primarily consist of the construction, operation, and maintenance of an expansion to the RFS; modifications to the Delevan Site; PG&E's installation of up to ~~three~~ four new hot tapped pipeline connections between the Wild Goose Interconnect Pipeline and PG&E Lines 400 and 401 to increase permitted storage and operational capacity; and PG&E's reconductoring of up to 6.1 miles (32,400 feet) of electrical distribution line. The Phase 3 Expansion would increase the current injection capacity of the facility from 450 to 650 million cubic feet per day (MMcfd), the withdrawal capacity from 700 to 1,200 MMcfd, and the working gas storage capacity from 29 to 50 Bcf. Components of the Phase 3 Expansion would be consistent with the 2002 facility improvements, and would extend facility operations in a similar way. The Phase 3 Expansion would include four main components:

- **Modifications to the RFS.** The RFS is currently the operation hub of the Wild Goose Facility. Modifications would include installation of four new natural gas compressors in a new building; installation of four 15-foot-high associated gas coolers; and installation of two new 30-foot-high gas contactors (dehydration units). A new 6,000-gallon glycol storage tank may also be installed on the site. Work at the site would require the expansion of the existing site area from 12.2 acres to approximately 16.7 acres, and the resulting fill of approximately 4.5 acres of rice field agricultural wetlands. Work might also include modifications to existing site utilities. The existing RFS is described in more detail in Section 2.3, Existing Facility.
- **Modifications to the Delevan Site.** The Delevan Site is approximately 25 miles west of the RFS, in Colusa County. This facility is also described in more detail in Section 2.3, Existing Facility. Modifications would include expansions of both Wild Goose and PG&E operations at the Delevan Interconnect Site, including the installation of new meters, piping, valves, and associated equipment, to accommodate the increase in withdrawal and injection volume. This work would not result in an expansion of the existing site area.
- **Hot Tapped Pipeline Connections.** Up to four new subsurface pipeline connections, totaling approximately 200 feet in length, would be installed using a hot tap process. The pipelines would run from the Wild Goose Connection Pipeline to PG&E Lines 400 and 401. (The Wild Goose Connection Pipeline currently only connects to PG&E Line 400.) The new hot tapped pipeline

connections at PG&E's Lines 400 and 401 would be installed largely within an existing 100-foot-wide easement held by PG&E. The total area temporarily disturbed during construction would be approximately 0.25 acres, approximately 0.1 acres of which would be outside of the PG&E easement. Further description of the hot tap process are provided below.

- **PG&E Distribution Line Reconductoring.** To accommodate the increase in use at the Wild Goose Facility as well as to increase reliability, PG&E would upgrade distribution lines in the vicinity of the RFS by reconductoring up to 6 miles (32,400 feet) of electrical line. An additional ground- or pole-mounted 1,500-kilovolt-ampere (kVA) transformer would also be required.

2.2 Location, Setting, and Ownership

The RFS modifications would take place at the existing RFS in Butte County, and the Delevan Site modifications and hot tapped pipeline connections would be in Colusa County (Figure 2-1). The RFS is near the center of the Sacramento Valley, on a 12.2-acre site, approximately 67 miles northwest of Sacramento and approximately 6 miles west of Highway 99, in southwestern Butte County. Specifically, it is located on West Liberty Road, approximately 7 miles west of the town of Gridley, approximately 1.1 miles west of the intersection of West Liberty Road and Pennington Road, and approximately 6 miles west of Highway 99. Rice fields border the RFS to the north, east, and west. The rice fields are lower than the RFS, and are flooded during normal rice farming operations. Much of the land in the area is also under active agricultural cultivation, most commonly for rice production. The Gray Lodge Wildlife Area is south of the RFS, across West Liberty Road, and comprises a 9,100-acre wetland area managed by the California Department of Fish and Game (CDFG). An approximately 3.5-acre area to the west of the RFS is used for farm equipment storage and for seasonal hunter parking and camping. Other details on the location and setting of the RFS are provided in Chapter 2, Project Description, of the Wild Goose Storage, Inc. Expansion Project Environmental Impact Report (2002 EIR). An aerial photo of the RFS location is shown in Figure 2-2. The reconductoring component would be located east of the RFS, between the RFS and the City of Gridley, along Pennington Road and either the Colusa Highway or West Evans Reimer Road.

The Delevan Interconnect Site is approximately 0.6 acres in northeastern Colusa County. It is approximately 25 miles west of the RFS and 4 miles west of Interstate 5 and the community of Delevan (Figure 2-3). The site is at the base of the Coast Range foothills and is surrounded by annual grassland. The site is owned by PG&E, and includes easements for Wild Goose Facility pipeline equipment. PG&E's Line 400 and Line 401 (the location of the proposed hot tapped pipeline connections) are located below ground surface (bgs) within a 100-foot-wide easement, approximately 700 feet west of the Delevan Interconnect Site, also in Colusa County.

Natural gas from the RFS is routed to the Delevan Site by the Wild Goose Connection Pipeline, which runs east–west between the two sites (as shown in Figure 2-1). No modifications to this pipeline are proposed as part of the Phase 3 Expansion.

Further information on the location and setting of the RFS and the Delevan Site can be found in the 2002 EIR.

The compressors (Caterpillar 3600 series) are equipped with clean burn combustion chamber design as best available control technology (BACT). The compressor engines also use Selective Catalytic Reduction (SCR) and oxidation catalysts for nitrogen oxides (NO_x), carbon monoxide (CO), and reactive organic gas (ROG) control, and a positive crankcase ventilation system. In addition, other equipment at Plants 1, 2 and 3 are also of low emissions design.

2. An 8.5-acre Well Pad Site (WPS) at the abandoned original Wild Goose Gas Field production compression facility, which includes 24 current or planned injection/withdrawal and observation wells, on the property of the Wild Goose Club;
3. A 4.5-mile, 18-inch-diameter bi-directional natural gas pipeline (storage pipeline) and 3-inch-diameter water pipeline that removes water from the gas stream (produced water) during extraction; these pipelines are routed between the WPS and the RFS;
4. A second bi-directional natural gas pipeline, 24 inches in diameter, generally following the 18-inch pipeline between the WPS and RFS in the same right-of-way (ROW) as the 18-inch pipeline;
5. A natural gas pipeline that interconnects to PG&E's Line 167, which is a 12-inch-diameter transmission line that is part of PG&E's Sacramento Valley Local Transmission System (SVLTS);
6. The Wild Goose Connection Pipeline, a 25.5-mile, 30-inch-diameter bi-directional pipeline originating from the RFS and interconnected with PG&E's Line 400, a 36-inch-diameter natural gas transmission pipeline located to the west of the Delevan Site;
7. Two fiber optic communication cables (one primary and one spare), located in the trenches of both the storage pipeline and the Wild Goose Connection Pipeline, to allow data acquisition and remote operation of valves by Wild Goose;
8. A mid-valve station located approximately 11.5 miles west of the RFS that provides a means of stopping gas flow through the Wild Goose Connection Pipeline and segregating the east and west portion of the line; and
9. The Delevan Interconnect Site, which includes valves, metering, maintenance, and pressure monitoring equipment associated with operation of the Wild Goose Facility, as well as similar equipment operated by PG&E. The custody transfer and metering point of natural gas movements between PG&E's Line 400 system and the Wild Goose Facility occurs at the Delevan Interconnect Site. Within the fenced, approximately 0.6-acre site, a second fenced area encloses PG&E's station building, a bi-directional flow meter, and a mercaptan gas odorant tank. PG&E's station building is a small, pre-engineered metal structure that houses instrumentation electronics, a calibration system, a computer control system, high voltage alternating current (HVAC), recorders, a chromatograph, valve solenoids, and communications equipment. The bi-directional flow meter ties into PG&E's Line 400, which is located approximately 700 feet to the west of the site.

   Outside of the fenced area for PG&E's operations, but within the larger fenced-in portion of the Delevan Site, Wild Goose maintains an actuated block valve, control valve, and associated electrical instrumentation devices for monitoring and control of the pressure and flow of gas that is routed to or from Line 400, and a 30-inch pig barrel and launcher (an existing above-ground piping segment where "pigs," or pipeline cleaning and inspection devices, can be inserted into the connection pipeline).

Electric service at the Delevan Site is currently provided by PG&E's existing 12-kilovolt (kV) electric distribution line running along the access road. Changes or increases to this service would not be required as a result of the Phase 3 Expansion (WGS 2009).

Approximately 400 gallons per day of water extracted from an existing well at the RFS is currently used for site operations, including sanitary usage. Drinking water is imported to the site. Sanitary wastewater from the plumbing in the office building at the RFS flows to a county-approved onsite septic holding tank, which is periodically pumped by a local sanitary waste hauler. Solid waste is removed by Waste Management, Inc.

A number of the Phase 2 Expansion components are yet to be completed at the RFS. Known as the "Phase 2B" components, these include the drilling of up to six additional withdrawal, injection, and observation wells and the installation of additional compression and dehydration/gas process train equipment. Installation and construction of these components is ongoing and is expected to be completed in late 2009 or early 2010. These components were included under permitting for the Phase 2 facility expansion, were reviewed under the 2002 EIR, and are not included as part of the Phase 3 Expansion.

More information on the existing facility can be found in Chapter 2, Project Description, of the 2002 EIR.

2.3.3 Gas Storage Operations

2.3.3.1 Natural Gas Injection, Withdrawal, and Conveyance

Natural gas at the Wild Goose Facility is injected via wells into the underground storage zones during periods of low demand (generally the ~~winter~~ summer season), and withdrawn during periods of peak demand (generally the ~~summer~~ winter season). During injection operations, natural gas flows from PG&E Line 400 through the Delevan Site, through the 25.5-mile Wild Goose Connection Pipeline, to the RFS compressor, and through the 4.5-mile pipeline to the WPS, for injection into the field. A schematic of natural gas flow through the Wild Goose Facility components is shown in Figure 2-5.

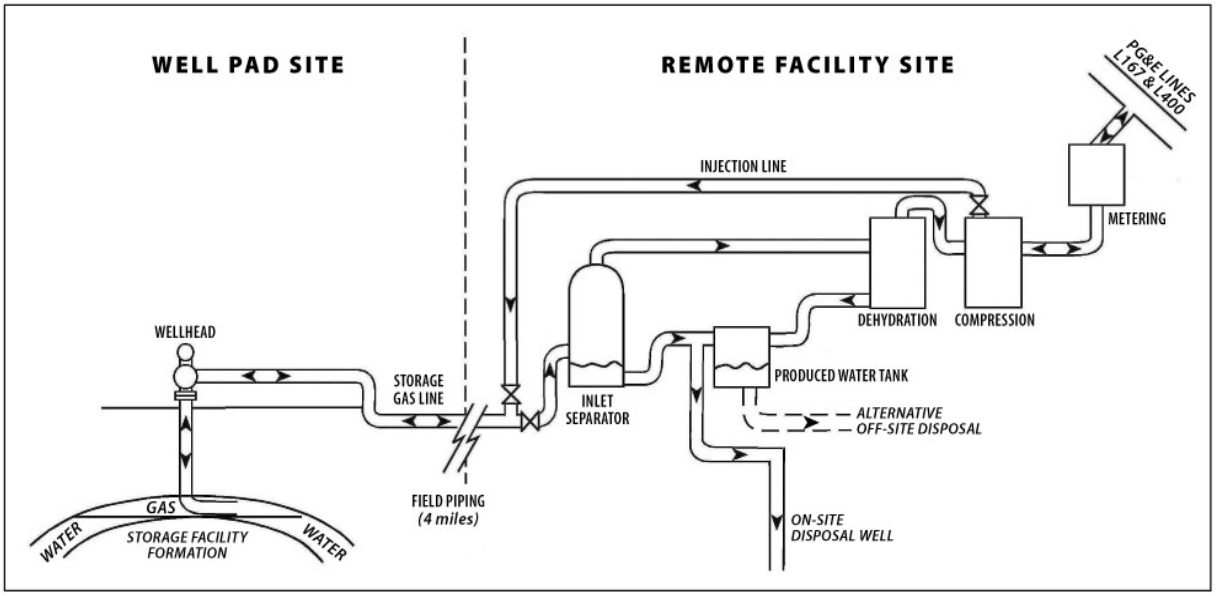

Figure 2-5 Natural Gas Flow Schematic
(SOURCE: TRC 2009)

- Use of an additional 200 gallons of water per day (for a total of up to 600 gallons per day of onsite water usage). This increase in water usage would be accommodated by the current well at the site, which has a current yield of 60 gallons per minute. Only very minor changes in drinking water consumption volumes and wastewater handling are expected from the Phase 3 Expansion.
- Injection of cushion gas into the U-1 and U-2 zones to re-establish the gas saturation, slowly depress the natural gas/water contact zone in the porous sandstone formations, and establish the base field pressure. Cushion gas injection would take place two to three months prior to use of the U-1 and U-2 zones for gas storage. Data collected and analyzed from gas injection and withdrawal from the gas field as well as testing performed on the reservoirs indicates that cushion gas in these fields should be increased to from 0.5 to 6.2 Bcf in the L-1 zone, from 6.5 to 11.1 Bcf in the L-4 zone, and a total of 4.0 Bcf in the U-1/U-2 zone.
- Use of approximately an additional 5,250 pounds of mercaptan gas odorant (at a ratio of approximately 0.25 pounds of mercaptan per million standard cubic feet [MMSCF] of gas) for the increased volume of gas injected and withdrawn from the reservoir that will pass through the RFS gas withdrawal process train. The existing mercaptan storage facility at the RFS has the capacity to hold this increase in volume.

Testing and modeling of Phase 3 Expansion gas storage volumes indicates that the maximum injection pressure gradient that would be reached at 50 Bcf of gas storage would not exceed 0.6 psi/foot, below the maximum pressure gradient allowed by DOGGR of 0.7 psi/foot (WGS 2010).

Natural gas would be used as the fuel for the compressor engines and glycol reboiler. Diesel would be used to fuel the 2.5-MW standby generator. Fuel gas would be obtained directly from natural gas storage supplies or purchased from natural gas supplies available on the PG&E system.

Electricity from PG&E's existing 12-kV distribution line along West Liberty Road would continue to be used for the jacket water coolers, process gas coolers, pumps, site lighting, office lighting, HVAC system, air compressors, and other miscellaneous equipment. An analysis of the electricity requirements of the Wild Goose Facility including the Phase 3 Expansion, PG&E has indicated that upgrades to the existing distribution line would be required to handle the additional load, as described below in Section 2.4.4.

Pacific Bell provided upgraded phone service from its existing cable along Pennington Road during development of the first phase of the facility; no further upgrades would be required for the Phase 3 Expansion.

After construction, the RFS would be enclosed by a 6-foot-high chain link security fence. While the proposed expansion area, including berms, would increase the RFS lease area an additional 4.5 acres to a total of 16.7 acres, the total fenced operations area would increase by 3.7 acres to a total of 12.4 acres. The existing perimeter landscaped berm would be extended to surround the expanded site.

A driveway currently providing access from West Liberty Road to the existing farm equipment storage and parking area (shown in Figure 2-3) would be removed. The stormwater culvert beneath this access driveway in the drainage ditch along West Liberty Road would also be removed. A new driveway of similar dimensions providing access from West Liberty Road to the west edge of the lease area would be added to provide access to the new farm equipment storage and parking area, and a new culvert would be installed under this driveway.

All proposed aboveground structures would be painted the same neutral color as the existing facilities to minimize visual impact.

2.4.2 Delevan Interconnect Site

Phase 3 Expansion components at the Delevan Interconnect Site are shown in Figure 2-9 and would include:

- An expansion of Wild Goose operations at the Delevan Interconnect Site. Expansion elements would include installation of additional piping, valves, and instrumentation, including a new meter line. The new station piping improvements would tie in immediately downstream of the pig launcher before the pipeline enters the ground departing east toward the RFS. Some minor excavation (approximately 300 cubic yards) would be required for this work. Modifications, including the construction staging area, would be confined to within the existing 0.6-acre footprint of the site.
- An expansion of PG&E operations at the Delevan Interconnect Site, which would be carried out by PG&E. The changes would involve an increase in the size of the PG&E fenced area and the installation of a new custody transfer meter and associated piping, valves, and instrumentation, including pipeline monitoring equipment, that would parallel the existing meter run. Modifications would be expected to be confined to within the existing 0.6-acre footprint of the site.
- Minor upgrades to PG&E's electrical and telecommunications infrastructure, comprising lines that would extend from the Delevan Interconnect Site to the Line 400 transmission pipeline in an existing underground conduit with capacity for such upgrades.

The pipeline materials would be constructed of a high strength steel pipe and would be cathodically protected for corrosion control. Pipelines would have a factory-applied external protective coating, and field welds and connections would be coated or wrapped in a similar way. Pipeline wall thickness would be determined by the operating pressures in accordance with applicable codes and regulations.

2.4.3 Hot Tapped Pipeline Connections to PG&E Lines 400 and 401

Currently, the Wild Goose Connection Pipeline only connects to the PG&E Line 400 pipeline, which runs parallel to the PG&E 401 pipeline. New connections from the Connection Pipeline to PG&E Lines 400 and 401 are required to accommodate the increase in gas volume from the Phase 3 Expansion. This project component would be carried out by PG&E, and would include excavation at the location of PG&E's Lines 400 and 401 and the installation of four approximately 50-foot-long pipeline segments from the Wild Goose Connection Pipeline to PG&E Lines 400 and 401. To avoid interruption to operations and gas flow through PG&E Lines 400 and 401, this installation would be completed using a "hot tap" procedure, which allows the construction contractor to safely tie in to a pressurized system while the system is fully operational. A diagram of this procedure is presented in Figure 2-9.

As shown in Figure 2-10, reconductoring the distribution line along the Option B alignment would be completed in two segments. The first segment of the Option B route would begin at the intersection of West Liberty and Pennington roads and extend north along Pennington Road for approximately 5,400 feet to the intersection with the Colusa Highway. The second segment would continue from this intersection and extend east along the Colusa Highway for approximately 25,000 feet. Most of the Option B reconductoring alignment is in unincorporated Butte County, but approximately 2,000 feet is in the City of Gridley, as shown in Figure 2-10.

Specific details of the reconductoring activities are provided below.

Conductor Removal and Replacement

During the reconductoring process, the existing 13-kV distribution line and any distribution lines that cross or are co-located on the line would be temporarily taken out of service. Conductors would be removed and replaced between the wooden poles supporting the existing distribution line. Each reconductoring crew would typically have two line trucks (one with a bucket lift and one with an auger attachment) and two light crew trucks. For each section of new conductor (pull section), a "puller truck" with an empty conductor reel would remove the old conductor, and a "line truck" containing a large spool of conductor would feed new conductor onto the line (Figure 2-11). The puller truck would draw the new conductor into place, while another truck located at the opposite end of the pull section would draw tension on the line during placement (a process known as "tensioning"). Typical pull and tension sites are approximately 40 feet wide by 100 feet long. Pull and tension sites would be located directly adjacent to the wooden poles and would be spaced approximately 1 mile apart along the alignment. Where the alignment was at a 90-degree or greater angle, the new conductor would likely be pulled and tensioned from intermediate points along the alignment. Typical practice would be to schedule several one-day pulling operations within the reconductoring period.

Figure 2-11 Typical Line Truck
(Source: PG&E)

Trucks used for conductor pulling and tensioning would operate from the roadway shoulder or partly within the road. For work in the road, the construction contractor would implement a traffic control and management plan to ensure safe operation and maintain traffic flow. PG&E or the reconductoring contractor would also obtain any necessary approvals for road encroachment. No grading of the reconductoring sites and no additional construction staging areas would be required.

All work would be performed in accordance with PG&E's normal operations and maintenance procedures and safe practices. Conductor removal and replacement would follow the steps described below.

Step 1: Grounding

To protect workers, equipment would be grounded to capture induced voltage[1] from nearby active circuits. During reconductoring, 0.625-inch diameter copper rods (ground rods) would be driven into the ground near reconductoring equipment. Ground rods would be installed deep enough to reach firm ground, with approximately 1 foot of the rod protruding aboveground. Construction equipment would be connected to the ground rods during reconductoring and be disconnected when the line was restored to service.

Step 2: Unclipping and Traveler Installation

Detaching (unclipping) the existing conductor from the insulators on the poles would be carried out from a line truck with a worker lift attachment. After equipment grounding, workers in the lift would unclip and remove the existing conductor from the insulators, place new insulators for the new conductor, and place rollers at the insulator ends to receive the new conductor. The existing conductor would be supported by a line truck during transfer, and placed on rollers for the majority of the reconductoring process.

Step 3: Conductor Replacement

After the rollers were installed, a cable from the puller truck would be attached to the existing conductor at one end of the pull section (the pull site), and a nylon pulling rope would be attached to the existing conductor on the opposite end (the tension site). As the puller truck removed the old conductor and reeled it onto an empty conductor spool, the rope would be pulled into place along the rollers. Once the pull rope was in place, the new conductor would be attached to the rope at the opposite end. Reel stands mounted on a line truck at the tension site would feed new conductor along the rollers while maintaining tension in the new line so that it did not sag to the ground as the conductor was simultaneously drawn onto the rollers from the pull site. The new conductor would be pulled onto the poles under a controlled tension to maintain its elevation and keep the line away from obstacles, thereby preventing damage to the line and protecting the public.

Once the new conductor was pulled into place and the conductor tension between poles was adjusted, the conductor would be removed from the rollers and clipped into the end of each new insulator by workers in the truck lift. The rollers would then be removed, and vibration dampers and other accessories would be installed on the conductor as needed.

[1] Induced voltage refers to voltage generated in a conductor when subjected to a moving magnetic field. Although the distribution line would be taken out of service during reconductoring activities, equipment and other potentially conducting material might be subject to induced voltage from other active circuits nearby.

Old conductor would be removed from the sites on a line truck and trailer, then salvaged at a location such as the PG&E service yard in Gridley or recycled. Any construction debris (such as packing crates or spare bolts) would be picked up and removed for recycling or disposal. PG&E personnel would also conduct a final survey to ensure that cleanup activities had been successfully completed.

Wooden Pole Replacement

During reconductoring activities, PG&E may remove and replace some of the existing wooden poles along the distribution line route, if it were determined that older poles might not be sufficient to support the weight and tension of the new conductor. New poles would be installed adjacent to the existing poles to facilitate the easy transfer of the reconductoring materials.

The existing poles are not secured in the ground with concrete foundations. They would be removed using a line truck equipped with a boom arm, which the construction crew would use to loosen poles as needed and then to pull the poles directly out of the ground. Poles might also instead be cut at ground level or 6 to 12 inches below the ground and left in place. Poles with communications facilities attached may be topped and left in place for the communications utility to transfer the communications lines to the new poles.

Replacement poles would be installed in holes excavated by a line truck with an auger attachment (highway digger with a 15- to 18-foot depth capacity). New switches and other associated hardware would be installed on poles as needed. Soil excavated for new poles would be used for excavation backfill or would be spread on the ground near the pole excavation.

All removed poles, associated hardware, and any other construction waste would be taken from the reconductoring component area and disposed of in accordance with local, state, and federal regulations and guidance. Any areas disturbed during reconductoring would be restored after project activities in this area were complete.

Construction Staging, Schedule, and Equipment

Access to the reconductoring areas would be primarily by existing major roadways suitable for truck traffic, including highways and county roads. Staging for worker parking, and equipment and material storage during reconductoring activities, would be located in the road or along the road shoulder, or in disturbed areas in the vicinity of the immediate work area. ~~and n~~ No other areas along the proposed alignments would be disturbed during reconductoring activities.

Where areas of sensitive habitat or wetlands are located directly below or immediately adjacent to the distribution lines, reconductoring activities would be restricted to existing paved surfaces or other previously disturbed adjacent areas. Wetland areas would be delineated and flagged, and work crews would be instructed to completely avoid these features by restricting reconductoring activities to at least 50 feet from any identified wetlands. In addition, a Stormwater Pollution Prevention Plan (SWPPP) would be written for the entire project as described in APM HYDRO-2, and workers would receive written instructions on the plan as well as pre-construction (tailgate) training as needed.

As discussed in Section 3.3, Biological Resources, potential habitat for a number of special-status species such as GGS and western burrowing owl is present in areas adjacent to each of the reconductoring alignments. No more than 30 days in advance of site preparation or construction activities, the applicant or its contractor would perform preconstruction special status plant and wildlife species surveys within

suitable habitat in and adjacent to reconductoring work areas during appropriate survey time periods, as described below and in Section 3.3. In addition, wherever possible, the applicant would avoid reconductoring activities from February 1 through August 31 (the typical avian nesting season) and from May through September, when GGS is most active and can disperse if threatened.

Encroachment permits would be obtained from the California Department of Transportation (Caltrans) and Butte County as necessary for work in roads or highways. Traffic control may be required for work along or in major roadways; all required permitting, notification, and safety measures for any traffic control would be completed and put in place prior to construction. As mentioned earlier in this section, a traffic control and management plan would be prepared according to Caltrans requirements and submitted for approval to the Butte County Public Works Department.

The reconductoring work is projected to start in September 2011 and to take from 4 to 8 weeks. Expected equipment and personnel needs for the work are shown in Table 2-1.

Table 2-1 Anticipated Personnel and Equipment for Reconductoring

Activity	Personnel	Equipment	
		Quantity	Equipment
Pole and Conductor Installation (includes old pole removal)	4-6	2	crew-cab truck
		1	line truck with worker-lift attachment
		1	line truck with auger attachment
		1	wire reel attached to line truck
		1	puller attached to line truck
		1	tensioner attached to line truck

Operation and Maintenance

No additional maintenance along the reconductored distribution line would be required beyond existing ongoing maintenance. Existing maintenance includes aerial inspection, ground inspection, and climbing inspection, as needed. Aerial and climbing inspections are performed only if a problem is identified or a ground inspection indicates the need for a closer inspection. Frequency of inspection may vary depending on the age of the system, vegetation conditions, and other factors but typically occurs at least once a year. Inspection activities could include assessing the line for corrosion, misalignment, and deterioration, and assessing the condition of hardware, insulators, and conductors. PG&E personnel drive to the poles in a pick-up truck to perform inspections.

~~CPUC Notice of Construction for Reconductoring~~

~~The Notice of Construction process for PG&E's reconductoring component is an exemption from the CPUC's formal permitting requirements under CPUC General Order 131-D, Section III, B.1, which exempts from CPUC permitting requirements "the placing of new or additional conductors, insulators, or their accessories on supporting structures already built."~~

2.4.5 Construction Activities

This section describes construction activities specific to each of the Phase 3 Expansion components. Section 2.4.5 provides details of the overall Phase 3 Expansion construction schedule, work force, and equipment.

No more than 30 days in advance of site preparation or construction activities, the applicant or its contractor would perform preconstruction special status plant and wildlife species surveys within suitable habitat in and adjacent to project work areas at the RFS, Delevan Site, hot tapped pipeline connections locations, and reconductoring component area, and during the appropriate survey windows, as described below and in Section 3.3, Biological Resources.

The applicant would prepare and implement a Hazardous Materials Release Response Plan for the Phase 3 Expansion. Construction contractors would update the plan as required by state, local, and federal regulations. The applicant would also update the facility's Storm Water Pollution Prevention Plan (SWPPP) for the Phase 3 Expansion.

Remote Facility Site

Site Preparation/Development

As part of site preparation activities, species exclusion fencing and temporary berms would be installed around the Phase 3 Expansion area at the RFS. Prior to species exclusion fencing installation and berm construction, all utilities (such as stormwater drainage pipes) that could provide a conduit for species movement between the RFS and the adjacent rice fields would be closed or temporarily blocked.

Species exclusion fencing would then be installed at the RFS to prevent giant garter snake (*Thamnophis gigas*), a federal- and state-listed threatened species known to be present in the site vicinity, from moving onto the site during construction activities. Fencing would be installed within the site perimeter and outside of perimeter access routes such that worker access to the site would not be obstructed; after the installation of the temporary berms, the fencing would be relocated to within the berms and perimeter access routes. Wild Goose or its construction contractors would coordinate and confirm appropriate fencing materials, installation techniques, and maintenance with U.S. Fish and Wildlife Service (USFWS) and CDFG staff.

After the initial installation of the species exclusion fencing, temporary soil berms composed of local native materials approximately 3.5 feet wide and up to 3 feet high would be constructed within the fencing around the west and north perimeter of the increased RFS area. The source of materials for the berms would likely be imported native material similar to or the same as the material used for fill over the rest of the site, as described below. The exact configuration and placement of the species exclusion fencing would be adjusted as determined by the construction biological monitor based on field conditions to prevent giant garter snakes from moving onto the site.

Once the temporary berms were installed and species exclusion fencing was relocated, the site would be stripped of topsoil and organic material, and the area for building foundations would be over-excavated (i.e., excavated below the grade required for construction). Approximately 42,000 cubic yards of material would be excavated from the site during this stage and stockpiled on the existing RFS east of the Phase 3 Expansion area, for later use as part of the fill for the permanent perimeter berm. The foundation areas would be filled with structural fill and compacted to support the concrete foundations and anticipated weight of the Phase 3 equipment. The remainder of the fenced area would be filled, leveled, and compacted with clean structural fill to bring the subgrade up to the elevation of the adjacent rice field dikes. Approximately 45,000 cubic yards of structural fill material would likely be obtained from one of the two quarries on the Sutter Buttes to the south. Fill material would be composed of non-expansive, low plasticity soil mixtures with maximum particle size of 3 inches and organic content less than 3 percent. Due to the high water table at the site, engineered fill immediately under some foundations may be "flowable fill," a lean concrete mix that would self-consolidate and harden to the required integrity without mechanical compaction. Approximately 4,200 cubic yards of aggregate (clean gravel) would be spread and compacted over the subgrade to create a stable surface for construction activities. Drainage

structures would be installed, and the final grade of the gravel surface would be sloped to drain into stormwater facilities and/or the existing drainage ditch immediately north of West Liberty Road.

Site development would continue with the civil, foundation, and structural work; mechanical and piping work; building erection and fabrication; electrical and instrumentation; and, finally, installation of permanent berms, landscaping, and cleanup. During foundation excavation, forming, and concrete work, sump pumps would be used to dewater the foundation areas. This groundwater would be pumped, filtered, and discharged into the West Liberty Road drainage ditch consistent with the applicable National Pollutant Discharge Elimination System permit.

Construction water would be obtained through contract arrangements with local water suppliers, irrigation and drainage districts, or hunting clubs that have water rights, as described in Section A.6, Hydrology. Approximately 1.6 million gallons of water would be required for construction (primarily for dust control on roads), as described in Section A.6, Hydrology.

Construction Staging

Staging for worker parking, equipment, and material storage would be located in the existing RFS facility (Plants 1, 2, and 3) area, the Phase 3 Expansion area, and possibly within the relocated parking area. Construction office trailers may be located either near the existing control building or in the expansion area. Temporary construction electrical service connections would be made from the existing PG&E electric distribution line along West Liberty Road as needed. Contractors would drink bottled water and use portable toilets.

Site Access

Heavy equipment for the construction at the RFS would be brought in on West Liberty Road via ~~Gridley Road~~ the Colusa Highway and Pennington Road. The existing bridge on West Liberty Road was previously upgraded to handle standard maximum weight loads. Material delivery from Sutter County would use West Butte Road, North Butte Road, and Pennington Road. The condition of these roads would be reviewed with Public Works Department staff from Butte and Sutter counties prior to construction and again after construction. The counties would be reimbursed for road repairs necessitated by damage from construction traffic and hauling.

Cleanup

Cleanup and restoration of the surface and temporary workspaces would involve removing construction debris, final grading to the finished contour, decompaction of topsoil, and revegetation as described in Section 3.3, Biological Resources.

Commissioning

Commissioning would involve drying the inside of the pipeline, purging air, and filling the pipeline with natural gas.

Delevan Interconnect Site and Hot Tapped Pipeline Connections

Site Preparation/Development

Site preparation at the Delevan Interconnect site would be limited to the existing site footprint. A minor amount (approximately 300 cubic yards) of material excavated to approximately 7 feet bgs would be required for the installation of the new Wild Goose and PG&E site components. Site preparation at the location of the hot tapped pipeline connection would require excavating to approximately 15 feet bgs, removing approximately 740 cubic yards of material.

Cleanup and restoration of the surface and temporary workspaces would involve removing construction debris, grading to the finished contour, decompacting the topsoil, and revegetating, if needed. Commissioning would involve drying the inside of the pipeline, purging air, and filling the pipeline with natural gas.

Construction Staging

The construction staging area for the improvements planned by the applicant at the Delevan Site would be located within the existing site footprint.

PG&E would manage construction activities pertaining to modifications at the Delevan Site and installation of the pipeline connections that would be hot-tapped into Line 401. The construction staging area for the PG&E elements would also be within the existing Delevan Site. The construction staging area may include worker parking, a construction office trailer, and/or a material laydown area. The staging area may also be fenced for security.

Staging for the hot tapped pipeline connections would take place within the existing PG&E easement for Lines 400~~/~~ and 401, as well as a small (approximately 4,500-square-foot) area adjacent to the easement. The total area disturbed during construction activities would be approximately 0.6 acres.

Construction contractors would drink bottled water and use portable toilets.

Site Access

The Delevan Site is accessed by the existing private paved road to the Delevan Compressor Station. Access to this private road is via graveled Delevan Road from Glenn County to the north or from the east via the end of Dirks Road in Colusa County. Access to the hot tap work location would be from an existing unpaved road that leads from the private road to the PG&E easement for Lines 400~~/~~ and 401.

Pipeline Installation (Hot Tap Connections)

The pipelines for the hot tap connections would be installed using a cut-and-cover approach, which entails excavating a trench, installing sections of pipeline into the trench, and backfilling the trench. Trenching would be conducted by tracked backhoes or ditchers, and would begin by removing the topsoil over the trench and segregating it at the edge of the construction area for replacement following construction. The excavated subsoil would be maintained in a windrow to be used as trench backfill following installation of the pipe. The trench would be a minimum of 45 inches wide (1.5 times the pipe diameter) and up to approximately 6 feet deep to ensure 3 feet of cover over the pipeline.

Backfilling the trench would involve replacing the excavated subsoil in the appropriate layers. The topsoil would then be re-spread to return the surface to its original grade. The bucket of the backhoe would be used to compact the backfill in the trench. When all the subsoil was replaced, the tracks of the backhoe might be driven along the trench to further compact the subsurface. The topsoil would be replaced last to re-establish the preconstruction soil profile. Topsoil may be mounded slightly over the trench to accommodate any future settling of the trench backfill. Backfilling would occur within 72 hours of pipeline installation to preclude potential impacts to wildlife that may fall into the trench. At the conclusion of each day's trenching activity, the end of the trench would be left ramped at an approximate 2-to-1 slope to allow any wildlife falling into the trench to escape.

On completion of pipeline construction, the pipeline would be hydrostatically tested. Test water would be analyzed for potential contaminants prior to testing; depending on its quality, the water would be either discharged upland or trucked to an appropriate offsite facility. The test and flushing water would be

drawn from local sources and returned to these sources as described in Section A.6, Hydrology. An energy dissipation basin consisting of hay or straw bales would be assembled to control the water discharged from the pipeline following hydrostatic testing and flushing. All discharges to waterways would be conducted in compliance with the National Pollution Discharge Elimination System (NPDES) General Permit requirements administered by the Central Valley Regional Water Quality Control Board.

Cleanup

Cleanup and restoration of the surface and temporary workspaces would involve removing construction debris, grading to the finished contour, decompacting the topsoil, and revegetating as described in Section 3.3, Biological Resources.

Commissioning

As described above, commissioning would involve drying the inside of the pipeline, purging air, and filling the pipeline with natural gas.

Reconductoring Component Area

The reconductoring project component would require minimal site preparation and construction staging, as described above under Section 2.4.4. The area would be accessed by the existing paved roads, including Pennington, West Liberty, and West Evans Reimer roads, as well as the Colusa Highway. Further details of reconductoring activities are discussed above.

2.4.6 Construction Schedule, Work Force, and Equipment

Construction Schedule

Site preparation and construction would take into consideration, and would generally take place outside of, the windows of potential impacts to sensitive species, as described in Section 3.3, Biological Resources, and as summarized here, unless otherwise authorized by the USFWS and CDFG. These windows are:

- Giant garter snake – Inactive (hibernation) season, October through April
- Nesting birds (raptors) – Nesting season, mid-February through early July
- Burrowing owl – Breeding season, mid-February through August 31
- Amphibians – Breeding season, October through April (normal wet season)
- Aquatic/Wetlands/Vernal Pools Plants – Blooming season, October through April (normal wet season)

To avoid impacts on giant garter snake according to the above, site preparation at the RFS would occur between May and September. Because rice fields adjacent to the RFS would usually be flooded by May 1 and may not be harvested until the end of September, Wild Goose has negotiated with the agricultural landowner, who would install temporary rice dikes during normal rice field preparation activities around late March or early April to isolate the property from the adjacent fields and prevent it from flooding. Site preparation and temporary berm installation, along with any work on the berms, including landscaping and cleanup, would be performed outside of the hibernation period for the giant garter snake to avoid potential impacts, as discussed in Section 3.3, Biological Resources. Construction and cleanup activities at the RFS inside the snake exclusion fencing and landscaped berms could occur within the hibernation period. After primary construction was completed, mechanical and other work that did not entail ground disturbance might continue beyond September 30.

To avoid impacts on sensitive bird species during their breeding and nesting season, construction activities would be delayed near active nests until chicks had fledged. Further information on measures

Table 2-2 Tentative Site Preparation, Construction, and Restoration/Cleanup Schedule

Activity	2010								2011												2012												2013				
	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M
1. Site Prep																																					
2. Berms																																					
3. Civil etc.																																					
4. Mechanical etc.																																					
5. Electrical etc.																																					
6. Restoration etc.																																					
7. Reconductoring																																					

1. Site Preparation
2. Installation of Permanent Berms
3. Civil, Foundation, and Structural Work
4. Mechanical Piping and Building Fabrication/Erection
5. Electrical and Instrumentation Work
6. Landscaping, Cleanup, Restoration

□ PG&E Delevan Meter Station & Hot Tapped Pipeline Connection Construction Activities

□ Remote Facility Site Plant 4 Construction Activities

□ Reconductoring Activities

□ Remote Facility Site Plant 5 Construction Activities

Table 2-3 Equipment for Project Construction, Remote Facility Site

Emission Source	Quantity	Frequency (Days on Site)
Inspector pickup	24	616
Safety pickup	10	616
Niska car	8	94
Electrician pickup	20	352
Erector pickup	8	352
Van	14	203
Contractor pickup	44	616
Dump/Cement truck	8	73
Boom truck	4	160
Fuel truck	7	196
X-ray truck	4	20
Semi truck	6	25
Flatbed truck	13	308

Table 2-4 Equipment for Project Construction, Delevan Interconnect Site and Hot Tapped Pipeline Connection

Equipment	Quantity	Frequency (Days on Site)
Pickup truck (1/2 ton)	11	132
Flatbed truck	3	15
Dirt hauling truck	1	22
X-ray truck	1	10

Table 2-5 Equipment for Reconductoring Component

Equipment	Quantity	Frequency (Days on Site)
Crew-cab truck	2	40
Line truck with worker-lift attachment	1	40
Line truck with auger attachment	1	40
Wire reel attached to line truck	1	40
Puller attached to line truck	1	40
Tensioner attached to line truck	1	40

2.4.8 Phase 3 Expansion Design Considerations

The applicant has incorporated into the Phase 3 Expansion a number of structural elements and practices, or applicant proposed measures (APMs) to avoid or minimize potential impacts on environmental resources. These APMs are part of the Phase 3 Expansion and are distinguished from mitigation measures for potentially significant impacts under CEQA. APMs have not been identified for all resource areas. If the Phase 3 Expansion is approved, the applicant will implement the APMs listed in Table 2-6 regardless of whether potential significant impacts were or were not identified during the CEQA environmental analysis.

Table 2-6 Project Design Features (PDFs)

Air Quality
APM AIR-1: Emissions from Construction Vehicles and Equipment. The following measures have been incorporated into the Phase 3 Expansion to reduce ROG and NOx emissions during construction activities: 1. Maintain all construction equipment in proper tune according to manufacturer's specifications. 2. Maximize, to the extent feasible, the use of diesel construction equipment meeting the CARB's 1996 or newer certification standard for off-road heavy-duty diesel engines.

Table 2-7 Permits Required for Phase 3 Expansion

Permits	Agency	Regulatory Authority	Jurisdiction/Purpose
Federal			
Section 404 Individual Permit	USACE	Clean Water Act, Section 404	Waters of the U.S. (temporary construction access at RFS) and NEPA lead agency
Section 7 Consultation (through USACE permit process)	U.S. Fish and Wildlife Service & NOAA Fisheries	Endangered Species Act, Section 7	Threatened and Endangered Species Biological Opinion and Take Authorization
State			
Certificate of Public Convenience and Necessity	California Public Utilities Commission	California Public Utilities Code Sections 399.25 and 1001	Overall project approval and CEQA lead agency
~~Notice of Construction (Reconductoring Only)~~	~~California Public Utilities Commission~~	~~California Public Utilities Commissions General Order 131-D, Section III, B.1~~	~~Noticing requirement~~
Project approval for a "significant expansion"	California Department of Conservation, Division of Oil, Gas, and Geothermal Resources	California Code of Regulations Sections 1724.6 through 1724.10	Supervision of the drilling, operation, maintenance, and plugging and abandonment of oil and gas wells and attendant facilities, including tanks and pipelines
NPDES Construction Storm Water General Permit	State Water Resources Control Board	Clean Water Act, NPDES Program	Surface disturbance greater than 1 acre
NPDES Industrial Storm Water General Permit	State Water Resources Control Board	Clean Water Act, NPDES Program	Industrial storm water discharges
NPDES General Permit for Discharges from Utility Vaults and Other Underground Structures	State Water Resources Control Board	Clean Water Act, NPDES Program	Short-term intermittent discharges from utility vaults to Waters of the U.S.
NPDES General Permit covering Dewatering and Other Low Threat Discharges to Surface Water	State Water Resources Control Board	Clean Water Act, NPDES Program	Short-term discharges from construction dewatering, pipeline/tank pressure testing, pipeline/tank flushing or dewatering, miscellaneous dewatering
Section 401 Certification and Low Threat Discharge Permit	Central Valley Regional Water Quality Control Board	Clean Water Act, Section 401	Water quality certification, hydrotesting water discharge, and dewatering
Streambed Alteration Agreement	California Department of Fish & Game	California Fish and Game Code, Section 1602	Waterways and adjacent wildlife habitat areas (temporary construction access at RFS)
Section 2081(b)/2080.1 Permit	California Department of Fish & Game	California Fish and Game Code, Section 2081(b)/2080.1	State-listed Endangered Species Take Authorization
Cultural Resources Section 106 Consultation (if required for the Corps permit amendment)	State Historic Preservation Office	National Historic Preservation Act, Section 106	Cultural resources protection and management
Local			
Land Use Permit[a]	Colusa County Planning	Colusa County Ordinance	Delevan Interconnect Site

Table 2-7 Permits Required for Phase 3 Expansion

Permits	Agency	Regulatory Authority	Jurisdiction/Purpose
Road Encroachment Permits	Butte County Public Works	Butte County Ordinance	Temporary construction access from West Liberty Road to RFS expansion area
Building Permits	Butte County and Colusa County Development Services	Butte County and Colusa County Ordinances	Building permits for structures and buildings
Authority to Construct/Operate	Butte County Air Quality Management District	Clean Air Act	Combustion emission reduction and monitoring for compressor engines

Notes:

[a]Permits for work at the Delevan Interconnect Site will be the responsibility of PG&E.

Key:

USACE = U.S. Army Corps of Engineers

NEPA = National Environmental Policy Act

NOAA = National Oceanic and Atmospheric Administration

NOAA Fisheries = National Marine Fisheries Service

NPDES = National Pollutant Discharge Elimination System

References

Wild Goose Gas Storage, LLC (WGS). 2009. Personal communication in response to data request. February.

———. 2010. Personal communication in response to data request. October.

3.2 Air Quality and Greenhouse Gas Emissions

To determine whether the Wild Goose Phase 3 Gas Storage Expansion (Phase 3 Expansion) would result in any new impacts related to air quality or greenhouse gases (GHGs), or increases in the severity of air quality impacts previously disclosed in the Wild Goose Storage, Inc. Expansion Project Environmental Impact Report (2002 EIR), this analysis considers changes to the resource area setting and changes to applicable plans, policies, and regulations of agencies with jurisdiction over the Phase 3 Expansion. The most significant change with respect to analysis of air quality since the publication of the 2002 EIR is the establishment of policies and plans in California that specifically address impacts related to GHGs. Several documents were reviewed for this analysis, including the Butte County Air Quality Management District (BCAQMD) California Environmental Quality Act (CEQA) Air Quality Handbook (BCAQMD 2009), the California Air Resources Board (CARB) Area Designations Maps (CARB 2009a), and the CARB document "Preliminary Draft Staff Proposal: Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act" (CARB 2008c).

The 2002 EIR identified 14 potentially significant impacts to air quality that would result from implementation of the Phase 2 Expansion. These potential impacts were reduced to less than significant through implementation of mitigation measures identified in the 2002 EIR and described below.

3.2.1 Environmental Setting: Air Quality

The Phase 3 Expansion components include the Remote Facility Site (RFS) expansion in Butte County; the improvements associated with the Delevan Interconnect Site and the new hot tapped pipeline connections to Pacific Gas and Electric Company (PG&E) Lines 400 and 401 in Colusa County; and PG&E's reconductoring of electrical distribution line east of the RFS in Butte County, as described in Chapter 2, Description of Phase 3 Expansion. Both of these counties are located in the Northern Sacramento Valley Air Basin (NSVAB), which also includes Sutter, Yuba, Glenn, Tehama, and Shasta counties. The BCAQMD and Colusa County Air Pollution Control District (CCAPCD) are the local air districts within which the project components would be located.

Average annual precipitation in Butte and Colusa counties is approximately 26 and 17 inches, respectively (NOAA 2009). Average annual temperature in the area is approximately 60 degrees Fahrenheit. Prevailing winds tend to be from the south. Other characteristics of the NSVAB are described in the 2002 EIR, Section 3.3, Air Quality.

Baseline air quality in the NSVAB and in Butte and Colusa counties was described in the 2002 EIR, and is updated here.

3.2.1.1 Ambient Air Quality

All of the air districts in the NSVAB, with the exception of Colusa and Glenn counties, have been designated as nonattainment areas for the state ozone Ambient Air Quality Standard (AAQS; NSVPA 2006). Colusa and Glenn counties have been designated as non-attainment transitional areas for ozone. All of the air districts in the NSVAB, including the BCAQMD and the CCAPCD, have been designated as non-attainment areas for the state standards for particulate matter with a diameter of 10 micrometers or less (PM_{10}). All other pollutants with state or federal AAQSs are in attainment or are unclassified in the NSVAB. The attainment status of the BCAQMD and CCAPCD are shown in Table 3.2-1.

Table 3.2-1 Butte County AQMD and Colusa County APCD Ambient Air Quality Attainment Status

Pollutant	BCAQMD		CCAPCD	
	State	Federal	State	Federal
1-Hour Ozone	Nonattainment	n/a[a]	Nonattainment	n/a[a]
8-Hour Ozone	Nonattainment[a]	Nonattainment[b]	Nonattainment	Unclassified/Attainment
Carbon Monoxide	Attainment	Unclassified/Attainment	Unclassified	Unclassified/Attainment
Nitrogen Dioxide	Attainment	Unclassified/Attainment	Attainment	Unclassified/Attainment
Sulfur Dioxide	Attainment	Unclassified	Attainment	Unclassified
PM_{10}	Nonattainment	Unclassified	Nonattainment	Unclassified
$PM_{2.5}$	Nonattainment	Nonattainment (pending)[c]	Unclassified	Unclassified/Attainment

Source: CARB 2010, USEPA 2009

Notes:

[a]The National 1-Hour Ozone Standard was revoked in June 2005

[b]The California Air Resources Board recommended that Butte County be designated nonattainment for the new 8-hour ozone standard in March 2009. The USEPA is expected to make the final area designations in mid-2010.

[c]In late 2008, the U.S. Environmental Protection Agency (USEPA) released the final nonattainment area designations for the new PM2.5 standard. The USEPA included much of Butte County in its final determination. The final nonattainment area designations will not become effective until after USEPA publishes the action in the Federal Register.

Key:

n/a = not applicable

$PM_{2.5}$ = particulate matter with a diameter of 2.5 micrometers or less

PM_{10} = particulate matter with a diameter of 10 micrometers or less

Maximum concentrations of ozone and particulate matter are measured at air quality monitoring stations in Colusa, Chico, Willows, and Yuba City. The number of exceedances of AAQS from 2003 through 2007 is presented in Table 3.2-2. These data update similar information presented in the 2002 EIR, and are reasonably representative of current air quality for the Phase 3 Expansion study area.

As shown in the table, maximum concentrations of PM_{10} exceeded the California 24-hour standard each year from 2003 through 2007, except for the basin as a whole. Extensive agricultural activities, which typically generate PM_{10}, contribute to the region's difficulty in attaining state standards for this pollutant.

Table 3.2-2 also shows that the maximum concentrations of ozone exceeded, or came close to exceeding, the California one-hour ozone standard each year in the four-county area during the 2003 through 2007 period. The highest maximum concentrations occurred in Sutter County, to the south of the Phase 3 Expansion area, which may be primarily as a result of pollutant transport from the Sacramento metropolitan area.

Table 3.2-2 Butte County AQMD and Colusa County Criteria Pollutants Classified as Nonattainment

Pollutant (Units)	Averaging Period	Year	Air Quality Monitoring Station				Sacramento Valley Air Basin	California AAQS	Federal AAQS
			Colusa (Colusa County)	Chico (Butte County)	Willows (Glenn County)	Yuba City (Sutter County)			
			Maximum Concentrations						
Ozone	1 Hour	2003	0.089	0.092	0.090	0.177	0.140	0.09	–
(ppm)		2004	0.084	0.088	0.084	0.100	0.131		
		2005	0.085	0.083	0.077	0.096	0.134		
		2006	0.084	0.090	0.076	0.110	0.143		
		2007	0.080	0.094	0.091	0.098	0.138		
		2008	0.091	0.111	0.085	NA	0.166		
			Maximum Concentrations						
PM_{10}	24 Hours	2003	69	54	61	83	123.0	50	150
($\mu g/m^3$)		2004	81	115	138	53	171.0		
		2005	92	76	69	60	109.0		
		2006	69	81	77	66	111.0		
		2007	43	66	43	54	119.0		
		2008	90.3	140.8	120.4	NA	355.0		
			Annual Arithmetic Mean						
	Annual	2003	NA	21.6	20.4	26.4	28.8	20	–
		2004	NA	28.7	25.5	NA	35.1		
		2005	25.5	23.8	21.5	25.0	27.9		
		2006	NA	26.8	NA	NA	28.7		
		2007	22.0	21.7	20.1	NA	28.1		
		2008	30.5	27.6	NA	NA	33.4		
			Annual Arithmetic Mean						
$PM_{2.5}$	Annual	2003	NA	15.9	NA	9.3	15.9	12	15
($\mu g/m^3$)		2004	7.2	16.5	NA	10.1	16.5		
		2005	11.2	13.8	NA	10.1	13.8		
		2006	7.9	14.6	NA	11.1	15.2		
		2007	9.0	14.3	NA	NA	14.3		
		2008	NA	18.1	14.5	NA	18.9		

Source: CARB 2008a

Note:

Sacramento Valley Air Basin includes the counties of Shasta, Tehama, Glenn, Butte, Colusa, Yuba, Sutter, Yolo, Sacramento, and parts of Placer and Solano counties.

Key:

- = Federal standard revoked

NA = Not available

$PM_{2.5}$ = Particulate matter with a diameter of 2.5 micrometers or less

PM_{10} = Particulate matter with a diameter of 10 micrometers or less

ppm = parts per million

$\mu g/m^3$ = micrograms per cubic meter

3.2.1.2 Sensitive Receptors

A sensitive receptor for air quality is defined as a location where human populations, especially children, seniors, or sick persons are found, and there is reasonable expectation of continuous human exposure according to the averaging period for the AAQS (e.g., 24-hour, 8-hour, 1-hour) (BCAAQMD 2008). No sensitive receptors to air emissions are located in the immediate vicinity of the Phase 3 Expansion at the RFS. Potential sensitive receptors within an approximate 1-mile radius of the RFS include occupants of three farm residences. One residence is approximately 4,200 feet east of the RFS, one is approximately 5,800 feet northwest of the site, and the third is approximately 1 mile to the northeast. The Grey Eagle Ranch hunting club lodge is also located approximately 4,500 feet to the southwest of the RFS. An unpaved, disturbed area of approximately 3.5 acres is west of the developed portion of the RFS; this area is used by hunters and farmers for parking, camping, and equipment storage.

Sensitive receptors along both of the potential PG&E electrical distribution line reconductoring alignments include residences, farms, suppliers of farm equipment and machinery, and other agriculture-related businesses.

There are no sensitive air quality receptors in the immediate vicinity of the Delevan Site; the nearest residence is more than 1 mile to the southeast.

3.2.1.3 Existing Operational Emissions

Existing operational emissions from the Wild Goose Facility originate primarily from the RFS. Existing combustion equipment contributing to air emissions at the RFS includes the following, as described in Chapter 2, Description of Phase 3 Expansion:

1. Two 3,335 horsepower and four 3,550 horsepower gas-driven reciprocating natural gas compressors
2. Three dehydrations units (TEG / natural gas contactor towers with natural-gas-fired glycol reboilers)
3. Two thermal oxidizers for the still vapors from the dehydration units
4. Three natural-gas-fueled standby generators

The compressor engines (Caterpillar 3600 series) use clean burn combustion chamber design as best available control technology (BACT). The compressor engines also use Selective Catalytic Reduction (SCR) and oxidation catalysts for nitrogen oxides (NO_x), carbon monoxide (CO), and reactive organic gas (ROG) control, and a positive crankcase ventilation system. In addition, the reboiler burners are of low emissions design. Existing RFS estimated operations emissions are summarized in Table 3.2-3.

Vehicle trips associated with existing operations at the RFS and the Delevan Site comprise employee and visitor trips, and represent a relatively small percentage of total operational emissions.

Table 3.2-3 Existing Remote Facility Site Estimated Operations Emissions (tons/year)

	NO_x	CO	ROG	SO_2	PM_{10}
Compressor Engines	35.8	59.7	21.7	1.6	5.6
Glycol Reboiler Burners	3.0	2.4	0.2	0.1	0.2
Glycol Still Vent/Thermal Oxidizer	1.5	1.0	0.2	0	0.1
Blowdowns (ESD and routine)			1.2		
Total Emissions (tons/year)	**40.3**	**63.1**	**23.3**	**1.7**	**5.9**
Total Emissions (lbs/day)	220	346	128	9.4	32.3

Source: BCAQMD 2010 (from 2006 estimates)
Notes:
Lbs/day were estimated from yearly tons by converting tons to pounds and dividing by 365 days per year
Refer to table 3.2-6 for summary of BCAQMD local thresholds of significance for criteria pollutants
Key:
ESD = Emergency Shutdown
NO_x = nitrogen oxides
CO = carbon monoxide
ROG = reactive organic gases
SO_2 = sulfur dioxide
PM_{10} = particulate matter with a diameter of 10 micrometers or less

3.2.1.3 Regulatory Setting

Ambient air quality and air pollutant emissions from stationary and mobile sources are managed under a framework of federal, state, and local rules and regulations. Air quality in the vicinity of the Phase 3 Expansion is regulated and monitored by several jurisdictions, including the U.S. Environmental Protection Agency (USEPA), the CARB, and the BCAQMD and CCAPCD. A summary of the rules and regulations implemented by these agencies follows below; further detail may be found in the 2002 EIR in Section 3.3, Air Quality.

Federal

The USEPA is the principal agency administrator responsible for overseeing enforcement of federal Clean Air Act (CAA) statues and regulations. The USEPA also oversees implementation of federal programs for permitting new and modified stationary sources, controlling toxic air contaminants (TACs), and reducing emissions from motor vehicles and other mobile sources. The sections of the CAA that are most applicable to the Phase 3 Expansion include Title I (Air Pollution Prevention and Control) and Title II (Emission Standards for Mobile Sources).

State

The California CAA outlines a statewide air pollution control program in California. CARB is the primary administrator of the California CAA, while local air quality districts administer air rules and regulations at the regional level. CARB is responsible for establishing the California AAQS, maintaining oversight authority in air quality planning, developing programs for reducing emissions from motor vehicles, developing air emission inventories, collecting air quality and meteorological data, and preparing the State Implementation Plan (SIP). The SIP is a comprehensive plan that describes how an area will attain national ambient air quality standards (NAAQS).

Criteria Pollutants

Air quality is assessed by measuring ambient concentrations of criteria pollutants. Pursuant to the federal CAA, the USEPA has established the NAAQS for seven criteria air pollutants. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The seven criteria air pollutants for which NAAQS have been promulgated are:

- Sulfur dioxide (SO_2)
- Nitrogen dioxide (NO_2)
- Particulate matter with a diameter less than or equal to 10 microns (PM_{10})
- Particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$)
- Carbon Monoxide (CO)
- Ozone (O_3)
- Lead (Pb)

Under the California CAA, the state has established additional and/or more stringent ambient air quality standards for some of these criteria pollutants, as well as ambient air quality standards for sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility-reducing particulate matter. NAAQS and California Ambient Air Quality Standards (CAAQS) are summarized in Table 3.2-4.

Table 3.2-4 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
			Primary[c]	Secondary[d]
Ozone (O_3)	8 Hours	0.07 ppm[e]	0.075 ppm	0.075 ppm
	1 Hour	0.09 ppm	– [e]	– [e]
Carbon Monoxide (CO)	8 Hours	9.0 ppm	9 ppm	–
	1 Hour	20 ppm	35 ppm	–
Nitrogen Oxide (NO_2)	Annual Average	0.03 ppm	0.053 ppm	0.053 ppm
	1 Hour	0.18 ppm	–	–
Sulfur Dioxide ($S0_2$)	Annual Average	–	0.030 ppm	–
	24 Hours	0.04 ppm	0.14 ppm	–
	3 Hours	–	–	0.5 ppm
	1 Hour	0.25 ppm	–	–
Particulate Matter with diameters less than or equal to 2.5 microns ($PM_{2.5}$)	Annual Geometric Mean	12 μg/m^3	15 μg/m^3	15 μg/m^3
	24 Hours	–	35 μg/m^3	35 μg/m^3
Particulate Matter with diameters less than or equal to 10 microns (PM_{10})	Annual Arithmetic Mean	20 μg/m^3	– [f]	– [f]
	24 Hours	50 μg/m^3	150 μg/m^3	150 μg/m^3
Lead (Pb)	30-Day Average	1.5 μg/m^3	–	–
	Rolling 3-Month Average [g]	–	0.15 μg/m^3 [g]	0.15 μg/m^3 [g]
Sulfates	24 Hours	25 μg/m^3	–	–

Table 3.2-4 Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
			Primary[c]	Secondary[d]
Hydrogen Sulfide	1 Hour	0.03 ppm	–	–
Vinyl Chloride	24 Hours	0.010 ppm	–	–

Source: CARB 2010, USEPA 2009

Notes:

[a]California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.

[b]National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth-highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[c]National Primary Standards represent the levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[d]National Secondary Standards are the levels of air quality necessary to protect the environment, including public welfare, from any known or anticipated adverse effects of a pollutant.

[e]On June 15, 2005, the 1-hour ozone standard of 0.12 parts per million (ppm) was revoked for all areas except the 8-hour ozone nonattainment Early Action Compact (EAC) areas. (Those areas do not yet have an effective date for their 8-hour designations.)

[f]he annual PM_{10} NAAQS has been repealed.

[g]Final rule signed on October 15, 2008.

ppm = parts per million (by volume)

$\mu g/m^3$ = micrograms per cubic meter

Local

Butte County

The existing Wild Goose Facility is currently operated under several permits from the BCAQMD (including permits WGS-98-01, WGS-05-09, WGS-02-03, WGS-09-10-AC, and WGS-09-12-AC) for the compressor engines, dehydration units, thermal oxidizers, and emergency generators at the RFS. The BCAQMD applies enforceable limits on total annual emissions of NO_x to below 30.15 tons per year on a rolling monthly basis, and ROG from all combustion equipment to below 25 tons per year on a rolling monthly basis. Emission limits are monitored using fuel consumption for each piece of combustion equipment. Results of annual monitoring have shown that average actual annual emissions have been greater than 30.15 tons of NO_x, triggering the requirement for offsets. An amendment to the facility's existing Permit to Operate, including the necessary offsets, was required and was obtained by the applicant.

The BCAQMD requires that certain identified new stationary sources secure a permit to construct and a permit to operate through the New Source Review (NSR) program and facility permitting program (Rule 430).

All stationary equipment, other than internal combustion engines of less than 50 horsepower, emitting air pollutants controlled under BCAQMD rules and regulations require an Authority to Construct (ATC) and Permit to Operate (PTO). The BCAQMD, as regulatory authority for "direct" operation and maintenance emission sources, would review and evaluate the Phase 3 Expansion in accordance with District Regulation IV Permits. The potential operational activities include air emissions generated from stationary combustion, operational and emergency blowdowns and fugitive emissions. The operational air emissions, to be included in permits, does not include on-road vehicles. In addition, mobile and portable

sources and temporary activities that cause emissions of air contaminants in the county are required to adhere to the following rules:

- District Rule 200, Nuisance: Emissions must be prevented from creating a nuisance to surrounding properties as regulated under this rule.
- District Rule 201, Visible Emissions: Visible emissions from stationary diesel-powered equipment are not allowed to exceed 40 percent opacity for more than three minutes in any one-hour.
- District Rule 205, Fugitive Dust Emissions: Fugitive dust emissions must be prevented from being airborne beyond the property line.
- District Rule 230, Architectural Coatings: Architectural coatings and solvents used at the project shall be compliant with the district regulation.
- District Rule 231, Cutback and Emulsified Asphalt. Cutback and emulsified asphalt application shall be conducted in accordance with the district regulation.

Colusa County

The CCAPCD requires development projects that include emissions sources to obtain an ATC permit. Construction emissions for projects that do not include an operational emissions source are regulated by the CCAPCD through the ATC permitting process (Gomez 2010).

Toxic Air Contaminants (TACs)

TACs are air pollutants suspected or known to cause cancer, birth defects, neurological damage, or other related health issues. An example of a TAC is diesel particulate matter (DPM). Except for lead, there are no established ambient air quality standards for TACs. Instead, development projects resulting in emissions of TACs are managed on a case-by-case basis by the local air district depending on the quantity and type of emissions and proximity of potential receptors.

The state air toxics program was established through Assembly Bill (AB) 1807 (the Tanner Bill), and AB2588, the Air Toxics "Hot Spots" Information and Assessments Act (Hot Spots Act), which was passed in 1987 (ARB 1987). The Hot Spots Act established an air toxics inventory and a risk quantification program for substances that cause chronic and acute health effects. A facility is subject to the Hot Spots Act, and must report stationary sources of toxic emissions identified in the Act, if it does any of the following:

- Manufactures, formulates, uses, or releases a substance on the list of 600 toxic substances and emits 10 tons or more per year of total organic gases, particulate matter, nitrogen oxides, or sulfur oxides.
- Is listed on an air toxics survey, inventory, or report compiled by the local air district.
- Manufactures, formulates, uses, or releases a substance on the list of 600 toxic substances and emits less than 10 tons or more per year of the criteria pollutants, but is subject to the emission inventory requirements.

Facilities that are subject to the Hot Spots Act must adhere to the following requirements:

- Report emissions from a list of 600 toxic substances.

- If the local air district determines that a health risk assessment (HRA) must be conducted, the facility must conduct the HRA according to methods developed by the Office of Environmental Health Hazard Assessment (OEHHA) (CAPCOA 1990, 2009).
- The public must be notified of significant risks posed by nearby facilities.
- Facilities found to pose a significant risk must prepare and implement risk reduction audits and plans within 6 months of the determination.

Facilities that are subject to the Hot Spots Act must submit a proposed emission inventory plan to the BCAQMD showing how emissions will be measured or calculated. Once it is approved, the facility operator must implement the plan and submit an emission inventory. Emission inventories must be updated every four years. Facilities are required to install Toxic Best Available Control Technology to reduce risks to below significance.

The applicant has prepared and submitted to BCAQMD an emission inventory plan in accordance with the Hot Spots Act, with the finding that all risks related to TACs emissions from the existing facility occur below the applicable thresholds. This plan is still under review by the BCAQMD (Lusk 2010). Through the local permit to operate process, the applicant would be required to adhere to any additional restrictions placed on it by the District, once the District completes its review of the plan. The District suggested that a prioritization score be determined for the facility. See Section 3.2.3.2 for a discussion of the prioritization score analysis.

3.2.2 Environmental Setting: Greenhouse Gases

3.2.2.1 Background Information

Greenhouse gases (GHGs) are gases that have been shown to trap heat in the atmosphere. Because of this characteristic, and because GHGs can remain in the atmosphere for decades or longer, GHGs are thought to have an effect on climate change (CARB 2009b). The Intergovernmental Panel on Climate Change (IPCC) has found that there is a correlation between increased atmospheric levels of CO_2 and rising global temperatures (Figure 3.2-1).

The term “climate change” refers to any significant change in measures of climate (temperature, precipitation, or wind) that lasts for an extended period (decades or longer). Climate change may be affected by a number of factors including natural cycles, such as changes in the sun’s intensity; natural processes within the climate system, such as changes in ocean circulation; and human activities that change the atmosphere’s composition (such as the release of carbon dioxide through burning fossil fuels) or land surface (such as deforestation or urbanization) (USEPA 2010).

GHGs identified by the State in California Assembly Bill 32 (AB 32) include but are not limited to: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Global warming potential is a measure of how much a given amount of GHGs is estimated to contribute to climate change and is devised to determine potential warming effects of different gases. Global warming potential is a relative scale that compares the GHG to that of CO_2. For a given GHG, the CO_2 equivalent (CO_2e) is a quantity that describes the amount of CO_2 that would have the same global warming potential, when measured over a specified timescale (generally, 100 years). The global warming potential of CH_4 over 100 years, for example, is 25. This means that the emission of 1 million metric tons of CH_4 would be equivalent to the emission of 25 million metric tons of CO_2.

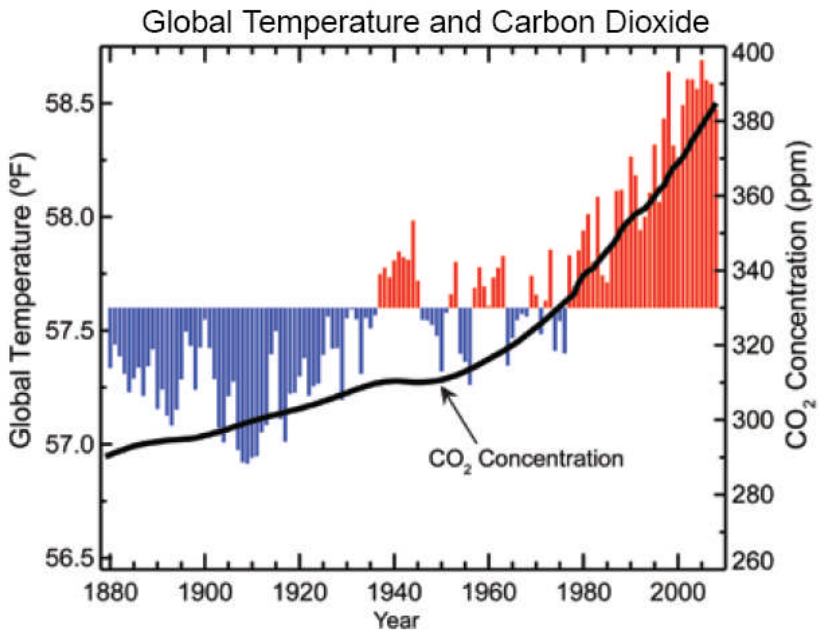

Figure 3.2-1 Relationship Between Global Temperature and Carbon Dioxide

Source: USGCRP 2009

As a result of climate change, California is expected to experience a range of adverse environmental effects. These could include declining air quality, a sharp rise in extreme heat, and increased risk of drought and flooding, with consequential effects on water supply reliability and increased occurrence and intensity of wildfires. As well as affecting the human environment, these changes could also have adverse effects on agricultural productivity over the next several decades. Statewide, annual temperatures are expected to increase by as much as 10 degrees Fahrenheit by 2100 (CEC 2006). Although the extent and magnitude of effects in the Phase 3 Expansion area and region are difficult to predict, it is likely that this area would experience similar types of effects, with resulting impacts on agriculture, public health, ecologically sensitive habitat, plant and wildlife resources, and water resources.

3.2.2.2 Regulatory Setting

California is a substantial contributor to global GHG emissions; it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC 2006). Regulations addressing the assessment and mitigation of climate change have been established on the federal and state levels. Neither BCAQMD nor CCAPCD, however, have established guidelines or CEQA significance thresholds for GHG assessment.

Federal

In 2009, the United States Environmental Protection Agency (USEPA) issued the Final Mandatory Reporting of Greenhouse Gases Rule, which requires reporting of GHG emissions from large sources and suppliers in the U.S. The intent is to collect accurate and timely emissions data to inform future policy decisions.

Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHGs are required to submit annual reports to

USEPA. The gases covered by the proposed rule are CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and other fluorinated gases. The rule became effective December 2009. Facilities are required to collect emissions data as of January 1, 2010. The first emissions reports are due to be submitted by March 31, 2011.

State

Executive Order S-3-05 and Assembly Bill 32

California Governor Arnold Schwarzenegger issued Executive Order S-3-05 in 2005, establishing statewide GHG emission reduction targets of 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050. In 2006, Governor Schwarzenegger signed the Global Warming Solutions Act, AB 32, with the requirement of reducing the State's GHG emissions to 1990 levels by 2020. With the passage of AB 32, the California Legislature officially recognized the State's vulnerability to the effects of global warming. The AB 32 program is the first statewide program in the country to mandate an economy-wide emissions cap that includes enforceable penalties. Figure 3.2-2 shows a graphic representation of emissions reduction strategies to meet the goals of AB 32.

Senate Bill 97

The California Senate passed Senate Bill 97 in 2007, requiring the Governor's Office of Planning and Research to prepare, develop, and transmit guidelines for the feasible mitigation of GHG emissions or their effects, including, but not limited to, effects associated with transportation or energy consumption.

California Air Resources Board, Climate Action Team, and Climate Change Scoping Plan

In 2007, based on its 1990 to 2004 inventories of GHG emissions in California, CARB staff approved a total of 427 million metric tons of CO_2e as the statewide GHG 1990 emissions level and 2020 emissions limit. This limit is an aggregated statewide limit, rather than sector- or facility-specific. Taking into account expected growth in population and energy use, the emissions reduction target is estimated to be equivalent to approximately 30 percent below business emissions as usual by the year 2020.

The Climate Change Scoping Plan (Scoping Plan), approved by CARB in 2008 to fulfill Section 38561 of AB 32, is the State's roadmap to reaching GHG reduction goals. The plan, developed by CARB in conjunction with the California Climate Action Team,[1] outlines a number of key strategies to reduce GHG emissions. The measures in the Scoping Plan will take effect in 2012. Discrete early action measures include a low carbon fuel standard, landfill CH_4 capture, reductions from mobile air conditioning, semiconductor reductions, SF_6 reductions, and a heavy-duty vehicles measure.

Cap and Trade Program

Appendix D of the Scoping Plan includes a cap-and-trade program proposed by the Western Climate Initiative as one of the main strategies California will employ to reduce GHG emissions. Under the cap-and-trade program, an overall limit on GHGs from capped sectors would be established, and facilities subject to the cap will trade permits (allowances) to emit GHGs. Currently, CARB is developing a California cap-and-trade program in conjunction with the western states and Canadian provinces included in the Western Climate Initiative. Consistent with AB 32, CARB would adopt the cap-and-trade regulation by January 1, 2011, with the program scheduled to begin on January 1, 2012.

[1] The California Climate Action Team was formed in 2004 to assist CARB with the Climate Change Scoping Plan. It is comprised of 14 agencies and 11 subgroups.

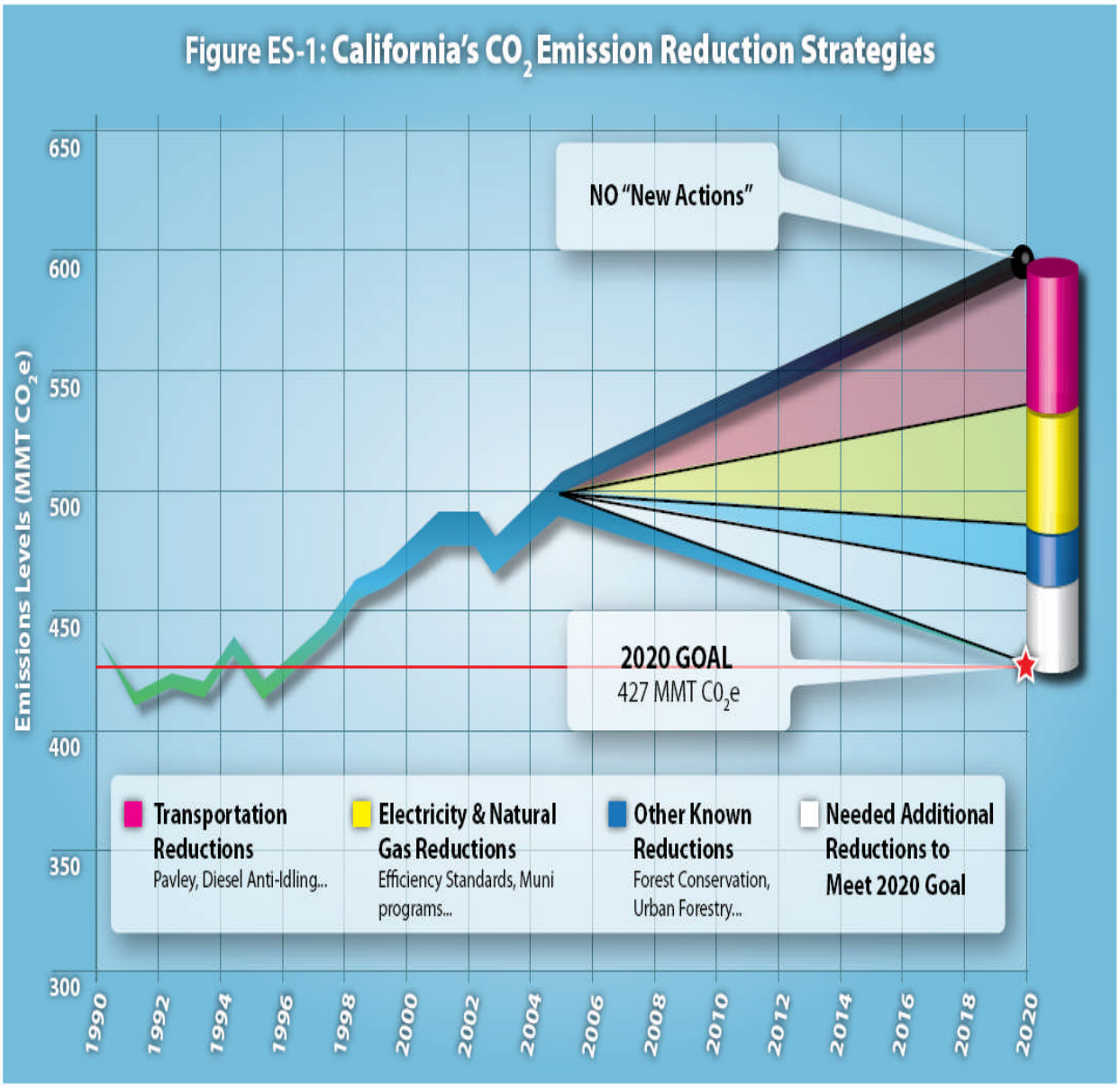

Figure 3.2-2 California's CO_2 Emission Reduction Strategies

Source: CEC 2007

CEQA Guideline Amendments

In December 2009, the Natural Resources Agency adopted CEQA Guidelines Amendments with new language for addressing the quantification and mitigation of GHG emissions. The Amendments became effective March 18, 2010. Updates to the Amendments include:

- Section 15064: Requires a lead agency make a "good-faith effort, based on scientific and factual data, to describe, calculate, or estimate the amount of GHG emissions resulting from a project." The agency may use a quantitative or qualitative analysis.
- Section 15126.4: Mitigation measures may include measures in an existing plan or mitigation program; implementation of project features; off-site measures, including offsets; or GHG sequestration. Mitigation in a plan may include project-specific mitigation.
- Section 15183: Projects may tier[2] from programmatic level GHG emissions analysis and mitigation.
- Appendix G: Two additional questions related to GHG impacts were added to the CEQA Appendix G Checklist (OPR 2010; discussed below under 3.2.2.1, Greenhouse Gas Impacts).

Local

In evaluating GHG impacts associated with development projects, the BCAQMD and CCAPCD follow the guidance and recommendations from the California Air Pollution Control Officers Association (CAPCOA 2008). Although the CAPCOA document has not been officially endorsed by the State, it is often used by air districts as a resource for how to treat GHG-related impacts in EIRs because there is, to date, no generally accepted approach. BCAQMD and CCAPCD have not established guidelines or significance thresholds for GHG assessment and, instead, rely on the CAPCOA document for guidance regarding appropriate analytical methodologies and mitigation.

3.2.3 Environmental Impacts and Mitigation Measures

3.2.3.1 Applicant Proposed Measures

The applicant proposes to implement the following applicant proposed measures (APMs), the full text of which is included in Table ~~A.1-1~~ 2-6 of Section ~~A.1-1~~ 2.4.8, as part of the Phase 3 Expansion to avoid or minimize potential impacts to air quality:

APM AIR-1: Emissions from Construction Vehicles and Equipment.

APM AIR-2: Construction Fugitive Dust.

APM AIR-3: Operational Emissions Permits.

APM AIR-4: Valves and Flanges.

APM AIR-5: No Open Burning of Vegetation.

[2] "Tiering" in CEQA refers to the coverage of general matters in broader EIRs with subsequent, project-specific EIRs incorporating by reference the general discussions in the prior document and focusing on a narrower range of project-specific impacts (CEQA Guidelines Section 15385).

The applicant proposes to implement the following APMs as part of the Phase 3 Expansion to avoid or minimize potential impacts related to GHGs:

APM AIR-6: Use of IC Engines Rather Than Gas Turbine Engines.

APM AIR-7: Use of Oxidizing Catalyst on Engine Exhaust.

APM AIR-8: Incinerate Regenerator Emissions.

APM AIR-9: Thermal Oxidizer Design.

APM AIR-10: Replace Gas-Operated Pneumatic Valve with Air-Operated Valves.

APM AIR-11: Replace Gas-Operated Pneumatic Pumps with Electric Pumps.

APM AIR-12: Fugitive GHG Emissions.

The project features included in Table 3.2-5 addressing Air Quality were adopted as part of the 2002 EIR for the Phase 2 Expansion, as either mitigation measures or applicant-proposed measures. These measures would also apply to the Phase 3 Expansion.

Table 3.2-5 Project Features Addressing Air Quality Adopted as Part of the 2002 EIR

Mitigation Measure 3.3-1. WGSI shall use adequate dust control measures that are implemented in a timely and effective manner during all phases of project development.
Mitigation Measure 3.3-2. Vehicle speeds will be limited to 15 mph on private unpaved roads and the ROW, or as required to control dust.
Mitigation Measure 3.2-3. Open haul trucks will be covered with tarps both on and off the work site.
Mitigation Measure 3.3-4. WGSI shall stabilize the construction access points with 6 inches of gravel to remove mud from construction equipment prior to entering paved roads.
Mitigation Measure 3.3-5. WGSI shall utilize non-toxic chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days).
Mitigation Measure 3.3-6. Any soil or mud deposited by construction equipment on paved roads near the egress from unpaved areas will be removed on a daily basis.
Mitigation Measure 3.3-7. Land clearing, grading, earth moving or excavation activities shall be suspended when winds exceed 20 miles per hour within the project area.
Mitigation Measure 3.3-8. WGSI shall use alternatives to open burning of vegetative material on the project site unless otherwise deemed infeasible by the AQMD (Among suitable alternatives are chipping, mulching, or conversion to biomass fuel).
Mitigation Measure 3.3-9. WGSI shall cover all inactive storage piles during construction and operation of the proposed project.
Mitigation Measure 3.3-10. WGSI shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints at all major construction areas. This person shall respond and take corrective action within 24 hours. The telephone number of the Colusa County Air District and BCAQMD shall also be visible to ensure compliance with BCAQMD Rule 201 & 207 (Nuisance and Fugitive Dust Emissions).
Mitigation Measure 3.3-11. Prior to final occupancy, the applicant shall demonstrate that all ground surfaces have been covered or treated sufficiently to minimize fugitive dust emissions.
Mitigation Measure 3.3-12. WGSI shall use fleet vehicles that use cleanburning fuels as may be practical.
Mitigation Measure 3.3-13: WGSI shall use non-toxic chemical soil stabilizers on exposed areas after cut and fill operation and hydroseed areas.

Table 3.2-5 Project Features Addressing Air Quality Adopted as Part of the 2002 EIR

Mitigation Measure 3.3-14: The prime contractor shall submit to the District for approval an Off-road Construction Equipment Reduction Plan (Plan) prior to groundbreaking. The Plan should include a comprehensive inventory (i.e. make, model, engine year, emission year, emission rating, fuel consumption rate) of all the heavy-duty off-road equipment, 50 horsepower or greater, that will be used an aggregate of 40 or more hours for the construction project, and indicate how the following measures will be met:

1. At 20% of the heavy-duty offroad equipment included in the inventory should be powered by EPA/CARB certified off-road engines, as follows:

a. 175 hp-750hp 1996 and newer engines
b. 100 hp-174hp 1997 and newer engines
c. 50hp-99hp 1998 and newer engines

Alternatively, equivalent emission reductions may be achieved by engine retrofit technology, exhaust filtration and lowsulfur diesel fuel, emulsified diesel fuels, or other CARB verified or certified technology. The District should be contacted to discuss alternative strategies.

2. Construction equipment exhaust emissions shall not exceed BCAQMD Rule 202 Visible Emission limitations.
3. The primary contractor shall be responsible to ensure all construction equipment is properly tuned and maintained.
4. Utilize existing power sources (e.g. power poles) or clean fuel generator rather than temporary power generators.
5. Minimize idling time to 10 minutes. Employ construction activity management techniques, such as: extending the construction period outside the ozone season of May through October; reducing the number of pieces used simultaneously; increasing the distance between emission sources; reducing or changing the hours of construction; and scheduling activity during off-peak hours.

3.2.3.2 Air Quality Impacts

Significance Thresholds

As discussed for the Phase 2 Expansion in the 2002 EIR, areas of potential environmental concern that may be associated with implementation of the Phase 3 Expansion include whether construction or operation would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

To determine the significance under CEQA of emissions from the Phase 3 Expansion, the proposed activities' compliance with BCAQMD and CCAPCD requirements is reviewed below. Construction activities at the RFS would be regulated by the BCAQMD. The BCAQMD CEQA Guidelines, which would apply to the Phase 3 Expansion, include both standard and discretionary measures for construction equipment. The applicant has included all of these measures, which are included in APM AIR-1, as features of the Phase 3 Expansion. In addition, the applicant would work with the BCAQMD to develop a Customized Construction Mitigation Program for the Phase 3 Expansion at the RFS.

The applicant would be required to secure a permit to construct (ATC) and a permit to operate (likely an Amended Permit to Operate) through the BCAQMD's New Source Review (NSR) program and facility

permitting program for the Phase 3 Expansion of the RFS. PG&E would not be required to secure permits from the BCAQMD for the reconductoring component.

Construction activities at the Delevan Site would be regulated by the CCAPCD. Operational activities at the Delevan Site would not result in emissions that would be required to be regulated by the CCAPCD.

BCAQMD Emissions Thresholds

The BCAQMD has established threshold criteria to determine the significance and appropriate mitigation level for long-term emissions from a project. Emissions that equal or exceed the designated threshold levels are considered potentially significant and should be mitigated. As shown in Table 3.2-6, the level of analysis and mitigation recommended follows a tiered approach based on the overall amount of emissions generated by the project.

Table 3.2-6 Butte County Air Quality Management District Thresholds of Significance for Criteria Pollutants of Concern

Pollutant	Level A	Level B	Level C
NO_x	≤25 lbs/day	>25 lbs/day	>137 lbs/day
ROG	≤ 25lbs/day	>25 lbs/day	>137 lbs/day
PM_{10}	≤ 80 lbs/day	> 80 lbs/day	>137 lbs/day
Level of Significance	Potentially Significant Impacts	Potentially Significant Impacts	Significant Impacts
Environmental Document	MND	MND or EIR	EIR
Project Mitigation Recommendations	Recommended list of standard mitigation measures.	Select as many Best Available Mitigation Measures (BAMM) with point value which may include off-site mitigations, in addition to the recommended list of standard mitigation measures. Coordinate with Planning Agencies to identify feasible mitigation measures. The emission reduction necessary is ten (10) percent of the calculated emission increase above Level B up to Level C.	Select as many BAMM with point value as necessary, in addition to the recommended list of standard mitigation measures. Off-site mitigation measures may also be required to reduce the overall air quality impacts of the project to a level of insignificance (below Level C). Coordinate with Planning Agencies to identify feasible mitigation measures. The emission reduction necessary is one hundred (100) percent of the calculated emission increase above Level C.

Source: BCAQMD 2009
Key:
BAMM = Best Available Mitigation Measures
EIR = Environmental Impact Report
MND = mitigated negative declaration
NO_x = nitrogen oxides
PM_{10} = particulate matter with a diameter of 10 micrometers or less
ROG = reactive organic gases

CCAPCD Emissions Thresholds

Under CCAPCD requirements, an applicant must apply BACT to any new emissions unit or modification of an existing emissions unit that results in (1) an emissions increase and (2) a potential to emit that equals or exceeds the amounts given in Table 3.2-7.

Table 3.2-7 Colusa County APCD Thresholds of Significance for Criteria Pollutants of Concern

Pollutant	Threshold
NO_x	≥25 lbs/day
ROG	≥ 25lbs/day
PM_{10}	≥80 lbs/day
CO	≥500 lbs/day
Level of Significance	Potentially Significant Impacts

Source: Colusa County APCD, New Source review rule 3.6

Key:

CO = carbon monoxide

NO_x = nitrogen oxides

PM_{10} = particulate matter with a diameter of 10 micrometers or less

ROG = reactive organic gases

These requirements also apply to construction emissions from development projects, which are addressed by the CCAPCD ATC permitting process.

TACs

Two significance thresholds apply to the evaluation below of the potential impacts associated with TACs from the Phase 3 Expansion. Consistent with the California Air Pollution Control Officers Association (CAPCOA) guidance for performing screening analysis and health risk assessments related to TACs (CAPCOA 2009), for acute (short-term), non-cancerous health effects and chronic (long-term) non-cancerous health effects, impacts are considered significant if the Phase 3 Expansion would result in emissions that pose an acute or chronic health risk with a Health Hazard Index (HHI) of 1 or greater. As discussed in Appendix C, the acute health hazard index is the ratio of the average short term ambient concentration of an acutely toxic substance or substances, divided by the acute reference exposure level set by the California Office of Environmental Health Hazard Assessment (OEHHA) (CAPCOA 2009). The chronic hazard index is the ratio of the average annual ambient concentration of a chronically toxic substance or substances divided by the chronic reference exposure level set by the OEHHA (CAPCOA 2009).

For potentially carcinogenic effects, impacts are considered significant if the Phase 3 Expansion would result in emissions that pose a lifetime cancer risk of greater than one in one million (CalEPA 2003).

Construction

Construction of the Phase 3 Expansion elements is estimated to take approximately 3 years to complete. During construction, air pollutants would include engine exhaust emissions from onsite construction equipment and on-road vehicles. Onsite clearing, earthmoving, grading, and paving activities, as well as vehicle travel on local and/or access roads, would also generate fugitive dust during construction activities. As part of the analysis of air quality impact, maximum daily air pollutant emissions were modeled for each construction phase using computer models accepted by the BCAQMD and CCAPCD (URBEMIS version 9.2.4; EMFAC 2007 version c 2.3).

Estimated emissions from construction of the Phase 3 Expansion elements at the RFS, the Delevan Site, and the reconductoring component area are presented in Tables 3.2-8, 3.2-9, and 3.2-10. Peak construction emissions are based on emissions projected for summer 2011, when work on the civil engineering, mechanical, and electrical components at the RFS would occur. Peak values are based on the combination of overlapping construction activities that would yield the highest potential emissions levels. Detailed calculations and assumptions are included in Appendix C.

Table 3.2-8 Estimated Construction Phase Emissions from Phase 3 Expansion at RFS

Peak Daily (lbs/day)[a]							
Emissions	**NO_x**	**ROG**	**Exhaust PM_{10}**	**Fugitive PM_{10}**	**CO**	**SO_2**	**$PM_{2.5}$**
Max Daily RFS Plant 4[b~~a~~]	93.71	15.10	5.82	75.93	60.44	0.13	5.13
Max Daily RFS Plant 5[b~~a~~]	87.22	14.04	5.41	75.93	58.06	0.13	4.76
Applicable BCAQMD Threshold	Level B: >25 lbs/day	Level A: ≤ 25lbs/day	Level B: > 80 lbs/day		NA	NA	NA
Exceeds threshold?	Yes	No	Yes		NA	NA	NA
Tons[c] per Year							
Total tons/yr 2011 (RFS Plant 4)	2.9~~6~~	0.50	0.18~~7~~	3.38~~5~~	2.24~~2~~	0.005	0.15
Total tons/yr 2012 (RFS Plant 4 + 5)	3.5~~6~~4	0.61	0.22~~1~~	4.29~~6~~	2.80~~78~~	0.006~~1~~	0.19
Total tons per year 2013 (RFS Plant 5)	0.99	0.17	0.06	1.30	0.80	0.002	0.05

Notes:
[a~~Total lbs per phase divided by total days in phase assuming 22 work days per month~~]
[a~~b~~]Assume no overlap of construction activities at Plants 4 and 5, as described in Chapter 2, Description of Phase 3 Expansion

Key:
BCAQMD = Butte County Air Quality Management District
CO = carbon monoxide
NA = not applicable
NO_x = nitrogen oxides
PM_{10} = particulate matter with a diameter of 10 micrometers or less
$PM_{2.5}$ = particulate matter with a diameter of 2.5 micrometers or less
RFS = Remote Facility Site
ROG = reactive organic gas
SO_2 = sulfur dioxide

Table 3.2-9 Estimated Construction Phase Emissions from Phase 3 Expansion at Delevan Site

Peak Daily (lbs/day)[a]							
Emissions	**NO_x**	**ROG**	**Exhaust PM_{10}**	**Fugitive PM_{10}**	**CO**	**SO_2**	**$PM_{2.5}$**
Maximum Daily Emissions[b~~a~~]	38.65	4.84	2.06	12.93	16.20	0.05	1.83
Applicable CCAPCD Threshold	Level B: >25 lbs/day	Level A: ≤ 25 lbs/day	Level A: ≤ 80 lbs/day		NA	NA	NA
Exceeds threshold?	Yes	No	No		NA	NA	NA

Table 3.2-9 Estimated Construction Phase Emissions from Phase 3 Expansion at Delevan Site

Peak Daily (lbs/day)[a]							
Emissions	**NO_x**	**ROG**	**Exhaust PM_{10}**	**Fugitive PM_{10}**	**CO**	**SO_2**	**$PM_{2.5}$**
Tons[c] per Phase[c]							
Total tons per year 2010	0.74	0.10	0.04	0.25	0.34	0.0009	0.03

Notes:
[a]~~Total lbs per phase divided by total days in phase assuming 22 work days per month~~
[b]Assume overlap of civil, foundation, structural, mechanical, piping, erection, fabrication, electrical and instrumentation in September 2010
[c]~~Metric tons~~

Key:
CCAPCD = Colusa County Air Pollution Control District
CO = carbon monoxide
NA = not applicable
NO_x = nitrogen oxides
PM_{10} = particulate matter with a diameter of 10 micrometers or less
$PM_{2.5}$ = particulate matter with a diameter of 2.5 micrometers or less
ROG = reactive organic gas
SO_2 = sulfur dioxide

Table 3.2-10 Estimated Construction Phase Emissions from PG&E Reconductoring Component

Peak (lbs/day)[a]						
Emissions	**NO_x**	**ROG**	**PM_{10}**	**CO**	**SO_2**	**$PM_{2.5}$**
Maximum Daily Emissions[b]	112.13	11.94	4.18	35.33	0.13	4.18
Applicable BAAQMD Threshold	Level B: >25 lbs/day	Level A: ≤ 25 lbs/day	Level B: ≤ 80 lbs/day	NA	NA	NA
Exceeds threshold?	Yes	No	No	NA	NA	NA
Tons per Phase[b]						
Total tons per year (2010)	2.24	0.24	0.08	0.712	0.003	0.08

Notes:
[a]~~Total pounds per phase divided by total days in phase assuming 22 work days per month~~
[b]~~Metric tons~~
Key:
BCAQMD = Butte County Air Quality Management District
CO = carbon monoxide
NA = not applicable
NO_x = nitrogen oxides
PM_{10} = particulate matter with a diameter of 10 micrometers or less
$PM_{2.5}$ = particulate matter with a diameter of 2.5 micrometers or less
ROG = reactive organic gas
SO_2 = sulfur dioxide

Operation and Maintenance

Air pollutants associated with the operation of the Phase 3 Expansion would be generated by operation of the following equipment at the RFS (further description of this equipment is included in Chapter 2, Description of Phase 3 Expansion):

- Combustion equipment (four additional natural-gas-fired compressor engines, glycol dehydrator, reboilers, thermal oxidizer, and 2.5-MW diesel generator)
- Relief vent system
- Fugitive natural gas emissions from valves and flanges
- Vehicles used for deliveries, inspection, maintenance, and worker commute

Stationary combustion equipment associated with the proposed expansion of the RFS would include four additional compressor units and two additional dehydration units. These new combustion units would include BACT as determined by the BCAQMD. The compressor engines would make use of SCR and oxidation catalysts for NO_x, CO, and ROG control, and a positive crankcase ventilation system. Reboiler burners would be designed to emit low levels of emissions. The Phase 3 Expansion elements at the RFS would also require routine maintenance and emergency repair for service continuity. In addition to the RFS staff described in the 2002 EIR, an additional four workers would travel to and from the site each day. Most emissions from operation and maintenance of the Phase 3 Expansion elements would be associated with combustion of natural gas to run ~~pumps and other~~ process equipment at the RFS, as well as from direct fugitive release of gas to the atmosphere from leaks and designed pressure release points such as valves.

Estimated emissions from operation of the Phase 3 Expansion elements at the RFS are presented in Table 3.2-11, along with emissions from existing components at the RFS. Operational emissions assume the implementation of BACT. Because most of the expansion elements at the Delevan Site would be underground, and because there would not be any additional operational staff associated with the Delevan Site expansion, operations at the Delevan Site are not anticipated to result in more than a very minor increase in fugitive emissions as a result of the Phase 3 Expansion (less than 1 percent of operations fugitive emissions that would take place at the RFS).

TACs

To determine potential effects related to the emission of TACs from the operation of the Phase 3 Expansion elements at the RFS (Plants 4 and 5) as well as the cumulative operations of the RFS after the Phase 3 Expansion (Plants 1 though 5, or "Post-Expansion RFS"), the applicant performed a Level 1 analysis using the prioritization methodology described by CAPCOA (CAPCOA 1990). The TACs analysis assessed TAC emissions in relation to three different health measures: acute (short-term) non-cancerous health effects, chronic (long-term) non-cancerous health effects, and carcinogenic effects. A description of this analysis, including estimates of TACs emissions for the Phase 3 Expansion elements and for the facility as a whole, is presented in Appendix C. The Level 1 analysis is based on the quantity of emissions, proximity to potential sensitive receptors, and height of the emission points. The resulting prioritization score indicates whether any further analysis is required.

Table 3.2-11 Potential to Emit Criteria Pollutants Wild Goose Plants 4 and 5, RFS Phase 3 Expansion Operations

Emissions (tons/year)						
Phase 3 Expansion Elements[a]						
	NO_x	**CO**	**ROG**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Compressor Engines	11.0	29.9	8.8	1.0	3.4	3.4
Glycol Reboiler Burners	1.6	1.4	0.09	0.05	0.12	0.12
Glycol Still Vent/Thermal Oxidizer	0.86	0.32	0.19	0.03	0.07	0.07
Blowdowns (ESD and routine)	-	-	0.95	-	-	-
Fugitives	-	-	0.26	-	-	-
Vehicle Emissions	0.17	0.32	0.04	0.0005	0.008	0.006
Total Phase 3 Expansion	**13.6**	**31.9**	**10.3**	**1.1**	**3.6**	**3.6**
Existing RFS Elements[a]						
Compressor Engines	35.8	59.7	21.7	1.6	5.6	5.6
Glycol Reboiler Burners	3.0	2.4	0.2	0.06	0.2	0.2
Glycol Still Vent/Thermal Oxidizer	1.5	1.0	0.2	0.02	0.08	0.08
Blowdowns (ESD and routine)	-	-	1.2	-	-	-
Total Existing RFS	**40.3**	**63.1**	**23.3**	**1.7**	**5.9**	**5.9**
Total Existing and Phase 3 Expansion	**53.9**	**95.0**	**33.6**	**2.4**	**9.5**	**9.5**
Current BCAQMD Permit Limits	*40.41*	*NA*	*25*	*NA*	*NA*	*NA*
Emissions[b] (lbs/day)						
	NO_x	**CO**	**ROG**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Total Phase 3 Expansion	**74.5**	**174.8**	**56.4**	**6.0**	**19.7**	**19.7**
Applicable BCAQMD Significance Threshold	Level B: >25 lbs/day	NA	Level B: >25 lbs/day	NA	Level A: <25 lbs/day	NA
Exceeds BCAQMD threshold?	**Yes**	**NA**	**Yes**	**NA**	**No**	**NA**

Notes:
a. $PM_{2.5}$ emissions were assumed to be equal to PM_{10} emissions.
Daily lbs/day were derived from yearly tons by converting tons to pounds (2,000 lbs/ton) and dividing by 365 days per year
Refer to Table 3.2-6 for summary of BCAQMD local thresholds of significance for criteria pollutants
Key:
BCAQMD = Butte County Air Quality Management District
CO = carbon monoxide
ESD = Emergency Shutdown
NA = not applicable (no applicable significance threshold)
NO_x = nitrogen oxides
PM_{10} = particulate matter with a diameter of 10 micrometers or less
SO_2 = sulfur dioxide

As shown in Table 3.2-12, the prioritization scores for Plants 4 and 5 were below the thresholds for acute and chronic non-carcinogenic effects, as well as below the threshold for carcinogenic effects. Table 3.2-12 also shows that the prioritization scores for the new plants plus the existing plants (Plants 1 through 5) were below the thresholds for acute and chronic non-carcinogenic effects, but above the threshold for carcinogenic effects. Therefore, further investigation was required to determine whether the post-expansion RFS could pose a health risk related to emissions of carcinogenic compounds.

Table 3.2-12 Results of Level 1 TACs Air Quality Screening Analysis, Phase 3 Expansion and Post-Expansion RFS

Prioritization Scores	Phase 3 Expansion (Plants 4 and 5)	Post-Expansion RFS (Plants 1, 2, 3, 4, 5)
Acute Non-Carcinogen (above threshold if greater than 1)	0.09	0.20
Chronic Non-Carcinogen (above threshold if greater than 1)	0.006	0.01
Cancer risk (above threshold if greater than 0.1)	0.06	0.15

Sources for prioritization score thresholds: CAPCOA 1990, 2009
Note:
Value highlighted in table (cancer risk for post-expansion RFS, Plants 1, 2, 3, 4, 5) represents an exceedence of the threshold value of 0.1.
Key:
HHI = Health Hazard Index
RFS = Remote Facility Site
TACs = toxic air contaminants

Because the screening analysis showed a potential for the post-expansion RFS to exceed the significance threshold for carcinogenic effects, a health risk assessment (HRA) was performed using the SCREEN3 model to further analyze the potential carcinogenic risk for Plants 1, 2, 3, 4 and 5. The USEPA-approved SCREEN3 model is recommended by CAPCOA when prioritization scores exceed the significance threshold. The HRA accounts for the inhalation health risks associated with fugitive emissions from the compressors, reboilers, and oxidizer that would be used to control emissions from the glycol dehydrator.

The model uses source parameters (stack temperature, exit velocity, exit temperature, stack height, stack diameter, and emission rate) to determine impacts at nearby receptors. The nearest residential and non-residential receptors to the RFS were included in the analysis. The model is conservative, so it yields a worst-case result. Cancer risk estimates are based on the maximum predicted downwind concentration of TACs emitted by all sources. Individual sources were modeled as point sources. Fugitive emissions were modeled as an area source, 60 meters on a side. Appendix C contains additional details on the calculation of health risks using the SCREEN3 model.

The results of the SCREEN3 health risk assessment are shown in Table 3.2-13. As shown in the table, the combined cancer risk of all pollutants for residential and non-residential receptors at the site is less than one-in-a-million, below the California EPA significance threshold for health risks associated with TACs (CalEPA 2003) as well as the CAPCOA level of 10 in one million. This cancer risk represents a worst case using the conservative SCREEN3 model.

Table 3.2-13 Results of SCREEN3 HRA, Post-Expansion RFS (Plants 1, 2, 3, 4, 5)

	Residential Receptor	Non-Residential Receptor
Cancer risk (significant if greater than 1.0E-06)	4.75E-07[b]	4.19E-07[c]
Significant Risk?	No	No

Notes:
[a]Represents 0.000001, or 1 in one million
[b]Represents 0.0000005, or 5 in 10 million
[c]Represents 0.0000004, or 4 in 10 million
Key:
SCREEN3 = Conservative USEPA-approved SCREEN3 model recommended by CAPCOA
HRA = Health risk assessment
RFS = Remote Facility Site
Sources for cancer risk threshold: CalEPA 2003

Impact AIR-1: Conflict with or obstruct implementation of the applicable air quality plan.

Construction

As part of determining whether proposed development conflicts with or obstructs implementation of an applicable air quality plan, a development's consistency with and conformance to a local general plan should be reviewed. Construction and operation of the Phase 3 Expansion would be consistent with the existing land use designation and zoning, as discussed in Section A.7, Land Use and Planning.

The BCAQMD and CCAPCD air management plans are established according to forecasts of air pollution emissions, based on existing land uses and growth projections. The emissions associated with Phase 3 Expansion construction (Tables 3.2-8, 3.2-9, and 3.2-10) would be temporary, and would be only a small fraction of the regional emissions inventory included in the air districts affected (NSVPAD 2006).

However, as shown in Tables 3.2-8, 3.2-9, and 3.2-10, projected estimates of maximum daily emissions of NO_x and PM_{10} during construction activities at the RFS would exceed BCAQMD significance thresholds, and estimates of maximum daily emissions of NO_x during construction activities at the Delevan Site would exceed CCAPCD significance thresholds. In addition, estimates of maximum daily emissions of NO_x during reconductoring activities would also exceed BCAQMD significance thresholds. The Phase 3 Expansion is required to be consistent with the BCAQMD and CCAPCD best management practices (BMPs) during construction. However, even with application of all required and discretionary BMPs as detailed in the APMs above, emissions of NO_x and PM_{10} would exceed BCAQMD and CCAPCD screening thresholds. Therefore, the applicant would be required to reduce construction emissions to a less than significant level through implementation of appropriate mitigation measures. Mitigation measures, as outlined in the BCAQMD's CEQA Guidelines (2008), to be implemented during construction to control fugitive dust are summarized in Phase 3 Mitigation Measure (MM) AIR-1 and Phase 3 MM AIR-2.

For construction emissions that exceed the BCAQMD's Level B significance threshold (such as those from the Phase 3 Expansion activities at the RFS), the applicant is required to select Best Available Mitigation Measures (BAMMs) with individual mitigation point values to achieve emission reductions totaling 10 percent of the calculated emissions increase above Level B (BCAQMD CEQA Guidelines 2008). Mitigation points are equivalent to a percentage of the emission reduction associated with using a particular measure. Implementing mitigation measures totaling 15 mitigation points means the measures are expected to result in a 15 percent reduction in overall emissions. If the application of BAMMs is not sufficient to achieve the required reduction in construction emissions, offsite measures, such as the purchase of offsets through the State's Carl Moyer Program[3], may also be required by the BCAQMD. The requirement to apply BAMMs and/or offsite measures to reduce Phase 3 Expansion construction emissions at the RFS will be included in the applicant's BCAQMD air permits for the Phase 3 Expansion, and are detailed in Phase 3 MM AIR-3, below. Coordination with the BCAQMD to achieve the desired reduction in construction emissions would reduce this impact to a less than significant level.

> **PHASE 3 MM AIR-1:** The applicant will implement the following measures for Phase 3 Expansion construction equipment:
>
> - Maintain all construction equipment in proper tune according to manufacturer's specifications.

[3] The State's Carl Moyer Memorial Air Quality Standards Attainment Program (Carl Moyer Program) is a voluntary program that offers grants to owners of heavy-duty vehicles and equipment. Local Air Districts administer the Carl Moyer program in partnership with the CARB.

- Maximize the use of diesel construction equipment meeting the CARB's 1996 or newer certification standard for off-road heavy-duty diesel engines.

PHASE 3 MM AIR-2: The applicant will implement the following measures to prevent and control dust emissions:

Land Clearing/Earth Moving

- Water shall be applied by means of truck(s), hoses and/or sprinklers as needed prior to any land clearing or earth movement to minimize dust emission.
- Haul vehicles transporting soil into or out of the property shall be covered.
- A water truck shall be on site at all times. Water shall be applied to disturbed areas a minimum of two times per day or more as necessary.
- On-site vehicles will be limited to a speed which minimizes dust emissions on unpaved roads.
- The applicant will post a publicly visible sign with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hours. The telephone number of the BCAQMD shall also be visible to ensure compliance with District Rule 200 & 205 (Nuisance and Fugitive Dust Emissions).

Visibly Dry Disturbed Soil Surface Areas

- All visibly dry disturbed soil surface areas of operation shall be watered to minimize dust emission.

Paved Road Track-Out

- Existing roads and streets adjacent to the Phase 3 Expansion area will be cleaned at least once per day unless conditions warrant a greater frequency.

Visibly Dry Disturbed Unpaved Roads

- All visibly dry disturbed unpaved road surface areas shall be watered to minimize dust emission.
- A water truck shall be on site at all times. Water shall be applied to disturbed areas a minimum of two times per day or more as necessary.
- On-site vehicles will be limited to a speed which minimizes dust emissions on unpaved roads.
- Haul roads will be sprayed down at the end of the work shift to form a thin crust. This application of water shall be in addition to the minimum rate of application.

Vehicles Entering/Exiting Construction Area

- Vehicles entering or exiting the Phase 3 Expansion construction area shall travel at a speed which minimizes dust emissions.

Employee Vehicles

- Construction workers shall park in designated parking areas(s) to help reduce dust emissions.

Soil Piles

- Soil pile surfaces shall be moistened if dust is being emitted from the pile(s). Adequately secured tarps, plastic or other material will be used to further reduce dust emissions.

PHASE 3 MM AIR-3: To address potentially significant construction emissions at the RFS and the PG&E reconductoring component area, the applicant and PG&E will apply appropriate BCAQMD Best Available Mitigation Measures (BAMMs) and/or offsite measures such as purchase of offsets for NO_x and PM_{10} emissions, as presented in the BCAQMD CEQA Air Quality Handbook (2008), in order to reduce construction emissions to a less than significant level. This measure will apply to emissions of NO_x and PM_{10} in the years 2011 and 2012. The BCAQMD will identify the BAMMs and/or offsite measures, such as purchase of offsets for NO_x and PM_{10} emissions, that will be implemented, and include them in a construction emissions reduction plan. The applicant will submit the construction emissions reduction plan to the CPUC and BCAQMD prior to the start of Phase 3 Expansion construction activities.

For NO_x construction emissions that exceed the CCAPCD's Level B significance threshold, such as those from Phase 3 Expansion activities at the Delevan Site, the applicant is required to purchase NO_x offsets sufficient to counteract the exceedance (Gomez 2010). If stipulated by CCAPCD, this requirement will be enforced by the CCAPCD through the ATC permitting process, and is detailed in MM AIR-4, below. Coordination with the CCAPCD to achieve the desired reduction in construction emissions would reduce this impact to a less than significant level.

PHASE 3 MM AIR-4: To address potentially significant construction emissions at the Delevan Site, the applicant will purchase NO_x offsets for exceedances over the CCAPCD threshold limit during the construction period. Based on calculations of NO_x emissions for the construction phase, total NO_x emissions are anticipated to exceed the CCAPCD limit of 25 pounds per day. The applicant will be required to purchase NO_x offset credits for daily NO_x emissions in excess of 25 pounds and to provide documentation of the offsets purchase to the CPUC and the CCAPCD prior to the start of Phase 3 Expansion construction activities. If required by the CCAPCD, these offset credits will also be incorporated into the Authority to Construct permit conditions.

Operations

Operational emissions associated with the Phase 3 Expansion would be generated from stationary combustion, operational and emergency blowdowns, fugitive emissions, and vehicles used by workers to travel to work and inspect the site. Of these emissions, NO_x and ROG would exceed the BCAQMD thresholds and would thus require purchased offsets in order to mitigate the impacts to a less than significant level (below the Level C threshold). The BCAQMD has indicated that market-based offset credits are available within the county; in addition, the BCAQMD holds air quality offset community bank credits, based on existing projects removing emissions from the air basin, that may be available to the applicant (Lusk 2010). The community bank credits are available for lease for public services projects in the county. A rule change by the vote of the BCAQMD Governing Board would be required to allow these credits to be used for the Phase 3 Expansion. The requirement to purchase NO_x and ROG offsets will be included in the applicant's BCAQMD air permits for the Phase 3 Expansion, and is detailed below in MM AIR-5. If the Applicant identifies contemporaneous emission reductions to existing equipment that would result in no net emission increase of NO_x and ROG, the requirement for emission offsets may be removed as long as these emission reductions are verified and approved by the BCAQMD and appropriate documentation is provided to the CPUC prior to the start of project construction.

PHASE 3 MM AIR-5: To address potentially significant operations emissions at the RFS, the applicant will purchase offsets for NO_x and ROG emissions, either from existing market-based offsets within Butte County, or from the BCAQMD community offset bank, as available. Based on the calculations of NO_x and ROG pounds per day emissions for the operations phase, these emissions are anticipated to exceed the Level B BCAQMD 25 pounds per day limit. It is anticipated that the BCAQMD will include appropriate permit conditions in the Phase 3 Expansion Permit to Operate to

ensure that offsets for NO_x and ROG emissions are adequate and applied. If the applicant identifies contemporaneous emission reductions to existing equipment that would result in no net emission increase of NO_x and ROG, the requirement for emission offsets may be removed as long as these emission reductions are verified and approved by the BCAQMD and appropriate documentation is provided to the CPUC prior to the start of Phase 3 Expansion construction.

Operations and maintenance activities at the Delevan Site and the PG&E reconductoring component area are not anticipated to result in more than a very minor increase in emissions as a result of the Phase 3 Expansion, and would not conflict with any applicable district plans. The Phase 3 Expansion elements at the Delevan Site would include periodic vehicle inspections during operations, and emissions would consist of approximately one passenger vehicle or light truck per day. No additional maintenance along the reconductored distribution line would be required beyond existing ongoing maintenance, which requires vehicle inspections approximately once a year. Thus, the project as proposed would not cause any conflicts with BCAQMD or CCAPCD air quality plans, and no mitigation is required.

Impact AIR-2: Violate air quality standard or contribute substantially to an existing or projected air quality violation.

As discussed above, emissions from construction activities at the RFS, Delevan Site, and reconductoring component area would exceed the BCAQMD threshold limits for NO_x and PM_{10} and the CCAPCD threshold limit for NO_x. While construction-related emissions would be temporary, short-term impacts could contribute to the regional pollution load and to exceedances of air quality standards. Operations emissions at the RFS would exceed the BCAQMD threshold limits for NO_x and ROG.

Exceeding these defined emissions levels does not, in itself, represent a violation of local air quality standards. However, any emissions beyond the allowable limit must be either reduced or offset to below the defined thresholds. As discussed above, MMs AIR-1 through AIR-5~~3~~ would reduce this impact to a less than significant level.

Impact AIR-3: Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

According to the BCAQMD CEQA Air Quality Handbook (BCAQMD 2008), project emissions that are not consistent with the Air Basin's Air Quality Attainment Plan (AQAP) or ~~State Implementation Plan~~ SIP, or that exceed district thresholds, will have a significant cumulative impact unless offset. Development projects are consistent with the AQAP if:

- The project does not require a change in the existing land use designation (e.g., a general plan amendment or rezone), and projected emissions of ROG and NO_x from the proposed project are equal to or less than the emissions anticipated for the site if otherwise developed under the existing land use designation;
- The project does not exceed the "project alone" significance criteria (i.e., the significance criteria for the project-specific impacts);
- The lead agency for the project requires the project to implement any applicable emission reduction measures contained in and/or derived from the AQAP; and
- The project complies with all applicable district rules and regulations (BCAQMD 2008).

As discussed in Section A.7, Land Use and Planning, the Phase 3 Expansion would be consistent with the land use designation and zoning in the area of the RFS, the Delevan Site, and the reconductoring component area, and neither a general plan amendment nor a rezoning application would be required. As discussed above, the Phase 3 Expansion would include implementation of all applicable emission reduction measures recommended and required by the BCAQMD and the CCAPCD, and would comply with all applicable district rules and regulations. After application of the mitigation measures described above, the Phase 3 Expansion would not exceed the "project alone" significance criteria.

Butte and Colusa counties are in nonattainment for the state and federal ozone and PM_{10} standards. For this reason, development that resulted in individually significant air quality impacts related to ozone and PM_{10} would also be considered to create cumulatively significant air quality impacts; however, as discussed above, the Phase 3 Expansion, with application of MMs AIR-1 through AIR-5~~3~~, would have less than significant impacts as an individual project. Therefore, the Phase 3 Expansion would have a less than significant impact under this criterion. Further discussion of cumulative impacts related to Air Quality is included in Chapter 4, Cumulative and Growth-Inducing Impacts.

Impact AIR-4: Expose sensitive receptors to substantial pollutant concentrations.

Land use conflicts can arise when sensitive receptors are located next to major sources of air pollutant emissions. The nearest sensitive receptors to the RFS are one residence, approximately 4,200 feet from the RFS (the closest sensitive receptor), and the Grey Eagle Ranch hunting lodge, approximately 1 mile from the RFS. The nearest sensitive receptor to the Delevan Site is a residence located more than 1 mile from the site. The nearest sensitive receptors to the reconductoring component include numerous homes, farms, and agriculture-related businesses within 30 to 50 feet of the distribution line right-of-way and the reconductoring activities, most of which are located either along the Option A reconductoring segment between Block Road and State Route 99 or along a portion of the Option B reconductoring alignment, between Bock Road and West Biggs Gridley Road.

Because most of the expansion elements at the Delevan Site would be underground, and because there would be no additional operational staff associated with the Delevan Site expansion, operations at the Delevan Site are not anticipated to result in more than a very minor increase in fugitive emissions from the Phase 3 Expansion or to expose sensitive receptors to substantial pollutant concentrations. In addition, given that reconductoring activities would be very short-term and would impact specific locations for only limited durations, no significant impact under this criterion would result from the reconductoring component.

The results of the Level 2 SCREEN3 health risk assessment are shown in Table 3.2-13, above. Appendix C contains additional details for this analysis. The combined cancer risk for the Phase 3 Expansion is less than the California EPA limit of one in one million.

The results of the health risk screening analysis (Table 3.2-13, above) show that the Phase 3 Expansion would not pose a significant health risk to sensitive receptors; therefore, this impact is less than significant. Construction and operation of the Phase 3 Expansion would not expose sensitive receptors to substantial pollutant concentrations; therefore, there would be a less than significant impact.

Impact AIR-5: Create objectionable odors affecting a substantial number of people.

Construction

Existing population in the Phase 3 Expansion areas is sparse, and does not represent a substantial number of people. Phase 3 Expansion construction activities would include the use of diesel-fueled construction equipment, which emits a distinctive odor that may be offensive to some individuals. Odors generated by

diesel exhaust would be reduced by the use of either low-sulfur to ultra-low-sulfur fuel, as required in California. Paving activities would also generate odors from hot asphalt sources; however, emissions at this level would not likely cause a perceptible odor to a substantial number of people. Another potential source of offensive odors would be operational or emergency blowdowns or unintended release of natural gas during construction activities. These events are unlikely to result in significant odor impacts because the nearest sensitive receptors are not close and methane is lighter than air so it disperses relatively quickly.

Operation

Processing of natural gas at the RFS has the potential to release odorized natural gas. Odorized gas could be emitted from piping components such as valves and flanges (fugitive emissions). Such leaks would be small and would quickly be dissipated in the atmosphere. The Wild Goose Facility operator has existing measures in place to prevent and repair such leaks. Emergency releases during blowdown events could also release odorized gas. However, these releases would occur relatively infrequently and the gas would dissipate rapidly because it would be under pressure. For these reasons, and because the RFS is not close to the nearest sensitive receptor, these events are unlikely to result in significant odor impacts.

Therefore, construction and operation of the Phase 3 Expansion would result in a less than significant impact related to objectionable odors affecting substantial numbers of people.

3.2.2.1 Greenhouse Gas Impacts

Greenhouse Gas Significance Criteria

The Phase 3 Expansion area is within the jurisdiction of the BCAQMD (RFS) and CCAPCD (Delevan Site). Neither the state of California nor the BCAQMD or CCAPCD has officially adopted CEQA thresholds of significance for impacts related to GHG emissions. In March 18, 2010, the most recent amendments to the CEQA Guidelines became effective, including new language addressing the quantification and mitigation of GHG emissions. The CEQA Environmental Checklist (Appendix G) was amended to include two considerations to help assess the significance of impacts associated with GHG emissions. These considerations were whether the proposed project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; and
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

In the absence of an accepted or adopted significance threshold, and in order to conservatively assess potential Phase 3 Expansion impacts from GHGs, quantitative significance criteria are applied, and a limit of 10,000 metric tons of CO_2e per year is used here. This number includes construction emissions, added to yearly operational emissions. Construction emissions are amortized over the life of the Phase 3 Expansion, which is defined as 30 years.

The 10,000-metric-ton number corresponds to the lowest officially adopted GHG emissions significance threshold in the state, the interim threshold adopted by the South Coast Air Quality Management District (SCAQMD) in response to the adoption of AB 32. Using this level for the Phase 3 Expansion is consistent with the nature of impacts associated with GHG emissions, which do not produce a direct localized effect, but take place on a state-wide and global scale, as described in Section 3.2.2.1. In addition, the 10,000-metric-ton number is appropriately conservative, because it is based on a 90 percent

emissions source capture rate for the SCAQMD area, and represents a scale and quantity of industrial emissions sources that is much higher than in more rural, far less developed Butte County.

Construction

Construction activities associated with the Phase 3 Expansion would result in CO_2 and CH_4 emissions generated by on-road vehicles and non-road equipment during project construction. Table 3.2-14 shows total CO_2 and CH_4 emissions generated by the Phase 3 Expansion during construction. Further details supporting these estimates are presented in Appendix C.

Table 3.2-14 Estimated ~~Direct~~ Emissions of GHGs for the Phase 3 Expansion During Construction

Construction Year	GHG	Total Emissions (MT)~~lbs/yr~~				GWP	Standardized GHG Emissions (MT CO_2e)
		RFS	*Delevan*	*PG&E Reconductoring*	*Total*		
2010	CO_2	-	71	236	307	1	307
	CH_4	-	0.0006	0.020	0.021	21	0.44
Total Direct Emissions, 2010							**307**
2011	CO_2	379	-	-	379	1	379
	CH_4	0.0084	-	-	0.0084	21	0.17
Total Direct Emissions, 2011							**379**
2012	CO_2	478	-	-	478	1	478
	CH_4	0.010	-	-	0.010	21	0.21
Total Direct Emissions, 2012							**478**
2013	CO_2	140	-	-	140	1	140
	CH_4	0.003	-	-	0.003	21	0.06
Total Direct Emissions, 2013							**140**
Total Direct Emissions, All Construction Years							**1,304**
Amortized Over a 30-yr Period							**43.5 MT/year**

Note:
Direct emissions are from diesel-fueled construction equipment, diesel-fueled heavy trucks, and gasoline-fueled light trucks.
Key:
CO_2e = Carbon dioxide equivalent
GHG = Greenhouse gas
GWP = Global Warming Potential
MT = Metric tons

Operations

During operation of the Phase 3 Expansion elements, most GHG emissions would be CO_2 from combustion of fossil fuel (primarily natural gas) associated with stationary combustion of natural gas in compressors ~~pumps~~ and other equipment at the RFS; additional direct release of CH_4 (the primary component of natural gas) will also occur during blowdowns and as unintended fugitive release from valves, flanges, and other equipment. The Phase 3 Expansion would also result in CO_2 and CH_4 emissions generated by vehicles used during routine operational activities. A summary of these emissions is presented in Table 3.2-15. As discussed above, annual operational emissions associated with the Delevan Site would be minor, and are not included in the analysis.

Table 3.2-15 Estimated Direct and Indirect Emissions of GHGs for the Phase 3 Expansion During Operations

Source Type	Source	GHG	Annual Emissions (MT/yr)	GWP	Standardized GHG Emissions (MT CO_2e/yr)
Direct	Compressor Engines	CO_2	31,017	1	31,017
		CH_4	138	21	2,898
	Glycol Reboilers	CO_2	1,789	1	1,789
		CH_4	0.03	21	0.6
	Thermal Oxidizer	CO_2	963	1	963
		CH_4	0.18	21	3.8
	Mobile (Vehicles)	CO_2	41	1	41
		CH_4	0.003	21	0.06
	Blowdown/Vent	CH_4	189	21	3,969
	Fugitive	CH_4	51	21	1,071
	Subtotal	-	-	-	*41,752*
Indirect	Off-Site Electrical	CO_2	2,030	1	2,463
				Total Emissions Annual GHG Emissions	**43,782**

Note:
Direct emissions are from compressor engines, compressor blowdowns, compressor starter vents, reboilers, thermal oxidizer stacks, and fugitive releases. Indirect emissions are estimates of purchased electricity for operation of equipment at the RFS; units shown are kilowatt hours (kWh) rather than pounds.

Key:
CO_2e = Carbon dioxide equivalent
GHG = Greenhouse gas
GWP = Global Warming Potential
MT = Metric tons

Impact AIR-6: Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

Total GHG emissions for the Phase 3 Expansion from construction and operations combined have been estimated under a worst-case scenario to be approximately 43,826 tons per year (44 tons per year of amortized construction emissions, as summarized in Table 3.2-14, and 43,782 tons per year of operations emissions, as summarized in Table 3.2-15), which assumes maximum daily emissions levels are applied to the entire year. Actual emissions can reasonably be expected to be lower than this estimate because construction would not occur every day of the year. Using the maximum daily emissions level for every day overestimates actual construction levels on most days. In addition, the worst-case emissions for operations are estimated based on the fuel use limitations imposed by BCAQMD on Plant 3. For 2006, 2007 and 2008, Wild Goose did not exceed these fuel use limitations and has emitted on average less than half of the potential-to-emit value. Using the potential-to-emit emissions value may overestimate the actual annual GHG emissions from the operation of the Phase 3 Expansion.

Existing and proposed operations at the Wild Goose Facility include measures to reduce emissions of air pollutants, including CO_2. These measures include use of efficient internal combustion engines rather than gas turbine engines, use of flash tank separators on glycol dehydrators to reduce methane, and an aggressive maintenance and monitoring program to reduce fugitive emissions. Because the applicant already uses operations and equipment that efficiently reduce the potential for GHG emissions, only limited options are available for further reduction of GHG emissions. In addition, many of the measures recommended by CAPCOA for GHG mitigation (CAPCOA 2008), such as measures addressing parking,

carpooling, and building heating and cooling, are more suited to larger land use developments, and are not applicable to an expansion of an existing facility with relatively few employees. Feasible mitigation for the GHG emissions associated with the Phase 3 Expansion includes the applicant's purchase of offsets and participation in agreements to use renewable sources of energy. The following mitigation measures would reduce impacts related to GHG emissions to a less than significant level, as shown in Table 3.2-16, below.

Table 3.2-16 GHG Emissions, GHG Threshold, and Mitigation for the Phase 3 Expansion

Emission Type	GHG Emissions[a] CO_2e (MT/year)	GHG Emissions Reductions from MM AIR-4~~5~~6[b] (MT/year)	GHG Emissions Reductions from MM AIR-5~~6~~7[d] (MT/year)	GHG Emissions with Mitigation, CO_2e (MT/year)
Direct[c]	41,752		32,767	8,985
Indirect (Electricity)	2,030	1,015		1,015
			Total	**10,000**
			CPUC Threshold	**10,000**
			Significance Level After Mitigation Incorporated:	**Less than Significant**

Notes:
[a]All emissions estimates assume worst case (maximum emissions); actual emissions are expected to be less than as listed.
[b]Emissions offset assumes 50% of total kilowatt hours (kWh) on an annual basis
[c]Includes all construction (amortized over 30 years) and construction emissions, except electricity usage at RFS
[d]Assumes applicant will report GHG emissions and offset to below significant on a yearly basis
Key:
CO_2 = Carbon dioxide
CO_2e = CO_2 equivalent
CPUC = California Public Utilities Commission
GHG = Greenhouse gas
MM = Mitigation measure
MT/year = Million tons per year

PHASE 3 MM AIR-6: Prior to construction of the Phase 3 Expansion, the applicant will enter into an agreement with PG&E to participate in PG&E's Climate Smart™ Program, to provide 50 percent of the electricity used at the RFS annually (approximately 1,000 metric tons CO_2e) from renewable energy sources. A copy of the agreement between the applicant and PG&E will be provided to CPUC prior to the start of operation of the expanded RFS. Annual reports on the applicant's participation in the program will also be submitted by the applicant to CPUC.

PHASE 3 MM AIR-7: Until the applicant is required to comply with an adopted, verifiable state-wide cap and trade program, the applicant will obtain and retire, by the end of each year of Phase 3 Expansion construction and operation, sufficient carbon credits to fully offset GHG emissions ("carbon offsets") in excess of 10,000 metric tons of CO_2e. After that time, the applicant will comply with the requirements of the adopted state-wide cap and trade program. The total amount of offsets purchased will be based on actual GHG emissions, which may be lower than the worst-case GHG emissions estimated for each year of construction and operation. Renewable Energy Certificates (RECs) and TRECS (Tradable RECs) do not qualify as GHG offsets. Carbon offsets will apply to Phase 3 Expansion construction GHG emissions (amortized over 30 years) as well as direct operational GHG emissions. Prior to completion of project construction, the applicant will prepare a detailed written summary of the carbon offsets, including offset type, location, calculation methodology protocol employed, and registration status. In addition, prior to completion of project construction, the applicant will provide to CPUC an independent verification opinion statement(s) for

the carbon offsets, from a verification body registered with the California Climate Action Registry, ANSI, or the CARB.

Offsets purchased from a third party or developed by the applicant must meet at least one of the following requirements:

1. Offset project is located within California;
2. Offset project is located in jurisdictions that hold current, specific agreements with California (such as the Climate Action Reserve), or exist in the context of an ISO-compliant regional trading system like that being developed in the Western Climate Initiative or other regional program; and/or
3. Offset project is an internally developed reduction measure following a recognized protocol (such as the Climate Action Reserve, the Voluntary Carbon Standard, or the Chicago Climate Exchange). Some potential offset projects of this type include:
    - Fuel switching in applicant-owned equipment;
    - Energy efficiency upgrades beyond business as usual;
    - Implementation of a quantifiable carpooling program above and beyond what is currently in place; and
    - Sequestration and/or destruction of GHG conducted in accordance with any protocol available at the time of construction from the Climate Action Reserve, the Voluntary Carbon Standard, or the Chicago Climate Exchange.

Any carbon offset either purchased or developed by the applicant through another entity will either be registered in, or developed in accordance with a protocol for, an established Carbon Reduction/Sequestration Project. Established projects and protocols include those provided by recognized organizations, such as the Climate Action Reserve, the Voluntary Carbon Standard, or the Chicago Climate Exchange, that can provide a reasonable level of assurance that GHG reductions are real, additional, permanent, and verifiable. If the applicant were to develop a carbon offset project without registering it with one of the above-referenced registration bodies, the applicant will demonstrate to CPUC that the offset satisfies the four additionality tests as outlined in the UNFCC Additionality Tool, and will obtain an independent evaluation by a qualified third party confirming that the offset meets additionality testing requirements.

Prior to the start of project operation, the applicant will submit a project design document describing baseline procedures and emissions levels as well as projected levels of emissions reductions/offsets to CPUC. The design document will include the requirement that the applicant submit a report annually to CPUC documenting the previous year's offset activities and purchases. The annual report will be independently verified by an ANSI-accredited GHG emissions reduction verification body.

Impact AIR-7: Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

CARB's Climate Change Scoping Plan (CARB 2008b) provides an outline for actions to reduce California's GHG emissions. The scoping plan now requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. At this time, there are no mandatory GHG regulations or finalized agency guidelines that would apply to the Phase 3 Expansion. However, it is expected that the Wild Goose Facility would be captured under the California mandatory GHG reporting program, and eventually be covered under a statewide cap-and-trade program.

Because there are no direct conflicts with any of the policies or GHG reduction measures outlined by the California Climate Action Team and mitigation will be applied as stated in PHASE 3 MM AIR-4 and PHASE 3 MM AIR-5, the Phase 3 Expansion would have a less than significant impact.

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the segment borders this area to the north. The Gray Lodge Waterfowl Management Area contains a variety of wetland features near the utility ROW, as well as clusters of mature riparian vegetation. Although these wetland features have not yet been formally delineated, initial observations indicated that none of the distribution line utility poles appear to be within a wetland feature in this area, and there is relatively clear access from the road and shoulder to the poles and other areas under the distribution lines (TRC 2010).

The segment of the Option A alignment along Pennington Road between West Evans Reimer Road and West Liberty Road is along paved road and is surrounded by rice fields and by wetland and annual grassland habitats within the Gray Lodge Waterfowl Management Area. Fifteen utility poles occur within this segment. Willow saplings and patches of blackberries occur within the utility ROW, and clusters of mature willows and other tree species including black walnut (*Juglans californica*) and eucalyptus (*Eucalyptus* sp.) occur along both sides of the road adjacent to the utility ROW. Most of the poles are surrounded by upland grasses or barren ground. An agricultural ditch runs along the east side of the utility ROW. Three partly inundated areas on the west side of the road appear to be fed by stormwater runoff. These areas support vegetation typical of wetland habitats, including rush species. In this segment, although wetland features have not been formally delineated, initial observations indicated that all poles are at least 30 feet from the edges of identified wetland vegetation (TRC 2010). Widespread use of herbicide to control vegetation is less apparent for this segment of the distribution line.

Option B Alignment

The segment of the Option B alignment along Pennington Road between West Liberty Road and Colusa Highway is along paved road, and surrounded by rice fields, except for one parcel that supports a mix of annual grassland and wetland habitats. Twenty poles occur within this segment. Most of the distribution line poles in this segment are surrounded by annual grasses and herbaceous species; however, five poles are adjacent to portions of a roadside ditch that supports cattails (*Typha* spp.) and tules (*Scirpus* sp.), both of which are wetland plants (TRC 2010). None of the utility poles are located within sensitive habitats, and nearly all areas along the road shoulder provide clear access to the poles and areas below the distribution lines (TRC 2010). One pole is surrounded by blackberry plants. Mature willows and eucalyptus trees are also scattered along both sides of this section.

The segment of the Option B alignment along Colusa Highway between Pennington Road and Randolph Avenue is along paved road. The western portion of the segment is surrounded predominantly by rice fields, and the eastern portion of the segment is surrounded by a mix of orchards, cropland, and residential development. A large agricultural/stormwater collection and conveyance ditch runs along the western portion of the segment; vegetation in this portion of the segment includes annual grasses and herbaceous species. In the eastern portion of the segment, some of the utility poles are in or on the southern bank of a roadside drainage ditch. Vegetation in this portion of the segment includes a variety of trees and shrubs, many of which have been pruned to keep them clear of the utility line. Along this segment, the road and road shoulder and other adjacent disturbed areas provide clear access to the utility poles and other areas below the distribution lines without impacting the ditches and vegetation.

Delevan Site

The Delevan Site is located approximately 1,400 feet west of the Glenn-Colusa Canal (see Figure 2-8). For the purposes of this analysis, the Phase 3 Expansion study area for the Delevan Site is defined as the area which includes the developed landscape at the Delevan Interconnect Site (the existing buildings and equipment within the fenced yard, the 20-foot gravel road that provides primary access to the site, and the southern shoulder of the adjacent 30-foot local access road), as well as an approximately 0.6-acre area at the location of the hot tapped pipeline connection installation west of the Delevan Interconnect

Site and immediately adjacent grasslands (as described in Chapter 2, Description of Phase 3 Expansion). The study area also includes scattered shrubs within a 1-mile radius of the Delevan Site which provide habitat for raptors and nesting birds.

In the vicinity of the Delevan Site, the dominant plant community type is upland annual grassland. Annual grasslands occur on fine-textured, usually clay soils that are moist or even waterlogged during the winter rainy season and very dry during the summer and fall (Holland 1986). These grasslands are often habitat for numerous species of showy, native annual wildflowers whose germination occurs with the onset of the late fall rains; growth, flowering, and seed-set occur from winter through spring (Holland 1986). With few exceptions, grasslands plants are dead through the summer and fall dry season, persisting as seeds (Holland 1986). Annual grasslands in the Phase 3 Expansion area at the Delevan Site are dominated by native and non-native species including Italian ryegrass, soft chess brome (*Bromus hordeaceus*), and barley (*Hordeum* spp.; TRC 2009a). Other species in these disturbed grasslands include wild oat (*Avena barbata*), Ripgut brome (*Bromus diandrus* Roth), Bermuda grass (*Cynodon dactylon* Pers.), red brome (*Bromus rubens*), yellow star thistle (*Centaurea solstitialis*), filaree (*Erodium* sp.), bur-chervil (*Anthriscus caucalis*), and clover (*Trifolium sp*.).

Vernal pools are also present in the vicinity of the site, located approximately 1,000 feet east of the Delevan Interconnect Site, directly adjacent to the Glenn-Colusa Canal, in the grasslands bordering the 30-foot local road in this area, but are not present within the Phase 3 Expansion area. These pools are dominated by the following species: Italian ryegrass (*Lolium perenne* ssp. *multiflorum)*, Mediterranean barley (*Hordeum marinum*), toad rush (*Juncus bufonius*), and swamp timothy (*Crypsis schoenoides*; TRC 2009a). The entire grassland area, including the vernal pools, is subject to regular cattle grazing.

3.3.1.2 Sensitive Species

Literature Review

Known locations of sensitive species potentially occurring in the portion of the Western Sacramento Valley containing the RFS and the Delevan Site Phase 3 Expansion areas were obtained from the California Natural Diversity Database (CNDDB), the California Native Plant Society (CNPS), and the USFWS. A total of ~~57~~ 56 sensitive species—25 plant and ~~32~~ 31 wildlife species—were identified from these databases, and are listed in Table 3.3-1. Of these species, many were eliminated from further consideration upon review of surveys conducted for the study area because (1) suitable habitat is lacking in the Phase 3 Expansion area and/or (2) the Phase 3 Expansion area is outside of the species range.

Surveys Conducted

Field studies were conducted by the applicant in 2008, 2009, and 2010 to re-evaluate the habitats in the Phase 3 Expansion area. Both the RFS and the Delevan Site were surveyed, and coverage included the Phase 3 Expansion study area as described above, except that the local roads at each site were only assessed up to the road shoulder directly bordering each site.

Reconnaissance surveys to assess habitat for special status species were conducted in December 2008, and in February, March, July, and September 2009. Additionally, protocol-level surveys for rare plants were performed at both sites in February 2009, and a wetland delineation was conducted within the drainage south of the RFS in August and September 2009. Raptor and bird presence and potential nests were assessed visually during reconnaissance surveys in 2008 and 2009 for an area with a radius of 1 mile from the Phase 3 Expansion areas at the RFS and the Delevan Site, with the exception of burrowing owl assessments, which did not extend to areas across main access roads.

Table 3.3-1 Special Status Species with Potential to Occur in the Phase 3 Expansion Area

Common Name Scientific Name	Legal Status			Plant Community/Habitat Association	Potential in the Phase 3 Expansion Area	
	Federal	State	CNPS		Remote Facility Site	Delevan Site
central population *Ambystoma californiense*				vernal ponds and their associated grasslands, oak savannas and coastal scrub plant communities. Due to habitat loss, this species will also use manufactured, ephemeral, or permanent pools. Rarely seen due to primarily subterranean behaviors; inhabits ground squirrel and pocket gopher burrows within 1 mile of breeding pool. Relies on barrier-free uplands adjacent to ponds and on the presence of burrowing rodents. Not known to occur north of Yolo County.	(Butte County) does not appear to support the salamanders, although it did historically.	
California red-legged frog *Rana aurora draytonii*	FT, CH	CSC	–	Requires permanent or nearly permanent pools. Prefers shorelines with extensive vegetation and deeper pools. Highly susceptible to predation by fish and bullfrogs. Listed as occurring in Butte, Glenn, Sutter, and Colusa Counties.	No potential. Not expected to occur in the Phase 3 Expansion area due to current distribution and presence of bullfrogs. There are no CNDDB records within 5 miles of the RFS.	No potential. Not expected to occur in the Phase 3 Expansion area due to current distribution and presence of bullfrogs. There are no CNDDB records within 5 miles of the Delevan Site.
Mountain yellowlegged frog *Rana muscosa*	FC	CSC	–	Ponds, lakes, and streams at montane elevations of 4,500 to 12,000 feet. Listed as occurring in Butte County.	No potential. Not expected to occur in the Phase 3 Expansion area because the Phase 3 Expansion is out of the elevation range of the species.	No potential. Not expected to occur in the Phase 3 Expansion area because the Phase 3 Expansion is out of the elevation range of the species.
Western spadefoot toad *Spea hammondii*	–	ST ~~CSC~~	–	Occurs in valley and foothill grasslands, river floodplains, marshes, and alluvial fans, typically below elevations of 3,000 feet. Requires loose, sandy, or gravely soil a minimum of 3 feet deep, with sparse vegetation. Breeding pools must have standing water for at least three weeks. Terrestrial and breeding habitats must be in close proximity. Susceptible to predation by red swamp crayfish and bullfrogs; low frequency noise and/or vibrations near this	Potential. Site has adjacent drainage areas and marshes, as well as a gravely access road that may provide both suitable breeding and terrestrial habitats.	Potential. Suitable habitat west of the Glenn-Colusa Canal and vernal pool complex (1,000 feet from the Delevan Site).

Table 3.3-1 Special Status Species with Potential to Occur in the Phase 3 Expansion Area

Common Name Scientific Name	Legal Status			Plant Community/Habitat Association	Potential in the Phase 3 Expansion Area	
	Federal	State	CNPS		Remote Facility Site	Delevan Site
				species may result in mortality or reduce productivity. Listed as occurring in Butte, Glenn, Sutter, and Colusa counties.		
Reptiles						
Northwestern pond turtle *Clemmys marmorata marmorata*	–	CSC	–	Species forages in wetlands, ponds, marshes, lakes, streams, and irrigation drainages. Well-vegetated banks and basking logs required. Typically locate nests on unshaded slopes. Listed as occurring in Butte, Glenn, Sutter, and Colusa counties.	Occurs. Has been observed in Phase 3 Expansion area.	No potential. No suitable habitat.
Giant garter snake *Thamnophis gigas*	FT	ST	–	Species forages in permanent or seasonal slow-moving water with emergent vegetation, mud bottoms, and dirt banks. Occurs in irrigation drainages year-round, rice fields during growing season. Absent from waters with predatory fish. Species requires upland sites or elevated features above floodwaters for winter refugia. Butte, Glenn, Sutter, Colusa counties.	Occurs. Has been observed in Phase 3 Expansion area.	No potential. No suitable habitat.
Birds						
Tricolored blackbird *Agelaius tricolor*	–	CSC	–	Favors mature stands of cattails and scrub near water, blackberries, hay fields, wheat fields. Nesting synchronous. Colonies have been reported outside the Phase 3 Expansion area. Butte and Glenn counties.	Potential. Nesting habitat within 0.5 miles. Not observed during surveys in 2009.	No potential. No suitable habitat.
Western burrowing owl *Athene cunicularia*	–	CSC	–	Occurs primarily in grassland; also occasionally in levees and irrigation dikes, if there is enough soil for a burrow. Dependent on ground squirrels for burrows. Listed as occurring in Butte, Glenn, Sutter, and Colusa counties.	No potential. No suitable habitat.	Potential; suitable habitat in the Phase 3 Expansion vicinity. No ground squirrels or suitable burrows observed during surveys.

Table 3.3-1 Special Status Species with Potential to Occur in the Phase 3 Expansion Area

Common Name Scientific Name	Legal Status			Plant Community/Habitat Association	Potential in the Phase 3 Expansion Area	
	Federal	State	CNPS		Remote Facility Site	Delevan Site
				about 1 inch that does not fluctuate during the year for nesting habitat. Generally does not migrate throughout the year; breeding occurs from February to August. Highly secretive and rarely leaves its wetland habitat.		
Osprey *Pandion haliaetus*	–	WL ~~CSC~~	–	Able to live and breed successfully in a wide range of terrain; suitable habitat has safe nest sites and shallow water with abundant fish. Nests are generally very bulky, and can be found anywhere that keeps them safe from ground-based predators, including over-water and artificial nest sites. This species travels far from the nest during the day, and can be gone for long periods of time. Does not necessarily migrate, and may over-winter in selected habitat. Therefore, breeding can occur anytime in the winter or summer.	Potential; suitable habitat for foraging and nesting. Observed approximately 4 miles from RFS area.	Potential. Suitable foraging habitat. No suitable nesting habitat.
White-faced ibis *Plegadis chihi*	–	WL	–	Occurs in any water area or rice field or other harvested grain fields. Nests in aquatic vegetation, shrubs, and low trees in large colonies. Listed as occurring in Butte, Glenn, Sutter, and Colusa counties.	Occurs. Suitable foraging habitat in the Phase 3 Expansion area. Observed foraging in area during surveys in 2009.	No potential. No suitable nesting habitat.
Bank swallow *Riparia riparia*	–	ST	–	Colonial nesters in riparian and other lowland habitats where they dig neat holes in vertical banks and cliffs with fine-textured or sandy soils.	No potential. No suitable habitat.	No potential. No suitable habitat.
Northern spotted owl *Strix occidentalis caurina*	FT, CH	CSC	–	Uses dense, multi-layered conifer forests. Listed as occurring in Glenn and Colusa counties.	No potential. No suitable nesting or foraging habitat exists in the Phase 3 Expansion area.	No potential. No suitable nesting or foraging habitat exists in the Phase 3 Expansion area.

Table 3.3-1 Special Status Species with Potential to Occur in the Phase 3 Expansion Area

Common Name Scientific Name	Legal Status			Plant Community/Habitat Association	Potential in the Phase 3 Expansion Area	
	Federal	State	CNPS		Remote Facility Site	Delevan Site
Mammals						
Pacific fisher *Martes pennanti* (*pacifica*) DPS	FC	Candidate for ST, CSC	–	Occurs in intermediate to large tree stages of coniferous forests and deciduous riparian woodlands. Listed as occurring in Butte, Glenn, and Colusa counties. The specie's range surrounds the Sacramento Valley, but is not within the Sacramento Valley.	No potential. Phase 3 Expansion area is not within range of species.	No potential. Phase 3 Expansion area is not within range of species.

Sources: CDFG 2009, CNPS 2009, Hickman 1993, Kirschbaum and Watkins 2000, Limas 2001, Null 1999, Porter 2000, Redding 2000, SAIC 2007, USFWS 2009, TRC 2009a

Notes:

* * Special status species highlighted in gray have been known to occur within the Phase 3 Expansion area and/or have suitable habitat within the known range which may be affected by various Phase 3 Expansion components.

Key:

CNDDB = California Natural Diversity Database
NWR = National Wildlife Refuge
RFS = Remote Facility Site
Status Codes

U.S. Fish and Wildlife Service

FC = Listed as candidate by the federal government
FE = Listed as endangered by the federal government
FT = Listed as threatened by the federal government
CH = Critical habitat in Butte County and/or Colusa County

California Natural Plant Society

1B = Rare, threatened, or endangered in California
2 = Rare, threatened, or endangered in California, but more common elsewhere
3 = Need more information about this plant (Review List)

California Department of Fish and Game

CSC = Listed as California species of special concern
FP = Fully protected
SE = Listed as endangered by the state government
SR = Listed as rare by the state government
ST = Listed as threatened by the state government
WL = Watch List

These surveys were supplemented by additional surveys conducted by biological monitors from July through September 2009 during construction of Phase 2 Expansion components at the RFS. Preconstruction surveys targeted nesting birds and raptors and rare plants, and included scans for any other special status species that might occur within the Phase 2 work area. Reconnaissance and protocol-level surveys for various species listed in Table 3.3-1 were conducted in 2001 as part of the biological assessment for the 2002 EIR. A biological assessment of the reconductoring component area was also completed in 2010, and did not identify any special status species that had not already been identified for the RFS area.

Evaluation of the literature (as discussed above) and results of the 2001, 2008/2009, and 2010 field surveys indicated that seven sensitive plant and ~~18~~ 14 sensitive wildlife species are either known to occur in the Phase 3 Expansion areas at the RFS, reconductoring area, or Delevan site, or use habitat that could be affected by the proposed Phase 3 Expansion components. These species are shaded in gray in Table 3.3.1, and are described below as relevant for the Phase 3 Expansion study area. Where no reference is given for the description of these species below, information has been taken from the applicant's BA (TRC 2009a).

Although there are no vernal pools within the Phase 3 Expansion study area, special status plant and wildlife that may be associated with vernal pool systems may occur in the adjacent grassland habitat. Special status plants associated with vernal pools require specific microhabitat conditions, and would only occur within or bordering the pools; however, special status wildlife may occur both in the pools and adjacent to them, depending on their lifecycle requirements. For instance, some amphibians require both wetlands for breeding habitat and upland habitats for aestivation (a state of dormancy during summer or hot weather) and foraging habitat.

Special Status Plants

Several special status plants have the potential to occur within the Phase 3 Expansion area at the RFS and Delevan Site. Suitable habitat for the following plants occurs within the adjacent roadside drainage at the RFS site: woolly rose-mallow (also known as California hibiscus), Sanford's arrowhead *(Sagittaria sanfordii)*, and Brazilian watermeal *(Wolffia brasiliensis*). None of these species was observed during the 2009 rare plant surveys.

Suitable habitat for the following plants occurs within the annual grasslands surrounding the Delevan Site: bent-flowered fiddleneck *(Amsinckia lunaris*), Ferris' milkvetch *(Astragalus tener var. ferrisae*), adobe lily *(Fritillaria pluriflora*), and Milo Baker's lupine *(Lupinus milo-bakeri*). None of these species was observed during the February 2009 rare plant surveys, and no occurrences have been reported by the CNDDB within 5 miles of the Delevan Site. The absence of these plants is likely due to the fact that the grasslands at the site are of low quality due to regular disturbance from agricultural disking.[2]

No special status plants were identified in the area of the reconductoring component.

Special Status Wildlife

Remote Facility Site

Suitable habitat for the following special status wildlife occurs at the RFS site: northwestern pond turtle (*Clemmys marmorata marmorata*), giant garter snake *(Thamnophis gigas*), tri-colored blackbird

[2] "Disking" refers to cultivation of soils in agricultural areas with an implement that turns and loosens the soil with a series of metal disks.

(Agelaius tricolor), black tern *(Chlidonias niger)*, greater sandhill crane *(Grus canadensis tabida)*, California black rail *(Laterallus jamaicensis coturniculus*), and white-faced ibis *(Plegadis chihi)*.

Northwestern pond turtles forage in ponds, marshes, irrigation drainages, and other wetland areas; additionally, most nesting sites are within 200 yards of the aquatic foraging site (Jennings and Hayes 1994). This species has been observed in drainages associated with the roadside and the rice fields in the RFS area.

Giant garter snake is endemic to the valley floor wetlands of the Sacramento and San Joaquin valleys of Central California (USFWS 2009). Giant garter snakes are active from mid-March until October, breed in March and April, and are dormant from November to mid-March, during which months they retreat to winter hibernation areas (hibernacula). This species is primarily associated with wetlands, marshes and sloughs, low gradient streams, agricultural wetlands, and irrigation and drainage canals. Once common, giant garter snake has been affected by the elimination and degradation of its preferred aquatic habitat as a result of urban development, resulting in substantial population reduction. In addition, contaminants from agricultural runoff and predation from introduced species such as bullfrogs (*Rana catesbeiana*) threaten this species' future success and viability (CDFG 2009). Giant garter snakes could forage in the rice fields and drainages surrounding the RFS, and could use the unpaved farm equipment storage and hunter parking area and the berms around the RFS as upland hibernacula.

Tricolored blackbird nesting colonies are generally found in thickets of riparian scrub, blackberries, or wild roses, or in wheat fields or freshwater marshes near water. Colonies forage in pastures, grasslands, or croplands up to 4 miles from breeding sites (CDFG 2009). Though the tricolored blackbird was not observed during 2009 field surveys, CNDB records include a report of this species outside of the RFS area in the vicinity of the site, and this species could forage and nest within 0.5 miles of the RFS. The general bird breeding season (which would include the blackbird) for this region is late February to early July. Preconstruction surveys for Phase 2 construction activities did not detect nesting colonies within the immediate area. There is potential for this species to occur at the RFS.

Black terns inhabit shallow inland marshes and sloughs with dense vegetation and pockets of open water, but will also nest in rice fields. As these types of habitats have historically declined, rice fields have become a more common habitat for this species (CDFG 2009). Black terns occur at the RFS and also are found frequently in Butte County. Black terns were also observed foraging in the area of the RFS during surveys conducted in 2001.

Greater sandhill cranes prefer to forage in grain fields within 4 miles of a shallow water body, which is also used as a communal roosting site (CDFG 2009). These habitats exist in the rice fields and adjacent wetlands at the RFS; additionally, CNDDB records include a report of greater sandhill crane observations within 2 miles of the RFS. This species could occur at the RFS.

California black rail only inhabits marshes and wetlands with dense vegetation and specific water depth requirements (CDFG 2009). This species is highly secretive and difficult to observe. The California black rail is known to occur 3.5 miles from the RFS, according to CNDDB records. The roadside drainage areas adjacent to the RFS could provide adequate habitat for this species, and there is potential for this species to occur in the wetland areas surrounding the RFS.

White-faced ibis are colony-nesting birds that form rookeries in aquatic vegetation, shrubs, or low trees near water or wetlands. This species feeds in emergent wetland vegetation, wet meadows, shallow waters, pastures, and flooded rice fields. Breeding colonies in California have become rare, likely due to destruction of marsh systems (CDFG 2009). This species was observed foraging in the RFS area during

APM BIO-4: On-Site Environmental Training Program.

APM BIO-5: Vehicle Measures.

APM BIO-6: Refueling and Hazardous Materials Storage Measures.

APM BIO-7: Clear Construction Area Boundaries.

APM BIO-8: Equipment Washing.

APM BIO-9: Trench Backfilling.

APM BIO-10: Trench Ramping.

APM BIO-11: Water Withdrawal for Hydrostatic Testing.

APM BIO-12: Restoration of Grasslands Over Pipeline (Delevan Site).

APM BIO-13: The Comprehensive Landscape Restoration Plan.

APM BIO-14: Avoidance of Vernal Pools and Swales.

APM BIO-15: Protection of Sensitive Plants.

APM BIO-16: Invertebrate Species Protection Measures.

APM BIO-17: Reptile Species Protection Measures.

The project features included in Table 3.3-3 addressing biological resources were adopted as part of the 2002 EIR for the Phase 2 Expansion, as either mitigation measures (MMs) or APMs. These measures would also apply to the Phase 3 Expansion.

Table 3.3-3 Project Features Addressing Biological Resources Adopted as Part of the 2002 EIR

Mitigation 3.4-1. WGSI shall develop and implement an Integrated Vegetation Management Plan.
~~**Mitigation 3.4-4.** WSGI shall compensate the loss of 1.4 acres of wetlands by wetlands creation, restoration, or securing mitigation at an appropriate mitigation bank.~~
~~**Mitigation 3.4-5.** WSGI shall compensate the conversion of 23 acres of wetlands by wetlands creation, restoration, or securing mitigation at an appropriate mitigation bank.~~
Mitigation 3.4-7. Water Withdrawal for Hydrostatic Testing will be Timed and Conducted in a Manner to Avoid Adverse Effects to Fish and Aquatic Life.
Mitigation 3.4-8(a). Preconstruction surveys shall be conducted and construction shall be scheduled in giant garter snake habitat to avoid impacts to snakes or their habitat.
~~**Mitigation 3.4-8(b).** Preconstruction surveys shall be conducted for giant garter snake and protective actions (such as snake removal) shall be initiated prior to implementation of the Habitat Enhancement Plan.~~
Mitigation 3.4-8(c). Preconstruction surveys for northwestern pond turtle shall be conducted and impact avoidance and species protection procedures shall be implemented.
Mitigation 3.4-8 (d). Preconstruction surveys for Swainson's hawk shall be conducted and construction activities shall be scheduled to avoid impacts to nest sites.
Mitigation 3.4-8(e). Preconstruction surveys for Northern harrier shall be conducted and construction activities shall be scheduled to avoid impacts to nest sites.
Mitigation 3.4-8(g). Preconstruction surveys for Loggerhead shrike shall be conducted and construction activities shall be scheduled to avoid impacts to nest sites.

Table 3.3-3 Project Features Addressing Biological Resources Adopted as Part of the 2002 EIR

Mitigation 3.4-8(i). Preconstruction surveys for White-faced ibis shall be conducted and if present, nest sites shall be protected by appropriate buffers during construction.
Mitigation 3.4-8(j). Preconstruction surveys for Black tern shall be conducted and if present, nest sites shall be protected by appropriate buffers during construction.
Mitigation 3.4-8(k). Preconstruction surveys for Tricolored blackbird shall be conducted and if present, nest sites shall be protected by appropriate buffers during construction.
Mitigation 3.4-8(l). Preconstruction surveys for Western burrowing owl shall be conducted and if required, species protection, or species relocation plans shall be implemented.
Mitigation 3.4-10(b). Operations blowdowns and emergency shutdown valve blowdowns shall be routed into silencers (see WSGI Measure 3.10-2).
Mitigation 3.4-10(c). WGSI will reduce the gas/volume in the pipeline to a minimum prior to a planned maintenance blowdown (see WSGI Measure 3.10-3).
Mitigation 3.4-11(a). WGSI will implement an equipment-washing program to control the introduction and potential spread of noxious weeds. Washing of construction equipment before such equipment is delivered to the project site will be implemented to control the introduction of potentially noxious weeds to the project area. In addition, only weed-free materials will be used to for erosion control materials.
Mitigation 3.4-11(b). WGSI shall implement a weed eradication program if weeds are introduced to construction areas. All construction areas revegetated by the project will be monitored to ensure that noxious weeds are not present. If noxious weeds do occur on the pipeline ROW in numbers exceeding those in populations adjacent to the ROW, in areas not disturbed by construction, a noxious weed control program will be implemented. This program would be a component of the Integrated Vegetation Management Plan (see Mitigation 3.4-9) and would involve eradication of weeds by a combination of grubbing or chemical spraying pursuant to the IVM goals of environmentally sound vegetation management.

3.3.3.2 Potential Impacts to Biological Resources

The Phase 3 Expansion would have some of the same impacts as identified in the 2002 EIR for the Phase 2 Expansion, but the Phase 3 impacts would be less intensive and extensive. As discussed below, the Phase 3 Expansion could result in the following: (1) impacts to native vegetation; (2) impacts to wetlands, freshwater marsh, and drainages; (3) impacts to downstream fisheries and aquatic life; (4) impacts to special status wildlife species; (5) impacts to nesting birds; and (6) introduction and spread of noxious weeds.

As discussed for the Phase 2 Expansion in the 2002 EIR, the following topics are areas of potential environmental concern that may be associated with implementation of the Phase 3 Expansion:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the CDFG or USFWS-;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;

between work areas and active nests in coordination with the CDFG and depending on the species, site conditions, and proposed work activities near the active nest.

Impact BIO-2: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

Phase 3 Expansion construction activities could result in the loss of riparian vegetation at the RFS site, loss of native annual grasslands at the Delevan Site, and the potential degradation of these habitats through the introduction of invasive plant species (noxious weeds).

Potential Loss of Native Annual Grasslands at Delevan Site

Up to 0.6 acres of annual grassland could be temporarily disturbed during construction activities at the Delevan Site, at the location of the hot tapped pipeline connection installation, as described in Chapter 2, Description of Phase 3 Expansion. Temporary impacts to annual grasslands would not be considered significant given the abundance of this habitat type in the immediate area and the capacity for this habitat for rapid re-establishment with routine restoration (TRC 2009a). Although annual grasslands in this region provide suitable habitat for special status plants, no special status plants were found during surveys and thus no special status plants would be impacted by construction of the Phase 3 Expansion components at the Delevan Site. Additionally, these grasslands are continuously disked for agricultural purposes, and thus it is not expected that special status plants would occur within this area, as long as this practice takes place.

Grasslands also provide potential upland aestivation habitat for Western spadefoot toad, and foraging and/or nesting habitat for sensitive bird species including burrowing owl, Swainson's hawks, northern harrier, white-tailed kite, loggerhead shrike, and osprey. Impact analysis and associated mitigation for these species is discussed above.

The applicant proposes specific restoration measures for temporary disturbance to annual grassland to ensure impacts remain less than significant. Where work extends outside of fenced areas at the hot tapped pipeline connection location, a minimum of 1 foot of topsoil would be segregated from the grasslands disturbed by trenching, and replaced after construction activities are complete. The hot tapped pipeline connection location would be seeded with a native seed mix, as noted in the APMs above, and a straw or wood slurry mulch would be applied. Revegetation activities would commence at the hot tapped pipeline connection location as soon as construction was completed. In addition, the Landscape Restoration Plan developed for the Phase 2 Expansion would be implemented for the Phase 3 Expansion. With the implementation of these measures, impacts to native vegetation communities would be less than significant.

Potential Loss of Riparian Habitat on RFS Isolation Berms

To isolate the rice fields surrounding the RFS from the Phase 3 Expansion area, temporary isolation berms would be built large enough to prevent water from entering the Phase 3 Expansion construction area. The size of the berms would be approximately 3.5 feet wide and up to 3 feet high. The berms would be constructed on the west and north perimeter of the Phase 3 Expansion area. After construction, the berms would be removed, the rice field restored, and the land within the rice field leveled in accordance with the landowner's requirements. After site development and building erection, as part of the final stage of construction at the RFS, permanent berms would be installed at the site and the entire site (including berms) would be landscaped.

Prior to Phase 3 Expansion construction at the RFS, berms that were built to isolate the rice fields from the Phase 2 Expansion construction would be relocated around the expanded Wild Goose Facility. Sparse riparian vegetation such as willows and blackberry bushes exists on the existing dirt berms. This vegetation, which is irrigated, anchors the soil and reduces erosion. Although this vegetation is not located in a native riparian corridor, it may provide forage and shelter habitat for wildlife species. Removal of established isolation berms would require removal of the riparian vegetation. As part of APM BIO-13 (Comprehensive Landscape Restoration Plan), the applicant will transplant viable vegetation to the new, permanent berms and other locations at the RFS. Impacts to riparian habitat would be less than significant.

Potential Introduction of Noxious Weeds at RFS and Delevan Site from Phase 3 Construction Activities

Introduction of noxious weeds into the Phase 3 Expansion area could occur during construction, from grading and earth-moving activities, as well as during installation and removal of the temporary isolation berms. The spread of noxious weeds would potentially displace native and sensitive vegetation, and thus reduce the quality of foraging habitat for native and sensitive wildlife. Disturbance of annual grasslands at the Delevan Site would be less than significant because the grasslands have previously been highly disturbed, less than 1 acre of grassland would be affected, and proposed APMs would reduce the potential for introduction and spread of noxious species. Likewise at the RFS, vegetation in and around the drainages and rice fields is relatively disturbed, and APMs would prevent further disturbances from noxious weed proliferation. Impacts related to the spread of noxious weeds would be less than significant.

Impact BIO-3: Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

Phase 3 Expansion construction activities would not result in impacts to vernal pools in the vicinity of the Delevan Site, but would result in the loss of wetlands (rice fields and freshwater marsh) at the RFS. Reconductoring activities have the potential to affect wetland areas identified along West Evans Reimer Road (Option A alignment) and Pennington Road (Options A and B alignments).

Vernal Pools (Delevan Site)

Three highly disturbed vernal pools were identified in the grassland between the Delevan Interconnect Site and the Glenn-Colusa Canal, approximately 1,000 feet east of the Delevan Interconnect Site. These vernal pools are located along Dirks Road directly paralleling the Glenn-Colusa Canal, and are outside the direct influence of the Phase 3 Expansion area. The vernal pools would be avoided during construction, and thus no significant impacts are expected.

Rice Fields (RFS)

Rice fields are considered by the USACE to be farmed wetlands, providing important functional habitat for sensitive species. Approximately 6.13 acres of rice field would be temporarily impacted, while 4.5 acres of rice field would be permanently filled as a result of Phase 3 Expansion activities at the RFS. A permanent loss of foraging habitat for giant garter snake would result from expansion of the RFS into the adjacent rice field. Although both temporary and permanent impacts would be considered potentially significant, mitigation implemented consistent with the requirements in the USFWS BO dated September 13, 2002 (File No. 1-1-02-F-0060) and the CDFG Take Permit dated September 26, 2002, (File No. 2081-2002-017-02) for the giant garter snake would address these impacts. The implementation of MM BIO-3

would occur over a short-term period and would be a temporary, but potentially significant, impact. The implementation of MM BIO-4 would reduce this impact to a less than significant level.

PHASE 3 MM BIO-6: The following measures will reduce impacts to downstream fisheries and aquatic habitat at the RFS during Phase 3 Expansion construction activities:

1. The applicant will participate in ongoing consultations with CDFG (under Fish and Game Code 2081 and 1602) and USFWS (Section 7 consultation) ~~to establish a rate of withdrawal such that~~ to ensure water withdrawals and other activities at the RFS do not result in unacceptable impacts to downstream fisheries ~~do not occur~~. To this end, the applicant will adhere to any stipulations required by CDFG and USFWS regarding the water withdrawal rate, volume, and timing established through the agency consultation process. The applicant will also submit any required documented evidence that the stipulated conditions of water withdrawal have been met to both CDFG and USFWS.
2. In coordination with CDFG and USFWS, the applicant shall conduct downstream monitoring required by CDFG and/or USFWS to verify that withdrawal volume does not adversely impact fisheries or the aquatic life components that support special status aquatic species.

Potential Impacts to Nesting Sensitive Bird Species

Noise from construction activities could disturb the following sensitive birds that may nest in the area:

- Swainson's hawks
- northern harriers
- white-tailed kites
- greater sandhill cranes
- California black rail
- burrowing owls
- tricolored blackbirds
- white-faced ibis
- loggerhead shrikes
- black terns
- ospreys

Noise from Phase 3 Expansion construction activities, including human presence, at the RFS, reconductoring component area, or Delevan Site, may cause birds to abandon or avoid nests, resulting in a failure to lay eggs or mortality of the chicks from neglect. These birds could also be impacted by removal of trees and shrubs that provide nesting or roosting sites. Permanent loss of grasslands could remove foraging habitat for birds that may nest within 1 mile of the Delevan Site. This would be considered a less than significant impact due to the small amount of habitat that would be lost and the large quantity of available foraging habitat in the vicinity. Noise from operational activities, such as blow-down venting, may cause nesting birds to temporarily leave nests, which would be considered potentially significant. Implementation of the measures adopted for the Phase 2 Expansion, the APMs listed above, and MMs BIO-1, BIO-2, and BIO-3 (as pertinent to nesting raptors) would reduce impacts to less than significant levels.

Impact BIO-5: Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

As discussed above, policies, plans, and regulations at the local level are general in nature. Specific policies from the Butte County General Plan require common measures employed to protect biological

resources at the local level. These measures are already a part of the APMs and MMs stated for this project; therefore, there would be no conflict with local policies and no impact would occur.

Impact BIO-6: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

The Phase 3 Expansion would not conflict with any applicable habitat conservation plan or natural community conservation plans. No habitat conservation plans or natural community conservation plans have been adopted for Butte County or Colusa County. The Butte County Association of Governments is leading the planning efforts for preparation of the Butte County HCP/NCCP, as described in Section A.7, Land Use and Planning. BCAG is in the process of developing conservation strategies for sensitive species and habitats; however, the Butte County HCP/NCCP is still in the draft stages and is not anticipated to be adopted by local jurisdictions and the wildlife agencies (USFWS and CDFG) until 2011 (CDFG 2009, BCAG 2010). Construction and operation of the Phase 3 Expansion would not conflict with a habitat conservation plan or natural community conservation plan, and no impact would occur.

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a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION. In Butte County, the Phase 3 Expansion would impact land at the RFS, which is zoned for agriculture with a 40-acre minimum lot size, and with FMMP designations of Prime Farmland and Farmland of Statewide Importance. The reconductoring component would take place adjacent to lands that are zoned for Agriculture with a 40-acre minimum lot size and Agriculture with a 5-acre minimum lot size, and with FMMP designations of Prime Farmland. The Butte County municipal code permits development of natural gas-related facilities in areas zoned for agriculture (Butte County 2009b). CPUC General Order Number 131-D Section XIVB preempts Butte County and the City of Gridley from regulating the reconductoring component. In Colusa County, the Phase 3 Expansion would temporarily impact land zoned for grazing and land currently in agricultural production, and would impact land with an FMMP designation of Farmland of Local Importance.

Butte County is the local agency with the authority to determine the significance of impacts related to the conversion of agricultural lands in the county as well as enforce mitigation of such impacts. Although the 2002 EIR identified the conversion of farmland to non-agricultural use from the Phase 2 Expansion as a significant and unavoidable impact, Butte County Planning Division staff have indicated that the acreage of agricultural conversion represented by the Phase 3 Expansion (2.6 acres of Prime Farmland and 1.9 acres of Farmland of Statewide Importance at the RFS) would result in a relatively minor impact (Breedon 2010, Price 2010). Appropriate compensatory mitigation would reduce this potential impact. Because the FMMP program falls under State legislation for the protection of open space lands, appropriate compensatory mitigation includes forms of open space preservation and conservation, including compensatory wetlands mitigation.

Although the 2002 EIR identified the conversion of farmland to non-agricultural uses as a significant and unavoidable impact, the amount of farmland that would be converted as part of the Phase 3 Expansion is much smaller than that included in the analysis for the Phase 2 Expansion, and appropriate compensatory mitigation may be applied to reduce this impact to a less than significant level. Implementation of the following Mitigation Measure (MM) AG-1 would address potential impacts to Prime Farmland and Farmland of Statewide Importance:

> **PHASE 3 MM AG-1.** The applicant will purchase or obtain compensatory mitigation for the conversion of Prime Farmland and Farmland of Statewide Importance at a ratio of one unit of mitigation to one unit of agricultural land converted. Compensatory mitigation options for the conversion of FMMP designated farmland include one or more of the following:
>
> 1. Purchase of mitigation credits from an agricultural mitigation bank located within Butte County;
> 2. Placement of an easement or other restrictions to non-agricultural uses on existing agricultural land in Butte County; and/or
> 3. Purchase of wetlands and/or endangered species habitat mitigation credits from an appropriate ~~wetlands~~ mitigation bank at a ratio of two units of mitigation to one unit of agricultural land converted.

The selection of the mitigation bank and/or agricultural land use restriction documentation, and the purchase or completion of the compensatory mitigation, will be approved by CPUC Energy Division staff and Butte County Planning Division staff prior to the construction of the Phase 3 Expansion.

As described in Section 3.3, Biological Resources, the Phase 3 Expansion would also result in the removal of several trees at the RFS. Tree re-planting and monitoring for successful restoration of trees and other lands at the RFS following construction activities would be accomplished through the implementation of APM BIO-13.

Impacts to Prime Farmland and Farmland of Statewide Importance at the RFS would be mitigated by the implementation of the APMs and project features adopted as part of the 2002 EIR and applicable to the Phase 3 Expansion described above, as well as the implementation of MM AG-1 and APM BIO-13.

The Phase 3 Expansion components proposed for the Delevan Site would result in a temporary (approximately 3 months) impact to FMMP designated Farmland of Local Importance, during construction of the Phase 3 Expansion components. This impact would affect a relatively small area of land (approximately 0.6 acres), and would be temporary, because affected land would be restored after construction. In addition, no impacts to agricultural lands from reconductoring activities are anticipated. For these reasons, mitigation would not be required for these two components, and Phase 3 Expansion activities in the area of the hot tapped pipeline connections and the reconductoring would result in a less than significant impact.

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

NO IMPACT. The Phase 3 Expansion would not conflict with existing zoning for agricultural use. Per the Butte County zoning ordinance, development of natural gas-related facilities is a permitted use in areas zoned for agriculture (Butte County 2009b). The reconductoring component of the Phase 3 Expansion would not conflict with existing zoning for agricultural use, because reconductoring activities are exempt from local planning regulations, as discussed above.

The Colusa County General Plan allows oil and natural gas facilities as a compatible and acceptable use in the A-G zone as long as the use does not interfere with the viability of agriculture or create environmental hazards (Colusa County 1989). The Phase 3 Expansion components proposed at the Delevan Interconnect Site would take place within the existing footprint of the site and would not permanently affect agricultural production activities in the area. The hot tapped pipeline connection installation would temporarily affect a small (approximately 0.6 acres) area of land in agricultural use, which would be restored after the construction period, and agricultural production activities in this area would not be permanently affected.

Section A.5 of this document addresses potential hazards that may be posed by the Phase 3 Expansion; as described in this section, the proposed expansion elements would not result in environmental hazards. Additionally, the Phase 3 Expansion components do not cross or border any Williamson Act parcels; therefore, there would be no impact under this criterion.

c. Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

NO IMPACT. The RFS, reconductoring component area and Delevan Site are not within forest lands. The nearest forest land to the RFS and the reconductoring component area is the Plumas National Forest, which is approximately 27 miles to the east. The nearest forest land to the Delevan Site is the Mendocino National Forest, which is approximately 15 miles to the west (USFS 2009). The Phase 3 Expansion

California Code of Regulations, Title 22, Chapter 11

Title 22 of the CCR, Division 4.5, Chapter 11, contains regulations for the identification and classification of hazardous wastes. The code defines a waste as hazardous if it has ignitability, corrosivity, reactivity, or toxicity characteristics. Article 3 provides detailed definitions of each characteristic. Articles 4 and 5 provide lists of RCRA hazardous wastes, non-RCRA hazardous wastes, hazardous wastes from specific sources, extremely hazardous wastes, and hazardous wastes of concern and special wastes.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act, also known as the Business Plan Act, requires businesses using hazardous materials to prepare a plan that describes their facilities, inventories, emergency response plans, and training programs. Hazardous materials are defined as raw or unused materials that are part of a process or manufacturing step. They are not considered hazardous waste. Health concerns pertaining to the release of hazardous materials, however, are similar to those pertaining to hazardous waste.

California H&SC Article 1 requires emergency response plans for facilities that store hazardous materials in excess of 55 gallons, 500 pounds, or 200 cubic feet. Facilities that handle more than these indicated quantities of hazardous materials must submit a Hazardous Materials Business Plan to the Certified Uniform Program Agency (CUPA). The CUPA for Colusa County is the Department of Environmental Health and Office of Emergency Services.

Hazardous Waste Control Act

The Hazardous Waste Control Act created the state hazardous waste management program, which is similar to, but more stringent than, RCRA program requirements. The act is implemented by regulations contained in Title 26 of the CCR, which describes the requirements pertaining to the following aspects of proper management of hazardous waste:

- Identification and classification.
- Generation and transportation.
- Design and permitting of recycling, treatment, storage and disposal facilities.
- Treatment standards
- Operation of facilities and staff training.
- Closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for the identification, packaging, and disposal of such waste. Under the Hazardous Waste Control Act and Title 26, the generator of hazardous waste must complete a manifest, which accompanies the waste from the generator to the transporter to the ultimate disposal location. Copies of the manifest must be filed with the DTSC.

DTSC operates programs to protect California from exposures to hazardous wastes through management of the following:

- Handling of the aftermath of improper hazardous waste management by overseeing site clean-up;
- Prevention of the release of hazardous waste by ensuring those who generate, handle, transport, store, or dispose of wastes do so properly;
- Enforcement against those who fail to appropriately manage hazardous wastes;

- Exploration and promotion of measures to prevent pollution and encourage reuse and recycling;
- Evaluation of site-specific soil, water and air samples and the development of new analytical methods;
- Practice in other environmental sciences, including toxicology, risk assessment and technology development; and
- Involvement of the public in DTSC's decision-making.

Emergency Services Act

Under the Emergency Services Act, the state developed an emergency response plan to coordinate emergency services provided by federal, state, and local agencies. Rapid response to incidents involving hazardous material or hazardous waste is an important segment of the plan administered by the California Emergency Management Agency (CEMA). CEMA coordinates the response of agencies that include the California Environmental Protection Agency (CalEPA), the California Department of Transportation (CalTrans), California Highway Patrol, regional water quality control boards, air quality management districts, and county disaster response offices.

California Occupational Health and Safety Administration

The California Occupational Health and Safety Administration (Cal/OSHA) is responsible for the development and enforcement of workplace safety standards and ensuring worker safety in the handling and use of hazardous materials. In addition, Cal/OSHA enforces regulations for worker safety during grading and trenching activities. Cal/OSHA obligates businesses to prepare Injury and Illness Prevention Plans and Chemical Hygiene Plans. The Hazards Communication Standard requires that workers be informed of the hazards associated with the materials being handled. Manufacturers are required to label containers, provide Material Safety Data Sheets (MSDSs) in the workplace, and provide worker training.

Under Title 8 of the CCR, Cal/OSHA establishes requirements for safe working conditions and safety-related reporting in California, and also regulates electrical safety (Electrical Safety Orders). The primary intent of the Title 8 requirement is to protect workers, but compliance with these regulations also reduces potential hazards for non-construction workers and project vicinity occupants through the implementation of required controls relating to site monitoring, reporting and other activities..

Under Title 8 of the CCR, Cal/OSHA also enforces regulations that would apply to the hot tapped pipeline connection installation, including Subchapter 15, Article 5, Section 6777 (Fire and Explosions, Hot Work Permits); Subchapter 7, Group 16, Article 108, Section 5157 (Permit-Required Confined Spaces); Subchapter 7, Group 16, Article 109, Section 5189 (Process Safety Management of Acutely Hazardous Materials); Subchapter 7, Group 10, Article 88, Section 4848 (Fire Prevention and Suppression Procedure); and Subchapter 7, Group 11, Article 90, Section 4851 (Arc Welding and Cutting).

Division of Oil, Gas and Geothermal Resources

DOGGR regulates the production of oil, gas, and geothermal resources within California. Physical hazards, storage field maintenance, and operations within natural gas storage fields are under DOGGR's jurisdiction, to the extent that DOGGR statutes and regulations apply (hazards associated directly with reservoir or wellhead leakage for example). Other hazards, such as those associated with natural gas compressors, would not necessarily fall within DOGGR jurisdiction. Before a permit is issued, DOGGR engineers review all aspects of a proposed natural gas storage project to ensure no gas migration from the intended injection zone will take place and that there will be no contamination of any freshwater aquifers. In addition, all operators must report monthly injection or withdrawal volumes and well pressures to DOGGR.

RWQCB (CVRWQCB, Region 5). Under the National Pollutant Discharge Elimination System (NPDES), RWQCBs require a Construction Activities Storm Water General Permit (Order 99-08-DWQ) for stormwater discharges associated with any construction activity including clearing, grading, excavation reconstruction, and dredge and fill activities that would result in the disturbance of at least 1 acre of total land area. Because the Phase 3 Expansion would disturb more than 1 acre, the applicant would comply with the Construction Storm Water General Permit by filing a Notice of Intent (NOI) with the CVRWQCB, including a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP prepared for Base Project development and revised for the Phase 2 Expansion would be further revised to include the proposed Phase 3 Expansion components, and submitted along with the NOI.

In addition to the NPDES Construction Storm Water General Permit, the applicant would be required to apply for a new or updated NPDES Industrial Storm Water General Permit, General Permit for Discharges From Utility Vaults and Other Underground Structures, and General Permit covering Dewatering and Other Low Threat Discharges to Surface Water.

Other approvals from the CVRWQCB would be required for the Phase 3 Expansion, including a CWA Section 401 permit (Water Quality Certification) covering wetland fill activities, and Waste Discharge Requirements and/or a Low Threat Discharge Permit covering Phase 3 Expansion construction activities related to discharges from hydrostatic pipeline testing and construction dewatering.

Local

Butte County General Plan

The Butte County General Plan is currently being updated; however, many of the draft general plan update documents, including the general plan EIR, are not available to the public. The Water Resources Element of the Draft 2030 Butte County General Plan (Butte County 2009) includes goals and policies addressing the protection of water quality and water resources that would be relevant to the Phase 3 Expansion, such as the protection of water quality from the negative effects of agricultural activities, ensuring a sustainable water and groundwater supply (including requiring applicants to demonstrate that adequate water supply exists to meet the needs of development projects), the preservation of wetland areas, and the promotion of water conservation.

Colusa County

The Colusa County General Plan is currently being updated; however, the draft general plan update documents are not anticipated to be to be available for public review until late 2010. Therefore, the same goals and policies that were discussed for Colusa County in the 2002 EIR would apply to the Phase 3 expansion project.

A.6.3 Applicant Proposed Measures and Applicable Phase 2 Expansion Features

The applicant has incorporated the following Applicant Proposed Measures (APMs), the full text of which is included in Table A.1-1 of Section A.1-1, into the Phase 3 Expansion to minimize or avoid impacts to hydrology and water quality.

APM HYDRO-1: Stormwater Design Measures.

APM BIO-2: Wetlands Mitigation Consistent with CWA Section 404 Permit.

APM HYDRO-2: Storm Water Pollution Prevention Plan.

APM HAZ-1: Best Management Practices.

APM HAZ-2: Hazardous Materials Release Response Plan Update.

~~The project feature in Table A.6-2 addressing hydrology was adopted as part of the 2002 EIR for the Phase 2 Expansion as a mitigation measure. This measure would also apply to the Phase 3 Expansion.~~

~~Table A.6-2 Project Features Addressing Hydrology Adopted as Part of the 2002 EIR~~

~~**Mitigation Measure 3.8-6.** Locate all water supply wells in the project vicinity. After identifying the approved pipeline route and developing initial pipeline construction design plans, and prior to initiating construction, delineate wells in the immediate vicinity of the selected route. Conduct a hydrogeological investigation to determine de-water effects on the nearby area wells. Based on results of the hydrogeological investigation, modify construction plans or dewatering methods, if necessary, to protect local groundwater supplies. The hydrogeological investigation shall be conducted by a California Certified Hydrogeologist or Certified Engineering Geologist with an appropriate background in evaluating impacts to water wells associated with surface de-watering activities. The revised plans or de-watering methods must be reviewed and approved by the CPUC prior to implementing those operations.~~

A.6.4 Environmental Impacts and Mitigation Measures

Construction

Water sources for the Phase 3 Expansion construction activities at the RFS and the Delevan Site would include the Belding Lateral Canal (or the 833 Canal if the Belding Canal were not available) and a water production well approximately 200 feet to the south of the existing RFS in the Gray Lodge Waterfowl Management Area, which is estimated to have a yield of at least 60 gpm. Construction water used primarily for dust suppression (approximately 2,000 gallons per day of construction, or a total of approximately 1.6 million gallons) would be drawn from the Belding Lateral Canal or 833 Canal; hydrostatic testing water (approximately 51,000 gallons total) would be trucked from the nearby Gray Lodge well or from a municipal water source in Gridley. Water from the Gray Lodge well has been obtained with the permission and approval of the facility manager for use during the Phase 2 Expansion construction; the applicant would obtain new approvals for the use of this well or will work with the Biggs-West Gridley Water District to purchase hydrostatic testing water for the Phase 3 Expansion. Except for drinking water brought onto the site by PG&E personnel, reconductoring activities would not require the use of water.

Prior to operation, the applicant would perform hydrostatic testing and flushing of the pipeline at the Delevan Site, consisting of filling the pipeline with water to identify any leaks. Dirt and water from the testing would be discharged into an energy dissipation basin consisting of hay or straw bales, located on an upland site adjacent to the Phase 3 Expansion facilities, and/or, as appropriate, back into the Belding Lateral Canal or other local canals. During the excavation of foundations at the RFS, dewatering may need to be performed to remove water from the excavations. As appropriate under the NPDES General Permit Covering Dewatering and Other Low Threat Discharges to Surface Water, the applicant would discharge hydrostatic testing water and excavation dewatering volumes subject to a determination of suitable quality consistent with the General Permit, and discharges to waterways would be conducted in compliance with all NPDES- and other CVRWQCB-required approvals.

Operation

Water for daily operations at the RFS would be provided by an existing domestic well on the site with an average yield of 60 gpm. Daily operational water usage is expected to increase by 200 gallons per day, for a total usage of 600 gallons per day, to accommodate the incremental staff addition, additional berm vegetation watering, and water injection for the Selective Catalytic Reduction emissions systems for four additional compressors (as described in Chapter 2, Description of Phase 3 Expansion). No increase in water use for operations would take place at the Delevan Site, and no water would be required for the maintenance of the reconductored electrical distribution line.

A.8 Noise

Table A.8-1 Noise Checklist

Would the Project :	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐

To supplement information presented in the Wild Goose Storage, Inc. Expansion Project Environmental Impact Report (2002 EIR), Section 3.10, Noise, several documents and resources were reviewed for the Wild Goose Phase 3 Gas Storage Expansion (Phase 3 Expansion), including the Butte County General Plan Noise Element; the Colusa County General Plan Safety Element; the City of Gridley General Plan Noise Element; information on potential noise impacts from the Phase 3 Expansion provided by Bollard Acoustical Consultants, Inc. (included as Appendix F); and other information updated since 2002 pertinent to noise in the vicinity of the Phase 3 Expansion.

Environmental review of the Phase 2 Expansion of the Wild Goose Facility (2002 EIR) identified no significant noise impacts as a result of implementation of the Phase 2 Expansion, as well as 12 potential less than significant noise impacts. Impacts were primarily related to noise from the compressors, pressure relief venting (blowdowns), and construction activities (in large part construction along the interconnect pipeline route). These impacts were determined to be less than significant after the implementation of mitigation measures.

A.8.1 Environmental Setting

The Phase 3 Expansion would primarily be located within agricultural and low-density residential areas in Butte County (Remote Facility Site [RFS] and reconductoring component) and Colusa County (Delevan Site).

No public airports are located within 2 miles of the Phase 3 Expansion area. The airport nearest to the RFS is the private Bowles Airport, which is approximately 7 miles from the RFS in the City of Live Oak, Sutter County. The airport nearest to the Delevan Site is the Willows-Glenn County Airport, a public municipal airport, approximately 11 miles away. The Colusa County Airport in Colusa County and the Chico Municipal Airport in Butte County are approximately 12 and 30 miles from the RFS, respectively. Private airstrips in the vicinity of the Phase 3 Expansion, including an airstrip approximately 1.1 miles northwest of the RFS, are associated with agricultural activities.

Noise and Vibration Fundamentals

Sound is a pressure wave transmitted through the air and is measured by decibels (dB), frequency of pitch, and duration. Since the range of intensities that the human ear can detect is large, the dB scale is based on multiples of 10, according to the logarithmic scale. Each interval of 10 dB indicates a sound energy 10 times greater and is perceived by the human ear as being roughly twice as loud. Noise is defined as objectionable or unwanted sound.

To account for the fact that human hearing does not process all frequencies equally, an A-weighting (dBA) scale was developed. The dBA scale deviates from the "linear" dB weighting curve appropriately for specific frequency values.

Noise level descriptors are commonly used to characterize the average ambient noise environment in a given area. The Sound Equivalent Level, or L_{eq}, is generally used to characterize the average sound energy that occurs during a relatively short period of time, such as an hour. Two other descriptors, the Day-Night Level (L_{dn}) and Community Noise Equivalent Level (CNEL), are used for an entire 24-hour period. The value of the L_{dn} and CNEL are generally within 1 dB of each other and therefore are often used interchangeably in noise analysis. Both the L_{dn} and CNEL noise level descriptors are used to place a stronger emphasis on noise that occurs during nighttime hours (10 p.m. to 7 a.m.) by applying a 10-dB "penalty" to those hours, but the CNEL also applies a 5-dB "penalty" to the evening hours of 7 p.m. to 10 p.m.

Vibration is also a potential source of noise-related adverse impact to humans, and can also affect structures. Vibration can be felt outside, but the perceived intensity of vibration impacts is much greater inside buildings as a result of shaking of the structure. Some of the most common sources of vibration come from construction equipment, airplanes, and large vehicles.

Further information on noise and vibration fundamentals can be found in Section 3.10, Noise, of the 2002 EIR.

Sensitive Receptors

Noise-sensitive receptors can be defined as locations where people reside or where the presence of unwanted sound or vibration could adversely affect existing land uses. Typically, sensitive receptors include residences, hospitals, places of worship, libraries, schools, nature and wildlife preserves, and parks (23 Code of Federal Regulations Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise).

Sensitive receptors in the vicinity of the Phase 3 Expansion area are primarily farms, hunting areas, residences, and wildlife management areas within approximately 1 mile of the RFS, reconductoring component, and Delevan Site. The Gray Lodge Wildlife Management Area was identified as a noise-sensitive area in the Butte County General Plan Noise Element (Butte County 1977). Noise-sensitive receptors and land uses and relative location within the Phase 3 Expansion area are listed in Table A.8-2.

Table A.8-2 Noise-Sensitive Receptors in the Phase 3 Expansion Vicinity

Phase 3 Expansion Component	Nearest Receptor	Type	Approximate Distance to Phase 3 Expansion Area (feet)
RFS	Farming residence - NE from RFS (Waterbury)	Residential	4,000
	Residence - NE from RFS	Residential	5,280
	Residence with private airstrip - NW from RFS	Residential	5,800
	Gray Eagle Hunting Club Lodge	Recreational	4,500
	Hunting areas at Butte Sink	Recreational	5,000
	Gray Lodge Wildlife Management Area	Wildlife refuge	Adjacent (south)
Reconductoring Component Area	Option A Alignment: Approximately 30 residences	Residential	Within 30 to 50 feet
	Option B Alignment: Approximately 50 residences, farms and other agricultural uses	Residential, Agricultural	
Delevan Interconnect Site	Farming residence SW from site	Residential	2,500

Source: BAC 2009 (Confirmed during a September 23, 2009, site visit and supplemented with a review of aerial photographs.)

Existing Noise Levels

Existing ambient sound levels in the Phase 3 Expansion area are characteristic of a rural environment, where sound levels typically range from 40 to 60 dBA during the day and 20 to 45 dBA at night (USEPA 1978). Major noise sources in the area include traffic along I-5 and other roads, agricultural and hunting activities, wildlife, and construction activities taking place at Pacific Gas and Electric's (PG&E's) Colusa Generating Station site (west of the Delevan Site, in Colusa County). Noise surveys conducted by the applicant for the 2002 EIR indicated that ambient noise levels at the closest sensitive residential receptor to the RFS (the Waterbury residence) during operation of the existing equipment were in the range of 38 to 40 dBA L_{eq} during the day and about 36 dBA L_{eq} at night. The ambient noise surveys were repeated in 2008 for the Phase 3 Expansion and showed ambient conditions to those documented previously, with noise levels ranging from 41 to 45 dBA L_{eq} (BAC 2009).

Short-term noise surveys conducted in the vicinity of the Delevan Interconnect Site area on December 2008 indicated a daytime average noise level of 40 dBA L_{eq} (BAC 2009). Nighttime conditions were estimated to be approximately 5 dB lower than daytime levels, consistent with survey results near the RFS.

Further information on existing noise levels in the area can be found in Section 3.10, Noise, of the 2002 EIR.

A.8.2 Regulatory Setting

The following regulations apply to the Phase 3 Expansion.

Federal

No federal regulations directly apply to impacts from noise for the Phase 3 Expansion. Cumulative noise exposure criteria published by the Federal Transit Administration (FTA) and the U.S. Environmental Protection Agency (USEPA) provide general information related to the assessment of community noise impacts. These criteria indicate that a 2 percent increase over existing outdoor noise levels is the minimum measurable change in community reaction; therefore, such an increase is considered to be a threshold for community noise impacts (FTA 2006). The FTA has published a cumulative noise curve, based on general community reactions to noise at various levels, as discussed below. The USEPA has

also indicated that a noise level of 55 dBA for "outdoor areas…and other places in which quiet is a basis for use" is sufficiently protective of public health and welfare with a margin of safety (it should be noted that this is not regulatory goal) (USEPA 1978).

State of California

No state regulations apply to impacts from noise for the Phase 3 Expansion; however, the Governor's Office of Planning and Research (OPR) has issued suggested community noise exposure standards per land use designation. The standards are discussed in Section 3.10 of the 2002 EIR; updated standard levels are presented below in Table A.8-3.

Butte County

As of the date of this document, Butte County has not adopted a noise ordinance, and noise due to construction activity is not specifically addressed in the current local regulations. Preparation of a noise ordinance will likely take place after the adoption of the updated Butte County General Plan (Butte County 2009).

The Noise Element of the existing Butte County General Plan identifies maximum acceptable community noise levels for low-density residential land uses and recommends the use of state land use compatibility guidelines for community noise environments during environmental review of proposed new stationary sources. According to these guidelines, the normally acceptable maximum noise level in agricultural areas is 75 dBA, and the maximum acceptable community noise level for low-density residential land uses is 60 dBA L_{dn} (Butte County 1977). The Noise Element also identifies a 40-dBA maximum for wildlife refuges in rural areas. A comprehensive update of the General Plan and zoning code is being developed and is likely to be adopted in 2010, prior to construction of the Phase 3 Expansion. The revised plan establishes maximum allowable noise exposure standards for non-transportation (stationary) sources. For rural areas, these standards must be applied at a point 100 feet away from a noise-sensitive receptor. The following draft policies applicable to the Phase 3 Expansion are included in the updated General Plan.

HS-P1.1 New development projects proposed in areas that exceed the land use compatibility standards (Table 3.11-4) shall require mitigation of noise impacts.

HS-P1.7 Applicants for discretionary permits shall be required to limit noise-generating construction activities located within 1,000 feet of residential uses to daytime hours between 7 a.m. and 6 p.m.

HS-P1.9 The following standard construction noise control measures shall be required at construction sites in order to minimize construction noise impacts:

a. Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

b. Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.

c. Utilize quiet air compressors and other stationary noise-generating equipment where appropriate technology exists and is feasible.

Although these policies have not yet been formally adopted, they provide general information related to the local land use regulations to which construction and operation of the Phase 3 Expansion would be subject.

Table A.8-3 Noise/Land Use Compatibility Matrix for Community Noise Environments

Land Use Category	Community Noise Exposure Level (CNEL, dB)						
	50	55	60	65	70	75	80
Residential – low-density single-family, duplex, and mobile homes							
Residential – multi-family							
Transient lodging – hotels, motels							
Schools, libraries, churches, hospitals, nursing homes							
Auditoriums, concert halls, amphitheaters							
Sport arenas, outdoor spectator sports, amusement parks							
Playgrounds, neighborhood parks							
Golf courses, riding stables, cemeteries							
Office and professional buildings, retail commercial, banks, restaurants							
Industrial, manufacturing, utilities, service stations, warehousing, agriculture							

Source: OPR 2003

Normally acceptable: Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally acceptable: New construction or development should be undertaken only after a detailed analysis of the noise requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air systems or air conditioning, normally suffices.

Normally unacceptable: New construction or development should generally be discouraged. If it does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly unacceptable: New construction or development should generally not be undertaken.

Colusa County

The Safety Element of the Colusa County General Plan, adopted in 1989, includes information related to regulation of noise in the county. According to the Safety Element, noise in rural areas of the county is perceived as a relatively minor issue due to the presence of few noise-producing land uses compared with large urban centers, major airports, large industrial facilities, or congested highways (Colusa County 1989). A draft update to the Colusa County General Plan is expected to be published in late 2010, along with a Background Report that identifies existing conditions in the county (Colusa County 2009). New information in these documents may be applicable to Phase 3 Expansion activities.

Colusa County maintains a Noise Abatement Program which recommends that new land uses and activities should be compatible with the standards published by the California Department of Health Services (superseded by the revised OPR standards shown in Table A.8-3).

The Colusa County Municipal Code establishes minimum development standards that apply to all buildings and uses. Noise generated by a new proposed use as measured at the nearest residential zoned property must not exceed an L_{dn} of 60 dBA, or a median hourly noise level of 50 dBA in daytime (7 a.m. to 10 p.m.) and 45 dBA in the nighttime (10 p.m. to 7 a.m.), whichever is more restrictive.

Further information on the regulatory environment for noise impacts is presented in Section 3.10, Noise, of the 2002 EIR.

Applicant Proposed Measures

The following applicant proposed measures (APMs), the full text of which is included in Table A.1-1 of Section A.1-1, are included as part of the Phase 3 Expansion to minimize or avoid impacts from noise.

Construction

APM NOISE-1: Welding Noise.

APM NOISE-2: Limit Noise-Producing Construction Activities During Hunting Season.

APM NOISE-3: Limit Ambient Noise During Construction.

APM NOISE-4: Public Notification During Construction.

APM NOISE-5: Minimize Nighttime Construction Noise.

Operation

APM NOISE-6: Noise Control Features.

APM NOISE-7: Acoustic Silencers and Acoustically Lined Plenums.

APM NOISE-8: Noise Attenuation Design Features.

APM NOISE-9: Maintenance Blowdown Notification.

The project features shown in Table A.8-4 addressing potential noise impacts were adopted as part of the 2002 EIR for the Phase 2 Expansion as APMs or mitigation measures. These measures would also apply to the Phase 3 Expansion.

Table A.8-4 Mitigation of Impacts to Noise Adopted as Part of the 2002 EIR

WGSI Measure 3.10-2. During the design of the additional compressor building, noise modeling would be conducted to determine the noise attenuation design criteria needed to meet the maximum noise level. WGSI shall house the compressors and engine drivers in a metal-framed and sided building with sound insulation designed into the wall thickness, openings, and vents and shall route normal operations blowdowns and ESD blowdowns into silencers.
WGSI Measure 3.10-3. WGSI will reduce the gas pressure/volume in the pipeline to a minimum prior to a planned maintenance blowdown.
WGSI Measure 3.10-4. Pipeline operators will notify nearby residents when a maintenance blowdown is planned, so they will not be alarmed by the noise or can make plans to be elsewhere while it is occurring. If the valve lot(s) are located adjacent to the Sacramento River with its significant stand of riparian vegetation, blowdowns at these locations will not be planned between April 15 and August 1, unless absolutely necessary, to preclude impacts to Swainson's hawk or other sensitive bird species that may be nesting in the area.
WGSI Measure 3.10-5. Limiting construction activities to daylight hours, except within 1,000 feet of any residence within 200 feet of the pipeline ROW, where the limitation will be from 7:00 a.m. to 6:00 p.m., unless otherwise requested by the residents.
WGSI Measure 3.10-7. Ensuring all construction equipment have mufflers no less effective than original equipment and maintained to minimize noise generation.
WGSI Measure 3.10-8. Changing the location of stationary construction equipment to minimize noise impacts to sensitive receptors where feasible.
WGSI Measure 3.10-9. Rescheduling construction activities to accommodate specific situations where feasible.
WGSI Measure 3.10-10. Construction work hours and the adjustment during the hunting season will be similar to that described above. While the normal workday will be between 6:00 a.m. and 7:00 p.m., weather or construction schedule variables may require noise-producing work outside this 13-hour window. Similar coordination with waterfowl management facilities and noise mitigation will be implemented for the construction of the proposed facilities, as was implemented during initial project development.

A.8.3 Environmental Impacts and Mitigation Measures

Environmental Impacts

Construction

The Phase 3 Expansion construction would be undertaken over 23 months. The development of the RFS expansion would occur in two phases (RFS Plant 4 and RFS Plant 5, as described in Chapter 2, Description of Phase 3 Expansion) while the Delevan Site construction activities would take place over three months. Reconductoring activities would take place over a short period, from 4 to 8 weeks. Construction activities would generally occur in daytime hours between 6 a.m. and 7 p.m.; however, this schedule may be adjusted according to work needs and in accordance with negotiations and consultations with local landowners and jurisdictions, as described in Chapter 2, Description of Phase 3 Expansion (APM NOISE-3).

For example, during hot summer periods, the applicant may choose to begin construction activities before 6 a.m. to avoid high mid-day temperatures and allow concrete foundations to be poured under lower temperatures. Special nighttime construction schedules may also be proposed. As noted above, changes to the proposed construction schedule would take place after negotiation with landowners and local jurisdictions.

Major noise sources during Phase 3 Expansion construction would be associated with the use of heavy-duty equipment and vehicles. Existing equipment and safety valves operation at the RFS would also

contribute to composite noise levels during construction. Construction activities at the Delevan Site and for the reconductoring component would require less equipment and take place over a shorter time than those proposed at the RFS. Typical noise levels and maximum levels of the loudest pieces of construction equipment are presented in Tables A.8-5 and A.8-6.

Table A.8-5 Typical Noise Levels from Proposed Construction Equipment

Proposed Project construction equipment	Noise emission reference levels at 50 feet from the source (dBA)
Truck (including reconductoring line truck)	84
Bus service[a]	55
Crane	85
Backhoe or bucket excavator	80
Diesel tractor	84
Forklift	85
Grading equipment – Dozer – Water truck – Motor grader	 85 88 85
Sideboom	n/a
Man lift (including reconductoring lift)	85
Air compressor	81
Welding truck[b]	88
Hydrovac[c]	77
Vacuum truck	85
Radiographic truck[b]	88
Mobile office	n/a
Portable generator	81
Tractor trailer	84
Two-ton truck[b]	88

Source: FHWA 2006, FTA 2006

Notes:

[a]Estimated as similar to as the pickup truck level per FHWA (2006)

[b]Estimated as truck per FTA (2006)

[c]Estimated as pump per FHWA (2006)

Key:

dBA = Decibels measured with the A-weighting curve. The A-weighting curve is commonly used for the measurement of environmental noise.

Table A.8-6 Maximum Project Construction Equipment Noise Levels at Various Distances from Source (L_{max}, dBA)

Equipment	50 feet	100 feet	200 feet	2,500 feet	5,000 feet
Scrapers	89	83	77	55	49
Bulldozers	85	79	73	51	45
Heavy trucks	88	82	76	54	48
Backhoe	80	74	68	46	40
Pneumatic tools	85	79	73	51	45
Concrete pumps	82	76	70	48	42

Source: BAC 2009 (Based on FTA 2006)

Key:

dBA = Decibels measured with the A-weighting curve. The A-weighting curve is commonly used for the measurement of environmental noise.

L_{max} = The highest A-weighted sound level occurring during a noise event.

During a typical day, construction equipment would not be operated continuously at peak levels. As shown in Tables A.8-5 and A.8-6, construction equipment would be expected to generate noise levels ranging from 80 to 90 dBA L_{max}[1] at a distance of 50 feet. A maximum composite noise level of 75 dBA L_{dn} is anticipated at a distance of 200 feet from the RFS, reconductoring, and Delevan Site construction areas. These predicted noise levels would be decreased by distance and the presence of structures and vegetation, at a rate of 6 dB per doubling of the distance. At the receptors closest to the RFS (the Waterbury residence) and the Delevan Site (a farming residence approximately 2,500 feet southwest of the Delevan Site), it is estimated that maximum construction noise levels would be in the range of 40 to 55 dBA L_{max}. At the receptors closest to the reconductoring alignments (30 to 50 feet), it is estimated that the maximum construction noise levels would range from approximately 80 to 90 dBA L_{max}; this exposure would be temporary and transient, given the short work period (4 to 8 weeks) for the completion of the reconductoring component.

The level of groundborne vibration from construction activities that could reach sensitive receptors depends on the distance to the receptor, the type of equipment creating vibration, and the soil conditions surrounding the construction site.

Operation

Remote Facility Site

Operational noise sources at the expanded RFS would primarily consist of the existing and proposed new facility compressors and pressure relief safety systems (normal venting and safety valves). Section 3.10, Noise, of the 2002 DEIR includes further information related to the kind of equipment that would be installed as part of the Phase 3 Expansion.

The existing RFS currently includes six compressors housed in two large compressor buildings. The Phase 3 Expansion at the RFS would add four additional Caterpillar Model G3612 compressors that would be installed in a new similar compressor building, producing up to an additional 14,200 horsepower.

The new Phase 3 Expansion design would include noise attenuation design features similar to those currently operating at the existing facility. The existing noise control measures at the RFS limit sound from compressor operations by the use of acoustic silencers and acoustically lined plenums (also known as acoustical return air chambers) in the building cooling air inlet and exhaust ports. In addition, the interior surface of the existing compressor building is lined with acoustically absorbent materials, and the compressor engine exhaust gas is routed through appropriately sized acoustic mufflers. Similar noise control products, which have been proven effective at the existing facility, would be put in place for the Phase 3 Expansion components, and as a result, new noise levels are not expected to exceed 75 dBA L_{dn} at the RFS property line (BAC 2009). Table A.8-7 presents predicted noise levels at the noise-sensitive receptors located within 1 mile of the RFS (also refer to Table A.8-2 for more information on these sensitive receptors).

[1] L_{max} = The highest A-weighted sound level occurring during a noise event. The A-weighting curve is commonly used for the measurement of environmental noise.

Table A.8-7 Predicted Operational Noise Levels at Nearest Receptors

Facility	Reference Noise Level at 50 feet (dBA L_{dn})	Nearest noise-sensitive receptors	Distance (feet)	Predicted noise level at sensitive receptor L_{dn} (dBA)
RFS	75	Waterbury Residence	4,000	36
RFS	75	Gray Eagle Hunting Club Lodge	4,500	36
Delevan Site	55	Residence	2,700	20

Source: BAC 2009

Note: Noise measurements taken at the RFS for the 2002 EIR showed that the maximum noise level at the property line was 72 dBA; however, a theoretical maximum value of 75 dBA L_{dn} is used here to provide a conservative assessment of RFS noise levels at the nearest receptors.

dBA = Decibels measured with the A-weighting curve. The A-weighting curve is commonly used for the measurement of environmental noise.

L_{dn} = Day-night equivalent noise levels

Similar to current operations, the greatest source of noise generation from operation of the expanded RFS would come from pressure relief valves and pipeline blowdowns at the RFS. Pressure relief from compressor station piping is necessary for safe operation of the Wild Goose Facility. Regular, routine blowdowns (i.e., rapid depressurization events) take place whenever a compressor unit shuts down, can produce an audible sound over 120 dBA, and are routed through silencers for noise attenuation. Blowdowns occur during rare emergencies or infrequent maintenance, when large volumes of natural gas are vented from the pipeline. Fire and gas readings of 40 percent and higher also trigger activation of emergency shutdown valves, which blowdown the entire facility. Silenced blowdown vents are a part of the current facility; additional silenced blowdown vents would be installed as appropriate for the Phase 3 Expansion at both the RFS and the Delevan Site.

Immediate, emergency depressurization takes place at the facility via pressure safety valves, activated only when pressure exceeds the safe operating parameters of piping or vessels. Under these circumstances, pressure is relieved directly to the atmosphere, rather than with a controlled release through a silencer. Consequently, these emergency blowdowns are extremely loud—up to170 dB (Fluid Kinetics 2010). An unsilenced pressure safety valve release event could generate noise levels of approximately 74 dBA L_{max} at a distance of 4,000 feet for a period of 5 to 10 seconds during the discharge (BAC 2009).

Safety records for the Wild Goose Facility from 2005 to 2008 indicate that there have been no emergency blowdowns during this period. These safety reports also indicate that normal venting occurred through silencers designed to limit maximum noise levels to 75 dBA at any of the facility property lines (BAC 2009).

Similar to groundborne vibration from construction activities, the level of groundborne vibration from operations activities at the RFS and the Delevan Site that could reach sensitive receptors depends on the distance to the receptor, the type of equipment creating vibration, and the soil conditions surrounding the construction site.

Well Pad Site

Although the Phase 3 Expansion would not result in any physical expansion of the Wild Goose Well Pad Site (WPS), the Phase 3 Expansion increase in gas injection and withdrawal flow rates has the potential to result in higher noise levels at the WPS. A study was conducted in August, 2010 to address potential impacts associated with increased noise at the WPS related to the Phase 3 Expansion increase in natural

gas injection and withdrawal flows. The results of this study are presented in Final SEIR Appendix C, and indicate that, under predicted operating conditions, the Phase 3 Expansion could result in a minor (1 dBA) increase in noise outside of the WPS area (at a location 100 yards from the WPS berm). Under less than normal operating conditions, noise levels outside of the WPS area could increase to above background levels and above the USEPA level of 55 dBA for outdoor areas.

Delevan Site

Operational noise sources at the Delevan Site associated with the Phase 3 Expansion components would consist of the continuous sound of gas passing through control valves and infrequent noise generated by blowdowns. Facility operations noise measurements conducted for the Phase 3 Expansion indicate that gas passing through the valves generates noise levels of approximately 52 dBA L_{dn} at the property line (BAC 2009). At the nearest residence to the Delevan Site, estimated operational noise levels after completion of the Phase 3 Expansion would be below 20 dBA L_{dn}.

Although noise from blowdown activities could exceed 75 dBA L_{dn} at the property line, potential noise impacts from blowdowns at the Delevan Site would occur on an infrequent basis after construction of the Phase 3 Expansion components had been completed.

a. Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

LESS THAN SIGNIFICANT. Construction of the Phase 3 Expansion components would cause noise, primarily from heavy-duty vehicles and on-road and off-road equipment needed at the construction sites. In addition, haul trucks would be required to bring and remove materials to and from the RFS and Delevan Site construction areas. Estimated peak noise levels from the construction equipment would range from 80 to 90 dBA at 50 feet from the source at the proposed construction sites; a maximum composite noise level of 75 dBA L_{dn} would be anticipated at a distance of 200 feet from both sites.

To address potential impacts from construction noise, the applicant would adjust the construction schedule such that noise-producing activities would be confined to daytime hours and periods of the year that are not critical for sensitive species and hunting activities. Additionally, the applicant would coordinate closely with nearby property owners and local authorities to address concerns about construction activities.

Current Butte and Colusa county local ordinances and general plans do not include specific standards for construction noise. However, the Butte County General Plan Noise Element includes a maximum acceptable community noise level of 60 dBA L_{dn}. The Noise Element also establishes a normally acceptable maximum noise level in agricultural areas of 75 dBA. The Colusa County General Plan Safety Element identifies normally acceptable exterior noise levels up to 70 dBA in open spaces and identifies levels between 70 to 80 dBA as conditionally acceptable for standard construction activities.

Noise estimates prepared for the Phase 3 Expansion indicate that maximum construction noise levels would be audible to the closest receptors in a range from 40 to 55 dBA during peak construction activities. Construction noise would be temporary and intermittent in terms of equipment usage. These estimated levels would be acceptable under the Butte and Colusa county community noise and land use compatibility criteria for both residential (60 dBA) and agricultural areas (75 dBA) during daytime operations. Implementation of the construction period APMs described above would reduce potential impacts from construction noise to a less than significant level.

Potential sources of operational noise associated with Phase 3 Expansion activities include noise from compressor operations, blowdowns from the pressure relief system, and gas passing through the pipelines at the Delevan Site. Routine maintenance activities would also produce additional sources of noise during operations.

As indicated in the APMs listed above, the applicant would implement noise attenuation measures as part of the design of the Phase 3 Expansion components. These design features would ensure that operational noise levels would not exceed 75 dBA at the RFS property line and 55 dBA at the Delevan Site boundary; it is estimated that this would result in noise levels of 36 dBA and 20 dBA, respectively, at the identified closest sensitive receptors. These levels would be acceptable under the Butte and Colusa county community noise and land use compatibility criteria for both residential (60 dBA) and agricultural areas (75 dBA).

Reconductoring activities could produce noise above 80 dBA L_{max} at residential and agricultural property boundaries, resulting in a potential impact on these receptors. Given the short duration of construction activity at the reconductoring location (4 to 8 weeks), this impact would be less significant after compliance with the proposed policies of the Butte County General Plan Noise Element, implementation of the APMs listed above, and implementation of PHASE 3MM NOI-1.

PHASE 3 MM NOI-1: ~~The applicant~~ PG&E will employ the following noise reduction and control practices during ~~construction~~ reconductoring activities that could produce noise levels above 80 dBA L_{max} near sensitive receptors (within 100 feet):

- Unnecessary engine idling from construction equipment will be limited during construction hours.
- Construction equipment specifically designed for low noise emissions (i.e., equipment that is powered by electric or natural gas engines instead of those powered by diesel or gasoline reciprocating engines) will be used as much as feasible.
- Temporary enclosures or noise barriers (noise blankets) will be used around loudest pieces of equipment, as feasible.
- Construction traffic will be routed away from residences and other sensitive receptors, as feasible.
- Noise from back-up alarms (alarms that signal vehicle travel in reverse) in construction vehicles and equipment will be reduced by providing a layout of construction sites that minimizes the need for back-up alarms and using flagmen to minimize time needed to back up vehicles. As feasible, and in compliance with the applicant's safety practices and public and worker safety provisions required in the Occupational Safety and Health Standards for the Construction Industry (29 CFR Part 1926), the applicant may also use self-adjusting, manually adjustable, or broadband back-up alarms to reduce construction noise.

Although noise impacts at the WPS from the Phase 3 Expansion are projected to be minor under an operating scenario in which 20 of the total 24 wells would be in operation, there still exists the possibility that Wild Goose may operate fewer than 20 wells at the WPS after the Phase 3 Expansion. Noise from the WPS could therefore increase to a level outside the WPS (100 yards from the WPS berm) that would exceed the USEPA's suggested outdoors noise threshold of 55 dBA. Implementation of Phase 3 MM NOI-2 would address this impact.

PHASE 3 MM NOI-2: After full buildout of the Phase 3 Expansion, the applicant will employ the following noise reduction and control practices during operations at the WPS that could produce noise levels above 55 dBA L_{max} at a location 100 yards from the WPS berm:

- During periods when fewer than 20 wells are in operation at the WPS, the applicant will record sound pressure levels (SPLs, dBA, L_{eq}) on a once-a-week basis at a location 100 yards from the WPS berm.
- If noise levels exceed 55 dBA at a location 100 yards from the WPS berm, the applicant shall implement measures at the WPS to reduce noise levels to 55 dBA at this distance. Measures could include:
    1. Increasing the WPS berm in height by 2 feet (estimated total minimum noise reduction: 5 dBA);
    2. Increasing the WPS berm in height by 4 feet (estimated total minimum noise reduction: 10 dBA);
    3. Application of sound insulating lagging to well lines and valves (estimated total noise reduction: 12 to 24 dBA); or
    4. Installation of a cinder block (or other noise-absorbing material) enclosure or wall around the WPS equipment array (estimated total minimum noise reduction: 25 dBA).

Compliance with the noise policies of Butte and Colusa counties, implementation of the APMs listed above, and implementation of MM NOI-1 and Phase 3 MM NOI-2 would reduce potential impacts during operation of the Phase 3 Expansion components to a less than significant level.

b. Would the project expose persons to or generate excessive groundborne vibration or groundborne noise levels?

LESS THAN SIGNIFICANT. Construction vibration would occur mainly from the use of heavy-duty construction equipment, e.g., trucks, backhoes, excavators, loaders, and cranes. Groundborne vibration and groundborne noise generated from operation would primarily be generated by the compression equipment and maintenance vehicles. Groundborne vibration and noise from construction activities would be intermittent or continuous with a short duration and would occur during daytime hours.

Ground vibration from construction equipment, such as the tamping of ground surfaces, the passing of heavy trucks on uneven surfaces, and the excavation of trenches, could create perceptible vibration in the immediate vicinity (within approximately 100 feet) of the activity. As described in the 2002 EIR, groundborne vibration related to the processes and equipment at the RFS and the Delevan Site occurs within the same, approximately 100-foot vicinity of the site. No sensitive receptors are located within this area of influence for Phase 3 Expansion activities at the RFS and the Delevan Site. Groundborne vibration from equipment used at the reconductoring component area could also create perceptible vibration within approximately 100 feet of the activity; however, the reconductoring activities would be transient and take place over a short period. Therefore, construction and operation of the Phase 3 Expansion components would result in a less than significant impact under this criterion.

c. Would the project cause a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

LESS THAN SIGNIFICANT. Construction noise from Phase 3 Expansion activities would not contribute to a permanent increase in ambient noise levels in the vicinity. Operation of new compressor units at the

RFS is not anticipated to result in noise levels above existing conditions (75 dBA at the property line), while operations at the Delevan Site are estimated to result in an additional 3 dB over the existing noise level (52 dBA).

Short-term noise surveys conducted by the applicant for the Phase 3 Expansion indicated a daytime average ambient noise level ranging from 41 to 45 dBA (L_{eq}) in the vicinity of the RFS and 40 dBA (L_{eq}) daytime levels in the vicinity of the Delevan Site, with nighttime conditions estimated to be approximately 5 dB lower than daytime levels.

To address potential operational noise impacts from operations after construction of the Phase 3 Expansion components, the applicant would implement noise attenuation design features currently in place at the existing facility and as described in the APMs above. With implementation of these noise control measures, it is anticipated that noise levels would not cause a substantial permanent increase over the existing ambient noise levels at either the RFS or the Delevan Site. Reconductoring would involve the replacement of an existing electrical distribution line, would not result in noise-generating activities after the construction period, and would not result in an increase in ambient noise levels in the area. Thus, noise impacts from operations would be less than significant under this criterion.

d. Would the project cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

LESS THAN SIGNIFICANT. Noise from construction equipment and vehicles associated with the Phase 3 Expansion would result in temporary contributions to the ambient noise levels in the vicinity of the RFS and the Delevan Site during the construction periods. As shown in Tables A.8-5 and A.8-6, peak construction noise levels would range from 80 to 90 dBA (L_{max}) at 50 feet from the source and from 40 to 55 dBA at the closest sensitive receptors. These predicted noise levels at the closest receptors would be an increase of 10 to 15 dB over existing ambient noise levels.

Cumulative noise exposure criteria published by the FTA and the USEPA establish that a 2 percent increment over existing outdoor noise levels is the minimum measurable change in community reaction, and therefore, it is considered to be a threshold for community noise impacts (FTA 2006). Based on general community reactions to noise at varying levels, the FTA has published a cumulative noise level curve (Figure A.8-1), which shows that for ambient noise levels such as those existing at the RFS and the Delevan Site locations (40 dBA L_{dn}), a noise exposure increase from 10 to 15 dB would result in a moderate impact.

To address potential impacts from temporary increase of ambient noise levels during construction, the applicant would implement adjustments to the construction schedule, coordinate closely with local authorities and adjacent property owners, and program low-noise-producing activities during nighttime construction and/or seasonal hunting periods, as described in the APMs above. In addition, implementation of the measures listed in Butte County Noise Policy HS-P1.9 and MM NOI-1 would mitigate the effects of a temporary increase of ambient noise levels within the vicinity of the RFS, reconductoring component, and Delevan Site, resulting in a less than significant impact related to construction noise under this criterion.

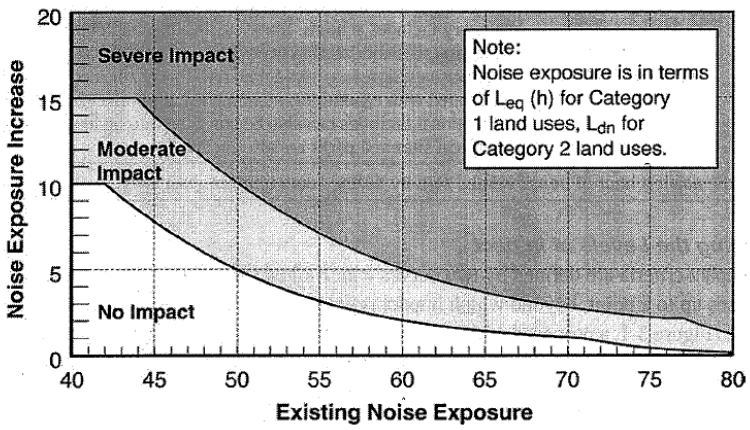

Figure A.8-1 Increase in Cumulative Noise Levels Allowed by Criteria (dBA)
(Source: FTA 2006)

Operational noise from the new compressor building along with the existing facilities at the RFS would produce a composite noise level of 75 dBA at the property line, which would attenuate over distance to 36 dBA at the closest sensitive receptors. In addition, anticipated operational noise levels at the Delevan Site would be 55 dBA at the property line and 20 dBA at the closest receptor. These contributions to ambient noise levels would be generally constant and would not be expected to fluctuate during operation. Noise from sudden, impulsive, unsilenced pressure releases would create a higher level of annoyance than the steady background noise associated with operations; however, these events would take place for safety purposes only, on an infrequent basis.

To address potential impacts from operational noise that could result after construction of the Phase 3 Expansion components, the applicant would implement noise attenuation design features, as described in the APMs above. With implementation of these noise control measures into the design of the Phase 3 Expansion components, it is anticipated that a substantial permanent increase over the existing ambient noise levels at both the RFS and the Delevan Site would not occur; thus, noise impacts from operations would be less than significant under this criterion.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

NO IMPACT. No public or public use airports are located within 2 miles of the Phase 3 Expansion areas. Construction and operation of the Phase 3 Expansion would not result in any impacts under this criterion.

f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

LESS THAN SIGNIFICANT. The RFS is located approximately 1 mile from a private airstrip associated with a residential facility. Previous ambient noise measurements within a 1-mile radius of the RFS have shown that existing levels typically range from 41 to 45 dBA (L_{eq}). The airstrip is expected to be primarily related to agricultural activities and transportation and is not large enough to accommodate large volumes of air traffic. Additionally, construction personnel associated with the proposed Phase 3 Expansion would only be present at the RFS on a short-term basis; therefore, impacts to residents and personnel from exposure to excessive noise levels from aircraft operations would be less than significant.

References

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Table A.5-3 Project Features Addressing Transportation and Traffic Adopted as Part of the 2002 EIR

• Provide breaks in spoil piles, trench, or pipe strings to accommodate agricultural field access during construction. • Obtain an encroachment permit from Caltrans for crossings of the State Route 45 and Interstate 5 which will address specific boring techniques and pipeline design requirements.
WGSI Measure 3.14-2. Develop and Implement a Transportation Management Plan (TMP). The TMP would be updated if needed to include procedures for coordination with the local Emergency Service Providers, including the county fire departments, county public works departments, paramedics, sheriff departments, Caltrans, and California Highway Patrol, if necessary. In addition, implementation of WGSI Measure 3.14-1, as described above, would reduce the potential for interference with emergency response and access routes to a less than significant level.
Mitigation Measures 3.14-1. Develop an Operations Road Maintenance Plan. WGSI shall prepare and implement a Road Maintenance Plan for use during operations and maintenance activities. The Plan objectives are to minimize road impacts due to project operation, and to establish a procedure to maintain existing access roads to a specified condition. The Plan will outline performance requirements for the road condition, prescribe responsibilities and coordination with adjacent property owners/tenants, identify a road maintenance schedule, and determine types of repairs necessary on an ongoing basis.

A.12.4 Environmental Impacts and Mitigation Measures

Construction

The construction of the Phase 3 Expansion components is anticipated to be completed as follows; 23 months for the construction of RFS, 4 to 8 weeks for the reconductoring component, and 3 months for construction at the Delevan Site. During peak construction periods, up to 150 workers would be present at the RFS, up to 6 workers would be present at the reconductoring component location, and up to 20 workers would be present at the Delevan Site. Workers would either travel to the sites in private vehicles or arrive via public transportation (bus). Construction vehicles in use at the three sites that could result in traffic impacts would include water trucks, backhoes, line trucks, and tractor trailers, as described in Chapter 2, Description of Phase 3 Expansion. The main source of construction traffic would be associated with daily construction worker commute trips to the RFS and the Delevan Site. Additional traffic flow would also be generated by trucks delivering equipment and supplies. The applicant estimates that as many as 25 total daily truck round trips (50 total vehicle trips) are anticipated at the RFS and the Delevan Site. Assuming that the share of construction activity at the Delevan Site would be approximately 10 percent of the overall activity (based on the scale of the work at the Delevan Site compared to the RFS), approximately three of these trips would be to and from the Delevan Site, and 22 would be to and from the RFS. These truck trips would deliver materials and equipment to and from the sites and would also be used by site staff for non-worker (on-site) commute trips. An additional 66 daily round trips (132 total vehicle trips) by dump trucks would also occur during the delivery of fill materials for pad construction at the RFS. The applicant estimates that construction-related truck traffic would cause a 54 percent increase in traffic volumes on West Butte Road during the construction period.

Heavy equipment for the construction at the RFS would access the site from West Liberty Road via the Colusa Highway ~~Gridley~~ and Pennington roads. The existing bridge on West Liberty Road was previously upgraded to handle standard maximum weight loads. The applicant would coordinate with county road departments as necessary on the timing and route selection for movement of heavy equipment and haul trucks to limit effects on access to nearby residential areas. Reconductoring activities would result in temporary, partial lane closures along the utility line alignment, and short (less than 1-hour) road closures during reconductoring activities where the line crosses the road, during the 4- to 8-week construction period.

Light grading and graveling may be required to prepare unpaved county roads for construction usage related to the Phase 3 Expansion components. Heavy traffic on these roads may result in the creation of an uneven road or other surface impacts. Paved roads in rural areas typically do not have sufficient road base and asphalt to sustain heavy construction traffic, and potholes may result. The condition of these

roads would be reviewed with staff from the Public Works departments of Butte, Colusa, and Sutter counties prior to and following construction, and these counties would be reimbursed for road repairs necessitated by damage from construction traffic and hauling, as described above under APM TRANS-3.

Operation

During operation of the Phase 3 Expansion elements, vehicular traffic would include an additional 12 round trips per year to/from the Delevan Site for PG&E maintenance purposes, and an additional 725 round trips per year to/from the RFS due to regular work day travel for up to three new employees and callouts (during the evening) that required operator response to emergencies (i.e., equipment failure; WGS 2009). No additional trips to the reconductored distribution line above existing maintenance trips would take place once construction is complete.

a) Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

LESS THAN SIGNIFICANT IMPACT. The Phase 3 Expansion would not result in a substantial permanent increase in the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections. As discussed above, the concept LOS Caltrans has set for state facilities in Butte County is generally LOS D in rural areas and LOS E in urban areas (Butte County 2009). Most of the local access roadways in Butte, Colusa, and Sutter counties that would be used during construction are operating at LOS C or above, and the volume of traffic during the temporary construction period would not be high enough to result in a significant adverse impact to this rating. Operational traffic volumes would be even lower, and would likewise not result in a significant impact.

Construction is anticipated to occur over a 23-month period. During construction there would be a temporary increase in truck traffic on regional and local roadways in the vicinity of the RFS, the reconductoring component, and the Delevan Site associated with materials delivery. Reconductoring activities would also result in temporary, partial lane closures along the utility line alignment, and short (less than 1-hour) road closures during reconductoring activities where the line crosses the road, during the 4 to 8-week construction period. Implementation of the Traffic Management Plan (APM TRANS-1) would limit potential traffic impacts in the RFS, reconductoring component area, and Delevan Site. The Traffic Management Plan would facilitate an adequate flow of traffic in both directions by providing sufficient signage to alert drivers of construction zones. In addition, the applicant would (1) coordinate the timing and routes for heavy equipment and truck traffic (APM TRANS-2), (2) repair any damage to roads and bridges (APM TRANS-3), and (3) minimize disruption to local traffic and farming activities, and coordinate with the road departments of Butte, Sutter, and Colusa counties (APM TRANS-4). During operations, vehicular traffic would include an additional 12 round trips per year to/from the Delevan Interconnect Site for PG&E maintenance purposes, an additional 725 round trips per year to/from the RFS due to regular work day travel for up to three new employees, and callouts (during evening) that required operator response to emergencies (e.g., equipment failure).

Therefore, the Phase 3 Expansion would not cause a substantial increase in traffic in relation to the existing traffic load and capacity of the street system, and there would be a less than significant impact under this criterion.

b) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

LESS THAN SIGNIFICANT. The Phase 3 Expansion would not cause traffic to exceed an LOS standard established by a county congestion management agency. As discussed above, the LOS standard in rural areas of Butte and Colusa counties is LOS D. During the peak period of construction there would be 170 workers at the RFS, as well as 66 daily round trips from dump truck deliveries at the RFS; this would result in an approximately 50 percent increase in traffic on roads that would be used for transportation of construction materials. During the peak period of construction at the Delevan Site there would be 20 workers and an estimated four daily round-trip truck trips. No road closures would be required at either the RFS or the Delevan Site. Reconductoring activities would require four to six workers over a 4- to 8-week period, resulting in minimal additional traffic on area roads.

For the reconductoring component, in areas where the road shoulder is too narrow to accommodate vehicles and equipment, partial lane closures may be required. In addition, short (less than 1-hour) road closures would be required during reconductoring activities where the line crosses the road. For work in the roads in the vicinity of the reconductoring component, the PG&E construction crew or contractor would implement the Phase 2 Expansion Traffic Management Plan (APM TRANS-1), perform traffic control, obtain any necessary approvals for encroachment, and ensure that access to emergency response and evacuation routes was maintained.

Operation and maintenance activities at the Delevan Site would be monitored remotely, and Wild Goose and PG&E personnel would only need to visit the site intermittently for equipment repairs. Operation and maintenance at the RFS would require three additional full-time employees, resulting in three additional round trips from the surrounding area to the RFS, which would likely involve the use of West Gridley Road. Maintenance of the reconductored utility line would be accommodated within these trips and would not result in any additional trip generation.

As discussed above, the LOS standard in rural areas of Butte County is LOS D, and roads around the RFS and reconductoring component are estimated to have an LOS of C or greater. Roads around the Delevan Site generally have an LOS of A or B. The addition of Phase 3 Expansion construction trips to these roads, as well as three round trips from the surrounding area to the RFS with the use of the Colusa Highway ~~Gridley Road~~ for operations at the RFS, would be a minor increase, given existing traffic and LOS levels of these roads, and would not result in a decrease of the county road LOS below the current level.

Because construction and operation of the Phase 3 Expansion would not result in an LOS decrease for the roads used for delivery of construction equipment and construction workers to LOS D or lower, the Phase 3 Expansion would have a less than significant impact under this criterion.

c) Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

NO IMPACT. No aircraft, airports, or airstrips would be used during construction or operation of the Phase 3 Expansion. The nearest air facility to the Phase 3 Expansion areas is a private airstrip approximately 5,800 feet northwest of the RFS. No aircraft would be used during the construction or operation of the project. Therefore, the proposed project would have no impact under this criterion.

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

LESS THAN SIGNIFICANT IMPACT. The Phase 3 Expansion would not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). Construction of the Phase 3 Expansion would involve relocating the driveway at the hunter parking and storage lot currently west of the existing RFS; this driveway would be relocated approximately 540 feet to the west. As described in Chapter 2, Description of Phase 3 Expansion, this driveway would be very similar to the existing driveway, would be designed to code, and would not include features that could result in hazards. During construction, maneuvering construction-related vehicles and equipment among the general-purpose traffic on local roads has the potential to cause safety hazards. Implementation of a Traffic Management Plan (APM TRANS-1) would minimize the potential for safety hazards. In addition, the applicant would coordinate the timing and routes for heavy equipment and truck traffic (APM TRANS–2), repair any damage to roads and bridges (APM TRANS-3), and minimize disruption to local traffic and farming activities, and coordinate with the road departments of Butte, Sutter, and Colusa counties (APM TRANS-4).

With the implementation of these measures, construction and operation of the Phase 3 Expansion would result in a less than significant impact.

e) Would the project result in inadequate emergency access?

LESS THAN SIGNIFICANT IMPACT. Construction activities at the RFS are anticipated to increase traffic along West Liberty Road. This increase in traffic could affect the response times of emergency responders traveling to emergencies in the area. Implementation of the Traffic Management Plan (APM TRANS-1) would protect workers and prevent impacts to emergency service response during construction activities; therefore, the Phase 3 Expansion would have a less than significant impact under this criterion.

During reconductoring activities, in areas where the road shoulder is too narrow to accommodate vehicles and equipment, partial lane closures may be required. In addition, short (less than 1-hour) road closures would be required during reconductoring activities where the line crosses the road. For work in the roads in the area of the reconductoring component, the PG&E construction crew or contractor would implement the Traffic Management Plan (APM TRANS-1), perform traffic control, obtain any necessary approvals for encroachment, and ensure that access to emergency response and evacuation routes is maintained. With the implementation of these measures, the Phase 3 Expansion activities would not result in inadequate emergency access, and there would be a less than significant impact under this criterion.

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

NO IMPACT. Construction and operation of the Phase 3 Expansion would take place in rural agricultural and residential areas of Butte and Colusa counties. Both counties have a regional public transportation system; however, the systems do not service the RFS, reconductoring component area, or Delevan site, nor do they provide public transportation service in the area (BCAG 2010, Colusa County 2010). Additionally, the RFS, reconductoring component, and Delevan Site are not near any city or county bicycle or pedestrian facilities; therefore, the Phase 3 Expansion would have no impact under this criterion.

Appendix B
Revised Air Quality Appendix

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Table 1
Summary of Construction Phase Emissions - Delevan and Remote Facility Plants 4 and 5
WGS Phase 3 Expansion

Daily Emissions

	Daily Emissions (lb/day)								
Construction Activity	**NO_x**	**ROG**	**Exhaust PM_{10}**	**Fugitive PM_{10}**	**CO**	**SO_2**	**$PM_{2.5}$**	**CO_2**	**CH_4**
Delevan - Site Preparation, August 2010	14.0	1.6	0.7	6.3	6.1	0.02	0.6	1,500	0.011
Delevan - Civil, foundation and structural, August - September 2010	19.7	2.4	1.0	7.1	8.1	0.02	0.9	1,966	0.015
Delevan - Mechanical piping/hot tap installation, Electrical and instrumentation September - October 2010	19.0	2.4	1.0	5.9	8.1	0.02	0.9	1,915	0.015
Max Daily Delevan[1]	**38.65**	**4.84**	**2.06**	**12.93**	**16.20**	**0.05**	**1.83**	**3,881**	**0.03**
Average Daily Delevan[3]	**22.56**	**2.90**	**1.19**	**7.64**	**10.32**	**0.03**	**1.05**	**2,146**	**0.02**
Remote Facility Plant 4- Site preparation and berm installation, May - July 2011	31.85	4.54	1.62	29.66	19.31	0.05	1.42	4,088	0.07
Remote Facility Plant 4- Civil, foundation and structural, July - October 2011	33.72	5.12	2.01	28.11	19.68	0.04	1.77	3,950	0.06
Remote Facility Plant 4- Mechanical piping, Building fabrication/erection, electrical and instrumentation, July 2011 - March 2012	59.99	9.98	3.82	47.82	40.76	0.08	3.36	7,431	0.13
Remote Facility Plant 4 - Landscaping, cleanup, restoration, May 2012	27.52	4.09	1.39	20.70	17.98	0.04	1.22	3,834	0.05
Max Daily RFS Plant 4[2]	**93.71**	**15.10**	**5.82**	**75.93**	**60.44**	**0.13**	**5.13**	**11,381**	**0.19**
Average Daily RFS Plant 4[3]	**31.01**	**5.23**	**1.84**	**35.44**	**23.56**	**0.05**	**1.61**	**3,964**	**0.09**
Remote Facility Plant 5 - Site preparation, June 2012	29.38	4.24	1.48	27.68	18.60	0.05	1.30	4,087	0.06
Remote Facility Plant 5- Civil, foundation and structural, July - October 2012	31.28	4.75	1.86	28.11	18.91	0.04	1.64	3,949	0.06
Remote Facility Plant 5 - Mechanical piping, Building fabrication/erection, electrical and instrumentation, July 2012 - March 2013	55.94	9.29	3.56	47.82	39.15	0.08	3.13	7,429	0.12
Remote Facility Plant 5 - Cleanup, April 2013	13.75	2.35	0.61	19.41	9.79	0.03	0.53	2,419	0.04
Max Daily RFS Plant 5[2]	**87.22**	**14.04**	**5.41**	**75.93**	**58.06**	**0.13**	**4.76**	**11,378**	**0.18**
Average Daily RFS Plant 5[3]	**28.49**	**4.91**	**1.73**	**35.51**	**22.60**	**0.05**	**1.51**	**3,920**	**0.08**

Peak Daily Emissions By Year and District

	Peak Daily Emissions (lb/day)						
Year and District	**NO_x**	**ROG**	**Exhaust PM_{10}**	**Fugitive PM_{10}**	**CO**	**SO_2**	**$PM_{2.5}$**
Year 2010 (CCAPCD)	38.65	4.84	2.06	12.93	16.20	0.05	1.83
Year 2011 (BAAQMD)	93.71	15.10	5.82	75.93	60.44	0.13	5.13
Year 2012 (BAAQMD)	87.22	14.04	5.41	75.93	58.06	0.13	4.76
Year 2013 (BAAQMD)	55.94	9.29	3.56	47.82	39.15	0.08	3.13

Total Emissions per Phase

	Emissions (tons)							Emissions (metric tons)	
Construction Activity	**NO_x**	**ROG**	**Exhaust PM_{10}**	**Fugitive PM_{10}**	**CO**	**SO_2**	**$PM_{2.5}$**	**CO_2**	**CH_4**
Delevan - Site Preparation, August 2010	0.12	0.01	0.01	0.04	0.05	0.0002	0.005	11	0.0001
Delevan - Civil, foundation and structural, August - September 2010	0.32	0.04	0.02	0.12	0.15	0.0004	0.02	30	0.0003
Delevan - Mechanical piping/hot tap installation, Electrical and instrumentation September - October 2010	0.31	0.04	0.02	0.09	0.14	0.0004	0.01	29	0.0003
Total Delevan	**0.74**	**0.10**	**0.04**	**0.25**	**0.34**	**0.0009**	**0.03**	**71**	**0.0006**
Remote Facility Plant 4- Site preparation and berm installation, May - July 2011	0.52	0.07	0.02	0.58	0.33	0.0009	0.02	67	0.0013
Remote Facility Plant 4- Civil, foundation and structural, July - October 2011	0.55	0.09	0.03	0.50	0.36	0.0008	0.03	63	0.0012
Remote Facility Plant 4- Mechanical piping, Building fabrication/erection, electrical and instrumentation, July 2011 - March 2012	2.87	0.51	0.18	3.44	2.31	0.0046	0.16	371	0.0089
Remote Facility Plant 4 - Landscaping, cleanup, restoration, May 2012	0.16	0.02	0.01	0.16	0.10	0.0003	0.01	22	0.0004
Total RFS Plant 4	**4.09**	**0.69**	**0.24**	**4.68**	**3.11**	**0.0065**	**0.21**	**523**	**0.0117**
Remote Facility Plant 5 - Site preparation, June 2012	0.16	0.02	0.01	0.19	0.11	0.0003	0.01	23	0.0004
Remote Facility Plant 5- Civil, foundation and structural, July - October 2012	0.51	0.08	0.03	0.50	0.35	0.0008	0.03	63	0.0011
Remote Facility Plant 5 - Mechanical piping, Building fabrication/erection, electrical and instrumentation, July 2012 - March 2013	2.67	0.47	0.17	3.44	2.21	0.0046	0.15	371	0.0083
Remote Facility Plant 5- Cleanup, April 2013	0.10	0.02	0.00	0.16	0.07	0.0002	0.00	18	0.0003
Total RFS Plant 5	**3.45**	**0.59**	**0.21**	**4.30**	**2.73**	**0.0059**	**0.18**	**474**	**0.0101**

Total Emissions by Year

	Emissions (tons)							Emissions (metric tons)	
Construction Activity	**NO_x**	**ROG**	**Exhaust PM_{10}**	**Fugitive PM_{10}**	**CO**	**SO_2**	**$PM_{2.5}$**	**CO_2**	**CH_4**
Year 2010 (Delevan)	0.74	0.10	0.04	0.25	0.34	0.0009	0.03	71	0.0006
Year 2011 (RFS Plant 4)	2.99	0.50	0.18	3.38	2.24	0.0047	0.15	379	0.0084
Year 2012 (RFS Plants 4 and 5)	3.56	0.61	0.22	4.29	2.80	0.0059	0.19	478	0.0103
Year 2013 (RFS Plant 5)	0.99	0.17	0.06	1.30	0.80	0.0017	0.05	140	0.0031

Notes:
1. Assume overlap of civil, foundation, structural, mechanical, piping, erection, fabrication, electrical and instrumentation in September 2010.
2. Assume overlap of civil, foundation, structural, mechanical, piping, erection, fabrication, electrical and instrumentation August through October 2011 and 2012.
3. Total lbs per phase divided by total days in phase assuming 22 work days per month.

Table 2

Emissions Calcs for Construction equipment - Delevan and Remote Facility Plants 4 and 5 [1,2]

WGS Phase 3 Expansion

Site	Activity	Equipment	Fuel	Number	Days Operating [3]	HP	Load	Hr/day	Emissions Factor (g/hp/hr)							Emissions (lb/day)							Emissions (tons)						Emissions (metric tons)
									ROG	NOx	PM	PM2.5 [4]	CO	SO2	CO2	ROG	NOx	PM10	PM2.5	CO	SO2	CO2	ROG	NOx	PM10	PM2.5	CO	SO2	CO2
Delevan	Site Preparation, August 2010	Water Truck	Diesel	1	17	250	0.5	8	0.319	3.144	0.112	0.100	0.837	0.004	324.222	0.7034	6.9325	0.2470	0.2198	1.8456	0.0088	715	0.0060	0.0589	0.0021	0.0019	0.0157	0.0001	5.5
		Backhoe	Diesel	1	17	175	0.55	8	0.423	3.22	0.192	0.171	1.936	0.004	324.222	0.7182	5.4671	0.3260	0.2901	3.2870	0.0068	550	0.0061	0.0465	0.0028	0.0025	0.0279	0.0001	4.2
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.4216**	**12.3996**	**0.5729**	**0.5099**	**5.1326**	**0.0156**	**1265**	**0.0121**	**0.1054**	**0.0049**	**0.0043**	**0.0436**	**0.0001**	**9.8**
	Civil, foundation and structural, August - September 2010	Water Truck	Diesel	1	34	250	0.5	8	0.319	3.144	0.112	0.100	0.837	0.004	324.222	0.7034	6.9325	0.2470	0.2198	1.8456	0.0088	715	0.0120	0.1179	0.0042	0.0037	0.0314	0.0001	11.0
		Welder	Diesel	2	34	120	0.45	8	0.518	3.152	0.275	0.245	1.77	0.003	255.965	0.9869	6.0049	0.5239	0.4663	3.3721	0.0057	488	0.0168	0.1021	0.0089	0.0079	0.0573	0.0001	7.5
		Crane	Diesel	1	34	250	0.43	8	0.271	2.698	0.102	0.091	0.755	0.003	244.589	0.5139	5.1162	0.1934	0.1721	1.4317	0.0057	464	0.0087	0.0870	0.0033	0.0029	0.0243	0.0001	7.2
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**2.2041**	**18.0537**	**0.9643**	**0.8582**	**6.6494**	**0.0202**	**1666**	**0.0375**	**0.3069**	**0.0164**	**0.0146**	**0.1130**	**0.0003**	**25.7**
	Mechanical piping/hot tap installation, Electrical and instrumentation September - October 2010	Water Truck	Diesel	1	34	250	0.5	8	0.319	3.144	0.112	0.100	0.837	0.004	324.222	0.7034	6.9325	0.2470	0.2198	1.8456	0.0088	715	0.0120	0.1179	0.0042	0.0037	0.0314	0.0001	11.0
		Welder	Diesel	2	34	120	0.45	8	0.518	3.152	0.275	0.245	1.77	0.003	255.965	0.9869	6.0049	0.5239	0.4663	3.3721	0.0057	488	0.0168	0.1021	0.0089	0.0079	0.0573	0.0001	7.5
		Crane	Diesel	1	34	250	0.43	8	0.271	2.698	0.102	0.091	0.755	0.003	244.589	0.5139	5.1162	0.1934	0.1721	1.4317	0.0057	464	0.0087	0.0870	0.0033	0.0029	0.0243	0.0001	7.2
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**2.2041**	**18.0537**	**0.9643**	**0.8582**	**6.6494**	**0.0202**	**1666**	**0.0375**	**0.3069**	**0.0164**	**0.0146**	**0.1130**	**0.0003**	**25.7**
Remote Facility Plant 4	Site preparation and berm installation, May - July 2011	Water Truck	Diesel	2	51	250	0.5	8	0.302	2.876	0.100	0.089	0.798	0.004	324.222	1.3318	12.6832	0.4410	0.3925	3.5192	0.0176	1430	0.0340	0.3234	0.0112	0.0100	0.0897	0.0004	33.1
		Motor Grader	Diesel	1	17	175	0.61	8	0.461	3.562	0.209	0.186	2.067	0.004	346.974	0.8681	6.7075	0.3936	0.3503	3.8923	0.0075	653	0.0074	0.0570	0.0033	0.0030	0.0331	0.0001	5.0
		Backhoe	Diesel	1	26	175	0.55	8	0.397	2.994	0.181	0.161	1.932	0.004	324.222	0.6740	5.0834	0.3073	0.2735	3.2802	0.0068	550	0.0088	0.0661	0.0040	0.0036	0.0426	0.0001	6.5
		Bobcat Loader	Diesel	1	17	50	0.59	8	1.416	3.24	0.335	0.298	3.824	0.004	307.158	0.7369	1.6860	0.1743	0.1552	1.9899	0.0021	160	0.0063	0.0143	0.0015	0.0013	0.0169	0.0000	1.2
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.6108**	**26.1600**	**1.3162**	**1.1714**	**12.6817**	**0.0340**	**2794**	**0.0564**	**0.4608**	**0.0201**	**0.0179**	**0.1824**	**0.0006**	**45.8**
	Civil, foundation and structural, July - October 2011	Water Truck	Diesel	1	51	250	0.5	8	0.302	2.876	0.100	0.089	0.798	0.004	324.222	0.6659	6.3416	0.2205	0.1962	1.7596	0.0088	715	0.0170	0.1617	0.0056	0.0050	0.0449	0.0002	16.5
		Welder	Diesel	2	34	120	0.45	8	0.485	2.987	0.263	0.234	1.753	0.003	255.965	0.9240	5.6906	0.5010	0.4459	3.3397	0.0057	488	0.0157	0.0967	0.0085	0.0076	0.0568	0.0001	7.5
		Crane	Diesel	1	26	250	0.43	8	0.255	2.513	0.093	0.083	0.714	0.003	244.589	0.4836	4.7654	0.1764	0.1570	1.3540	0.0057	464	0.0063	0.0620	0.0023	0.0020	0.0176	0.0001	5.5
		Manlift	Diesel	1	38	120	0.46	8	0.444	2.907	0.235	0.209	1.697	0.003	261.653	0.4323	2.8306	0.2288	0.2037	1.6524	0.0029	255	0.0082	0.0538	0.0043	0.0039	0.0314	0.0001	4.4
		Generators	Diesel	1	41	50	0.3	8	1.409	4.137	0.367	0.327	3.851	0.005	420.92	0.3728	1.0947	0.0971	0.0864	1.0190	0.0013	111	0.0076	0.0224	0.0020	0.0018	0.0209	0.0000	2.1
		Bobcat Loader	Diesel	1	17	50	0.59	8	1.416	3.24	0.335	0.298	3.824	0.004	307.158	0.7369	1.6860	0.1743	0.1552	1.9899	0.0021	160	0.0063	0.0143	0.0015	0.0013	0.0169	0.0000	1.2
		Air Compressor	Diesel	1	34	175	0.48	8	0.368	2.914	0.167	0.149	1.568	0.003	273.029	0.5453	4.3178	0.2475	0.2202	2.3234	0.0044	405	0.0093	0.0734	0.0042	0.0037	0.0395	0.0001	6.2
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**4.1608**	**26.7267**	**1.6456**	**1.4646**	**13.4379**	**0.0310**	**2597**	**0.0704**	**0.4844**	**0.0285**	**0.0253**	**0.2279**	**0.0006**	**43.5**
	Mechanical piping, Building fabrication/erection, electrical and instrumentation, July 2011 - March 2012	Water Truck	Diesel	2	136	250	0.5	8	0.302	2.876	0.100	0.089	0.798	0.004	324.222	1.3318	12.6832	0.4410	0.3925	3.5192	0.0176	1430	0.0906	0.8625	0.0300	0.0267	0.2393	0.0012	88.2
		Welder	Diesel	6	90	120	0.45	8	0.485	2.987	0.263	0.234	1.753	0.003	255.965	2.7719	17.0718	1.5031	1.3378	10.0190	0.0171	1463	0.1247	0.7682	0.0676	0.0602	0.4509	0.0008	59.7
		Crane	Diesel	2	68	250	0.43	8	0.255	2.513	0.093	0.083	0.714	0.003	244.589	0.9671	9.5308	0.3527	0.3139	2.7079	0.0114	928	0.0329	0.3240	0.0120	0.0107	0.0921	0.0004	28.6
		Manlift	Diesel	2	102	120	0.46	8	0.444	2.907	0.235	0.209	1.697	0.003	261.653	0.8647	5.6613	0.4577	0.4073	3.3048	0.0058	510	0.0441	0.2887	0.0233	0.0208	0.1685	0.0003	23.6
		Generators	Diesel	3	109	50	0.3	8	1.409	4.137	0.367	0.327	3.851	0.005	420.92	1.1185	3.2840	0.2913	0.2593	3.0569	0.0040	334	0.0610	0.1790	0.0159	0.0141	0.1666	0.0002	16.5
		Bobcat Loader	Diesel	1	45	50	0.59	8	1.416	3.24	0.335	0.298	3.824	0.004	307.158	0.7369	1.6860	0.1743	0.1552	1.9899	0.0021	160	0.0166	0.0379	0.0039	0.0035	0.0448	0.0000	3.3
		Air Compressor	Diesel	1	90	175	0.48	8	0.368	2.914	0.167	0.149	1.568	0.003	273.029	0.5453	4.3178	0.2475	0.2202	2.3234	0.0044	405	0.0245	0.1943	0.0111	0.0099	0.1046	0.0002	16.5
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**8.3362**	**54.2348**	**3.4676**	**3.0862**	**26.9212**	**0.0625**	**5228**	**0.3944**	**2.6547**	**0.1639**	**0.1459**	**1.2667**	**0.0031**	**236.4**
	Landscaping, cleanup, restoration, May 2012	Water Truck	Diesel	2	17	250	0.5	8	0.286	2.631	0.090	0.080	0.768	0.004	324.222	1.2613	11.6027	0.3969	0.3532	3.3869	0.0176	1430	0.0107	0.0986	0.0034	0.0030	0.0288	0.0001	11.0
		Motor Grader	Diesel	1	6	175	0.61	8	0.435	3.341	0.193	0.172	2.062	0.004	346.974	0.8191	6.2913	0.3634	0.3235	3.8829	0.0075	653	0.0025	0.0189	0.0011	0.0010	0.0116	0.0000	1.8
		Backhoe	Diesel	1	9	175	0.55	8	0.372	2.777	0.164	0.146	1.929	0.004	324.222	0.6316	4.7149	0.2784	0.2478	3.2752	0.0068	550	0.0028	0.0212	0.0013	0.0011	0.0147	0.0000	2.2
		Bobcat Loader	Diesel	1	6	50	0.59	8	1.297	3.197	0.314	0.279	3.704	0.004	307.158	0.6749	1.6637	0.1634	0.1454	1.9275	0.0021	160	0.0020	0.0050	0.0005	0.0004	0.0058	0.0000	0.4
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.3869**	**24.2726**	**1.2022**	**1.0699**	**12.4724**	**0.0340**	**2794**	**0.0180**	**0.1437**	**0.0062**	**0.0055**	**0.0610**	**0.0002**	**15.5**
Remote Facility Plant 5	Remote Facility Plant 5 - Site preparation, June 2012	Water Truck	Diesel	2	17	250	0.5	8	0.286	2.631	0.090	0.080	0.768	0.004	324.222	1.2613	11.6027	0.3969	0.3532	3.3869	0.0176	1430	0.0107	0.0986	0.0034	0.0030	0.0288	0.0001	11.0
		Motor Grader	Diesel	1	6	175	0.61	8	0.435	3.341	0.193	0.172	2.062	0.004	346.974	0.8191	6.2913	0.3634	0.3235	3.8829	0.0075	653	0.0025	0.0189	0.0011	0.0010	0.0116	0.0000	1.8
		Backhoe	Diesel	1	9	175	0.55	8	0.372	2.777	0.164	0.146	1.929	0.004	324.222	0.6316	4.7149	0.2784	0.2478	3.2752	0.0068	550	0.0028	0.0212	0.0013	0.0011	0.0147	0.0000	2.2
		Bobcat Loader	Diesel	1	6	50	0.59	8	1.297	3.197	0.314	0.279	3.704	0.004	307.158	0.6749	1.6637	0.1634	0.1454	1.9275	0.0021	160	0.0020	0.0050	0.0005	0.0004	0.0058	0.0000	0.4
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.3869**	**24.2726**	**1.2022**	**1.0699**	**12.4724**	**0.0340**	**2794**	**0.0180**	**0.1437**	**0.0062**	**0.0055**	**0.0610**	**0.0002**	**15.5**
	Civil, foundation and structural, July - October 2012	Water Truck	Diesel	1	51	250	0.5	8	0.286	2.631	0.090	0.080	0.768	0.004	324.222	0.6306	5.8014	0.1985	0.1766	1.6934	0.0088	715	0.0161	0.1479	0.0051	0.0045	0.0432	0.0002	16.5
		Welder	Diesel	2	34	120	0.45	8	0.451	2.807	0.247	0.220	1.735	0.003	255.965	0.8592	5.3477	0.4706	0.4188	3.3054	0.0057	488	0.0146	0.0909	0.0080	0.0071	0.0562	0.0001	7.5
		Crane	Diesel	1	26	250	0.43	8	0.241	2.336	0.085	0.076	0.677	0.003	244.589	0.4570	4.4298	0.1612	0.1435	1.2838	0.0057	464	0.0059	0.0576	0.0021	0.0019	0.0167	0.0001	5.5
		Manlift	Diesel	1	38	120	0.46	8	0.41	2.728	0.219	0.195	1.679	0.003	261.653	0.3992	2.6563	0.2132	0.1898	1.6349	0.0029	255	0.0076	0.0505	0.0041	0.0036	0.0311	0.0001	4.4
		Generators	Diesel	1	41	50	0.3	8	1.293	4.063	0.346	0.308	3.726	0.005	420.92	0.3421	1.0751	0.0916	0.0815	0.9859	0.0013	111	0.0070	0.0220	0.0019	0.0017	0.0202	0.0000	2.1
		Bobcat Loader	Diesel	1	17	50	0.59	8	1.297	3.197	0.314	0.279	3.704	0.004	307.158	0.6749	1.6637	0.1634	0.1454	1.9275	0.0021	160	0.0057	0.0141	0.0014	0.0012	0.0164	0.0000	1.2
		Air Compressor	Diesel	1	34	175	0.48	8	0.345	2.731	0.156	0.139	1.562	0.003	273.029	0.5112	4.0467	0.2312	0.2057	2.3145	0.0044	405	0.0087	0.0688	0.0039	0.0035	0.0393	0.0001	6.2
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.8743**	**25.0205**	**1.5296**	**1.3613**	**13.1454**	**0.0310**	**2597**	**0.0657**	**0.4519**	**0.0264**	**0.0235**	**0.2231**	**0.0006**	**43.5**
	Mechanical piping, Building fabrication/erection, electrical and instrumentation, July 2012 - March 2013	Water Truck	Diesel	2	136	250	0.5	8	0.286	2.631	0.090	0.080	0.768	0.004	324.222	1.2613	11.6027	0.3969	0.3532	3.3869	0.0176	1430	0.0858	0.7890	0.0270	0.0240	0.2303	0.0012	88.2
		Welder	Diesel	6	90	120	0.45	8	0.451	2.807	0.247	0.220	1.735	0.003	255.965	2.5776	16.0430	1.4117	1.2564	9.9161	0.0171	1463	0.1160	0.7219	0.0635	0.0565	0.4462	0.0008	59.7
		Crane	Diesel	2	68	250	0.43	8	0.241	2.336	0.085	0.076	0.677	0.003	244.589	0.9140	8.8595	0.3224	0.2869	2.5676	0.0114	928	0.0311	0.3012	0.0110	0.0098	0.0873	0.0004	28.6
		Manlift	Diesel	2	102	120	0.46	8	0.41	2.728	0.219	0.195	1.679	0.003	261.653	0.7985	5.3127	0.4265	0.3796	3.2698	0.0058	510	0.0407	0.2709	0.0218	0.0194	0.1668	0.0003	23.6
		Generators	Diesel	3	109	50	0.3	8	1.293	4.063	0.346	0.308	3.726	0.005	420.92	1.0264	3.2252	0.2747	0.2444	2.9577	0.0040	334	0.0559	0.1758	0.0150	0.0133	0.1612	0.0002	16.5
		Bobcat Loader	Diesel	1	45	50	0.59	8	1.297	3.197	0.314	0.279	3.704	0.004	307.158	0.6749	1.6637	0.1634	0.1454	1.9275	0.0021	160	0.0152	0.0374	0.0037	0.0033	0.0434	0.0000	3.3
		Air Compressor	Diesel	1	90	175	0.48	8	0.345	2.731	0.156	0.139	1.562	0.003	273.029	0.5112	4.0467	0.2312	0.2057	2.3145	0.0044	405	0.0230	0.1821	0.0104	0.0093	0.1042	0.0002	16.5
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**7.7639**	**50.7534**	**3.2267**	**2.8717**	**26.3401**	**0.0625**	**5228**	**0.3677**	**2.4784**	**0.1523**	**0.1355**	**1.2393**	**0.0031**	**236.4**
	Cleanup, April 2013	Water Truck	Diesel	2	17	250	0.5	8	0.272	2.409	0.080	0.071	0.747	0.004	324.222	1.1995	10.6237	0.3528	0.3140	3.2943	0.0176	1430	0.0102	0.0903	0.0030	0.0027	0.0280	0.0001	11.0
		Bobcat Loader	Diesel	1	6	50	0.59	8	1.183	3.075	0.288	0.256	3.591	0.004	307.158	0.6156	1.6002	0.1499	0.1334	1.8687	0.0021	160	0.0018	0.0048	0.0004	0.0004	0.0056	0.0000	0.4
		Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**1.8151**	**12.2239**	**0.5027**	**0.4474**	**5.1630**	**0.0197**	**1590**	**0.0120**	**0.0951**	**0.0034**	**0.0031**	**0.0336**	**0.0002**	**11.5**

Notes:

1. Emissions factors, approximate HP ratings, and load defaults are from URBEMIS 2007, Ver 9.2.4.
2. Equipment lists and construction schedule supplied by Niska Gas and PG&E, January 19 and February 2, 2010.
3. Calculated based on the URBEMIS default of 17 days per month.
4. For offroad combustion sources, it was assumed that 89% of PM10 would be PM2.5. This follows the SCAQMD calculation methodology, 2006.

Table 3
Emissions Calculations for On-site and Commute Trucks - Delevan and Remote Facility Plants 4 and 5
WGS Phase 3 Expansion

									Emissions Factors (lb/mile)[2]								Total Emissions (tons)							Total Emissions (Metric Tons)		Daily Emissions (lb/day)								
Site	Activity	Truck[1]	Fuel	No.	Days Operating	Average VMT Per day	Total VMT per day	Total VMT per phase	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CH4	CO	NOx	ROG	SOx	Exhaust PM10	Fugitive PM10[3]	PM2.5	CO2	CH4	CO	NOx	ROG	SOx	Exhaust PM10	Fugitive PM10[3]	PM2.5	CO2	CH4
Delevan	Site Preparation, August 2010	Pickup	Gasoline	2	22	30	60	1320	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.00008	0.0055	0.0006	0.00060	########	0.00006	0.0170	0.00004	0.66	4.9E-05	0.50	0.06	0.0548	0.00065	0.00522	1.542	0.0033	66	0.0049
		Flatbed Truck	Diesel	1	3	20	20	60	0.01120	0.03822	0.00304	0.00004	0.00183	0.00160	4.21121	0.00014	0.0003	0.0011	0.00009	########	0.00005	0.0030	0.00005	0.11	3.9E-06	0.22	0.76	0.0608	0.00083	0.03661	1.996	0.0320	84	0.0028
		Dirt Hauling Truck	Diesel	1	22	20	20	440	0.01120	0.03822	0.00304	0.00004	0.00183	0.00160	4.21121	0.00014	0.0025	0.0084	0.00067	########	0.00040	0.0220	0.00035	0.84	2.8E-05	0.22	0.76	0.0608	0.00083	0.03661	1.996	0.0320	84	0.0028
		Total															**0.0083**	**0.0102**	**0.00136**	**########**	**0.00052**	**0.0419**	**0.00044**	**1.61**	**8.1E-05**	**0.94**	**1.58**	**0.1765**	**0.00230**	**0.07844**	**5.534**	**0.0673**	**234**	**0.0106**
	Civil, foundation and structural, August - September 2010	Pickup	Gasoline	4	66	30	120	7920	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.00008	0.0327	0.0036	0.00362	########	0.00034	0.1018	0.00022	3.94	0.00029	0.99	0.11	0.1097	0.00129	0.01044	3.084	0.0066	131	0.0098
		Flatbed Truck	Diesel	1	7	20	20	140	0.01120	0.03822	0.00304	0.00004	0.00183	0.00160	4.21121	0.00014	0.0008	0.0027	0.00021	########	0.00013	0.0070	0.00011	0.27	9E-06	0.22	0.76	0.0608	0.00083	0.03661	1.996	0.0320	84	0.0028
		Xray Truck	Diesel	1	10	20	20	200	0.01120	0.03822	0.00304	0.00004	0.00183	0.00160	4.21121	0.00014	0.0011	0.0038	0.00030	########	0.00018	0.0100	0.00016	0.38	1.3E-05	0.22	0.76	0.0608	0.00083	0.03661	1.996	0.0320	84	0.0028
		Total															**0.0346**	**0.0101**	**0.00414**	**########**	**0.00066**	**0.1187**	**0.00049**	**4.59**	**0.00031**	**1.44**	**1.64**	**0.2313**	**0.00294**	**0.08366**	**7.076**	**0.0706**	**300**	**0.0155**
	Mechanical piping/hot tap installation, Electrical and instrumentation September - October 2010	Pickup	Gasoline	5	44	30	150	6600	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.00008	0.0273	0.0030	0.00302	########	0.00029	0.0848	0.00018	3.28	0.00024	1.24	0.14	0.1371	0.00162	0.01305	3.855	0.0082	164	0.0122
		Flatbed Truck	Diesel	1	5	20	20	100	0.01120	0.03822	0.00304	0.00004	0.00183	0.00160	4.21121	0.00014	0.0006	0.0019	0.00015	########	0.00009	0.0050	0.00008	0.19	6.4E-06	0.22	0.76	0.0608	0.00083	0.03661	1.996	0.0320	84	0.0028
		Total															**0.0278**	**0.0049**	**0.00317**	**########**	**0.00038**	**0.0898**	**0.00026**	**3.47**	**0.00025**	**1.46**	**0.90**	**0.1979**	**0.00244**	**0.04966**	**5.851**	**0.0402**	**249**	**0.0151**
Remote Facility Plant 4	Site preparation and berm installation, May - July 2011	Inspector Pickup	Gasoline	3	66	50	150	9900	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0409	0.0042	0.00422	########	0.00044	0.1272	0.00028	4.95	0.00034	1.24	0.13	0.1278	0.00162	0.01332	3.855	0.0085	165	0.0115
		Safety Pickup	Gasoline	1	66	50	50	3300	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0136	0.0014	0.00141	########	0.00015	0.0424	0.00009	1.65	0.00011	0.41	0.04	0.0426	0.00054	0.00444	1.285	0.0028	55	0.0038
		Niska Car	Gasoline	1	10	50	50	500	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0021	0.0002	0.00021	########	0.00002	0.0064	0.00001	0.25	1.7E-05	0.41	0.04	0.0426	0.00054	0.00444	1.285	0.0028	55	0.0038
		Van	Gasoline	2	22	50	100	2200	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0091	0.0009	0.00094	########	0.00010	0.0283	0.00006	1.10	7.7E-05	0.83	0.08	0.0852	0.00108	0.00888	2.570	0.0057	110	0.0077
		Contractor Pickup	Gasoline	5	66	50	250	16500	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0682	0.0070	0.00703	########	0.00073	0.2120	0.00047	8.25	0.00057	2.07	0.21	0.2131	0.00269	0.02220	6.425	0.0141	276	0.0192
		Dump/Cement Truck	Diesel	2	22	20	40	880	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0049	0.0152	0.00123	########	0.00073	0.0439	0.00064	1.68	5.2E-05	0.44	1.38	0.1118	0.00159	0.06643	3.992	0.0578	169	0.0052
		Fuel Truck	Diesel	1	22	20	20	440	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0024	0.0076	0.00061	########	0.00037	0.0220	0.00032	0.84	2.6E-05	0.22	0.69	0.0559	0.00079	0.03322	1.996	0.0289	84	0.0026
		Semi Truck	Diesel	1	4	50	50	200	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0011	0.0035	0.00028	########	0.00017	0.0026	0.00014	0.38	1.2E-05	0.56	1.73	0.1398	0.00199	0.08304	1.285	0.0722	211	0.0065
		Flatbed Truck	Diesel	2	33	20	40	1320	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0073	0.0228	0.00184	########	0.00110	0.0659	0.00095	2.53	7.7E-05	0.44	1.38	0.1118	0.00159	0.06643	3.992	0.0578	169	0.0052
		Total															**0.1497**	**0.0628**	**0.01778**	**########**	**0.00380**	**0.5506**	**0.00297**	**21.64**	**0.00129**	**6.63**	**5.69**	**0.9307**	**0.01242**	**0.30240**	**26.685**	**0.2507**	**1294**	**0.0654**
	Civil, foundation and structural, July - October 2011	Inspector Pickup	Gasoline	2	66	50	100	6600	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0273	0.0028	0.00281	########	0.00029	0.0848	0.00019	3.30	0.00023	0.83	0.08	0.0852	0.00108	0.00888	2.570	0.0057	110	0.0077
		Safety Pickup	Gasoline	1	66	50	50	3300	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0136	0.0014	0.00141	########	0.00015	0.0424	0.00009	1.65	0.00011	0.41	0.04	0.0426	0.00054	0.00444	1.285	0.0028	55	0.0038
		Niska Car	Gasoline	1	10	50	50	500	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0021	0.0002	0.00021	########	0.00002	0.0064	0.00001	0.25	1.7E-05	0.41	0.04	0.0426	0.00054	0.00444	1.285	0.0028	55	0.0038
		Van	Gasoline	1	22	50	50	1100	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0045	0.0005	0.00047	########	0.00005	0.0141	0.00003	0.55	3.8E-05	0.41	0.04	0.0426	0.00054	0.00444	1.285	0.0028	55	0.0038
		Contractor Pickup	Gasoline	5	66	50	250	16500	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0682	0.0070	0.00703	########	0.00073	0.2120	0.00047	8.25	0.00057	2.07	0.21	0.2131	0.00269	0.02220	6.425	0.0141	276	0.0192
		Dump/Cement Truck	Diesel	2	22	20	40	880	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0049	0.0152	0.00123	########	0.00073	0.0439	0.00064	1.68	5.2E-05	0.44	1.38	0.1118	0.00159	0.06643	3.992	0.0578	169	0.0052
		Boom Truck	Diesel	1	22	20	20	440	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0024	0.0076	0.00061	########	0.00037	0.0220	0.00032	0.84	2.6E-05	0.22	0.69	0.0559	0.00079	0.03322	1.996	0.0289	84	0.0026
		Fuel Truck	Diesel	1	22	20	20	440	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0024	0.0076	0.00061	########	0.00037	0.0220	0.00032	0.84	2.6E-05	0.22	0.69	0.0559	0.00079	0.03322	1.996	0.0289	84	0.0026
		Xray Truck	Diesel	2	10	20	40	400	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0022	0.0069	0.00056	########	0.00033	0.0200	0.00029	0.77	2.3E-05	0.44	1.38	0.1118	0.00159	0.06643	3.992	0.0578	169	0.0052
		Semi Truck	Diesel	1	4	50	50	200	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0011	0.0035	0.00028	########	0.00017	0.0026	0.00014	0.38	1.2E-05	0.56	1.73	0.1398	0.00199	0.08304	1.285	0.0722	211	0.0065
		Flatbed Truck	Diesel	1	33	20	20	660	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0037	0.0114	0.00092	########	0.00055	0.0329	0.00048	1.26	3.9E-05	0.22	0.69	0.0559	0.00079	0.03322	1.996	0.0289	84	0.0026
		Total															**0.1325**	**0.0640**	**0.01615**	**########**	**0.00375**	**0.5031**	**0.00297**	**19.78**	**0.00115**	**6.25**	**6.99**	**0.9573**	**0.01293**	**0.35996**	**28.107**	**0.3028**	**1353**	**0.0629**
	Mechanical piping, Building fabrication/erection, electrical and instrumentation, July 2011 - March 2012	Inspector Pickup	Gasoline	4	176	50	200	35200	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.1454	0.0149	0.01500	########	0.00156	0.4523	0.00099	17.60	0.00123	1.65	0.17	0.1705	0.00215	0.01776	5.140	0.0113	220	0.0154
		Safety Pickup	Gasoline	2	176	50	100	17600	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0727	0.0074	0.00750	########	0.00078	0.2262	0.00050	8.80	0.00061	0.83	0.08	0.0852	0.00108	0.00888	2.570	0.0057	110	0.0077
		Niska Car	Gasoline	1	26	50	50	1300	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0054	0.0005	0.00055	########	0.00006	0.0167	0.00004	0.65	4.5E-05	0.41	0.04	0.0426	0.00054	0.00444	1.285	0.0028	55	0.0038
		Electrician Pickup	Gasoline	10	176	50	500	88000	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.3636	0.0372	0.03750	########	0.00391	1.1308	0.00249	44.00	0.00306	4.13	0.42	0.4262	0.00539	0.04440	12.850	0.0283	551	0.0384
		Erector Pickup	Gasoline	4	176	50	200	35200	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.1454	0.0149	0.01500	########	0.00156	0.4523	0.00099	17.60	0.00123	1.65	0.17	0.1705	0.00215	0.01776	5.140	0.0113	220	0.0154
		Van	Gasoline	2	58	50	100	5800	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.0240	0.0024	0.00247	########	0.00026	0.0745	0.00016	2.90	0.0002	0.83	0.08	0.0852	0.00108	0.00888	2.570	0.0057	110	0.0077
		Contractor Pickup	Gasoline	7	176	50	350	61600	0.00826	0.00084	0.00085	0.00001	0.00009	0.00006	1.10235	0.00008	0.2545	0.0260	0.02625	########	0.00273	0.7916	0.00174	30.80	0.00215	2.89	0.30	0.2983	0.00377	0.03108	8.995	0.0198	386	0.0269
		Boom Truck	Diesel	1	58	20	20	1160	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0065	0.0200	0.00162	########	0.00096	0.0579	0.00084	2.22	6.8E-05	0.22	0.69	0.0559	0.00079	0.03322	1.996	0.0289	84	0.0026
		Fuel Truck	Diesel	1	58	20	20	1160	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0065	0.0200	0.00162	########	0.00096	0.0579	0.00084	2.22	6.8E-05	0.22	0.69	0.0559	0.00079	0.03322	1.996	0.0289	84	0.0026
		Semi Truck	Diesel	1	9	50	50	450	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0025	0.0078	0.00063	########	0.00037	0.0058	0.00033	0.86	2.6E-05	0.56	1.73	0.1398	0.00199	0.08304	1.285	0.0722	211	0.0065
		Flatbed Truck	Diesel	2	88	20	40	3520	0.01112	0.03456	0.00280	0.00004	0.00166	0.00144	4.22046	0.00013	0.0196	0.0608	0.00492	########	0.00292	0.1756	0.00254	6.74	0.00021	0.44	1.38	0.1118	0.00159	0.06643	3.992	0.0578	169	0.0052
		Total															**1.0459**	**0.2120**	**0.11307**	**########**	**0.01609**	**3.4416**	**0.01146**	**134.40**	**0.00889**	**13.84**	**5.76**	**1.6419**	**0.02132**	**0.34910**	**47.819**	**0.2726**	**2202**	**0.1320**
	Landscaping, cleanup, restoration, May 2012	Inspector Pickup	Gasoline	3	22	50	150	3300	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0126	0.0013	0.00131	########	0.00015	0.0424	0.00009	1.65	0.00011	1.15	0.12	0.1194	0.00161	0.01347	3.855	0.0086	165	0.0108
		Safety Pickup	Gasoline	1	22	50	50	1100	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0042	0.0004	0.00044	########	0.00005	0.0141	0.00003	0.55	3.6E-05	0.38	0.04	0.0398	0.00054	0.00449	1.285	0.0029	55	0.0036
		Niska Car	Gasoline	1	4	50	50	200	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0008	0.0001	0.00008	########	0.00001	0.0026	0.00001	0.10	6.5E-06	0.38	0.04	0.0398	0.00054	0.00449	1.285	0.0029	55	0.0036
		Van	Gasoline	2	7	50	100	700	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0027	0.0003	0.00028	########	0.00003	0.0090	0.00002	0.35	2.3E-05	0.77	0.08	0.0796	0.00107	0.00898	2.570	0.0058	110	0.0072
		Contractor Pickup	Gasoline	5	22	50	250	5500	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0211	0.0021	0.00219	########	0.00025	0.0707	0.00016	2.75	0.00018	1.91	0.19	0.1991	0.00268	0.02245	6.425	0.0144	275	0.0179
		Fuel Truck	Diesel	1	7	20	20	140	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0007	0.0022	0.00018	########	0.00010	0.0070	0.00009	0.27	7.4E-06	0.20	0.62	0.0506	0.00081	0.02991	1.996	0.0259	84	0.0023
		Semi Truck	Diesel	1	2	50	50	100	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0005	0.0015	0.00013	########	0.00007	0.0013	0.00006	0.19	5.3E-06	0.51	1.55	0.1264	0.00202	0.07478	1.285	0.0647	211	0.0058
		Flatbed Truck	Diesel	1	11	20	20	220	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0011	0.0034	0.00028	########	0.00016	0.0110	0.00014	0.42	1.2E-05	0.20	0.62	0.0506	0.00081	0.02991	1.996	0.0259	84	0.0023
		Total															**0.0437**	**0.0113**	**0.00488**	**########**	**0.00083**	**0.1580**	**0.00061**	**6.28**	**0.00038**	**5.51**	**3.25**	**0.7053**	**0.01008**	**0.18848**	**20.697**	**0.1509**	**1040**	**0.0535**
Remote Facility Plant 5	Site preparation, June 2012	Inspector Pickup	Gasoline	3	22	50	150	3300	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0126	0.0013	0.00131	########	0.00015	0.0424	0.00009	1.65	0.00011	1.15	0.12	0.1194	0.00161	0.01347	3.855	0.0086	165	0.0108
		Safety Pickup	Gasoline	1	22	50	50	1100	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0042	0.0004	0.00044	########	0.00005	0.0141	0.00003	0.55	3.6E-05	0.38	0.04	0.0398	0.00054	0.00449	1.285	0.0029	55	0.0036
		Niska Car	Gasoline	1	4	50	50	200	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0008	0.0001	0.00008	########	0.00001	0.0026	0.00001	0.10	6.5E-06	0.38	0.04	0.0398	0.00054	0.00449	1.285	0.0029	55	0.0036
		Van	Gasoline	2	7	50	100	700	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0027	0.0003	0.00028	########	0.00003	0.0090	0.00002	0.35	2.3E-05	0.77	0.08	0.0796	0.00107	0.00898	2.570	0.0058	110	0.0072
		Contractor Pickup	Gasoline	5	22	50	250	5500	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0211	0.0021	0.00219	########	0.00025	0.0707	0.00016	2.75	0.00018	1.91	0.19	0.1991	0.00268	0.02245	6.425	0.0144	275	0.0179
		Dump/Cement Truck	Diesel	2	7	20	40	280	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0014	0.0043	0.00035	########	0.00021	0.0140	0.00018	0.54	1.5E-05	0.41	1.24	0.1011	0.00162	0.05983	3.992	0.0517	169	0.0047
		Fuel Truck	Diesel	1	7	20	20	140	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0007	0.0022	0.00018	########	0.00010	0.0070	0.00009	0.27	7.4E-06	0.20	0.62	0.0506	0.00081	0.02991	1.996	0.0259	84	0.0023
		Semi Truck	Diesel	1	2	50	50	100	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0005	0.0015	0.00013	########	0.00007	0.0013	0.00006	0.19	5.3E-06	0.51	1.55	0.1264	0.00202	0.07478	1.285	0.0647	211	0.0058
		Flatbed Truck	Diesel	2	11	20	40	440	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0022	0.0068	0.00056	########	0.00033	0.0220	0.00028	0.84	2.3E-05	0.41	1.24	0.1011	0.00162	0.05983	3.992	0.0517	169	0.0047
		Total															**0.0462**	**0.0190**	**0.00551**	**########**	**0.00120**	**0.1830**	**0.00093**	**7.23**	**0.0004**	**6.13**	**5.10**	**0.8569**	**0.01250**	**0.27822**	**26.685**	**0.2285**	**1293**	**0.0605**
	Civil, foundation and structural, July - October 2012	Inspector Pickup	Gasoline	2	66	50	100	6600	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0253	0.0026	0.00263	########	0.00030	0.0848	0.00019	3.30	0.00021	0.77	0.08	0.0796	0.00107	0.00898	2.570	0.0058	110	0.0072
		Safety Pickup	Gasoline	1	66	50	50	3300	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0126	0.0013	0.00131	########	0.00015	0.0424	0.00009	1.65	0.00011	0.38	0.04	0.0398	0.00054	0.00449	1.285	0.0029	55	0.0036
		Niska Car	Gasoline	1	10	50	50	500	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0019	0.0002	0.00020	########	0.00002	0.0064	0.00001	0.25	1.6E-05	0.38	0.04	0.0398	0.00054	0.00449	1.285	0.0029	55	0.0036
		Van	Gasoline	1	22	50	50	1100	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0042	0.0004	0.00044	########	0.00005	0.0141	0.00003	0.55	3.6E-05	0.38	0.04	0.0398	0.00054	0.00449	1.285	0.0029	55	0.0036
		Contractor Pickup	Gasoline	5	66	50	250	16500	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0632	0.0064	0.00657	########	0.00074	0.2120	0.00047	8.24	0.00054	1.91	0.19	0.1991	0.00268	0.02245	6.425	0.0144	275	0.0179
		Dump/Cement Truck	Diesel	2	22	20	40	880	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0045	0.0136	0.00111	########	0.00066	0.0439	0.00057	1.68	4.7E-05	0.41	1.24	0.1011	0.00162	0.05983	3.992	0.0517	169	0.0047
		Boom Truck	Diesel	1	22	20	20	440	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0022	0.0068	0.00056	########	0.00033	0.0220	0.00028	0.84	2.3E-05	0.20	0.62	0.0506	0.00081	0.02991	1.996	0.0259	84	0.0023
		Fuel Truck	Diesel	1	22	20	20	440	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0022	0.0068	0.00056	########	0.00033	0.0220	0.00028	0.84	2.3E-05	0.20	0.62	0.0506	0.00081	0.02991	1.996	0.0259	84	0.0023
		Xray Truck	Diesel	2	10	20	40	400	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0020	0.0062	0.00051	########	0.00030	0.0200	0.00026	0.76	2.1E-05	0.41	1.24	0.1011	0.00162	0.05983	3.992	0.0517	169	0.0047
		Semi Truck	Diesel	1	4	50	50	200	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0010	0.0031	0.00025	########	0.00015	0.0026	0.00013	0.38	1.1E-05	0.51	1.55	0.1264	0.00202	0.07478	1.285	0.0647	211	0.0058
		Flatbed Truck	Diesel	1	33	20	20	660	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0034	0.0102	0.00083	########	0.00049	0.0329	0.00043	1.26	3.5E-05	0.20	0.62	0.0506	0.00081	0.02991	1.996	0.0259	84	0.0023
		Total															**0.1226**	**0.0576**	**0.01496**	**########**	**0.00352**	**0.5031**	**0.00276**	**19.77**	**0.00107**	**5.77**	**6.26**	**0.8784**	**0.01304**	**0.32907**	**28.107**	**0.2745**	**1352**	**0.0580**
	Mechanical piping, Building fabrication/erection, electrical and instrumentation, July 2012 - March 2013	Inspector Pickup	Gasoline	4	176	50	200	35200	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.1347	0.0137	0.01401	########	0.00158	0.4523	0.00101	17.59	0.00114	1.53	0.16	0.1593	0.00215	0.01796	5.140	0.0115	220	0.0143
		Safety Pickup	Gasoline	2	176	50	100	17600	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0674	0.0068	0.00701	########	0.00079	0.2262	0.00051	8.79	0.00057	0.77	0.08	0.0796	0.00107	0.00898	2.570	0.0058	110	0.0072
		Niska Car	Gasoline	1	26	50	50	1300	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0050	0.0005	0.00052	########	0.00006	0.0167	0.00004	0.65	4.2E-05	0.38	0.04	0.0398	0.00054	0.00449	1.285	0.0029	55	0.0036
		Electrician Pickup	Gasoline	10	176	50	500	88000	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.3368	0.0341	0.03504	########	0.00395	1.1308	0.00253	43.97	0.00286	3.83	0.39	0.3981	0.00537	0.04490	12.850	0.0288	551	0.0358
		Erector Pickup	Gasoline	4	176	50	200	35200	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.1347	0.0137	0.01401	########	0.00158	0.4523	0.00101	17.59	0.00114	1.53	0.16	0.1593	0.00215	0.01796	5.140	0.0115	220	0.0143
		Van	Gasoline	2	58	50	100	5800	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.0222	0.0022	0.00231	########	0.00026	0.0745	0.00017	2.90	0.00019	0.77	0.08	0.0796	0.00107	0.00898	2.570	0.0058	110	0.0072
		Contractor Pickup	Gasoline	7	176	50	350	61600	0.00765	0.00078	0.00080	0.00001	0.00009	0.00006	1.10153	0.00007	0.2358	0.0239	0.02453	########	0.00277	0.7916	0.00177	30.78	0.002	2.68	0.27	0.2787	0.00376	0.03143	8.995	0.0201	386	0.0251
		Boom Truck	Diesel	1	58	20	20	1160	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0059	0.0179	0.00147	########	0.00087	0.0579	0.00075	2.22	6.1E-05	0.20	0.62	0.0506	0.00081	0.02991	1.996	0.0259	84	0.0023
		Fuel Truck	Diesel	1	58	20	20	1160	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0059	0.0179	0.00147	########	0.00087	0.0579	0.00075	2.22	6.1E-05	0.20	0.62	0.0506	0.00081	0.02991	1.996	0.0259	84	0.0023
		Semi Truck	Diesel	1	9	50	50	450	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0023	0.0070	0.00057	########	0.00034	0.0058	0.00029	0.86	2.4E-05	0.51	1.55	0.1264	0.00202	0.07478	1.285	0.0647	211	0.0058
		Flatbed Truck	Diesel	2	88	20	40	3520	0.01022	0.03092	0.00253	0.00004	0.00150	0.00129	4.21591	0.00012	0.0180	0.0544	0.00445	########	0.00263	0.1756	0.00228	6.73	0.00019	0.41	1.24	0.1011	0.00162	0.05983	3.992	0.0517	169	0.0047
		Total															**0.9687**	**0.1922**	**0.10537**	**########**	**0.01569**	**3.4416**	**0.01110**	**134.29**	**0.00829**	**12.81**	**5.18**	**1.5230**	**0.02135**	**0.32912**	**47.819**	**0.2544**	**2200**	**0.1227**
	Cleanup, April 2013	Inspector Pickup	Gasoline	3	22	50	150	3300	0.00709	0.00071	0.00075	0.00001	0.00009	0.00006	1.10087	0.00007	0.0117	0.0012	0.00123	########	0.00015	0.0424	0.00010	1.65	0.0001	1.06	0.11	0.1119	0.00161	0.01360	3.855	0.0088	165	0.0101
		Safety Pickup	Gasoline	1	22	50	50	1100	0.00709	0.00071	0.00075	0.00001	0.00009	0.00006	1.10087	0.00007	0.0039	0.0004	0.00041	########	0.00005	0.0141	0.00003	0.55	3.3E-05	0.35	0.04	0.0373	0.00054	0.00453	1.285	0.0029	55	0.0034
		Niska Car	Gasoline	1	4	50	50	200	0.00709	0.00071	0.00075	0.00001	0.00009	0.00006	1.10087	0.00007	0.0007	0.0001	0.00007	########	0.00001	0.0026	0.00001	0.10	6.1E-06	0.35	0.04	0.0373	0.00054	0.00453	1.285	0.0029	55	0.0034
		Van	Gasoline	2	7	50	100	700	0.00709	0.00071	0.00075	0.00001	0.00009	0.00006	1.10087	0.00007	0.0025	0.0002	0.00026	########	0.00003	0.0090	0.00002	0.35	2.1E-05	0.71	0.07	0.0746	0.00107	0.00907	2.570	0.0058	110	0.0067
		Contractor Pickup	Gasoline	5	22	50	250	5500	0.00709	0.00071	0.00075	0.00001	0.00009	0.00006	1.10087	0.00007	0.0195	0.0020	0.00205	########	0.00025	0.0707	0.00016	2.75	0.00017	1.77	0.18	0.1864	0.00268	0.02267	6.425	0.0146	275	0.0168
		Flatbed Truck	Diesel	2	11	20	40	440	0.00932	0.02743	0.00226	0.00004	0.00134	0.00115	4.21519	0.00010	0.0020	0.0060	0.00050	########	0.00029	0.0220	0.00025	0.84	2.1E-05	0.37	1.10	0.0905	0.00163	0.05348	3.992	0.0459	169	0.0042
		Total															**0.0403**	**0.0099**	**0.00452**	**########**	**0.00078**	**0.1607**	**0.00057**	**6.23**	**0.00035**	**4.63**	**1.52**	**0.5379**	**0.00807**	**0.10788**	**19.412**	**0.0809**	**829**	**0.0444**

Notes:
1. Equipment lists and usage percentssupplied by Niska Gas and PG&E, January 19, 2010.
2. Most conservative emissions factors from EMFAC2007 v.2.3 for the SCAQMD.
3. Calculated with 55% emissions reduction due to 2x daily watering (URBEMIS default). See fugitive worksheet for calculation of emissions factors and paved/unpaved assumptions.

Table 4
Construction Fugitive Dust Emissions - Delevan and Remote Facility Plants 4 and 5
WGS Phase 3 Expansion

Fugitive Dust from Grading
Acreage supplied by Niska Gas.

Phase	Acres Graded[1]	PM10 Emission Factor[2] (lb/acre)	Emissions[3] (lb/phase)	Emissions (tons/phase)	Emissions (lb/day)
Delevan - Site Preparation[4]	0.4	20	3.6	0.0018	0.72
Remote Facility Plant 4 and 5 - Site preparation and berm installation[5]	7.5	20	67.5	0.0338	3.97
Plant 4 (75% of total)[6]				0.0253	2.98
Plant 5 (25% of total)[6]				0.0084	0.99

Notes:
1. Acreage supplied by Niska Gas.
2. Emisions factor from URBEMIS2007, Version 9.2.4.
3. Calculated with 55% emissions reduction due to 2x daily watering (URBEMIS default).
4. Assumes 5 days of grading.
5. Assumes 17 days of grading.
6. Based on 3 months site prep at RFS Plant 4, and 1 month site prep RFS Plant 5.

Fugitive Dust from Roads

Calculation of Emissions Factors	**$E=[k(sL/2)^{0.65}*(W/3)^{1.5}]-C$**		From USEPA AP-42, Chapter 13 Part 2.1
Paved Surfaces	E	= 0.001	Emissions PM10 (lb/vehicle mile traveled)
Eq 1:	k	= 0.016	Particle size multiplier (lb/vehicle mile traveled)
Where:	sL	= 0.03	Silt loading (g/m^2)
	W	= 3	Weight (tons)
	C	= 0.00047	Brake and tire wear (lb/vehicle mile traveled)
	$E=[k(s/12)^{a}*(W/3)^{b}]$		From USEPA AP-42, Chapter 13 Part 2.2
Unpaved Surfaces	E	= 1.1	Emissions PM10 (lb/vehicle mile traveled)
Eq 1a:	k	= 1.5	Particle size multiplier (lb/vehicle mile traveled)
Where:	s	= 8.5	Silt content (%)
	a	= 0.9	Empirical constant
	W	= 3	Weight (tons)
	b	= 0.45	Empirical constant

Notes:
Emissions for Fugitive PM10 are calculated on the Trucks worksheet using the Emission Factors calculated above.
Vehicle miles were estimated for pickups and semis to consist of 95% paved surfaces and 5% unpaved.
Vehicle miles were estimated for other vehicles to consist of 80% paved surfaces and 20% unpaved.

Table 5
Summary of Construction Phase Emissions - PG&E Reconducting Component
WGS Phase 3 Expansion

Non-Road Equipment

Equipment	Fuel	Number	Days Operating	HP[1]	Hr/day[2]	Emissions Factor[4] (lb/hr)								Emissions (lb/day)								Emissions (tons)						Emissions (metric tons)	
						ROG	NOx	PM	PM2.5	CO	SO2	CO2	CH4	ROG	NOx	PM10	PM2.5	CO	SO2	CO2	CH4	ROG	NOx	PM10	PM2.5	CO	SO2	CO2	CH4
crew cab truck	Diesel	2	40	250	6	0.16394	1.61495	0.057	0.057	0.43012	0.00187	166.545	0.01479	1.9672	19.3794	0.6893	0.6893	5.1614	0.0225	1999	0.178	0.0393	0.3876	0.0138	0.0138	0.1032	0.0004	36.3	0.0032
line truck with worker lift attachment	Diesel	1	40	500	8	0.24923	2.31885	0.08717	0.087	0.75416	0.00267	272.334	0.02249	1.9938	18.5508	0.6973	0.6973	6.0333	0.0214	2179	0.180	0.0399	0.3710	0.0139	0.0139	0.1207	0.0004	39.5	0.0033
line truck with auger attachment	Diesel	1	40	500	8	0.24923	2.31885	0.08717	0.087	0.75416	0.00267	272.334	0.02249	1.9938	18.5508	0.6973	0.6973	6.0333	0.0214	2179	0.180	0.0399	0.3710	0.0139	0.0139	0.1207	0.0004	39.5	0.0033
wire reel attached to line truck	Diesel	1	40	500	8	0.24923	2.31885	0.08717	0.087	0.75416	0.00267	272.334	0.02249	1.9938	18.5508	0.6973	0.6973	6.0333	0.0214	2179	0.180	0.0399	0.3710	0.0139	0.0139	0.1207	0.0004	39.5	0.0033
puller attached to line truck	Diesel	1	40	500	8	0.24923	2.31885	0.08717	0.087	0.75416	0.00267	272.334	0.02249	1.9938	18.5508	0.6973	0.6973	6.0333	0.0214	2179	0.180	0.0399	0.3710	0.0139	0.0139	0.1207	0.0004	39.5	0.0033
tensioner attached to line truck	Diesel	1	40	500	8	0.24923	2.31885	0.08717	0.087	0.75416	0.00267	272.334	0.02249	1.9938	18.5508	0.6973	0.6973	6.0333	0.0214	2179	0.180	0.0399	0.3710	0.0139	0.0139	0.1207	0.0004	39.5	0.0033
Total	-	-	-	-	-	-	-	-	-	-	-	-	-	**11.9365**	**112.1332**	**4.1760**	**4.1760**	**35.3280**	**0.1294**	**12892**	**1.077**	**0.2387**	**2.2427**	**0.0835**	**0.0835**	**0.7066**	**0.0026**	**233.9**	**0.020**

On-Road Vehicles

Vehicle Type[1]	Fuel	Number	Days Operating	Average VMT Per day[3]	Total VMT per day	Total VMT per phase	Emissions Factors[4] (lb/mile)								Emissions (lb/day)								Emissions (tons)						Emissions (metric tons)	
							ROG	NOx	PM10	PM2.5	CO	SOx	CO2	CH4	ROG	NOx	PM10	PM2.5	CO	SO2	CO2	CH4	ROG	NOx	PM10	PM2.5	CO	SO2	CO2	CH4
Worker Commute (3)	Gasoline	6	40	14	84	3360	0.000914	0.000918	0.000087	0.000055	0.008263	0.000011	1.095682	0.000081	0.07678	0.07712	0.00731	0.0046	0.69407	0.00091	92.0373	0.00684	0.00154	0.00154	0.00015	9.2E-05	0.01388	1.8E-05	1.7	0.00012

Total

Emissions (lb/day)								Emissions (tons)						Emissions (metric tons)	
ROG	NOx	PM10	PM2.5	CO	SO2	CO2	CH4	ROG	NOx	PM10	PM2.5	CO	SO2	CO2	CH4
12.0133	**112.2104**	**4.1833**	**4.1806**	**36.0221**	**0.1303**	**12984**	**1.0839**	**0.2403**	**2.2442**	**0.0837**	**0.0836**	**0.7204**	**0.0026**	**236**	**0.0197**

Notes:
1. Horsepower assumed based on comparible equipment types
2. Equipment hours per day assumes 8 hours of daily operation;
3. For worker commute, a round trip distance of 14 miles was usedbased on maximum travel distance from the town of Gridley
4. Emissions factors applied are from SCAQMD, scenario year 2010 (derived from EMFAC)

Table 6
Summary of Operational Emissions
WGS Phase 3 Expansion

Potential to Emit Emissions for Criteria Pollutasnts for Plant 4 and 5

Source Type	Unit	Annual Fuel Limit[1,2] (MMBtu/Yr)	Permit Lmits[3] (ppmvd @ 15% O2)			Permit Lmits[3] (g/bhp-hr)			Calculated Emission Rate[4] (lb/MMBtu)						Annual Emissions (Tons/Year)					
			CO	NOx	ROG	CO	NOx	ROG	CO	NOx	ROG	SO2	PM10	PM2.5	CO	NOx	ROG	SO2	PM10	PM2.5
Compressor Engines	Engine 1	152,547	40	9	21	0.30	0.11	0.90	0.098	0.036	0.029	0.00313	0.0111	0.0111	7.47	2.75	2.21	0.24	0.85	0.85
	Engine 2	152,547	40	9	21	0.30	0.11	0.90	0.098	0.036	0.029	0.00313	0.0111	0.0111	7.47	2.75	2.21	0.24	0.85	0.85
	Engine 3	152,547	40	9	21	0.30	0.11	0.90	0.098	0.036	0.029	0.00313	0.0111	0.0111	7.47	2.75	2.21	0.24	0.85	0.85
	Engine 4	152,547	40	9	21	0.30	0.11	0.90	0.098	0.036	0.029	0.00313	0.0111	0.0111	7.47	2.75	2.21	0.24	0.85	0.85
	Subtotal	-	-	-	-	-	-	-	-	-	-	-	-	-	*29.9*	*11.0*	*8.8*	*1.0*	*3.4*	*3.4*
DeHy System	Glycol Reboilers	30,101	-	-	-	-	-	-	0.092	0.109	0.006	0.00313	0.0083	0.0083	1.38	1.64	0.09	0.05	0.12	0.12
	Thermal Oxidizer	17,107	-	-	-	-	-	-	0.0378	0.1004	0.0223	0.00313	0.0083	0.0083	0.32	0.86	0.19	0.03	0.07	0.07
Total			-	-	-	-	-	-	-	-	-	-	-	-	**31.61**	**13.48**	**9.13**	**1.03**	**3.58**	**3.58**

Notes:

1. Annual fuel limit for each compressor engine based on Condition 30 in Authority to Construct (ATC) **WGS-09-10-AC** for Plant 3 -Compressor A. This permit condition limits natural gas combusted in the engine to 166.90 MMscf/year. This value was converted to units of MMBtu/year using a gas lower heating value (LHV) of 914 Btu/scf.

2. Annual fuel limits for glycol reboilers and thermal oxidizers based on Condition 31 in Authority to Construct (ATC) **WGS-09-12-AC** for Plant 3 - DeHy System. This permit condition limits natural gas combusted in the glycol reboilers and thermal oxidizers to 19.76 MMscf/year and 11.23 MMscf/year. Since the expansion would have a capcity of 500 MMscf/day of gas compared to 300 MMscf/day of gas for Plant 3, the existing annual fuel limits were multiplied by a factor of 1.667 (i.e., 500/300). Values (in units of MMScf/year) were then converted to units of million Btus per year using a gas lower heating value (LHV) of 914 Btu/scf.
3. Values from permit for Plant 3 ATC: **WGS-09-10-AC** for Plant 3, Compressor A Condition 27
4. Values from "Plant 3 WG Lusk .xls"

Table 7
Summary of Operational GHG Emissions
WGS Phase 3 Expansion

Source Type	Unit	Annual Fuel Limit[1,2] (MMBtu/Yr)	Calculated Emission Rate[3,4,5] (lb/MMBtu)		Annual Emissions (Metric Tons/Year)	
			CO2	CH4	CO2	CH4
Compressor Engines	Engine 1	152,547	112	0.50	7754	35
	Engine 2	152,547	112	0.50	7754	35
	Engine 3	152,547	112	0.50	7754	35
	Engine 4	152,547	112	0.50	7754	35
	Subtotal	-	-	-	*31017*	*138*
DeHy System	Glycol Reboilers	30,101	131	0.0025	1789	0.03
	Thermal Oxidizer	17,107	124	0.024	963	0.18
Total			-	-	**33768**	**139**

Notes:

1. Annual fuel limit for each compressor engine based on Condition 30 in Authority to Construct (ATC) **WGS-09-10-AC** for Plant 3 -Compressor A. This permit condition limits natural gas combusted in the engine to 166.90 MMscf/year. This value was converted to units of MMBtu/year using a gas lower heating value (LHV) of 914 Btu/scf.

2. Annual fuel limits for glycol reboilers and thermal oxidizers based on Condition 31 in Authority to Construct (ATC) **WGS-09-12-AC** for Plant 3 - DeHy System. This permit condition limits natural gas combusted in the glycol reboilers and thermal oxidizers to 19.76 MMscf/year and 11.23 MMscf/year. Since the expansion would have a capcity of 500 MMscf/day of gas compared to 300 MMscf/day of gas for Plant 3, the existing annual fuel limits were multiplied by a factor of 1.667 (i.e., 500/300). Values (in units of MMScf/year) were then converted to units of million Btus per year using a gas lower heating value (LHV) of 914 Btu/scf.

3. CO2 emission factor for compressor engines based on value of 110 lb/MMBtu for natural gas-fired internal combustion engines (USEPA AP-42) plus value of 2 lb/MMBtu of CO2 converted from CH4 from the catalytic oxidizer. Assume 60% conversion of CH4 to CO2.

4. CH4 emission factor for compressor engines based on value of 1.25 lb/MMBtu for natural gas-fired internal combustion engines (USEPA AP-42) multiplied by 0.40 to account for conversion of CH4 to CO2. Assume 60% conversion of CH4 to CO2.

Table 8
Operations vehicle emissions
WGS Phase 3 Expansion

Vehicle Type	Fuel	Number	Average VMT Per day	Total VMT per day	Days per year[1]	Total VMT per year	Emissions Factors (lb/mile)[2]							
							CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CH4
On Site Vehicles	Gasoline	3	40	120	242	29040	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.00008
Delivery	Gasoline	1	60	60	121	7260	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.00013
Commute	Gasoline	3	50	150	242	36300	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.00008

Notes:

1. Trips per year estimated by WGS personnel.

2. Most conservative emissions factors from EMFAC2007 v.2.3 for the SCAQMD. Scenario year 2010 used (most conservative).

Average Daily Operational Mobile Emissions

Vehicle Type	VMT/day	Daily Emissions (lb/day)							
		CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CH4
On Site vehicle use	120	0.991531	0.110177	0.109679	0.001292968	0.010437	0.0065738	131.48188	0.0097753
Worker Commute	150	1.239414	0.137721	0.137098	0.001616211	0.013047	0.0082172	164.35235	0.0122191
Delivery Trucks	60	1.106259	1.237476	0.155375	0.001620595	0.045073	0.0385398	163.93332	0.0075459
Total	**-**	**3.34**	**1.49**	**0.40**	**0.0045**	**0.07**	**0.05**	**459.77**	**0.03**

Yearly Operational Mobile Emissions

Vehicle Type	VMT/day	Emissions (tons/yr)						Emissions (metric tons/yr)	
		CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CH4
On Site vehicle use	242	0.120	0.013	0.0133	0.00016	0.00126	0.00080	14.4	0.00107
Worker Commute	121	0.075	0.008	0.0083	0.00010	0.00079	0.00050	9.0	0.00067
Delivery Trucks	242	0.121	0.150	0.0188	0.00020	0.00545	0.00466	18.0	0.00083
Total	**-**	**0.316**	**0.171**	**0.040**	**0.00045**	**0.008**	**0.006**	**41**	**0.0026**

Table 9
Emissions for Blowdown and Starter Vent
WGS Phase 3 Expansion

Source Description	Natural Gas Volume (ft^3)	Gauge Pressure (psig)	Atmospheric Pressure (psi)	Absolute Pressure (psia)	Gas Temperature (F)	Gas Temperature (R)	Natural Gas Emissions[1] (lbmoles)	Natural Gas Emissions[1] (lbs)	Natural Gas Emissions[1] (tons)	Natural Gas Emissions[1] (metric tons)	CH4 Emissions[2] (metric tons)	VOC Emissions[2] (tons)
Compressor Blowdown	9,898,000	0	14.696	15	68	528	25,675	425,305	212.7	192.9	180	0.91
Engine Start	530,000	0	14.696	15	114	574	1,265	20,948	10.5	9.5	8.9	0.04
Total	**10,428,000**	-	-	-	-	-	**26,940**	**446,253**	**223.1**	**202.4**	**189**	**0.95**

Notes:

1. Calculations based on molecular weight of natural gas of 17.09 lb/lbmole (see Table G-2).
2. Calculations based on VOC weight fraction in natural gas of 3.32% (see Table G-2).

The ideal gas law is assumed to represent the relationship between the pressure, volume, temperature, and molar content of natural gas from the blowdown vent. The ideal gas law is expressed as:

$PV = nRT$ (Eq. 1)

Where:
P = pressure of gas
V = volume of gas
n = moles of gas
R = gas constant = 10.73 ft3-psia/lbmole-R
T = temperature of gas

This equation can be rearranged to calculate the number of moles of a given volume of gas:

$n = PV/RT$ (Eq. 2)

The following equation can be used to calculate the mass of a given number of moles of gas:

$m = n(MW)$ (Eq. 3)

Where:
m = mass of gas
n = moles of gas
MW = molecular weight of gas

Table 10
Composition of Representative Natural Gas
WGS Phase 3 Expansion

Component	MW (lb/lbmole)	Molar Fraction (Volume Fraction) (%)	Contribution to Natural Gas MW (lb/lbmole of Nat. Gas)	Mass Fraction (%)
Methane	16.02	96.6	15.48	93.45
Ethane	30.07	1.78	0.54	3.23
Propane	44.09	0.091	0.040	0.24
Butane	58.12	0.025	0.015	0.088
Pentane	72.15	0.0090	0.006	0.039
Hexane	86.17	0.0034	0.0029	0.018
Heptane	100.21	0.0014	0.0014	0.0085
Methyl Cyclohexane	98.19	0.00028	0.00027	0.0017
C8+	96	0.0052	0.0050	0.030
Benzene	78	0.00008	0.000062	0.00038
Toluene	92	0.00004	0.000037	0.00022
Ethylbenzene	106	0.00001	0.000011	0.00006
Xylenes	106	0.00001	0.000011	0.00006
Nitrogen	28.01	1.020	0.29	1.73
Carbon Dioxide	44.01	0.440	0.19	1.17
All Components	-	**100.0**	**16.56**	**100.0**
VOCs[1]	-	**-**	**-**	**0.43**

Notes:

1. VOCs above components except methane, ethane, nitrogen, and carbon dioxide.

Table 11
Calculation of Fugitive Emissions, Proposed Plants 4&5.

Emission Rate per Source Calculation[1,2,3]

Source	B0	B1	log (SV) 4000	B0+B1*log(SV) 4000	Component Emission Rate (kg/h/source) 4,000
Connector	-5.9147	0.75	3.602059991	-3.213155007	**0.0006121**
Valves	-6.0399	0.83	3.602059991	-3.050190207	**0.0008909**
Open-ended lines	-6.9586	1.28	3.602059991	-2.347963211	**0.0044878**
Pressure relief device	-5.1479	0.91	3.602059991	-1.870025408	**0.0134888**
Pressure regulators	-6.4821	0.91	3.602059991	-3.204225408	**0.0006248**

Notes:

1. Based on "Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage - Volume 1- GHG Emission estimation Methodologies and Procedures", Interstate Natural Gas Association of America (INGAA), September 2005.
2. Niska uses a Screening Value of 4,000 ppm of methane
3. Calculations based on Equation 4-2 and Table 4-8.

Component Count and Calculation of emission rates

Component	Count	Component (per Table 4-8)	Component Emission Rate (kg/hr/component)	Total Hourly Natural Gas Emissions (kg/hr)	Rationale for Selected Component Category
Equipment and Piping flanges and connectors	2000	Connector	0.000612	1.2243	
Sight glass	12	Connector	0.000612	0.0073	
Sample connections	20	Connector	0.000612	0.0122	
Unions	600	Connector	0.000612	0.3673	
Block Valves	566	Valves	0.000891	0.5042	
Control Valves	100	Valves	0.000891	0.0891	
Diaphragm presure regulators	150	Valves	0.000891	0.1336	See Footnote A.
Drains	6	Valves	0.000891	0.0053	See Footnote B.
Atmospheric organic liquid storage tank hatches	6	Open ended lines	0.004488	0.0269	See Footnote C.
Open ended lines	0	Open ended lines	0.004488	0.0000	
Instrument Seals and Packing	130	Pressure regulators	0.000625	0.0812	See Footnote F.
Pump seals	966	Pressure regulators	0.000625	0.6036	See Footnote F.
Compressor seals	24	Pressure regulators	0.000625	0.0150	See Footnote F.
Pressure Relief Valves to Atm.	98	Pressure Relief Device	0.013489	1.3219	See Footnote D.
Pressure Relief Vents	137	Pressure Relief Device	0.013489	1.8480	See Footnote E.
Underground pipelines (resulting from corrosion, faulty connection, etc)	0	(Not applicable)	(Not applicable)	0.0000	
Total				**6.24**	

Notes:

A - The industry sometimes uses natural gas-powered motors to actuate pressure regulators. Niska uses compressed air. The structure of this device is similar to a valve.
B- Drains at Niska are liquid seal drains. This device is most similar to a valve.
C- Tank hatches are similar to open ended lines.
D- Pressure relief valves that open to the atmosphere are a type of pressure relief device.
E- Pressure relief vents (Pressure system vents-PSVs) are a type of pressure relief device.
F- Like a pressure regulator, these devices include a stem in a packing gland.

Parameter	Value	Units
Hourly Emissions - Natural Gas	6.24	kg/hr
Hourly Emissions - CH4	5.83	kg/hr
Hourly Emissions - VOC	0.027	kg/hr
Annual Operation	8,760	hr/yr
Annual Emissions - CH4	51,080	kg/yr
	51.1	metric tons/yr
Annual Emissions - VOC	234	kg/yr
	0.26	tons/yr

Table 12
Summary of Indirect Greenhouse Emissions Due to Electricity Use
WGS Phase 3 Expansion

Source	Annual Power Usage (kWh/yr)	Emissions Factor[1] (lb/MW-hr)	CO2 Emissions (lbs/year)	CO2 Emissions (metric tons/year)
Purchased Electricity	6,178,200	724.12	4,473,758	2,030

Notes:

1. Emission Factor for eGrid Subregion WECC California from "California Climate Action Registry General Reporting Protocol - Version 3.1 - January 2009" - Appendix C, Table C.2.

WILD GOOSE PHASE 3 GAS STORAGE EXPANSION SUPPLEMENTAL EIR

Summary of Toxic Air Contaminants Analysis

Toxic Air Contaminants

Toxic air contaminants (TACs) are air pollutants suspected or known to cause cancer, birth defects, neurological damage, or other related health issues. Except for lead, there are no established ambient air quality standards for TACs. Instead, development projects resulting in emissions of TACs are managed on a case-by-case basis depending on the quantity and type of emissions and proximity of potential receptors. Statewide and local programs identify industrial and commercial emitters of TACs and require reduction in these emissions.

Diesel engines emit a complex mix of pollutants, the most visible of which are very small carbon particles, or "soot," known as diesel particulate matter (DPM). California Air Resources Board (CARB) has identified DPM as a TAC (CARB 1998).

The Toxic Air Contaminant Identification and Control Act (AB 1807) created a program to reduce exposure to TACs. AB 1807 defines a "toxic air contaminant" as an air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or that may pose a present or potential hazard to human health. AB 1807 requires that the CARB prioritize the identification and control of TACs, considering the following criteria:

- The risk of harm to public health,
- The amount or potential amount of emissions,
- Manner of usage of the substance,
- Exposure to the substance,
- Persistence in the atmosphere, and
- Ambient concentrations in the community.

AB 1807 established a two-step process of risk identification and risk management to address the potential health effects from air toxic substances and protect public health. The first step (identification) requires the CARB and the Office of Environmental Health Hazard Assessment (OEHHA) to determine whether a substance should be formally identified TAC.

In the second step (risk management), the CARB reviews the emission sources of an identified TAC and determines whether any regulatory action is necessary to reduce the risk. The analysis includes a review of available technologies, controls that are already in place, the associated costs of reducing emissions, and the associated risk. Public outreach is an important part in the development of a control plan. The risk management step must balance public health protection and economic growth.

The California Air Toxics "Hot Spots" Information and Assessments Act (Hot Spots Act) was passed in 1987. The Hot Spots Act established an air toxics inventory and a risk quantification program for substances that cause chronic and acute health effects. The Hot Spots program is administered by the local air districts in California.

A facility is subject to the Hot Spots Act if it does any of the following:

- Manufactures, formulates, uses, or releases a substance on the list of 600 toxic substances and emits 10 tons or more per year of total organic gases, particulate matter, nitrogen oxides, or sulfur oxides;
- Is listed on an air toxics survey, inventory, or report compiled by the local air district; or
- Manufactures, formulates, uses, or releases a substance on the list of 600 toxic substances and emits less than 10 tons or more per year of the criteria pollutants, but is subject to the emission inventory requirements.

Facilities that are subject to the Hot Spots Act are required to do the following:

- Facilities must report emissions from a list of 600 toxic substances.
- If an Air Quality Management District (AQMD) determines that a health risk assessment (HRA) must be conducted, the facility must conduct the HRA according to methods developed by the OEHHA.
- The public must be notified of significant risks posed by nearby facilities.
- Facilities found to pose a significant risk must prepare and implement risk reduction audits and plans within six months of the determination.
- Facilities that are subject to the Hot Spots Act must prepare an air toxics emission inventory, plans, and emission inventory reports. Facilities must submit a proposed emission inventory plan to the local air district showing how emissions will be measured or calculated. The local air district must approve, modify, or return the inventory plan to the operator for revisions within 120 days.

Once it is approved, the facility operator must implement the plan and submit an emission inventory within 180 days. Emission inventories must be updated every four years. After reviewing an emission inventory, the air district will rank a facility as high, intermediate, or low priority. High priority facilities must prepare an HRA and notify the surrounding community of its emissions if the risk assessment shows that the emissions are a significant risk. If the facility poses a significant risk, it must prepare an emissions reduction plan that will reduce the risk below the significant risk level within five years. Low and medium priority facilities must prepare an emissions inventory update every four years or prepare a risk assessment that shows the facility does not pose a significant risk. A facility's rank may change if the annual inventory shows any significant changes.

In ranking a facility, the air district considers potency, toxicity, quantity, the volume of hazardous materials released, and a facility's proximity to potential receptors. Within 150 days of being designated as a high priority facility, a facility must prepare and submit an HRA. The HRA must include:

- A comprehensive dispersion analysis of the hazardous substances,
- The potential for human exposure, and
- A quantitative assessment of both individual and population-wide health risks using OEHHA's Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.

After the HRA is reviewed by the OEHHA and approved by the AQMD, the facility must notify everyone listed in the risk assessment as an exposed person, if it has been determined that there is a potentially significant health risk.

According to the Butte County AQMD (BCAQMD) California Environmental Quality Act (CEQA) guide, when evaluating potential impacts related to TACs, lead agencies should consider whether a new or modified source of TACs is proposed for a location near a sensitive receptor. Facilities and equipment that require permits from the BCAQMD are screened for risks from toxic emissions and are required to install Toxic Best Available Control Technology to reduce the risks to below significant.

The applicant has prepared a plan in accordance with the Hot Spots program (finding a less than significant impact, with all risks below the applicable thresholds) and submitted it to the BCAQMD. This plan is still under review so it is unclear what, if any, issues may be raised by the BCAQMD. However, through the local permit to operate process, the applicant would be required to adhere to any additional restrictions placed on it by the BCAQMD, regardless of the results, once the BCAQMD completes its review of the plan.

The BCAQMD also suggested that prioritization scores be determined for the facility, and accordingly, a Level 1 TAC air quality (screening) analysis was performed.

Level I TAC Air Quality Analysis

A Level 1 analysis using the California Air Pollution Control Officers Association (CAPCOA) prioritization methodology (CAPCOA 2009) was performed for the new Plants 4 and 5 alone, and for the existing and new plants together (Plants 1, 2, 3, 4, and 5). Table 1 shows emissions for TACs for Plants 4 and 5. Table 2 shows emissions for the existing plants and the new plants. Emissions are associated with operation of the compressors, dehydration and regeneration, blowdown, fugitives, the methanol (MeOH) tank, and the produced water (PW) tank. The Level 1 analysis is based on the quantity of emissions, proximity to receptor, and release height of the source. The resulting prioritization score indicates whether any further analysis is required. The nearest residential structures or offsite worksites represent the receptors used as inputs. Emissions are expected “worst case” emissions. Worst case cancer risk is based on exposure for a period of 70 years. Worst case for acute adverse health effects is based on the highest hourly emissions. Worst case for chronic adverse health effects is based on the annual average emissions.

TABLE 1 TAC Emissions for Plants 4 and 5

Substance	Annual Emissions (lb/yr)						
	Compressors	Dehydration & Regeneration	Blow-down	Fugitives	MeOH Tank	PW Tank	TOTAL
1,3-Butadiene	55.52						55.52
Acetaldehyde	5.76						5.76
Acrolein	5.76						5.76
Anthracene	0.02						0.02
Benzene	31.14	0.63	1.61	0.26		4.3	38.00
Benzo(a)pyrene	0.00						0.00
Benzo(b)fluoranthene	0.01						0.01
Benzo(k)fluoranthene	0.00						0.00
Chrysene	0.00						0.00
Dibenz(a,h)anthracene	0.00						0.00
Ethylbenzene	10.28	0.067	0.27	0.04		5.48	16.14
Formaldehyde	53.61						53.61
Naphthalene	3.44						3.44
Propylene	624.21						624.21
Toluene	38.04	0.32	0.95	0.15		19.01	58.48
Xylene (total)	100.61	0.07	0.27	0.04		5.48	106.47
Ammonia	17333.00						17333.00
Methanol			30.64		13.07		43.71
Hydrogen sulfide			0.02				0.02
Carbonyl sulfide			0.28				0.28
Hexane			48.97				48.97
Cyclohexane			8.70				8.70

Key:
MeOh = methanol
PW = produced water

TABLE 2 TAC Emissions for Plants 1, 2, 3, 4, and 5

Substance	Annual Emissions (lb/yr)						
	Compressors	Dehydration & Regeneration	Blow-down	Fugitives	MeOH Tank	PW Tank	TOTAL
1,3-Butadiene	146.54						146.54
Acetaldehyde	15.20						15.20
Acrolein	15.20						15.20
Anthracene	0.04						0.04
Benzene	82.19	1.52	4.04	0.65		10.77	99.16
Benzo(a)pyrene	0.001						0.001
Benzo(b)fluoranthene	0.01						0.01
Benzo(k)fluoranthene	0.003						0.003
Chrysene	0.01						0.01
Dibenz(a,h)anthracene	0.00						0.001
Ethylbenzene	27.14	0.16	0.69	0.11		13.69	41.79
Formaldehyde	141.50						141.50
Naphthalene	9.07						9.07
Propylene	1647.66						1647.66
Toluene	100.41	0.77	2.38	0.38		47.53	151.47
Xylene (total)	265.56	0.17	0.69	0.11		13.69	280.22
Ammonia	34667.00						34,667
Methanol			76.61		13.07		89.68
Hydrogen sulfide			0.04				0.04
Carbonyl sulfide			0.70				0.70
Hexane			122.42				122.42
Cyclohexane			21.74				21.74

Key:
MeOh = methanol
PW = produced water

Hourly and annual emission rates and prioritization scores for Plants 4 and 5 are shown in Table 3. Hourly and annual emission rates and prioritization scores for Plants 1, 2, 3, 4, and 5 are shown in Table 4. Prioritization scores for carcinogens are obtained by multiplying the cancer potency factor (unit risk) by the facility-wide hourly emissions (lb/hr), and then multiplying the resultant total emissions by the receptor adjustment factor and the normalization factor (1,700). Prioritization scores for acute non-carcinogens are obtained by dividing the hourly emission rate by the acceptable exposure level, and then multiplying the resultant total emissions by the receptor adjustment factor and the acute normalization factor (1,500). Prioritization scores for chronic non-carcinogens are obtained by dividing the annual average hourly emission rate by the acceptable exposure level and then multiplying total emissions by the receptor adjustment factor and the chronic normalization factor (150). The prioritization scores for Plants 4 and 5 are below the thresholds, as shown in Table 3. As shown in Table 4, prioritization scores for the new and existing plants are below the thresholds for acute and chronic non-carcinogenic effects, but above the threshold for carcinogenic effects. Therefore, a Level II analysis was performed to further define the potential carcinogenic effects from the operation of all five plants.

TABLE 3 Prioritization Scores for Plants 4 and 5

Substance	Applicant's Degree of Accuracy	Toxics Potency Factors			Prioritization Scores		
		Cancer Potency Value ($\mu g/m^3)^{-1}$	Acute REL ($\mu g/m^3$)	Chronic REL ($\mu g/m^3$)	Carcinogen	Acute Non-Carcinogen	Chronic Non-Carcinogen
1,3-Butadiene	0.1	1.7E-04		20	9.44E-03		3.17E-04
Acetaldehyde	20	2.7E-06	470	140	1.55E-05	1.94E-06	4.69E-06
Acrolein	0.05		2.5	0.35		3.64E-04	1.88E-03
Anthracene	50						
Benzene	2	2.9E-05	1,300	60	1.10E-03	9.32E-05	7.22E-05
Benzo(a)pyrene	0.05	1.1E-03			4.07E-07		
Benzo(b)fluoranthene	0.5	1.1E-04			5.64E-07		
Benzo(k)fluoranthene	0.5	1.1E-04			1.38E-07		
Chrysene	5	1.1E-05			2.55E-08		
Dibenz(a,h)anthracene	0.1	1.2E-03			4.44E-07		
Ethylbenzene	200			2,000			9.21E-07
Formaldehyde	5	6.0E-06	55	9	3.22E-04	1.54E-04	6.80E-04
Naphthalene	50	3.4E-05		9	1.17E-04		4.36E-05
Propylene	200			3,000			2.38E-05
Toluene	200		37,000	300		1.95E-06	2.23E-05
Xylene (total)	200		22,000	700		1.82E-06	1.74E-05
Ammonia	200		3,200	200		8.11E-04	9.89E-03
Methanol	200		28,000	4,000		8.23E-05	1.25E-06
Hydrogen sulfide	5		42	10		2.91E-05	2.01E-07
Carbonyl sulfide	100						
Hexane	200			7,000			7.99E-07
Cyclohexane	200						
	Sum				0.011	0.0015	0.012
	Normalization Factor				1,700	1,500	150
	Receptor Proximity (RP) Adjustment Factor				0.003	0.04	0.003
	Prioritization Score				0.0561	0.0878	0.0056
	Significance Threshold				0.1	1.0	1.0
	Significant Toxics Risk				No	No	No

Key:
REL = Reference Exposure Level
$\mu g/m^3$ = micrograms per cubic meter

TABLE 4 Prioritization Scores for Plants 1, 2, 3, 4, and 5

Substance	Applicant's Degree of Accuracy	Toxics Potency Factors			Prioritization Scores		
		Cancer Potency Value ($\mu g/m^3)^{-1}$	Acute REL ($\mu g/m^3$)	Chronic REL ($\mu g/m^3$)	Carcinogen	Acute Non-Carcinogen	Chronic Non-Carcinogen
1,3-Butadiene	0.1	1.7E-04		20	2.49E-02		8.36E-04
Acetaldehyde	20	2.7E-06	470	140	4.10E-05	4.84E-06	1.24E-05
Acrolein	0.05		2.5	0.35		9.10E-04	4.96E-03
Anthracene	50						
Benzene	2	2.9E-05	1,300	60	2.88E-03	2.33E-04	1.89E-04
Benzo(a)pyrene	0.05	1.1E-03			1.07E-06		
Benzo(b)fluoranthene	0.5	1.1E-04			1.49E-06		
Benzo(k)fluoranthene	0.5	1.1E-04			3.64E-07		
Chrysene	5	1.1E-05			6.74E-08		
Dibenz(a,h)anthracene	0.1	1.2E-03			1.17E-06		
Ethylbenzene	200			2,000			2.39E-06
Formaldehyde	5	6.0E-06	55	9	8.49E-04	3.85E-04	1.79E-03
Naphthalene	50	3.4E-05		9	3.08E-04		1.15E-04
Propylene	200			3,000			6.27E-05
Toluene	200		37,000	300		4.88E-06	5.76E-05
Xylene (total)	200		22,000	700		4.54E-06	4.57E-05
Ammonia	200		3,200	200		1.62E-03	1.98E-02
Methanol	200		28,000	4,000		1.61E-05	2.56E-06
Hydrogen sulfide	5		42	10		7.27E-05	5.02E-07
Carbonyl sulfide	100						
Hexane	200			7,000			2.00E-06
Cyclohexane	200						
	Sum				0.029	0.0033	0.028
	Normalization Factor				1,700	1,500	150
	Receptor Proximity (RP) Adjustment Factor				0.003	0.04	0.003
	Prioritization Score				0.1479	0.1952	0.0125
	Significance Threshold				0.10	1.00	1.00
	Significant Toxics Risk				Potential	No	No

Key:
REL = Reference Exposure Level
$\mu g/m^3$ = micrograms per cubic meter

Screening Health Risk Assessment

An HRA was performed with the SCREEN3 model for carcinogenic risk for Plants 1, 2, 3, 4, and 5, since there is a potential of exceeding the significance threshold. The SCREEN3 model is an EPA-approved model recommended by CAPCOA when prioritization scores exceed the significance threshold. SCREEN3 uses source parameters (stack temperature, exit velocity, exit temperature stack height, stack diameter, and emission rate) to determine impacts at nearby receptors. The nearest residence (1,500 meters from source) was used for the carcinogenic analysis and chronic health hazard analysis. The scenario for acute (1-hour) exposures is for a worker in the nearby field at an average distance of 400 meters. Individual sources were modeled as point sources. Fugitive emissions were modeled as an area

source, 60 meters on a side. Unitized impacts for point sources (micrograms per cubic meter per grams per second) and the area source (micrograms per cubic meter per grams per second per square meter) are shown in Table 5. Impacts for individual pollutants are found by multiplying the unitized impact by the individual pollutant emission rate. A scaling factor of 0.1 was used to convert maximum hourly concentrations to maximum annual concentrations. The cancer risk estimates are based on the maximum predicted downwind concentration of TACs emitted by all sources and conservatively assume that all emission sources are co-located. The results of the SCREEN3 health risk assessment are shown in Table 6.

Appendix D contains additional details on the calculation of health risks using the SCREEN3 model. The HRA accounts for the inhalation health risks associated with fugitive emissions, the compressors, reboilers, and oxidizer that would be used to control emissions from the glycol dehydrator. The combined cancer risk of all pollutants is less than 1 X 10^{-6}. This cancer risk represents a worst case using the extremely conservative SCREEN3 model.

TABLE 5 Unitized Impacts for Plants 1, 2, 3, 4, and 5

	Emission Sources				
	Compressors ($\mu g/m^3$)/g/s	**DeHydration ($\mu g/m^3$)/g/s**	**Blowdown ($\mu g/m^3$)/g/s**	**Fugitives ($\mu g/m^3$)/g/s-m^2**	**Produced Water ($\mu g/m^3$)/g/s**
Dispersion to Residential Receptor	7.008	156.3	68.06	338.9	353.5
Dispersion to Non-Residential Receptor	12.22	404.6	163.7	1,941.7	2,737

Key:
($\mu g/m^3$)/g/s = micrograms per cubic meter per gram per second
($\mu g/m^3$)/g/s-m^2 = micrograms per cubic meter per gram per second per meter squared

TABLE 6 Risk Screening Analysis for Plants 1, 2, 3, 4, and 5

	Cancer Potency Value	**Emission Rate**					**Residential Receptor**	**Non-Residential Receptor**
	(ug/m^3)$^{-1}$	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(lb/yr)**	**(Risk)**	**(Risk)**
Substance								
1,3-Butadiene	1.7E-04	146.54					2.51E-07	1.00E-07
Acetaldehyde	2.7E-06	15.20					4.14E-10	1.65E-10
Benzene	2.9E-05	82.19	1.52	4.04	0.65	10.77	2.14E-07	3.15E-07
Benzo(a)pyrene	1.1E-03	0.001					1.08E-11	4.32E-12
Benzo(b)fluoranthene	1.1E-04	0.01					1.50E-11	5.98E-12
Benzo(k)fluoranthene	1.1E-04	0.003					3.67E-12	1.46E-12
Chrysene	1.1E-05	0.01					6.80E-13	2.71E-13
Dibenz(a,h)anthracene	1.2E-03	0.00					1.18E-11	4.71E-12
Formaldehyde	6.0E-06	141.50					8.57E-09	3.41E-09
Naphthalene	3.4E-05	9.07					3.11E-09	1.24E-09
						Sum	4.77E-07	4.20E-07
						Significance Threshold	1.0E-06	1.0E-06
						Significant Toxics Risk?	No	No

Key:
lb/yr = pounds per year
(ug/m^3)$^{-1}$ = micrograms per cubic meter times 1/10

References

California Air Pollution Control Officers Association (CAPCOA). 2009. Health Risk Assessments for Proposed Land Use Projects. CAPCOA Guidance Document. Prepared by CAPCOA Planning Managers. July.

TACs Analysis Backup Calculations and Model Outputs
Plants 1, 2, 3, 4, & 5.

Introduction

This document calculates the Prioritizaiton Score, Health Risk, and determines the "Significance"-level of Toxic Air Contaminants.
This document calculates the Potential to Emit of emissions from Plants 1,2,3,4,&5.
Other similar documents will make similar calculations based on:
-- The Potential to Emit of proposed Plants 4 & 5.

Of the two required analyses listed above, this document which calculates Potential to Emit from Plants 1,2,3,4 & 5 will represent the greatest calculated health risk value, and the greatest Prioritization Score. The results of this spreadsheet (see Tables 9 and 10) indicate that all health risks are less than significant. The analysis of the Plant 4&5 scenario is, therefore, expected to also demonstrate less-than-significant health risks.

This document includes the following tabs:
Table 1 - Compressor Engine emissions.
Table 2 - DeHy emissions
Table 3 - Blowdown emissions
Table 4 - Fugitive emissions
Table 5 - Methanol Tank emissions
Table 6 - Produced Water Tank emissions
Table 7 - Total Hourly Emissions
Table 8 - Total Annual Emissions
Table 9 - Prioritization Score and Significance Level.
Table 10 - Calculation of Risk and Determination of Significance Level

Table 1 - Engine emissions are calculated with the use of emission factors specified for the engines (expressed in units of "pounds of contaminant per million standard cubic foot of natural gas consumed". The Butte County AQMD air permits for the engines limit the volume of gas consumed per year, which is the basis of the Potential-to-Emit calculation. The hourly gas consumed is based on the 100% load specification for the engines..
Table 2 - DeHy emissions (from the flash tank and from the afterburner) are estimated for the existing Plants 1 and 2 operation. These are calculated with the use of the Gas Research Institute's GRI-GLY model. After the emissions from Plant 1 and 2 were calculated, emissions from Plants 3, 4 and 5 were calculated by proportion. This proportional calculation approach is used in all subsequent emission source calculations.
Table 3 - Blowdown emissions were calculated based on blowdown frequency and volume data in Plants 1 and 2.
Table 4 - Fugitive emissions were quantified by counting the number of components in and using the Tier 3-Plus methodology outlined in INGAA's GHG Emission Estimation Guidelines. Analysis of the natural gas was used to calculate the mass of each chemical species.
Table 5 - Emissions from the methanol tank were estimated with the use of EPA's TANKS model.
Table 6 - Emissions from the Produced Water tanks were estimated with the use of EPA's TANKs model.
Tables 7 and 8 use the data calculated in Tables 1 through 6.
Table 9 calculates the Prioritization Score according to methodology outlined in the CA Air Pollution Control Officers Association's "Air Toxics Hot Spots Facility Prioritization Guidelines". This includes the calculation of three scores - one for carcinogenic compounds, a second for contaminants that cause health effects due to long-term, chronic exposures, and a third score for contaminants that cause health effects due to short-term, or acute exposures.
In Tables 9 and 10, the major contributors to the Prioritization Score and to Risk are indicated in bold. These major contributors are 1,3, butadiene for carcinogenic exposures and ammonia for chronic and acute exposures. These major emission contributions are from the compressors.
In Table 9, the calculation of Prioritization score use a "Proximity Factor", which recognizes that the nearest receptors are 1500 meters from the emission source for concerns with long-term (annual) exposures. For short-term (one hour) exposures, the nearest receptor is 400 meters from the source. This table indicates that less-than-significant risk results due to both chronic and acute toxic substances. The prioritization score approach did not conclude that arcinogenic health risk was less than significant. Therefore, a screening level risk assessment was used (Table 10).
Table 10 presents the calculation of health risks due to carcinogenic toxic substances. Exposures were determined with the use of the SCREEN3 dispersion model. Results indicate that carcinogenic health risk are less-than-significant.

Table 1
Potential to Emit - Plants 1,2,3,4&5
Calculation of Compressor Engine Emissions

			Emission Rate (lb/hour)						Emission Rate (lb/yr)					
			Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Total	Plant 1	Plant 2	Plant 3	Plant 4	Plant 5	Total
	Emission Factor	Control Efficiency	0.0528 MMcf/hr	0.0528 MMcf/hr	0.0528 MMcf/hr	0.0528 MMcf/hr	0.0528 MMcf/hr		299 MMcf/yr	462 MMcf/yr	334 MMcf/yr	334 MMcf/yr	334 MMcf/yr	
SUBSTANCE	(lbs/MMcf)	(%)												
1,3-Butadiene	3.78E-01	78	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03	**2.19E-02**	2.48E+01	3.84E+01	2.78E+01	2.78E+01	2.78E+01	**1.47E+02**
Acetaldehyde	3.92E-02	78	4.55E-04	4.55E-04	4.55E-04	4.55E-04	4.55E-04	**2.27E-03**	2.57E+00	3.99E+00	2.88E+00	2.88E+00	2.88E+00	**1.52E+01**
Acrolein	3.92E-02	78	4.55E-04	4.55E-04	4.55E-04	4.55E-04	4.55E-04	**2.27E-03**	2.57E+00	3.99E+00	2.88E+00	2.88E+00	2.88E+00	**1.52E+01**
Anthracene	1.13E-04	78	1.31E-06	1.31E-06	1.31E-06	1.31E-06	1.31E-06	**6.56E-06**	7.42E-03	1.15E-02	8.30E-03	8.30E-03	8.30E-03	**4.38E-02**
Benzene	2.12E-01	78	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	**1.23E-02**	1.39E+01	2.16E+01	1.56E+01	1.56E+01	1.56E+01	**8.22E+01**
Benzo(a)pyrene	2.52E-06	78	2.92E-08	2.92E-08	2.92E-08	2.92E-08	2.92E-08	**1.46E-07**	1.65E-04	2.56E-04	1.85E-04	1.85E-04	1.85E-04	**9.77E-04**
Benzo(b)fluoranthene	3.49E-05	78	4.05E-07	4.05E-07	4.05E-07	4.05E-07	4.05E-07	**2.03E-06**	2.29E-03	3.55E-03	2.56E-03	2.56E-03	2.56E-03	**1.35E-02**
Benzo(k)fluoranthene	8.54E-06	78	9.91E-08	9.91E-08	9.91E-08	9.91E-08	9.91E-08	**4.96E-07**	5.61E-04	8.69E-04	6.27E-04	6.27E-04	6.27E-04	**3.31E-03**
Chrysene	1.58E-05	78	1.83E-07	1.83E-07	1.83E-07	1.83E-07	1.83E-07	**9.17E-07**	1.04E-03	1.61E-03	1.16E-03	1.16E-03	1.16E-03	**6.13E-03**
Dibenz(a,h)anthracene	2.52E-06	78	2.92E-08	2.92E-08	2.92E-08	2.92E-08	2.92E-08	**1.46E-07**	1.65E-04	2.56E-04	1.85E-04	1.85E-04	1.85E-04	**9.77E-04**
Ethylbenzene	7.00E-02	78	8.12E-04	8.12E-04	8.12E-04	8.12E-04	8.12E-04	**4.06E-03**	4.60E+00	7.12E+00	5.14E+00	5.14E+00	5.14E+00	**2.71E+01**
Formaldehyde	3.65E-01	78	4.24E-03	4.24E-03	4.24E-03	4.24E-03	4.24E-03	**2.12E-02**	2.40E+01	3.71E+01	2.68E+01	2.68E+01	2.68E+01	**1.42E+02**
Naphthalene	2.34E-02	78	2.72E-04	2.72E-04	2.72E-04	2.72E-04	2.72E-04	**1.36E-03**	1.54E+00	2.38E+00	1.72E+00	1.72E+00	1.72E+00	**9.07E+00**
Propylene	4.25E+00	78	4.93E-02	4.93E-02	4.93E-02	4.93E-02	4.93E-02	**2.47E-01**	2.79E+02	4.32E+02	3.12E+02	3.12E+02	3.12E+02	**1.65E+03**
Toluene	2.59E-01	78	3.01E-03	3.01E-03	3.01E-03	3.01E-03	3.01E-03	**1.50E-02**	1.70E+01	2.63E+01	1.90E+01	1.90E+01	1.90E+01	**1.00E+02**
Xylene (Total)	6.85E-01	78	7.95E-03	7.95E-03	7.95E-03	7.95E-03	7.95E-03	**3.97E-02**	4.50E+01	6.97E+01	5.03E+01	5.03E+01	5.03E+01	**2.66E+02**

Ammonia:

Compressor	SCR	Limit	Ex Flow	NH3 Flow	NH3 Flow	NH3 Flow
	-Y/N-	(ppm)	(SCFM)	SCFM	(lb/Hr)	(lb/yr)
P1A	N	None	22,605			
P1B	N	None	22,605			
P2A	Y	10	24,107	0.24107	0.65	4,333
P2B	Y	10	24,107	0.24107	0.65	4,333
Plant 3	Y	10	48,214	0.48214	1.30	8,667
Plant 4	Y	10	48,214	0.48214	1.30	8,667
Plant 5	Y	10	48,214	0.48214	1.30	8,667
Total (lb/Hr)					**5.19**	**34,667**

Potential-to-Emit is based on Butte County AQMD permit conditions that limit annual natural gas usage.

The efficiency of the oxidation catalyst units were guaranteed by the supplier to be 90 percent efficient at reducing VOC emissions. Testing of the Plant 1B engine emissions in early 2007 indicated that emissions after installation of the system were reduced by 78 percent compared with testing prior to installation.
Hourly Potential-to-Emit is based on 100 percent load specifications for the engines.

Emission factors are from the CA Air Resources Board's California Air Toxics Emission Factors (CATEF) database.
The Potential-to-Emit ammonia is based on air permit conditions that limit emissions to 10 ppm.
Hourly ammonia flow is based on all engines operating at capacity for one hour.
Annual ammonia emissions are based on permit condition limits that effectively limit operating hours.

Table 2
Potential to Emit - Plants 1,2,3,4&5
Calculation of DeHy emissions

The following calculates the emissions from operation of Plants 1 & 2.
Input to GRI-Gly-calc Model

	Concentration, by volume	
	PPM	**%**
Carbon Dioxide		0.44
Hydrogen Sulfide		
Nitrogen		1.02
Methane		96.6
Ethane		1.78
Propane		0.091
Isobutane		0.012
n-butane		0.013
Isopentane		0.0052
N-Pentane		0.0034
Cyclopentane	2	0.0002
n-Hexane		
Cyclohexane		
Other Hexanes	22	0.0022
Heptane	14	0.0014
Methyl cyclohexane	2.8	0.00028
2,2,4-trimethylpentane		
C8+		0.0052
Benzene	0.8	0.00008
Toluene	0.4	0.00004
Ethylbenzene	0.1	0.00001
Xylenes	0.1	0.00001
Total, dry gas		**99.97402**

Gas Produced	18.49	Bcf/year		
Gas Produced	18,490	MMcf/year		
Operation-Regen A	2,268	hours/year		
Operation-Regen B	2,671	hours/year		
Average Operation	2,470	hours/year	This is equivalent to both Regens running.	
Average Operation	102.9	days/year	179.6963	MMcf/day-avg
			Note: Maximum value input to model	
Modeled operation	179.70	MMcf/day	is 2000 MMcf/day.	
Water produced	2,653,297	Gal/yr		
Density of Water	8.3	lb/gal		
Water produced	22,022,365	lb/yr		
			Note: Minimum value input to model	
Water content removed	1191.04192	lb H20/MM	is 0.01 lb H20/MMcf.	

Output from GRI-Gly-calc Model

Regenerator Afterburner Stack

Temperature							
Flow Rate							
Benzene				1.85E-04	lb/hr	0.456858	lb/yr
Toluene				9.35E-05	lb/hr	0.230898	lb/yr
Ethylbenzene				1.96E-05	lb/hr	0.048402	lb/yr
Xylene				2.12E-05	lb/hr	0.052353	lb/yr

Flash Gas Emissions

Temperature							
Flow Rate					SCFH		
Benzene				2.00E-05	lb/hr	0.04939	lb/yr
Toluene				1.05E-05	lb/hr	0.02593	lb/yr
Ethylbenzene				2.13E-06	lb/hr	0.00526	lb/yr
Xylene				1.96E-06	lb/hr	0.00484	lb/yr

Flash Gas Emissions from Each Regenerator (half of total Flash Gas Emissions

Temperature							
Flow Rate					SCFH		
Benzene				1.00E-05	lb/hr	0.024695	lb/yr
Toluene				5.25E-06	lb/hr	0.012965	lb/yr
Ethylbenzene				1.07E-06	lb/hr	0.00263	lb/yr
Xylene				9.80E-07	lb/hr	0.00242	lb/yr

Regenerator and Flash Gas - total of Plants 1 and 2

Benzene				2.05E-04	lb/hr	5.06E-01	lb/yr
Toluene				1.04E-04	lb/hr	2.57E-01	lb/yr
Ethylbenzene				2.17E-05	lb/hr	5.37E-02	lb/yr
Xylene				2.32E-05	lb/hr	5.72E-02	lb/yr

The following calculates emissions from other plants, by proporation:
Regenerator and Flash Gas - Plant 3

Benzene				1.54E-04	lb/hr	3.80E-01	lb/yr
Toluene				7.80E-05	lb/hr	1.93E-01	lb/yr
Ethylbenzene				1.63E-05	lb/hr	4.02E-02	lb/yr
Xylene				1.74E-05	lb/hr	4.29E-02	lb/yr

Regenerator and Flash Gas - total of Plants 4 and 5

Benzene				2.56E-04	lb/hr	6.33E-01	lb/yr
Toluene				1.30E-04	lb/hr	3.21E-01	lb/yr
Ethylbenzene				2.72E-05	lb/hr	6.71E-02	lb/yr
Xylene				2.90E-05	lb/hr	7.15E-02	lb/yr

Regenerator and Flash Gas - total of Plants 1, 2, 3, 4&5

Benzene				6.15E-04	lb/hr	1.52E+00	lb/yr
Toluene				3.12E-04	lb/hr	7.70E-01	lb/yr
Ethylbenzene				6.52E-05	lb/hr	1.61E-01	lb/yr
Xylene				6.95E-05	lb/hr	1.72E-01	lb/yr

Table 3
Potential to Emit, Plants 1,2,3,4,&5
Calculation of Blowdown Emissions

The following are calculations for Plants 1&2. Calculations for the other plants are at the end of this sheet.

TACs	Concentration, by volume			MW
	PPM	Percent		
Hydrogen Sulfide	0.02	0.000002		34
Carbonyl sulfide	0.24	0.000024		45
Methanol	37	0.0037		32
Cyclohexane	4	0.0004		84
Hexanes	22	0.0022		86
Benzene	0.8	0.00008		78
Toluene	0.4	0.00004	Less than	92
Ethylbenzene	0.1	0.00001	Less than	106
Xylenes	0.1	0.00001	Less than	106

Blowdown Volumes		Plant 1	Plant 2
Annual	MMcu ft/yr	3.51	6.48
Max Hourly	MMcu ft/hr	0.249632	0.443286

Annual

Hydrogen Sulfide	MMcu ft/yr	7.02E-08	1.296E-07
Carbonyl sulfide	MMcu ft/yr	8.424E-07	1.5552E-06
Methanol	MMcu ft/yr	0.00012987	0.00023976
Cyclohexane	MMcu ft/yr	0.00001404	0.00002592
Hexanes	MMcu ft/yr	0.00007722	0.00014256
Benzene	MMcu ft/yr	0.000002808	0.000005184
Toluene	MMcu ft/yr	0.000001404	0.000002592
Ethylbenzene	MMcu ft/yr	0.000000351	0.000000648
Xylenes	MMcu ft/yr	0.000000351	0.000000648

Following are calculated by proportion:

				Plant 3	Plants 4&5	Total
Hydrogen Sulfide	lb/yr	0.00618342	0.011415544	0.008799482	0.017598964	0.043997409
Carbonyl sulfide	lb/yr	0.098207254	0.181305699	0.139756477	0.279512953	0.698782383
Methanol	lb/yr	10.76642487	19.87647668	15.32145078	30.64290155	76.60725389
Cyclohexane	lb/yr	3.055336788	5.640621762	4.347979275	8.695958549	21.73989637
Hexanes	lb/yr	17.20445596	31.76207254	24.48326425	48.9665285	122.4163212
Benzene	lb/yr	0.567419689	1.047544041	0.807481865	1.614963731	**4.037409326**
Toluene	lb/yr	0.334632124	0.617782383	0.476207254	0.952414508	2.381036269
Ethylbenzene	lb/yr	0.096388601	0.177948187	0.137168394	0.274336788	0.685841969
Xylenes	lb/yr	0.096388601	0.177948187	0.137168394	0.274336788	0.685841969

Hourly

Hydrogen Sulfide	MMcu ft/hr	4.99264E-09	8.86572E-09
Carbonyl sulfide	MMcu ft/hr	5.99117E-08	1.06389E-07
Methanol	MMcu ft/hr	9.23638E-06	1.64016E-05
Cyclohexane	MMcu ft/hr	9.98528E-07	1.77314E-06
Hexanes	MMcu ft/hr	5.4919E-06	9.75229E-06
Benzene	MMcu ft/hr	1.99706E-07	3.54629E-07
Toluene	MMcu ft/hr	9.98528E-08	1.77314E-07
Ethylbenzene	MMcu ft/hr	2.49632E-08	4.43286E-08
Xylenes	MMcu ft/hr	2.49632E-08	4.43286E-08

Hydrogen Sulfide	lb/hr	0.000439766	0.000780918	0.000610342	0.001220685	0.003051711
Carbonyl sulfide	lb/hr	0.006984522	0.012402821	0.009693672	0.019387343	0.048468358
Methanol	lb/hr	0.765710591	1.359716642	1.062713617	2.125427233	5.313568083
Cyclohexane	lb/hr	0.217296249	0.385865534	0.301580891	0.603161782	1.507904456
Hexanes	lb/hr	1.223584829	2.172790446	1.698187637	3.396375275	8.490938187
Benzene	lb/hr	0.040355018	0.071660742	0.05600788	0.11201576	0.280039399
Toluene	lb/hr	0.023799113	0.042261463	0.033030288	0.066060576	0.16515144
Ethylbenzene	lb/hr	0.006855179	0.012173139	0.009514159	0.019028318	0.047570795
Xylenes	lb/hr	0.006855179	0.012173139	0.009514159	0.019028318	0.047570795

Table 4
Potential to Emit - Plants 1,2,3,4&5
Calculation of Fugitives Emissions

Based on "Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage - Volume 1- GHG Emission estimation Methodologies and Procedures", Interstate Natural Gas Association of America (INGAA), September 2005.
Niska uses a Screening Value of 4,000 ppm of methane

The following table is based on Equation 4-2 and Table 4-8.

Plants 1 and 2			log (SV)	B0+B1*log(SV)	Emission Rate (kg/h/source)
Source	**B0**	**B1**	**4000**	**4000**	**4,000**
Connector	-5.9147	0.75	3.602059991	-3.213155007	**0.0006121**
Valves	-6.0399	0.83	3.602059991	-3.050190207	**0.0008909**
Open-ended lines	-6.9586	1.28	3.602059991	-2.347963211	**0.0044878**
Pressure relief device	-5.1479	0.91	3.602059991	-1.870025408	**0.0134888**
Pressure regulators	-6.4821	0.91	3.602059991	-3.204225408	**0.0006248**

The following table is the Component Count and calculation of emission rates.

Component	Count	Component (Table 4-8)	Leak Rate kg/hr/component	Total kg/hr	Rationale for Selected Component Category
Equipment and Piping flanges and connectors	2000	Connector	0.000612	1.2243	
Sight glass	12	Connector	0.000612	0.0073	
Sample connections	20	Connector	0.000612	0.0122	
Unions	600	Connector	0.000612	0.3673	
Block Valves	566	Valves	0.000891	0.5042	
Control Valves	100	Valves	0.000891	0.0891	
Diaphragm presure regulators	150	Valves	0.000891	0.1336	See Footnote A.
Drains	6	Valves	0.000891	0.0053	See Footnote B.
Atmospheric organic liquid storage tank hatches	6	Open ended lines	0.004488	0.0269	See Footnote C.
Open ended lines	0	Open ended lines	0.004488	0.0000	
Instrument Seals and Packing	130	Pressure regulators	0.000625	0.0812	See Footnote F.
Pump seals	966	Pressure regulators	0.000625	0.6036	See Footnote F.
Compressor seals	24	Pressure regulators	0.000625	0.0150	See Footnote F.
Pressure Relief Valves to Atm.	98	Pressure Relief Device	0.013489	1.3219	See Footnote D.
Pressure Relief Vents	137	Pressure Relief Device	0.013489	1.8480	See Footnote E.
Underground pipelines (resulting from corrosion, faulty connection, etc)	0	(Not applicable)	(Not applicable)	0.0000	
Total				**6.2401**	**kg/hr - NG**
				13.7281	lb/hr - NG
				8,760	hours/yr
				120,258	lb/yr - NG

A - The industry sometimes uses natural gas-powered motors to actuate pressure regulators. Niska uses compressed air. The structure of this device is similar to a valve.
B- Drains at Niska are liquid seal drains. This device is most similar to a valve.
C- Tank hatches are similar to open ended lines.
D- Pressure relief valves that open to the atmosphere are a type of pressure relief device.
E- Pressure relief vents (Pressure system vents-PSVs) are a type of pressure relief device.
F- Like a pressure regulator, these devices include a stem in a packing gland.

	Concentration, by volume		TAC ?	Molecular Weight		
	PPM	**%**			**lb/hr**	**lb/yr**
Carbon Dioxide		0.44	No			
Hydrogen Sulfide			No			
Nitrogen		1.02	No			
Methane		96.6	No			
Ethane		1.78	No			
Propane		0.091	No			
Isobutane		0.012	No			
n-butane		0.013	No			
Isopentane		0.0052	No			
N-Pentane		0.0034	No			
Cyclopentane	2	0.0002	No			
n-Hexane			No			
Cyclohexane			No			
Other Hexanes	22	0.0022	No			
Heptane	14	0.0014	No			
Methyl cyclohexane	2.8	0.00028	No			
2,2,4-trimethylpentane			No			
C8+		0.0052	No			
Benzene	0.8	0.00008	Yes	78	2.96E-05	2.59E-01
Toluene	0.4	0.00004	Yes	92	1.75E-05	1.53E-01
Ethylbenzene	0.1	0.00001	Yes	106	5.03E-06	4.40E-02
Xylenes	0.1	0.00001	Yes	106	5.03E-06	4.40E-02

Plant 3	**Benzene**	1.48E-05	1.30E-01
	Toluene	8.73E-06	7.64E-02
	Ethylbenzene	2.51E-06	2.20E-02
	Xylenes	2.51E-06	2.20E-02
Plant 4&5	**Benzene**	2.96E-05	2.59E-01
	Toluene	1.75E-05	1.53E-01
	Ethylbenzene	5.03E-06	4.40E-02
	Xylenes	5.03E-06	4.40E-02
Total	**Benzene**	7.40E-05	6.48E-01
	Toluene	4.36E-05	3.82E-01
	Ethylbenzene	1.26E-05	1.10E-01
	Xylenes	1.26E-05	1.10E-01

Table 5
Potential to Emit - Plants 1,2,3,4&5
Calculation of Methanol Emissions

Methanol Emissions from Methanol Tank, using EPA TANKS model

Model Input			
Capacity	500	gallons	
Volume added	150	gal/yr	
Diameter	46	inches	
Height	5.7	feet	Effective height considering cone shape.
Flapper weight	4	oz	
Vent diameter	2	inches	
Color	white		
Diameter	3.833	feet	
Volume	65.750	cu ft	
Conversion	7.48	gal/cu ft	
Volume	491.812	gallons	OK
Area of vent	3.14	sq in	
pressure of valve	0.080	psi	
Output from Model			
Working Loss	0.18	lb/yr	
Breathing Loss	12.89	lb/yr	
Total	13.07	lb/yr	
Annual emissions	13.07	lb/yr	
Max daily emission	0.323	lb/day	Assumes working loss occurs during summer; and breathing loss occurs during 90 days.
App Deg Accuracy	200	lb/yr	(Applicable Degree of Accuracy for methanol is similar to a de minimis value, according to 2588 guidance.)

The following are calculated by proportion

	Emission Rate	
	(lb/hr)	**(lb/yr)**
Plants 1&2	0.18	13.07
Plant 3	0.09	6.54
Plants 4 & 5	0.18	13.07
Total	0.45	13.07

Table 6
Potential to Emit - Plants 1,2,3,4&5
Calculation of Produced Water Tank Emissions (with use of Tanks model)

The following is the calculation from the existing Plant 1 and Plant 2 operation. Plants 3, 4 and 5 are calcualted at the bottom of this sheet, by proportion.

Emissions from Produced Water Tanks

Number of Tanks	6		
Outside capacity	400	barrel	
Actual capacity	375	barrel	
2005 throughput	19,560	barrel	
Units conversion	42	gal/barrel	
Outside capacity	16,800	gallons	
Actual capacity	15,750	gallons	
2005 throughput	821,520	gallons	
Diameter	12	feet	
Height	20	feet	Effective height considering cone shape.
Color	light beige		
Volume	2,261	cu ft	
Conversion	7.48	gal/cu ft	
Volume	16,911	gallons	OK

Henry's Law

		Benzene		Ethylbenzer	Toluene	Xylene
Partial Pressure of benzene = Hpx * mole fraction in liquid						
		300	Hpx at 25 deg C (atmospheres)	300	300	300
		0.8	ppm of benzene in air	0.1	0.4	0.1
		800	Total Pressure in water separator (psi)	800	800	800
		14.7	One atmosphere (psi)	14.7	14.7	14.7
		4.35374E-05	Partial pressure of benzene in air (atm)	5.44E-06	2.18E-05	5.44E-06
		1.45125E-07	Mole fraction in liquid	1.81E-08	7.26E-08	1.81E-08
		1.45125E-07	Moles of benzene in 18 grams of water	1.81E-08	7.26E-08	1.81E-08
		78	MW of benzene	106	92	106
		1.13197E-05	Grams of benzene in 18 grams of water	1.92E-06	6.68E-06	1.92E-06
		1.13197E-05	Pounds of benzene in 18 pounds of water	1.92E-06	6.68E-06	1.92E-06
		8.34	density of water (lb/gal)	62.4	62.4	62.4
		5.24481E-06	Pounds of benzene per gallon of water	6.67E-06	2.31E-05	6.67E-06
		4.308714057	Pounds of benzene per year	5.476303	19.01207	5.476303
		1095	Hours/year (Water to Tanks)	1095	1095	1095
		0.003934899	Max hourly emissions	0.005001	0.017363	0.005001

Pounds per hour	
	Benzene
Plant 1&2	0.0039
Plant 3	0.0020
Plant 4&5	0.0039
Total	**0.0098**

Pounds per hour		
Ethyl-benzene	**Toluene**	**Xylene**
0.0050	0.0174	0.0050
0.0025	0.0087	0.0025
0.0050	0.0174	0.0050
0.0125	**0.0434**	**0.0125**

Pounds per year	
	Benzene
Plant 1&2	4.31
Plant 3	2.15
Plant 4&5	4.31
Total	**10.77**

Pounds per year		
Ethyl-benzene	**Toluene**	**Xylene**
5.48	19.01	5.48
2.74	9.51	2.74
5.48	19.01	5.48
13.69	**47.53**	**13.69**

Table 7
Potential to Emit - Plants 1,2,3,4&5
Calculation of Maximum Hourly Emissions

Substance	Max Hourly Emissions (lb/hr)						
	Compres-sors	Dehy & Regen	Blow-down	Fugitives	MeOH Tank	PW Tank	TOTAL
1,3-Butadiene	2.19E-02						2.19E-02
Acetaldehyde	2.27E-03						2.27E-03
Acrolein	2.27E-03						2.27E-03
Anthracene	6.56E-06						6.56E-06
Benzene	1.23E-02	6.15E-04	2.80E-01	7.40E-05		9.84E-03	3.03E-01
Benzo(a)pyrene	1.46E-07						1.46E-07
Benzo(b)fluoranthene	2.03E-06						2.03E-06
Benzo(k)fluoranthene	4.96E-07						4.96E-07
Chrysene	9.17E-07						9.17E-07
Dibenz(a,h)anthracene	1.46E-07						1.46E-07
Ethylbenzene	4.06E-03	6.52E-05	4.76E-02	1.26E-05		1.25E-02	6.42E-02
Formaldehyde	2.12E-02						2.12E-02
Naphthalene	1.36E-03						1.36E-03
Propylene	2.47E-01						2.47E-01
Toluene	1.50E-02	3.12E-04	1.65E-01	4.36E-05		4.34E-02	1.81E-01
Xylene (Total)	3.97E-02	6.95E-05	4.76E-02	1.26E-05		1.25E-02	9.99E-02
Ammonia	5.19E+00						5.19E+00
Methanol			0.00E+00		4.50E-01		4.50E-01
Hydrogen sulfide			3.05E-03				3.05E-03
Carbonyl sulfide			4.85E-02				4.85E-02
Hexane			8.49E+00				8.49E+00
Cyclohexane			1.51E+00				1.51E+00

Table 8
Potential to Emit - Plants 1,2,3,4&5
Calculation of Annual Emissions

Substance	Annual Emissions (lb/yr)						
	Compres-sors	Dehy& Regen	Blow-down	Fugitives	MeOH Tank	PW Tank	TOTAL
1,3-Butadiene	1.47E+02						1.47E+02
Acetaldehyde	1.52E+01						1.52E+01
Acrolein	1.52E+01						1.52E+01
Anthracene	4.38E-02						4.38E-02
Benzene	8.22E+01	1.52E+00	4.04E+00	6.48E-01		1.08E+01	9.92E+01
Benzo(a)pyrene	9.77E-04						9.77E-04
Benzo(b)fluoranthene	1.35E-02						1.35E-02
Benzo(k)fluoranthene	3.31E-03						3.31E-03
Chrysene	6.13E-03						6.13E-03
Dibenz(a,h)anthracene	9.77E-04						9.77E-04
Ethylbenzene	2.71E+01	1.61E-01	6.86E-01	1.10E-01		1.37E+01	4.18E+01
Formaldehyde	1.42E+02						1.42E+02
Naphthalene	9.07E+00						9.07E+00
Propylene	1.65E+03						1.65E+03
Toluene	1.00E+02	7.70E-01	2.38E+00	3.82E-01		4.75E+01	1.51E+02
Xylene (Total)	2.66E+02	1.72E-01	6.86E-01	1.10E-01		1.37E+01	2.80E+02
Ammonia	3.47E+04						3.47E+04
Methanol			7.66E+01		13.07		8.97E+01
Hydrogen sulfide			4.40E-02				4.40E-02
Carbonyl sulfide			6.99E-01				6.99E-01
Hexane			1.22E+02				1.22E+02
Cyclohexane			2.17E+01				2.17E+01

Table 9
Potential-to-Emit - Plants 1,2,3,4&5
Calculation of Prioritization Scores

Substance	Facility-wide total	Facility-wide total	Applic Deg. Of Accuracy	Toxics Potency Factors: Cancer Potency Value	Toxics Potency Factors: Acute REL	Toxics Potency Factors: Chronic REL	Calc of Prioritization Scores: Carcinogen	Calc of Prioritization Scores: Acute Non-Carcin-ogen	Calc of Prioritization Scores: Chronic Non-Carcin-ogen
	(lb/hr)	(lb/yr)		$(ug/m^3)^{-1}$	(ug/m^3)	(ug/m^3)			
1,3-Butadiene	2.19E-02	1.47E+02	0.1	1.7E-04		20	2.49E-02		8.36E-04
Acetaldehyde	2.27E-03	1.52E+01	20	2.7E-06	470	140	4.10E-05	4.84E-06	1.24E-05
Acrolein	2.27E-03	1.52E+01	0.05		2.5	0.35		9.10E-04	4.96E-03
Anthracene	6.56E-06	4.38E-02	50						
Benzene	3.03E-01	9.92E+01	2	2.9E-05	1300	60	2.88E-03	2.33E-04	1.89E-04
Benzo(a)pyrene	1.46E-07	9.77E-04	0.05	1.1E-03			1.07E-06		
Benzo(b)fluoranthene	2.03E-06	1.35E-02	0.5	1.1E-04			1.49E-06		
Benzo(k)fluoranthene	4.96E-07	3.31E-03	0.5	1.1E-04			3.64E-07		
Chrysene	9.17E-07	6.13E-03	5	1.1E-05			6.74E-08		
Dibenz(a,h)anthracene	1.46E-07	9.77E-04	0.1	1.2E-03			1.17E-06		
Ethylbenzene	6.42E-02	4.18E+01	200			2000			2.39E-06
Formaldehyde	2.12E-02	1.42E+02	5	6.0E-06	55	9	8.49E-04	3.85E-04	1.79E-03
Naphthalene	1.36E-03	9.07E+00	50	3.4E-05		9	3.08E-04		1.15E-04
Propylene	2.47E-01	1.65E+03	200			3000			6.27E-05
Toluene	1.81E-01	1.51E+02	200		37000	300		4.88E-06	5.76E-05
Xylene (Total)	9.99E-02	2.80E+02	200		22000	700		4.54E-06	4.57E-05
Ammonia	5.19E+00	3.47E+04	200		3200	200		1.62E-03	1.98E-02
Methanol	4.50E-01	8.97E+01	200		28000	4000		1.61E-05	2.56E-06
Hydrogen sulfide	3.05E-03	4.40E-02	5		42	10		7.27E-05	5.02E-07
Carbonyl sulfide	4.85E-02	6.99E-01	100						
Hexane	8.49E+00	1.22E+02	200			7000			2.00E-06
Cyclohexane	1.51E+00	2.17E+01	200						
			Sum				2.9E-02	3.3E-03	2.8E-02
			Normalization Factor				1700	1500	150
			Receptor Proximity (RP) Adjustment Factor				0.003	0.04	0.003
			Prioritization Score				0.1479	0.1952	0.0125
			Significance Threshold				0.10	1.00	1.00
			Significant Toxics Risk ?				Maybe	No	No

Note that the indicated Prioritization Score, 0.16, would indicate that carcinogenic risk would be 1.6 per million. This is greater than one per million. Therefore risks may not be less-than-significant.

Table 10
Potential-to-Emit - Plants 1,2,3,4&5
Calculation of Health Risks and Determination of Significance

		Emission Sources						
		Compres-sors	DeHy	Blowdown	Fugitives	Produced Water		
Dispersion to Residential Receptor (ug/m3 per gram/sec)		7.008	156.3	68.06	338.9	353.5		
Dispersion to Non-Residential Receptor (ug/m3 per gram/sec)		12.22	404.6	163.7	1,941.7	2737		
							Calc of Risk	Calc of Risk
	Cancer Potency Value	Emission Rate					Residential Receptor	Non-Residential Receptor
	$(ug/m^3)^{-1}$	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(Risk)	(Risk)
Substance								
1,3-Butadiene	1.7E-04	1.47E+02					2.51E-07	1.00E-07
Acetaldehyde	2.7E-06	1.52E+01					4.14E-10	1.65E-10
Benzene	2.9E-05	8.22E+01	1.52E+00	4.04E+00	6.48E-01	1.08E+01	2.14E-07	3.15E-07
Benzo(a)pyrene	1.1E-03	9.77E-04					1.08E-11	4.32E-12
Benzo(b)fluoranthene	1.1E-04	1.35E-02					1.50E-11	5.98E-12
Benzo(k)fluoranthene	1.1E-04	3.31E-03					3.67E-12	1.46E-12
Chrysene	1.1E-05	6.13E-03					6.80E-13	2.71E-13
Dibenz(a,h)anthracene	1.2E-03	9.77E-04					1.18E-11	4.71E-12
Formaldehyde	6.0E-06	1.42E+02					8.57E-09	3.41E-09
Naphthalene	3.4E-05	9.07E+00					3.11E-09	1.24E-09
					Sum		4.77E-07	4.20E-07
					Significance Threshold		1.0E-06	1.0E-06
					Significant Toxics Risk ?		No	No

Cancer Potency Factors are current levels from the CA Office of Health Hazard Environmental Assessment (OHHEA).
Exposures are calculated with the use of the SCREEN3 model.
Emissions from each source are modeled from that source's stack characteristics..

The nearest residence (1500 meters from source) is used for the residential receptor analysis.
The nearest non-residential receptor wascalculated for the exposure of a worker in the nearby field at an average distance of 400 meters. It was assumed (worst-case) that he was at that location for 2000 hours per year.
A scaling factor of 0.1 was used to convert maximum hourly concentrations to maximum annual concentrations.
Carcinogenic risk is less than one per million; therefore, risk is not significant.

TACs Analysis Backup Calculations and Model Outputs
Plants 4 & 5

Introduction
This document calculates the Prioritizaiton Score, Health Risk, and determines the "Significance"-level of Toxic Air Contaminants.
This document calculates the Potential to Emit of emissions from Plants 4,&5.

Of the two required analyses listed above, this document which calculates Potential to Emit from Plants 1,2,3,4 & 5 will represent the greatest calculated health risk value, and the greatest Prioritization Score. The results of this spreadsheet (see Tables 9 and 10) indicate that all health risks are less than significant. The analysis of the Plant 4&5 scenario is, therefore, expected to also demonstrate less-than-significant health risks.

This document includes the following tabs:
Table 11 - Compressor Engine emissions.
Table 12 - DeHy emissions
Table 13 - Blowdown emissions
Table 14 - Fugitive emissions
Table 15 - Methanol Tank emissions
Table 16 - Produced Water Tank emissions
Table 17 - Total Hourly Emissions
Table 18 - Total Annual Emissions
Table 19 - Prioritization Score and Significance Level.
Table 20 - Calculation of Risk and Determination of Significance Level

Table 1 - Engine emissions are calculated with the use of emission factors specified for the engines (expressed in units of "pounds of contaminant per million standard cubic foot of natural gas consumed". The Butte County AQMD air permits for the engines limit the volume of gas consumed per year, which is the basis of the Potential-to-Emit calculation. The hourly gas consumed is based on the 100% load specification for the engines..
Table 2 - DeHy emissions (from the flash tank and from the afterburner) are estimated for the existing Plants 1 and 2 operation. These are calculated with the use of the Gas Research Institute's GRI-GLY model. After the emissions from Plant 1 and 2 were calculated, emissions from Plants 3, 4 and 5 were calculated by proportion. This proportional calculation approach is used in all subsequent emission source calculations.
Table 3 - Blowdown emissions were calculated based on blowdown frequency and volume data in Plants 1 and 2.
Table 4 - Fugitive emissions were quantified by counting the number of components in and using the Tier 3-Plus methodology outlined in INGAA's GHG Emission Estimation Guidelines. Analysis of the natural gas was used to calculate the mass of each chemical species.
Table 5 - Emissions from the methanol tank were estimated with the use of EPA's TANKS model.
Table 6 - Emissions from the Produced Water tanks were estimated with the use of EPA's TANKs model.
Tables 7 and 8 use the data calculated in Tables 1 through 6.
Table 9 calculates the Prioritization Score according to methodology outlined in the CA Air Pollution Control Officers Association's "Air Toxics Hot Spots Facility Prioritization Guidelines". This includes the calculation of three scores - one for carcinogenic compounds, a second for contaminants that cause health effects due to long-term, chronic exposures, and a third score for contaminants that cause health effects due to short-term, or acute exposures.
In Tables 9 and 10, the major contributors to the Prioritization Score and to Risk are indicated in bold. These major contributors are 1,3, butadiene for carcinogenic exposures and ammonia for chronic and acute exposures. These major emission contributions are from the compressors.
In Table 9, the calculation of Prioritization score use a "Proximity Factor", which recognizes that the nearest receptors are 1500 meters from the emission source for concerns with long-term (annual) exposures. For short-term (one hour) exposures, the nearest receptor is 400 meters from the source. This table indicates that less-than-significant risk results due to both chronic and acute toxic substances. The prioritization score approach did not conclude that arcinogenic health risk was less than significant. Therefore, a screening level risk assessment was used (Table 10).
Table 10 presents the calculation of health risks due to carcinogenic toxic substances. Exposures were determined with the use of the SCREEN3 dispersion model. Results indicate that carcinogenic health risk are less-than-significant.

Table 11
Potential to Emit - Plants 4&5
Calculation of Compressor Engine Emissions

SUBSTANCE	Emission Factor (lbs/MMcf)	Control Efficiency (%)	Emission Rate (lb/hour) Plant 4 0.0528 MMcf/hr	Plant 5 0.0528 MMcf/hr	Total	Emission Rate (lb/yr) Plant 4 334 MMcf/yr	Plant 5 334 MMcf/yr	Total
1,3-Butadiene	3.78E-01	78	4.39E-03	4.39E-03	**8.77E-03**	2.78E+01	2.78E+01	**5.55E+01**
Acetaldehyde	3.92E-02	78	4.55E-04	4.55E-04	**9.10E-04**	2.88E+00	2.88E+00	**5.76E+00**
Acrolein	3.92E-02	78	4.55E-04	4.55E-04	**9.10E-04**	2.88E+00	2.88E+00	**5.76E+00**
Anthracene	1.13E-04	78	1.31E-06	1.31E-06	**2.62E-06**	8.30E-03	8.30E-03	**1.66E-02**
Benzene	2.12E-01	78	2.46E-03	2.46E-03	**4.92E-03**	1.56E+01	1.56E+01	**3.11E+01**
Benzo(a)pyrene	2.52E-06	78	2.92E-08	2.92E-08	**5.85E-08**	1.85E-04	1.85E-04	**3.70E-04**
Benzo(b)fluoranthene	3.49E-05	78	4.05E-07	4.05E-07	**8.10E-07**	2.56E-03	2.56E-03	**5.13E-03**
Benzo(k)fluoranthene	8.54E-06	78	9.91E-08	9.91E-08	**1.98E-07**	6.27E-04	6.27E-04	**1.25E-03**
Chrysene	1.58E-05	78	1.83E-07	1.83E-07	**3.67E-07**	1.16E-03	1.16E-03	**2.32E-03**
Dibenz(a,h)anthracene	2.52E-06	78	2.92E-08	2.92E-08	**5.85E-08**	1.85E-04	1.85E-04	**3.70E-04**
Ethylbenzene	7.00E-02	78	8.12E-04	8.12E-04	**1.62E-03**	5.14E+00	5.14E+00	**1.03E+01**
Formaldehyde	3.65E-01	78	4.24E-03	4.24E-03	**8.47E-03**	2.68E+01	2.68E+01	**5.36E+01**
Naphthalene	2.34E-02	78	2.72E-04	2.72E-04	**5.43E-04**	1.72E+00	1.72E+00	**3.44E+00**
Propylene	4.25E+00	78	4.93E-02	4.93E-02	**9.86E-02**	3.12E+02	3.12E+02	**6.24E+02**
Toluene	2.59E-01	78	3.01E-03	3.01E-03	**6.01E-03**	1.90E+01	1.90E+01	**3.80E+01**
Xylene (Total)	6.85E-01	78	7.95E-03	7.95E-03	**1.59E-02**	5.03E+01	5.03E+01	**1.01E+02**

Ammonia:

Compressor	SCR -Y/N-	Limit (ppm)	Ex Flow (SCFM)	NH3 Flow SCFM	NH3 Flow (lb/Hr)	NH3 Flow (lb/yr)
Plant 4	Y	10	48,214	0.48214	1.30	8,208
Plant 5	Y	10	48,214	0.48214	1.30	8,208
Total (lb/Hr)					**2.59**	**16,417**

Potential-to-Emit is based on Butte County AQMD permit conditions that limit annual natural gas usage.

The efficiency of the oxidation catalyst units were guaranteed by the supplier to be 90 percent efficient at reducing VOC emissions. Testing of the Plant 1B engine emissions in early 2007 indicated that emissions after installation of the system were reduced by 78 percent compared with testing prior to installation.
Hourly Potential-to-Emit is based on 100 percent load specifications for the engines.

Emission factors are from the CA Air Resources Board's California Air Toxics Emission Factors (CATEF) database.
The Potential-to-Emit ammonia is based on air permit conditions that limit emissions to 10 ppm.
Hourly ammonia flow is based on all engines operating at capacity for one hour.
Annual ammonia emissions are based on permit condition limits that effectively limit operating hours.

Table 12
Potential to Emit - Plants 4&5
Calculation of DeHy emissions

The following calculates the emissions from operation of Plants 1 & 2.
Input to GRI-Gly-calc Model

	Concentration, by volume	
	PPM	**%**
Carbon Dioxide		0.44
Hydrogen Sulfide		
Nitrogen		1.02
Methane		96.6
Ethane		1.78
Propane		0.091
Isobutane		0.012
n-butane		0.013
Isopentane		0.0052
N-Pentane		0.0034
Cyclopentane	2	0.0002
n-Hexane		
Cyclohexane		
Other Hexanes	22	0.0022
Heptane	14	0.0014
Methyl cyclohexane	2.8	0.00028
2,2,4-trimethylpentane		
C8+		0.0052
Benzene	0.8	0.00008
Toluene	0.4	0.00004
Ethylbenzene	0.1	0.00001
Xylenes	0.1	0.00001
Total, dry gas		**99.97402**

Gas Produced	18.49	Bcf/year	
Gas Produced	18,490	MMcf/year	
Operation-Regen A	2,268	hours/year	
Operation-Regen B	2,671	hours/year	
Average Operation	2,470	hours/year	This is equivalent to both Regens running.
Average Operation	102.9	days/year	179.6963 MMcf/day-avg
			Note: Maximum value input to model
Modeled operation	179.70	MMcf/day	is 2000 MMcf/day.
Water produced	2,653,297	Gal/yr	
Density of Water	8.3	lb/gal	
Water produced	22,022,365	lb/yr	
			Note: Minimum value input to model
Water content removed	1191.04192	lb H20/MM	is 0.01 lb H20/MMcf.

Output from GRI-Gly-calc Model

Regenerator Afterburner Stack

Temperature							
Flow Rate							
Benzene				1.85E-04	lb/hr	0.456858	lb/yr
Toluene				9.35E-05	lb/hr	0.230898	lb/yr
Ethylbenzene				1.96E-05	lb/hr	0.048402	lb/yr
Xylene				2.12E-05	lb/hr	0.052353	lb/yr

Flash Gas Emissions

Temperature							
Flow Rate					SCFH		
Benzene				2.00E-05	lb/hr	0.04939	lb/yr
Toluene				1.05E-05	lb/hr	0.02593	lb/yr
Ethylbenzene				2.13E-06	lb/hr	0.00526	lb/yr
Xylene				1.96E-06	lb/hr	0.00484	lb/yr

Flash Gas Emissions from Each Regenerator (half of total Flash Gas Emissions

Temperature							
Flow Rate					SCFH		
Benzene				1.00E-05	lb/hr	0.024695	lb/yr
Toluene				5.25E-06	lb/hr	0.012965	lb/yr
Ethylbenzene				1.07E-06	lb/hr	0.00263	lb/yr
Xylene				9.80E-07	lb/hr	0.00242	lb/yr

Regenerator and Flash Gas - total of Plants 1 and 2

Benzene				2.05E-04	lb/hr	5.06E-01	lb/yr
Toluene				1.04E-04	lb/hr	2.57E-01	lb/yr
Ethylbenzene				2.17E-05	lb/hr	5.37E-02	lb/yr
Xylene				2.32E-05	lb/hr	5.72E-02	lb/yr

The following calculates emissions from other plants, by proporation:
Regenerator and Flash Gas - Plant 3

Benzene				1.54E-04	lb/hr	3.80E-01	lb/yr
Toluene				7.80E-05	lb/hr	1.93E-01	lb/yr
Ethylbenzene				1.63E-05	lb/hr	4.02E-02	lb/yr
Xylene				1.74E-05	lb/hr	4.29E-02	lb/yr

Regenerator and Flash Gas - total of Plants 4 and 5

Benzene				2.56E-04	lb/hr	6.33E-01	lb/yr
Toluene				1.30E-04	lb/hr	3.21E-01	lb/yr
Ethylbenzene				2.72E-05	lb/hr	6.71E-02	lb/yr
Xylene				2.90E-05	lb/hr	7.15E-02	lb/yr

These are emissions of Plants 4 and 5.

Table 13
Potential to Emit, Plants 4,&5
Calculation of Blowdown Emissions

The following are calculations for Plants 1&2. Calculations for the other plants are at the end of this sheet.

TACs	Concentration, by volume			MW
	PPM	Percent		
Hydrogen Sulfide	0.02	0.000002		34
Carbonyl sulfide	0.24	0.000024		45
Methanol	37	0.0037		32
Cyclohexane	4	0.0004		84
Hexanes	22	0.0022		86
Benzene	0.8	0.00008		78
Toluene	0.4	0.00004	Less than	92
Ethylbenzene	0.1	0.00001	Less than	106
Xylenes	0.1	0.00001	Less than	106

Blowdown Volumes		Plant 1	Plant 2
Annual	MMcu ft/yr	3.51	6.48
Max Hourly	MMcu ft/hr	0.249632	0.443286

Annual

Hydrogen Sulfide	MMcu ft/yr	7.02E-08	1.296E-07
Carbonyl sulfide	MMcu ft/yr	8.424E-07	1.5552E-06
Methanol	MMcu ft/yr	0.00012987	0.00023976
Cyclohexane	MMcu ft/yr	0.00001404	0.00002592
Hexanes	MMcu ft/yr	0.00007722	0.00014256
Benzene	MMcu ft/yr	0.000002808	0.000005184
Toluene	MMcu ft/yr	0.000001404	0.000002592
Ethylbenzene	MMcu ft/yr	0.000000351	0.000000648
Xylenes	MMcu ft/yr	0.000000351	0.000000648

Following are calculated by proportion:

				Plant 3	Plants 4&5	Plant 4&5
Hydrogen Sulfide	lb/yr	0.00618342	0.011415544	0.008799482	0.017598964	0.017598964
Carbonyl sulfide	lb/yr	0.098207254	0.181305699	0.139756477	0.279512953	0.279512953
Methanol	lb/yr	10.76642487	19.87647668	15.32145078	30.64290155	30.64290155
Cyclohexane	lb/yr	3.055336788	5.640621762	4.347979275	8.695958549	8.695958549
Hexanes	lb/yr	17.20445596	31.76207254	24.48326425	48.9665285	48.9665285
Benzene	lb/yr	0.567419689	1.047544041	0.807481865	1.614963731	1.614963731
Toluene	lb/yr	0.334632124	0.617782383	0.476207254	0.952414508	0.952414508
Ethylbenzene	lb/yr	0.096388601	0.177948187	0.137168394	0.274336788	0.274336788
Xylenes	lb/yr	0.096388601	0.177948187	0.137168394	0.274336788	0.274336788

Hourly

Hydrogen Sulfide	MMcu ft/hr	4.99264E-09	8.86572E-09
Carbonyl sulfide	MMcu ft/hr	5.99117E-08	1.06389E-07
Methanol	MMcu ft/hr	9.23638E-06	1.64016E-05
Cyclohexane	MMcu ft/hr	9.98528E-07	1.77314E-06
Hexanes	MMcu ft/hr	5.4919E-06	9.75229E-06
Benzene	MMcu ft/hr	1.99706E-07	3.54629E-07
Toluene	MMcu ft/hr	9.98528E-08	1.77314E-07
Ethylbenzene	MMcu ft/hr	2.49632E-08	4.43286E-08
Xylenes	MMcu ft/hr	2.49632E-08	4.43286E-08

				Plant 3	Plants 4&5	Plants 4&5
Hydrogen Sulfide	lb/hr	0.000439766	0.000780918	0.000610342	0.001220685	0.001220685
Carbonyl sulfide	lb/hr	0.006984522	0.012402821	0.009693672	0.019387343	0.019387343
Methanol	lb/hr	0.765710591	1.359716642	1.062713617	2.125427233	2.125427233
Cyclohexane	lb/hr	0.217296249	0.385865534	0.301580891	0.603161782	0.603161782
Hexanes	lb/hr	1.223584829	2.172790446	1.698187637	3.396375275	3.396375275
Benzene	lb/hr	0.040355018	0.071660742	0.05600788	0.11201576	0.11201576
Toluene	lb/hr	0.023799113	0.042261463	0.033030288	0.066060576	0.066060576
Ethylbenzene	lb/hr	0.006855179	0.012173139	0.009514159	0.019028318	0.019028318
Xylenes	lb/hr	0.006855179	0.012173139	0.009514159	0.019028318	0.019028318

Table 14
Potential to Emit - Plants 4&5
Calculation of Fugitives Emissions

Based on "Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage - Volume 1- GHG Emission estimation Methodologies and Procedures", Interstate Natural Gas Association of America (INGAA), September 2005.
Niska uses a Screening Value of 4,000 ppm of methane

The following table is based on Equation 4-2 and Table 4-8.

Plants 1 and 2			log (SV)	B0+B1*log(SV)	Emission Rate (kg/h/source)
Source	**B0**	**B1**	**4000**	**4000**	**4,000**
Connector	-5.9147	0.75	3.602059991	-3.213155007	**0.0006121**
Valves	-6.0399	0.83	3.602059991	-3.050190207	**0.0008909**
Open-ended lines	-6.9586	1.28	3.602059991	-2.347963211	**0.0044878**
Pressure relief device	-5.1479	0.91	3.602059991	-1.870025408	**0.0134888**
Pressure regulators	-6.4821	0.91	3.602059991	-3.204225408	**0.0006248**

The following table is the Component Count and calculation of emission rates.

Component	Count	Component (Table 4-8)	Leak Rate kg/hr/component	Total kg/hr	Rationale for Selected Component Category
Equipment and Piping flanges and connectors	2000	Connector	0.000612	1.2243	
Sight glass	12	Connector	0.000612	0.0073	
Sample connections	20	Connector	0.000612	0.0122	
Unions	600	Connector	0.000612	0.3673	
Block Valves	566	Valves	0.000891	0.5042	
Control Valves	100	Valves	0.000891	0.0891	
Diaphragm presure regulators	150	Valves	0.000891	0.1336	See Footnote A.
Drains	6	Valves	0.000891	0.0053	See Footnote B.
Atmospheric organic liquid storage tank hatches	6	Open ended lines	0.004488	0.0269	See Footnote C.
Open ended lines	0	Open ended lines	0.004488	0.0000	
Instrument Seals and Packing	130	Pressure regulators	0.000625	0.0812	See Footnote F.
Pump seals	966	Pressure regulators	0.000625	0.6036	See Footnote F.
Compressor seals	24	Pressure regulators	0.000625	0.0150	See Footnote F.
Pressure Relief Valves to Atm.	98	Pressure Relief Device	0.013489	1.3219	See Footnote D.
Pressure Relief Vents	137	Pressure Relief Device	0.013489	1.8480	See Footnote E.
Underground pipelines (resulting from corrosion, faulty connection, etc)	0	(Not applicable)	(Not applicable)	0.0000	
Total				**6.2401**	**kg/hr - NG**
				13.7281	lb/hr - NG
				8,760	hours/yr
				120,258	lb/yr - NG

A - The industry sometimes uses natural gas-powered motors to actuate pressure regulators. Niska uses compressed air. The structure of this device is similar to a valve.
B- Drains at Niska are liquid seal drains. This device is most similar to a valve.
C- Tank hatches are similar to open ended lines.
D- Pressure relief valves that open to the atmosphere are a type of pressure relief device.
E- Pressure relief vents (Pressure system vents-PSVs) are a type of pressure relief device.
F- Like a pressure regulator, these devices include a stem in a packing gland.

	Concentration, by volume		TAC ?	Molecular Weight		
	PPM	**%**			**lb/hr**	**lb/yr**
Carbon Dioxide		0.44	No			
Hydrogen Sulfide			No			
Nitrogen		1.02	No			
Methane		96.6	No			
Ethane		1.78	No			
Propane		0.091	No			
Isobutane		0.012	No			
n-butane		0.013	No			
Isopentane		0.0052	No			
N-Pentane		0.0034	No			
Cyclopentane	2	0.0002	No			
n-Hexane			No			
Cyclohexane			No			
Other Hexanes	22	0.0022	No			
Heptane	14	0.0014	No			
Methyl cyclohexane	2.8	0.00028	No			
2,2,4-trimethylpentane			No			
C8+		0.0052	No			
Benzene	0.8	0.00008	Yes	78	2.96E-05	2.59E-01
Toluene	0.4	0.00004	Yes	92	1.75E-05	1.53E-01
Ethylbenzene	0.1	0.00001	Yes	106	5.03E-06	4.40E-02
Xylenes	0.1	0.00001	Yes	106	5.03E-06	4.40E-02

Plant 3	**Benzene**	1.48E-05	1.30E-01
	Toluene	8.73E-06	7.64E-02
	Ethylbenzene	2.51E-06	2.20E-02
	Xylenes	2.51E-06	2.20E-02
Plant 4&5	**Benzene**	2.96E-05	2.59E-01
	Toluene	1.75E-05	1.53E-01
	Ethylbenzene	5.03E-06	4.40E-02
	Xylenes	5.03E-06	4.40E-02
Plant 4&5	**Benzene**	2.96E-05	2.59E-01
	Toluene	1.75E-05	1.53E-01
	Ethylbenzene	5.03E-06	4.40E-02
	Xylenes	5.03E-06	4.40E-02

Table 15
Potential to Emit - Plants 4&5
Calculation of Methanol Emissions

Methanol Emissions from Methanol Tank, using EPA TANKS model

Model Input			
Capacity	500	gallons	
Volume added	150	gal/yr	
Diameter	46	inches	
Height	5.7	feet	Effective height considering cone shape.
Flapper weight	4	oz	
Vent diameter	2	inches	
Color	white		
Diameter	3.833	feet	
Volume	65.750	cu ft	
Conversion	7.48	gal/cu ft	
Volume	491.812	gallons	OK
Area of vent	3.14	sq in	
pressure of valve	0.080	psi	
Output from Model			
Working Loss	0.18	lb/yr	
Breathing Loss	12.89	lb/yr	
Total	13.07	lb/yr	
Annual emissions	13.07	lb/yr	
Max daily emission	0.323	lb/day	Assumes working loss occurs during summer; and breathing loss occurs during 90 days.
App Deg Accuracy	200	lb/yr	(Applicable Degree of Accuracy for methanol is similar to a de minimis value, according to 2588 guidance.)

The following are calculated by proportion

	Emission Rate	
	(lb/hr)	**(lb/yr)**
Plants 1&2	0.18	13.07
Plant 3	0.09	6.54
Plants 4 & 5	0.18	13.07
Plant 4&5	0.18	13.07

Table 16
Potential to Emit - Plants 4&5
Calculation of Produced Water Tank Emissions (with use of Tanks model)

The following is the calculation from the existing Plant 1 and Plant 2 operation. Plants 3, 4 and 5 are calcualted at the bottom of this sheet, by proportion.

Emissions from Produced Water Tanks

Number of Tanks	6		
Outside capacity	400	barrel	
Actual capacity	375	barrel	
2005 throughput	19,560	barrel	
Units conversion	42	gal/barrel	
Outside capacity	16,800	gallons	
Actual capacity	15,750	gallons	
2005 throughput	821,520	gallons	
Diameter	12	feet	
Height	20	feet	Effective height considering cone shape.
Color	light beige		
Volume	2,261	cu ft	
Conversion	7.48	gal/cu ft	
Volume	16,911	gallons	OK

Henry's Law

		Benzene		Ethylbenzer	Toluene	Xylene
Partial Pressure of benzene = Hpx * mole fraction in liquid						
		300	Hpx at 25 deg C (atmospheres)	300	300	300
		0.8	ppm of benzene in air	0.1	0.4	0.1
		800	Total Pressure in water separator (psi)	800	800	800
		14.7	One atmosphere (psi)	14.7	14.7	14.7
		4.35374E-05	Partial pressure of benzene in air (atm)	5.44E-06	2.18E-05	5.44E-06
		1.45125E-07	Mole fraction in liquid	1.81E-08	7.26E-08	1.81E-08
		1.45125E-07	Moles of benzene in 18 grams of water	1.81E-08	7.26E-08	1.81E-08
		78	MW of benzene	106	92	106
		1.13197E-05	Grams of benzene in 18 grams of water	1.92E-06	6.68E-06	1.92E-06
		1.13197E-05	Pounds of benzene in 18 pounds of water	1.92E-06	6.68E-06	1.92E-06
		8.34	density of water (lb/gal)	62.4	62.4	62.4
		5.24481E-06	Pounds of benzene per gallon of water	6.67E-06	2.31E-05	6.67E-06
		4.308714057	Pounds of benzene per year	5.476303	19.01207	5.476303
		1095	Hours/year (Water to Tanks)	1095	1095	1095
		0.003934899	Max hourly emissions	0.005001	0.017363	0.005001

Pounds per hour	
	Benzene
Plant 1&2	0.0039
Plant 3	0.0020
Plant 4&5	0.0039
Plant 4&5	**0.0039**

Pounds per hour			
	Ethyl-benzene	**Toluene**	**Xylene**
Plant 1&2	0.0050	0.0174	0.0050
Plant 3	0.0025	0.0087	0.0025
Plant 4&5	0.0050	0.0174	0.0050
Plant 4&5	**0.0050**	**0.0174**	**0.0050**

Pounds per year	
	Benzene
Plant 1&2	4.31
Plant 3	2.15
Plant 4&5	4.31
Plant 4&5	**4.3087**

Pounds per year			
	Ethyl-benzene	**Toluene**	**Xylene**
Plant 1&2	5.48	19.01	5.48
Plant 3	2.74	9.51	2.74
Plant 4&5	5.48	19.01	5.48
Plant 4&5	**5.4763**	**19.0121**	**5.4763**

Table 17
Potential to Emit - Plants 4&5
Calculation of Maximum Hourly Emissions

Substance	Max Hourly Emissions (lb/hr)						
	Compres-sors	Dehy & Regen	Blow-down	Fugitives	MeOH Tank	PW Tank	TOTAL
1,3-Butadiene	8.77E-03						8.77E-03
Acetaldehyde	9.10E-04						9.10E-04
Acrolein	**9.10E-04**						9.10E-04
Anthracene	2.62E-06						2.62E-06
Benzene	4.92E-03	2.56E-04	1.12E-01	2.96E-05		3.93E-03	1.21E-01
Benzo(a)pyrene	5.85E-08						5.85E-08
Benzo(b)fluoranthene	8.10E-07						8.10E-07
Benzo(k)fluoranthene	1.98E-07						1.98E-07
Chrysene	3.67E-07						3.67E-07
Dibenz(a,h)anthracene	5.85E-08						5.85E-08
Ethylbenzene	1.62E-03	2.72E-05	1.90E-02	5.03E-06		5.00E-03	2.57E-02
Formaldehyde	8.47E-03						8.47E-03
Naphthalene	5.43E-04						5.43E-04
Propylene	9.86E-02						9.86E-02
Toluene	6.01E-03	1.30E-04	6.61E-02	1.75E-05		1.74E-02	7.22E-02
Xylene (Total)	1.59E-02	2.90E-05	1.90E-02	5.03E-06		5.00E-03	4.00E-02
Ammonia	2.59E+00						2.59E+00
Methanol			0.00E+00		1.80E-01		1.80E-01
Hydrogen sulfide			1.22E-03				1.22E-03
Carbonyl sulfide			1.94E-02				1.94E-02
Hexane			3.40E+00				3.40E+00
Cyclohexane			6.03E-01				6.03E-01

Table 18
Potential to Emit - Plants 4&5
Calculation of Annual Emissions

Substance	Annual Emissions (lb/yr)						
	Compres-sors	Dehy& Regen	Blow-down	Fugitives	MeOH Tank	PW Tank	TOTAL
1,3-Butadiene	5.55E+01						5.55E+01
Acetaldehyde	5.76E+00						5.76E+00
Acrolein	5.76E+00						5.76E+00
Anthracene	1.66E-02						1.66E-02
Benzene	3.11E+01	6.33E-01	1.61E+00	2.59E-01		4.31E+00	3.80E+01
Benzo(a)pyrene	3.70E-04						3.70E-04
Benzo(b)fluoranthene	5.13E-03						5.13E-03
Benzo(k)fluoranthene	1.25E-03						1.25E-03
Chrysene	2.32E-03						2.32E-03
Dibenz(a,h)anthracene	3.70E-04						3.70E-04
Ethylbenzene	1.03E+01	6.71E-02	2.74E-01	4.40E-02		5.48E+00	1.61E+01
Formaldehyde	5.36E+01						5.36E+01
Naphthalene	3.44E+00						3.44E+00
Propylene	6.24E+02						6.24E+02
Toluene	3.80E+01	3.21E-01	9.52E-01	1.53E-01		1.90E+01	5.85E+01
Xylene (Total)	1.01E+02	7.15E-02	2.74E-01	4.40E-02		5.48E+00	1.06E+02
Ammonia	1.64E+04						1.64E+04
Methanol			3.06E+01		13.07		4.37E+01
Hydrogen sulfide			1.76E-02				1.76E-02
Carbonyl sulfide			2.80E-01				2.80E-01
Hexane			4.90E+01				4.90E+01
Cyclohexane			8.70E+00				8.70E+00

Table 19
Potential-to-Emit - Plants 4&5
Calculation of Prioritization Scores

Substance	Facility-wide total	Facility-wide total	Applic Deg. Of Accuracy	Toxics Potency Factors: Cancer Potency Value	Toxics Potency Factors: Acute REL	Toxics Potency Factors: Chronic REL	Calc of Prioritization Scores: Carcinogen	Calc of Prioritization Scores: Acute Non-Carcin-ogen	Calc of Prioritization Scores: Chronic Non-Carcin-ogen
	(lb/hr)	(lb/yr)		$(ug/m^3)^{-1}$	(ug/m^3)	(ug/m^3)			
1,3-Butadiene	8.77E-03	5.55E+01	0.1	1.7E-04		20	9.44E-03		3.17E-04
Acetaldehyde	9.10E-04	5.76E+00	20	2.7E-06	470	140	1.55E-05	1.94E-06	4.69E-06
Acrolein	9.10E-04	5.76E+00	0.05		2.5	0.35		3.64E-04	1.88E-03
Anthracene	2.62E-06	1.66E-02	50						
Benzene	1.21E-01	3.80E+01	2	2.9E-05	1300	60	1.10E-03	9.32E-05	7.22E-05
Benzo(a)pyrene	5.85E-08	3.70E-04	0.05	1.1E-03			4.07E-07		
Benzo(b)fluoranthene	8.10E-07	5.13E-03	0.5	1.1E-04			5.64E-07		
Benzo(k)fluoranthene	1.98E-07	1.25E-03	0.5	1.1E-04			1.38E-07		
Chrysene	3.67E-07	2.32E-03	5	1.1E-05			2.55E-08		
Dibenz(a,h)anthracene	5.85E-08	3.70E-04	0.1	1.2E-03			4.44E-07		
Ethylbenzene	2.57E-02	1.61E+01	200			2000			9.21E-07
Formaldehyde	8.47E-03	5.36E+01	5	6.0E-06	55	9	3.22E-04	1.54E-04	6.80E-04
Naphthalene	5.43E-04	3.44E+00	50	3.4E-05		9	1.17E-04		4.36E-05
Propylene	9.86E-02	6.24E+02	200			3000			2.38E-05
Toluene	7.22E-02	5.85E+01	200		37000	300		1.95E-06	2.23E-05
Xylene (Total)	4.00E-02	1.06E+02	200		22000	700		1.82E-06	1.74E-05
Ammonia	2.59E+00	1.64E+04	200		3200	200		8.11E-04	9.37E-03
Methanol	1.80E-01	4.37E+01	200		28000	4000		6.43E-06	1.25E-06
Hydrogen sulfide	1.22E-03	1.76E-02	5		42	10		2.91E-05	2.01E-07
Carbonyl sulfide	1.94E-02	2.80E-01	100						
Hexane	3.40E+00	4.90E+01	200			7000			7.99E-07
Cyclohexane	6.03E-01	8.70E+00	200						
			Sum				1.1E-02	1.5E-03	1.2E-02
			Normalization Factor				1700	1500	150
			Receptor Proximity (RP) Adjustment Factor				0.003	0.04	0.003
			Prioritization Score				0.0561	0.0878	0.0056
			Significance Threshold				0.10	1.00	1.00
			Significant Toxics Risk ?				No	No	No

Note that the indicated Prioritization Score, 0.16, would indicate that carcinogenic risk would be 1.6 per million. This is greater than one per million. Therefore risks may not be less-than-significant.

Table 20
Potential-to-Emit - Plants 4&5
Calculation of Health Risks and Determination of Significance

		Emission Sources						
		Compres-sors	DeHy	Blowdown	Fugitives	Produced Water		
Dispersion to Residential Receptor (ug/m3 per gram/sec)		7.008	156.3	68.06	338.9	353.5		
Dispersion to Non-Residential Receptor (ug/m3 per gram/sec)		12.22	404.6	163.7	1,941.7	2737		
							Calc of Risk	Calc of Risk
	Cancer Potency Value	Emission Rate					Residential Receptor	Non-Residential Receptor
	$(ug/m^3)^{-1}$	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(Risk)	(Risk)
Substance								
1,3-Butadiene	1.7E-04	5.55E+01					9.52E-08	3.79E-08
Acetaldehyde	2.7E-06	5.76E+00					1.57E-10	6.24E-11
Benzene	2.9E-05	3.11E+01	6.33E-01	1.61E+00	2.59E-01	4.31E+00	8.51E-08	1.26E-07
Benzo(a)pyrene	1.1E-03	3.70E-04					4.11E-12	1.64E-12
Benzo(b)fluoranthene	1.1E-04	5.13E-03					5.69E-12	2.26E-12
Benzo(k)fluoranthene	1.1E-04	1.25E-03					1.39E-12	5.54E-13
Chrysene	1.1E-05	2.32E-03					2.58E-13	1.03E-13
Dibenz(a,h)anthracene	1.2E-03	3.70E-04					4.48E-12	1.78E-12
Formaldehyde	6.0E-06	5.36E+01					3.25E-09	1.29E-09
Naphthalene	3.4E-05	3.44E+00					1.18E-09	4.69E-10
					Sum		1.85E-07	1.66E-07
					Significance Threshold		1.0E-06	1.0E-06
					Significant Toxics Risk ?		No	No

Cancer Potency Factors are current levels from the CA Office of Health Hazard Environmental Assessment (OHHEA).
Exposures are calculated with the use of the SCREEN3 model.
Emissions from each source are modeled from that source's stack characteristics..

The nearest residence (1500 meters from source) is used for the residential receptor analysis.
The nearest non-residential receptor wascalculated for the exposure of a worker in the nearby field at an average distance of 400 meters. It was assumed (worst-case) that he was at that location for 2000 hours per year.
A scaling factor of 0.1 was used to convert maximum hourly concentrations to maximum annual concentrations.
Carcinogenic risk is less than one per million; therefore, risk is not significant.

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

WildGoose, Blowdown Scenario 4

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.00000
STACK HEIGHT (M)	=	12.8000
STK INSIDE DIAM (M)	=	1.7500
STK EXIT VELOCITY (M/S)	=	.7360
STK GAS EXIT TEMP (K)	=	352.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = .926 M**4/S**3; MOM. FLUX = .345 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
400.	163.7	4	2.0	2.1	640.0	18.54	29.59	15.52	NO
1500.	68.06	6	1.0	1.1	10000.0	32.78	49.47	19.19	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	163.7	400.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

02/02/10
13:11:22

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Wild Goose, 2/2/10

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.00000
STACK HEIGHT (M)	=	13.5000
STK INSIDE DIAM (M)	=	.7100
STK EXIT VELOCITY (M/S)	=	26.3000
STK GAS EXIT TEMP (K)	=	725.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 19.367 M**4/S**3; MOM. FLUX = 35.229 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
50.	.7286E-03	6	1.0	1.2	10000.0	76.19	14.29	14.19	NO
100.	.1474	5	1.0	1.1	10000.0	90.57	22.86	22.30	NO
200.	7.209	3	10.0	10.3	3200.0	32.69	23.97	14.61	NO
300.	12.63	3	10.0	10.3	3200.0	32.69	34.70	21.02	NO
400.	12.22	3	10.0	10.3	3200.0	32.69	44.98	27.01	NO
500.	11.24	4	15.0	15.7	4800.0	26.11	36.33	18.65	NO
600.	10.79	4	10.0	10.5	3200.0	32.41	43.06	21.89	NO
700.	10.51	4	10.0	10.5	3200.0	32.41	49.48	24.63	NO
800.	9.963	4	8.0	8.4	2560.0	37.14	55.98	27.62	NO
900.	9.505	4	8.0	8.4	2560.0	37.14	62.25	30.23	NO
1000.	8.923	4	8.0	8.4	2560.0	37.14	68.46	32.80	NO
1100.	8.289	4	8.0	8.4	2560.0	37.14	74.62	34.79	NO
1200.	7.871	4	5.0	5.2	1600.0	51.32	81.16	37.67	NO
1300.	7.600	4	5.0	5.2	1600.0	51.32	87.19	39.51	NO
1400.	7.308	4	5.0	5.2	1600.0	51.32	93.18	41.30	NO
1500.	7.008	4	5.0	5.2	1600.0	51.32	99.13	43.05	NO
1600.	6.708	4	5.0	5.2	1600.0	51.32	105.05	44.76	NO
1700.	6.434	4	4.5	4.7	1440.0	55.52	111.06	46.74	NO
1800.	6.189	4	4.5	4.7	1440.0	55.52	116.90	48.37	NO

1900.	5.949	4	4.5	4.7	1440.0	55.52	122.72	49.98	NO
2000.	5.742	4	4.0	4.2	1280.0	60.77	128.65	51.94	NO
2100.	5.877	5	1.0	1.1	10000.0	90.57	102.42	40.87	NO
2200.	6.070	5	1.0	1.1	10000.0	90.57	106.63	41.66	NO
2300.	6.246	5	1.0	1.1	10000.0	90.57	110.83	42.43	NO
2400.	6.404	5	1.0	1.1	10000.0	90.57	115.02	43.20	NO
2500.	6.547	5	1.0	1.1	10000.0	90.57	119.19	43.96	NO
2600.	6.674	5	1.0	1.1	10000.0	90.57	123.35	44.71	NO
2700.	6.788	5	1.0	1.1	10000.0	90.57	127.50	45.45	NO
2800.	6.887	5	1.0	1.1	10000.0	90.57	131.64	46.18	NO
2900.	6.974	5	1.0	1.1	10000.0	90.57	135.76	46.90	NO
3000.	7.049	5	1.0	1.1	10000.0	90.57	139.88	47.62	NO
3500.	7.273	5	1.0	1.1	10000.0	90.57	160.27	51.10	NO
4000.	7.307	5	1.0	1.1	10000.0	90.57	180.41	54.42	NO
4500.	7.145	5	1.0	1.1	10000.0	90.57	200.30	57.23	NO
5000.	6.934	5	1.0	1.1	10000.0	90.57	219.97	59.90	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 50. M:

331.	12.84	3	10.0	10.3	3200.0	32.69	38.03	22.97	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
400.	12.22	3	10.0	10.3	3200.0	32.69	44.98	27.01	NO
1500.	7.008	4	5.0	5.2	1600.0	51.32	99.13	43.05	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	12.84	331.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Wild Goose, DeHy Stack

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.00000
STACK HEIGHT (M)	=	7.9200
STK INSIDE DIAM (M)	=	.9144
STK EXIT VELOCITY (M/S)	=	.2370
STK GAS EXIT TEMP (K)	=	1423.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = .386 M**4/S**3; MOM. FLUX = .002 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN DISCRETE DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
400.	404.6	4	1.0	1.0	320.0	16.10	29.61	15.56	NO
1500.	156.3	6	1.0	1.0	10000.0	23.57	49.30	18.75	NO

DWASH= MEANS NO CALC MADE (CONC = 0.0)
DWASH=NO MEANS NO BUILDING DOWNWASH USED
DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

****
*** SUMMARY OF SCREEN MODEL RESULTS ***
****

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	404.6	400.	0.

****
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
****

03/20/10
11:40:08

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

Wild Goose, Fugitive Emissions

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =         AREA
   EMISSION RATE (G/(S-M**2))  =      1.00000
   SOURCE HEIGHT (M)          =        .0000
   LENGTH OF LARGER SIDE (M)   =      60.0000
   LENGTH OF SMALLER SIDE (M)  =      60.0000
   RECEPTOR HEIGHT (M)        =        .0000
   URBAN/RURAL OPTION         =        RURAL
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST     CONC             U10M   USTK  MIX HT   PLUME  MAX DIR
   (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   (DEG)
-------  ----------  ----  -----  -----  ------  ------  -------
   400.   .6988E+07    6     1.0    1.0 10000.0     .00     45.
  1500.   .1220E+07    6     1.0    1.0 10000.0     .00     37.

     ************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      .6988E+07      400.        0.


**************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
**************************************************
```

03/20/10
11:35:07

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

Wild Goose, Produced Water Tank

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE            =        POINT
   EMISSION RATE (G/S)    =      1.00000
   STACK HEIGHT (M)       =       6.4000
   STK INSIDE DIAM (M)    =       1.0000
   STK EXIT VELOCITY (M/S)=        .0100
   STK GAS EXIT TEMP (K)  =     293.0000
   AMBIENT AIR TEMP (K)   =     293.0000
   RECEPTOR HEIGHT (M)    =        .0000
   URBAN/RURAL OPTION     =        RURAL
   BUILDING HEIGHT (M)    =        .0000
   MIN HORIZ BLDG DIM (M) =        .0000
   MAX HORIZ BLDG DIM (M) =        .0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

*********************************
*** SCREEN DISCRETE DISTANCES ***
*********************************

 *** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)  DWASH
-------  ----------  ----  -----  -----  ------  ------  ------  ------  -----
    400.   2737.        6     1.0    1.0 10000.0    3.45   14.64    7.05    NO
   1500.   353.5        6     1.0    1.0 10000.0    3.45   49.03   18.03    NO

 DWASH=   MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

     ************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ************************************

 CALCULATION        MAX CONC    DIST TO   TERRAIN
  PROCEDURE        (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      2737.          400.        0.


************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
************************************************
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Appendix C
Supplemental Noise Information

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Noise Study
Wild Goose Well Pad Site
Phase 3 Expansion

Butte County, California

August 2010

Prepared for:
California Public Utilities Commission

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.
130 Battery Street, Suite 400
San Francisco, CA 94111

Table of Contents

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List of Abbreviations and Acronyms

Bcf	billion cubic feet
CEC	California Energy Commission
Caltrans	California Department of Transportation
CPUC	California Public Utilities Commission
dBA	decibel(s) A-scale
E & E	Ecology and Environment, Inc.
L_{eq}	equivalent continuous noise level
MMcfd	million cubic feet per day
SPL	sound pressure level

1 Introduction

1.1 Background

Wild Goose Storage, LLC (Wild Goose) is proposing the Wild Goose Phase 3 Gas Storage Expansion (Phase 3 Expansion), to expand the capabilities of their Wild Goose Facility in Butte County, beyond those currently certificated. The expansion would allow enhancement of the injection, withdrawal, and storage capacity of the most suitable natural gas storage reservoirs in the Wild Goose Gas Field. The expansion would increase cumulative total injection capacity from 450 million cubic feet per day (MMcfd) to approximately 650 MMcfd, withdrawal capacity from 700 to approximately 1,200 MMcfd, and storage capacity from approximately 20 billion cubic feet (Bcf) to 50 Bcf. Table 1-1 presents the existing and proposed storage and injection and withdrawal flow rates.

Table 1-1 Maximum Storage, Injection, and Withdrawal Limits

	Existing	Proposed
Storage	14 bcf	29 bcf
Injection	450 MMcfd	650 MMcfd
Withdrawal	700 MMcfd	1,200 MMcfd

Although the Phase 3 Expansion would not require physical modifications to the Wild Goose Well Pad Site (WPS), located approximately 5 miles west of the main facility site, increased gas flow through the wells and other equipment at the WPS as a result of the Phase 3 Expansion has the potential to increase noise levels at the site.

Existing equipment at the WPS includes wellheads, valves, flow measurement devices, piping, and control valves. Noise is generated when gas flows through a restriction (such as flow measurement devices and control valves). Noise from the operation of this equipment is due to the turbulence downstream of the restriction. Noise levels increase as the gas flow increases but the increase is not linear in relation to flow, as discussed further in this report.

As part of the California Environmental Quality Act (CEQA) review and public comment process for the Phase 3 Expansion, the California Public Utilities Commission (CPUC) commissioned Ecology and Environment, Inc. (E & E) to conduct a sound level study to determine existing noise levels from operations at the WPS, projected noise levels that would occur after full buildout of the Phase 3 Expansion, and the potential impact to the

ambient noise environment from the increase in gas flow rates during injection and withdrawal operations at the WPS.

1.2 Study Objectives

The objectives of the noise study were:

1. To determine current noise levels at the WPS during existing injection and withdrawal operations;
2. To determine the frequency characteristics of noise generated by injection and withdrawal operations at the WPS; and
3. To estimate noise levels that may occur during injection and withdrawal operations at the WPS after full buildout of the Phase 3 Expansion.

This report includes a description of the WPS and monitoring locations, methods used to obtain the sound measurements, survey results, evaluation methods, and projected sound levels. Accompanying figures display the site layout and sampling locations.

1.3 Noise Fundamentals

Noise is defined as any unwanted sound. Sound is defined as any pressure variation that the human ear can detect. Humans can detect a wide range of sound pressures, but only the pressure variations occurring within a particular set of frequencies are experienced as sound. However, the acuity of human hearing is not the same at all frequencies. Humans are less sensitive to low frequencies than to mid-frequencies, and so sound measurements are often adjusted (or weighted) to account for human perception and sensitivities. The unit of sound measurement is a decibel (dB). The most common weighting scale used is the A-weighted scale, which was developed to allow sound-level meters to simulate the frequency sensitivity of human hearing. Sound levels measured using this weighting are noted as dBA (A-weighted decibels). ("A" indicates that the sound has been filtered to reduce the strength of very low and very high frequency sounds, much as the human ear does.) The A-weighted scale is logarithmic, so an increase of 10 dB actually represents a sound that is 10 times louder. However, humans do not perceive the 10 dBA increase as ten times louder but as only twice as loud.

The following is typical of human responses to changes in noise level:

- A 3-dBA change is the threshold of change detectable by the human ear.
- A 5-dBA change is readily noticeable.
- A 10-dBA change is perceived as a doubling (or halving) of noise level.

Table 1-2 list some typical sources and levels of noise.[1]

[1] It should be noted that birds and other wildlife perceive sound differently than humans – the range of audible sounds perceived by birds is far less than those perceived by the human ear, and birds also perceive a narrower band of sound frequencies than humans.

Because they are based in a logarithmic scale, dBs are not additive. For example, if two similar noise sources produce the same amount of noise (e.g., 100 dB each), the total noise level is 103 dB, not 200 dB. In terms of human response, an increase in noise level of 10 dB is generally perceived as being twice as loud. Everyday sounds normally range from 30 dB (very quiet) to 100 dB (very loud).

Table 1-2 Typical Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet		
	100	
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**70**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**60**	
		Large business office
Quiet urban daytime	**50**	Dishwasher in next room
Quiet urban nighttime	**40**	Theater, large conference room (background)
Quiet suburban nighttime		
	30	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
	0	
Source: Caltrans 2009		

The decrease in sound level that occurs as distance from any single sound source increases normally follows the inverse square law: the sound pressure level changes in inverse proportion to the square of the distance from the sound source. In a large open area with no obstructive or reflective surfaces, it is a general rule that at distances greater than 50 feet, the sound pressure level from a point source of sound drops off at a rate of 6 dB with each doubling of distance away from the source. For example, a sound source with a sound pressure level of 95 dBA at 50 feet would have a sound level of 89 dBA at 100 feet due to divergence of sound energy over distance. In addition, sound energy is absorbed in the air as a function of temperature, humidity, and the frequency of the sound. This attenuation can be up to 2 dB over 1,000 feet. The drop-off rate also varies with both terrain conditions and the presence of obstructions in the sound propagation path.

Various descriptors are used to evaluate sound levels over time. A common description used to evaluate sound levels is Leq, or the continuous equivalent sound level. The sound energy from the fluctuating sound pressure levels (SPLs) is averaged over time to create a single number (Leq) to describe the mean energy, or intensity, level. Leq values from various sound sources can be added and subtracted to determine cumulative sound levels.

The background (or ambient) sound level is the term used to describe the sound level measured in the absence of the noise under investigation. It is described as the A-weighted Leq sound level measured on a sound level meter over a given time period.

2 Site Description and Measurement Locations

2.1 General Site Description

The Wild Goose Facility is located near the center of the Sacramento Valley approximately 62 miles northwest of Sacramento. The Wild Goose Facility includes the main plant site as well as the WPS, which is located about 4.5 miles southwest of the main facility site.

2.2 Description of Existing WPS

The existing WPS is located near the southern and western jurisdictional boundaries of Butte County, about one mile to the west of the Gray Lodge Waterfowl Management Area. The WPS is an 8.5-acre site which currently includes 15 gas injection/withdrawal and observation wells, in an area above the natural gas field. The WPS is located within the property of the Wild Goose Club, and is leased by Wild Goose.

The WPS consists of an array of gas flow and pressure control equipment surrounded by a 4.5-foot high berm. Equipment at the site includes wellheads, valves, annular flow measurement devices, control valves, and two loop-in or gathering pipelines (18-inch and 24-inch diameter, respectively). Under regular operation, the relative gas flows between the two pipelines are distributed (32 percent of total flow through the 18-inch line, and 68 percent of flow through the 24-inch line), so that the pressure drop is consistent for both pipelines. During typical injection and withdrawal operations, as many wells as possible are used, to distribute the gas flow evenly among the wells.

2.3 Measurement Locations

Sound pressure level (SPL) measurements were collected at four locations (see Figure 2-1 and location photographs in Appendix A):

Site 1: At the WPS, 50 feet from the center of the equipment array

Site 2: 300 feet (100 yards) west of the WPS berm

Site 3: 1,000 feet west of the WPS berm, and

Site 4: 2,300 feet south of WPS berm, near the Wild Goose Club

Measurements of ground borne vibration were also taken at Sites 1 and 3.


Site 1
Site 2
Site 3
Site 4
Legend
Site 1: Well Pad Site (WPS) Boundary
100-yd Buffer from WPS Boundary
Site 1: WPS
Site 2: 300 feet west of WPS Berm
Site 3: 1,000 feet west of WPS Berm
Site 4: 2,300 feet south of WPS Berm (near Wild Goose Club)
Figure 2-1
Wild Goose Well Pad and Sound Measurement Location Map
Butte County, California
1:6,000
0 150 300 600 900 Feet
Base Map Source: Microsoft Virtual Earth Aerial Imagery, (c)2009 Microsoft Corporation. Please see http://maps.live.com for a complete list of data suppliers.

3 Methodology

3.1 Data Gathering

On August 2 and 3, 2010, noise measurements were taken during daylight hours at the four measurement locations described in Section 2.3. Gas injection operations took place on August 2, and gas withdrawal operations took place on August 3. SPLs were measured on the A-weighted decibel scale and recorded as Leq for equivalent continuous noise level. SPL measurements were collected for approximately 5-minute durations at Sites 1 and 2 during gas injection and withdrawal at various flow rates, and at Sites 3 and 4 during injection at 350 MMcfd and withdrawal at 400 MMcfd. Measurements of groun borne vibration were also taken at Site 1 and Site 3 during injection at 350 MMcfd. During both injection operations on August 2, and withdrawal operations on August 3, up to 9 wells[2] receiving and producing gas. Each well is equipped with an individual lateral line and valves. Both the 18-inch and 24-inch pipeline were used to transport gas during the injection and withdrawal tests. Measurements were taken under gas injection and withdrawal conditions at various flow rates and locations as presented in Table 3-1.

Table 3-1 Well Pad Site SPL and Ground borne Vibration Measurement Locations, Conditions, and Flow Rates

Location	Flow Rate (MMcfd) and Measurement Locations								
	INJ (150)	INJ (250)	INJ (300)	INJ (350)	WDW (150)	WDW (250)	WDW (300)	WDW (350)	WDW (400)
1	x	x	x	x(a)	x	x	x	x	x
2	x	x	x	x	x	x	x	x	x
3				x(a)					x
4				x					x

x = Measurement of SPL taken
a = Measurement of ground borne vibration also taken
INJ = Injection flow
WDW = Withdrawal flow

Frequency data were collected at the same time as SPLs were measured at all locations, to determine the tonal characteristics of the operational noise at the WPS and to aid in developing mitigation measures, if necessary. Efforts were made to exclude excess noise not associated with the storage operation. Sound level information was immediately re-

[2] Due to equipment maintenance requirements on the days of the study, only 9 wells were available for the tests on August 2 and 3. Normally, gas is distributed among as many as 15 wells during injection and withdrawal operations. Under full buildout of the previous, Phase 2 expansion, up to 24 wells will be in operation at any one day at the WPS.

corded on field data sheets and saved electronically in the sound analyzer following the sampling period.

The study data were used to develop graphs and charts showing the relationship of gas flow rate through the WPS with SPLs generated by turbulence due to valve flow restriction and pipeline configuration at the WPS. These figures are included in Section 4 of this report and were used to extrapolate the future noise levels that can be expected during the operational maximum gas flow rates after full buildout of the Phase 3 Expansion.

3.2 Measurement Equipment

Sound data were measured and recorded using a Brüel and Kjaer 2260 and a Casella CEL-480 Type I real-time sound level meters. The sound meters were factory calibrated (see Appendix B for Certificates of Conformance and Calibration) and field calibrated prior to and after conducting the study. The sound level meters were mounted on a tripod at approximately five feet above the ground and protected from self-induced wind noise by a high-density foam windscreen.

Vibration measurements were collected using an Instantel MiniMate Plus vibration and overpressure monitor with an Instantel Standard Triaxial Geophone. A 30-pound weight was placed on the geophone during the measurements. One-minute histograms were collected for 5-minute sampling periods, during the maximum injection gas flow (350 MMcfd). Vibration was measured as vertical displacement in peak particle velocity (ppv) as inches per second (in/sec).

A portable Global Positioning System (GPS) was also used during the study to identify the measurement locations at the planned distances from the WPS.

3.3 Survey Conditions

Weather conditions during the study included clear skies, temperatures in the 80 to 90 degree F range, and very light winds.

4 Measured and Projected Sound Levels

4.1 Measured Sound Data

Table 4-1 presents the sound measurement values for each sound measurement site under injection and withdrawal conditions at given flow rates. In general, the measured Leq at Site 1 (at the WPS, 50 feet from the center of the valve area) ranged between 34.0 and 67.6 dBA during gas injection operations, and from 35.7 to 64.7 dBA during gas withdrawal operations. At Site 2 (300 feet [100 yards] from the WPS berm), the measured Leq ranged between 37.1 and 48.7 dBA during gas injection and from 35.0 to 40.5 dBA during gas withdrawal. As can be seen from measurements listed in the table, at Site 2, WPS operational activities did not contribute significantly to the background sound level which typically ranged from 35 to 50 dBA. It should be noted that measurements taken during this study showed that injection operations may be somewhat louder at any given flow rate than withdrawal operations.

Table 4-1 Measured Well Pad Site SPLs (dBA, Leq)

Site	Flow Rate (MMcfd) and Measurement Locations (Data Points)								
	INJ (150)	INJ (252)	INJ (300)	INJ (350)	WDW (150)	WDW (250)	WDW (300)	WDW (350)*	WDW (400)*
1	34.0	55.7	59.1	67.6	35.7	48.0	57.2	64.4	64.7
2	48.7	39.8	37.1	42.3	40.5	38.4	35.0	37.9	35.1
3				37.8					30.4
4				37.0					30.8

INJ = Injection flow
WDW = Withdrawal flow
* This flow rate verified by E & E staff by reviewing Wild Goose's SCADA system interface at the WPS

The vibration level at location Site 1 was measured at a ppv of 0.1 inch per second at the highest injection flow rate. This level dropped off to background vibration levels at Site 3.

Figure 4-1 presents a comparison of gas injection flow noise as Leq (dBA) with gas withdrawal flow noise, at Site 1. As shown in the figure, the overall Leq sound level for gas injection operations was higher than for withdrawal operations. At the 250 MMcfd injec-

tion flow rate, the sound level exceeded the level at the 250 MMcfd withdrawal flow rate by 7.7 dBA.

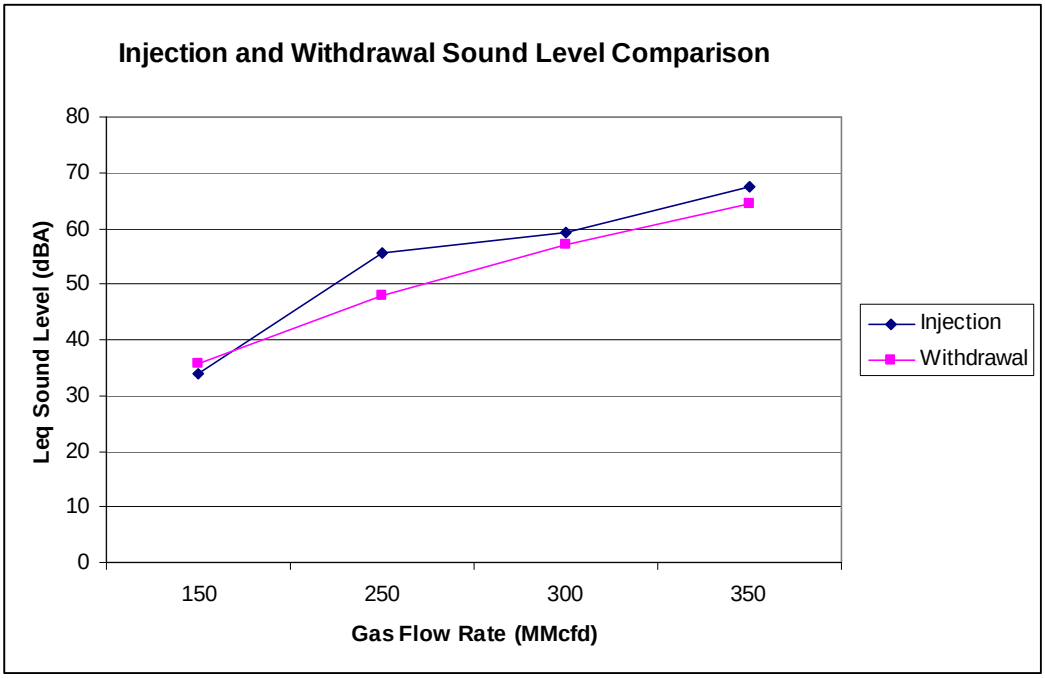

Figure 4-1. Comparison of Gas Injection Flow SPL with Gas Withdrawal Flow SPL at Site 1

Figure 4-2 presents a comparison of gas injection flow noise in octave band frequencies with gas withdrawal flow noise frequencies at flow rates of 350 MMcfd, at Site 1.

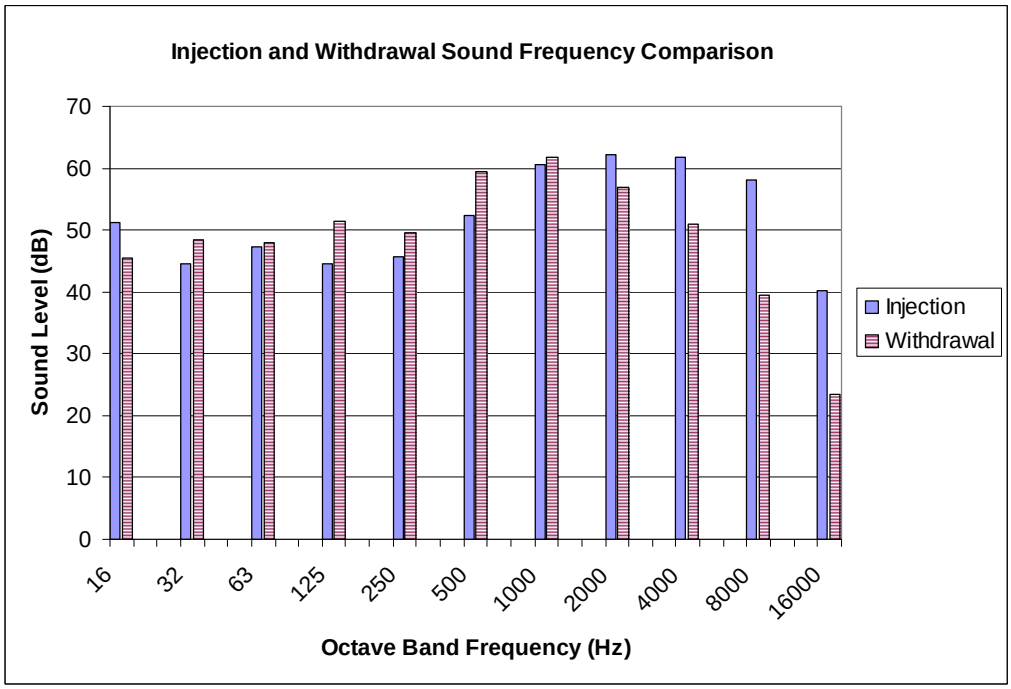

Figure 4-2. Comparison of Gas Injection Noise in Octave Band Frequencies with Gas Withdrawal Flow Noise Frequencies at 350 MMcfd Flow Rate

Although the broadband noise levels at this flow rate were similar (67.3 dBA for injection and 65.3 dBA for withdrawal), the frequency characteristics were different; sound levels were greater in the higher frequencies for the injection operation.

4.2 Study Observations

Noise generated by the WPS injection and withdrawal gas flows was barely audible to two noise specialists at Site 2 (300 feet from the WPS berm) and not audible at Site 3 (1,000 feet from the WPS berm). Various other background noise sources contributed to the ambient sound levels recorded during the study. These sources included aircraft, vehicles, wind rustle in vegetation, insects, and songbirds.

4.3 Noise Projections, Post-Phase 3 Expansion Buildout

Future noise levels from gas injection and withdrawal operations at the WPS after full buildout of the Phase 3 Expansion were projected based on the SPLs measured during gas injection and withdrawal operations at 9 well units on the days of the study. Projected noise levels for the future WPS gas flow rates were calculated based on the SPLs measured during the highest injection and withdrawal flow rates (350 MMcfd, injection and 400 MMcfd, withdrawal) experienced during the study. For the purpose of the calculations, it was assumed that the sound level contributed by each well, line, and valve unit was equal due to the consistent line diameter and length and valve type. The sound level contribution for one individual combined well, line, and valve unit was calculated using the following equation:

$$10 \times \mathrm{Log}_{10}[10^{(\text{measured Leq}/10)}/9]$$

Using this formula, the resulting sound level at Site 1 (the immediate WPS area) for one well unit during gas injection at 350 MMcfd would be 58.0 dBA, and one well unit during gas withdrawal at 400 MMcfd would be 55.1 dBA. Using these values, sound levels were predicted for flow rates greater than 350 MMcfd during injection and 400 MMcfd during withdrawal. Predicted sound levels assumed that more wells would be added to the operations as the flow rate increased – for the sake of this analysis, it was assumed that wells would be added at a regular rate, up to a total of 24 wells in operation at the highest flow rates. Figures 4-3 and 4-4 present the measured and projected sound levels for gas injection and withdrawal, respectively. The highest projected flow rates shown in the figures assumed up to 24 wells in operation.

As can be seen in Figures 4-3 and 4-4, the addition of more wells to operations at the WPS serves to distribute the flow of gas through the valves and other equipment, which results in a lower cumulative noise level at the site.

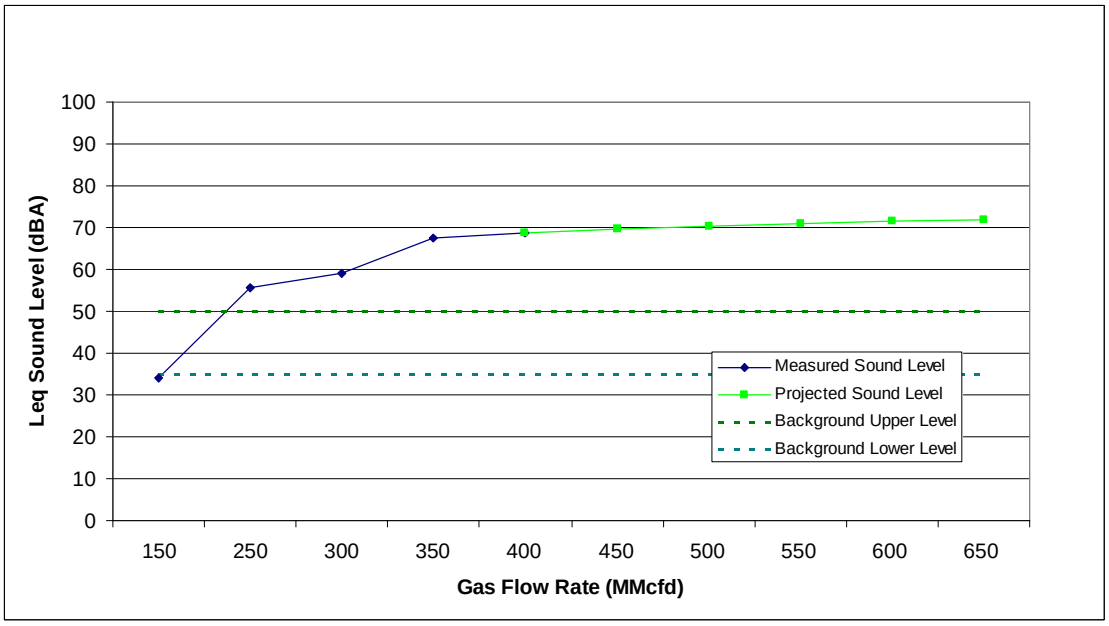

Figure 4-3 Measured and Projected SPLs at WPS (Site 1), Gas Injection Flow Rates (24 well scenario)

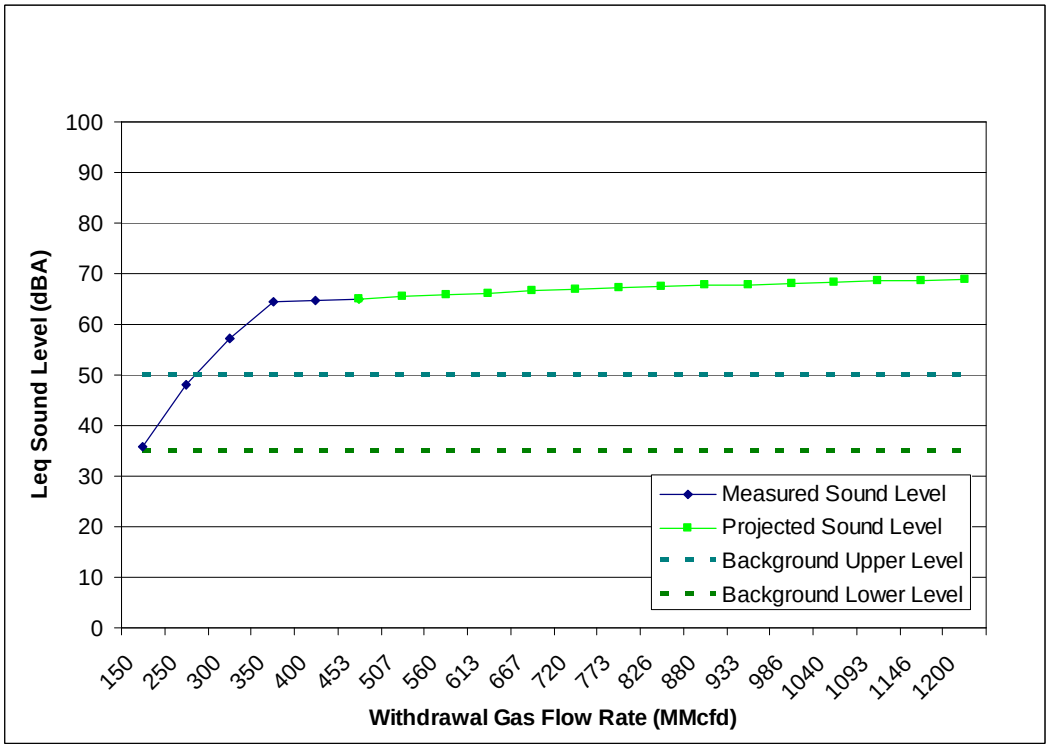

Figure 4-4 Measured and Projected SPLs at WPS (Site 1), Gas Withdrawal Flow Rates (24 well scenario)

As presented in Figure 4-3, the noise level projected for the maximum gas injection flow rate of 650 MMcfd is 71.9 dBA at 50 feet (Site 1). As presented in Figure 4-4, the noise level predicted for the maximum gas withdrawal flow rate of 1,200 MMcfd is 68.9 dBA at 50 feet (Site 1).

For the sake of presenting a more conservative analysis, a scenario was modeled in which only up to 20 wells would be available for injection operations (which were measured to be louder than withdrawal operations) at the WPS, to determine if noise levels would increase significantly from the 24-well maximum flow scenario. Figure 4-5 presents the measured and projected sound levels for gas injection for this scenario.

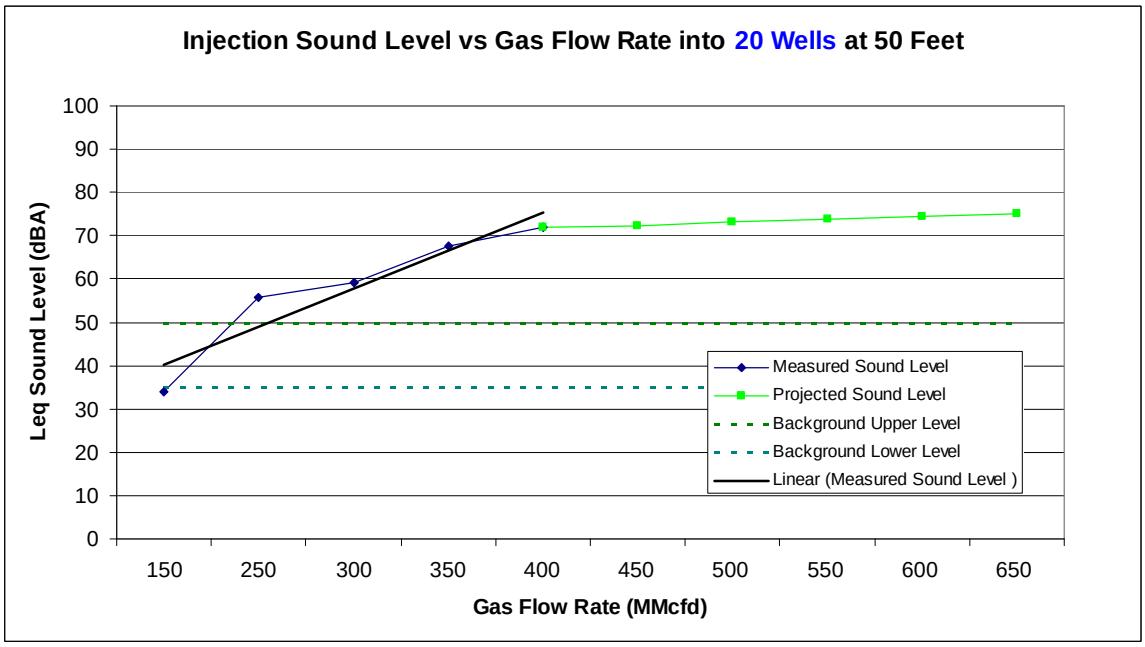

Figure 4-5 Measured and Projected SPLs at WPS (Site 1), Gas Injection Flow Rates (20 well scenario)

As presented in Figure 4-5 for the 20-well scenario, the noise level projected for the maximum gas injection flow rate of 650 MMcfd is 75 dBA at 50 feet (Site 1), and 51 dBA at a location 100 yards from the WPS berm (Site 2). This indicates that sound levels would not significantly increase from the 24-well maximum flow scenario, for a scenario in which some wells would not be in operation at the WPS during the maximum flow rate.

4.4 WPS Operational Noise Evaluation, Phase 3 Expansion

To identify potential noise impacts that would result after full buildout of Phase 3 at the WPS, computer noise modeling of WPS operations was conducted using the Cadna/A Model version 3.7.124 developed by Datakustik GmbH. The model simulates the outdoor three-dimensional propagation of sound from each noise source and accounts for sound wave divergence, atmospheric and ground sound absorption, and sound attenuation due to interceding barriers and topography, based on the International Organization for Standardization (ISO) standard for attenuation of sound during propagation outdoors (9613). Standard conditions of 20 degrees Celsius and 50 percent relative humidity were assumed. The model calculated the overall A-weighted sound levels within the receptor grid based on the predicted sound pressure contribution during the maximum gas injection and withdrawal flow rates described in section 4.3.

Sound levels were modeled for selected specific receptor locations that were identical to the study measurement locations (Sites 1 through 4).

Tables 4-2 and 4-3 present a comparison of predicted WPS operational sound levels after full buildout of Phase 3, showing a range of background sound levels. As indicated in Table 4-2, the predicted increase in noise level over the existing background at 100 yards (300 feet) from the WPS berm (equivalent of Site 2) would range from 0.7 dBA to 8.0 dBA during maximum injection rates (650 MMcfd). As indicated in Table 4-3, the predicted increase in noise level over the existing background at 100 yards (300 feet) from the WPS berm would range from 0.2 dBA to 3.3 dBA during maximum withdrawal rates (1,200 MMcfd).

Table 4-2 SPL Comparison for Gas Injection at 650 MMcfd

Location	Description	Sound Pressure Level as Leq (dBA)			
		Predicted Well Pad Contribution	Background Sound Level	Combined Background and Well Pad	Increase Over Background
1	50 ft from center of equipment at WPS	71.9	35- 50	71.9	21.9 - 36.9
2	100 yds west of berm	42.2	35- 50	43.0 - 50.7	0.7 - 8.0
3	1,000 ft west of berm	33.5	35- 50	37.3 - 50.1	0.1 - 2.3
4	2,300 ft south of pad	26.1	35- 50	35.5 - 50.0	0 - 0.5

Table 4-3 SPL Comparison for Gas Withdrawal at 1200 MMcfd

Location	Description	Sound Pressure Level as Leq (dBA)			
		Predicted Well Pad Contribution	Background Sound Level	Combined Background and Well Pad	Increase Over Background
1	50 ft from center of equipment at WPS	68.9	35- 50	68.9 - 69.0	19.0 - 33.9
2	100 yds west of berm	35.5	35- 50	38.3 -50.2	0.2 - 3.3
3	1,000 ft west of berm	30.4	35- 50	36.3 - 50.0	0 - 1.3
4	2,300 ft south of pad	23.5	35- 50	35.3 - 50.0	0 - 0.3

These projections show that, under certain conditions, at the maximum injection and withdrawal rates, WPS operational noise may exceed the background level at 100 yards from the WPS berm.

5 Summary and Conclusion

CPUC requested that E & E conduct a sound study to determine the potential impact to the ambient noise environment from the increase in gas flow rates during injection and withdrawal operations for the full buildout of the Phase 3 Expansion of the Wild Goose facility, located in Butte County, California.

Noise measurements were conducted at four sites, as described in Section 2, during injection and withdrawal of gas at specific flow rates. Noise levels were measured as Leq dBA using a sound level meter at each site. Based on these noise levels and flow rates, sound levels were predicted for the maximum gas flow rates proposed for the full buildout of Phase 3. To assist in the evaluation of the noise impacts that may be associated with the expanded operations, noise modeling was conducted based on the predicted noise levels.

The modeling results indicate that during the proposed maximum gas flow rates at the WPS, a worst case increase of 10 dBA over the background level at 100 yards (300 feet) from the WPS berm may occur.

As part of the permitting approvals for the Phase 3 Expansion or as a stipulation associated with other agreements, Wild Goose may be required to monitor future noise levels at the WPS after expansion activities are completed, and employ measures to reduce noise to background levels at a distance of 100 yards from the WPS berm. Example noise reduction measures that may be employed, and average noise level reductions associated with each measure, are presented in Table 5.1

Table 5-1 Potential Noise Reduction Measures

Noise Reduction Measure	Approximate Minimum Noise Reduction	Effectiveness of Measure
Increase berm height 2 feet[a]	5 dBA	Moderate, proven
Increase berm height 4 feet[a]	10 dBA	High, proven
Apply sound insulating lagging to well lines and valves[b]	12 to 24 dBA	High, proven
Construct cinder block enclosure building around WPS[c]	25	High, proven

Notes:
a - Modeled using Cadna/A software by Datakustik
b - Reference is ISO/FDIS, 2001, 15664 *Acoustics – Noise Control Design Procedures for Open Plant.*
c - Reference is Clayton and Clayton, 1978, Patty's Industrial Hygiene and Toxicology, Volume I.

References

California Department of Transportation (Caltrans). 2009. *Technical Noise Supplement.* November, 2009.

California Energy Commission (CEC). 2009. *Best Management Practices & Guidance Manual: Desert Renewable Energy Projects*. CEC-700-2009-016-SD. October 2009.

Clayton, George D. and Florence E. Clayton. 1978. *Patty's Industrial Hygiene and Toxicology*. Volume I. New York, New York. John Wiley & Sons,

International Standards Organization (ISO). 2001. ISO/FDIS 15664 Acoustics-Noise Control Design Procedures for Open Plant.

ISO. 1996. ISO 9613-2, Acoustics-Attenuation of Sound During Propagation Outdoors. December 15, 1996.

A Measurement Location Photographs

Figure B-1. Site 1 (50 Feet from Center of Equipment at WPS)

Figure B-2. Site 2 (100 Yards West of Well Pad Berm)

Figure B-3. Site 3 (1,000 Yards West of Well Pad Berm)

Figure B-4. Site 4 (2,300 Feet South of Well Pad Site Berm near Wild Goose Club)

B Certificates of Conformance and Calibration

Scantek, Inc.
CALIBRATION LABORATORY

ISO 17025: 2005, ANSI/NCSL Z540:1994 Part 1
and relevant requirements of ISO 9002: 1994
ACCREDITED by NVLAP
(an ILAC and APLAC signatory)

NVLAP®
NVLAP Lab Code: 200625-0

Calibration Certificate No.21612

Instrument:	**Sound Level Meter**	*Date Calibrated:*	**4/22/2010**
Model:	**2260**	*Status:*	**Received** / **Sent**
Manufacturer:	**Brüel and Kjær**	*In tolerance:*	X / X
Serial number:	**2391318**	*Out of tolerance:*	
Tested with:	**Microphone 4189 s/n 2386339** **Preamplifier ZC0026**	*See comments:*	
Type (class):	**1**	*Contains non-accredited tests:*	__Yes X No
		Calibration service:	__ Basic X Standard
Customer:	**Ecology and Environment, Inc.**	*Address:*	**368 Pleasant View Drive**
Tel/Fax:	**716-684-8060/ -0844/** **tsiener@ene.com**		**Lancaster, NY 14086**

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., 06/07/2005
SLM & Dosimeters – Acoustical Tests, Scantek Inc., 06/15/2005

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	25747	Dec 24, 2009	Scantek, Inc./ NVLAP	Dec 24, 2010
DS-360-SRS	Function Generator	61646	Nov 13, 2009	ACR Env. / A2LA	Nov 13, 2011
34401A-Agilent Technologies	Digital Multimeter	MY41022043	Nov 12, 2009	ACR Env. / A2LA	Nov 12, 2010
DPI 141-Druck	Pressure Indicator	790/00-04	Nov 21, 2008	Transcat / NVLAP	Nov 21, 2010
HMP233-Vaisala Oyj	Humidity & Temp. Transmitter	V3820001	Nov 25, 2009	ACR Env. / A2LA	May 25, 2011
PC Program 1019 Norsonic	Calibration software	v.46	Validated Dec 2006	-	-
1253-Norsonic	Calibrator	25726	Dec 7, 2009	Scantek, Inc./ NVLAP	Dec 7, 2010

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
23.7 °C	99.365 kPa	33.5 %RH

Calibrated by	Valentin Buzduga	**Checked by**	Mariana Buzduga
Signature		Signature	
Date	4/23/2010	Date	4/23/2010

Document stored as: Z:\Calibration Lab\SLM 2009\BNK2260_2391318_M2.doc

CASELLA CEL

Certificate of Conformance and Calibration

Instrument Type	**CEL- 450.A**	**Pre-amplifier**	**Integral to microphone**
Serial Number	149135	**Serial Number**	N/A
Firmware revision	V1.11		
Performance Class	2		
Microphone Type	**CEL-485**	**Calibrator Type**	**N/A**
Serial Number	001457	**Serial Number**	

Upgraded to CEL-490B 27 MAY 09 RS.

Applicable Sound Level meter standards:-

IEC 61672-1 2002-5 (Electroacoustics – Sound Level Meters)
IEC 60651 1979, IEC 60804:2000, ANSI S1.4: 1983, ANSI S1

For B and C models only, applicable filter standards include :-

EN61260: 1996, Class 0 and ANSI S1.11 1986, Order-3 Type 0C.

Test Conditions:-

Temperature	26	°C
Humidity	30	%RH
Pressure	1016	mBar

Test Engineer:- Anthony Dye

Date of Issue:- 2-Apr-09

Declaration of conformity

This test certificate confirms that the instrument specified above fully complies with the manufactures published specifications.

Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9001:2000 quality procedures. This product is certified as being compliant to the requirements of the CE Directive.

Test Summary :-

Self generated Noise tests	**All Tests Pass**
Level Linearity and Overload tests	**All Tests Pass**
Frequency weightings A/C/Z	**All Tests Pass**
F and S Time weightings	**All Tests Pass**
Pulse Tests	**All Tests Pass**
Peak C weighting tests	**All Tests Pass**
Acoustic Tests	**All Tests Pass**

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A Summary of Potential Impacts to Wildlife from Noise At the Wild Goose Well Pad Site

Prepared for:
California Public Utilities Commission

September 2010

1.0 Introduction

The Wild Goose Gas Storage Facility (Wild Goose Facility) is located in the Butte Sink area of Butte County, California. An 8.5-acre Well Pad Site (WPS), which includes fifteen current and nine planned natural gas injection/withdrawal and observation wells, provides a means of transporting the natural gas in the underground reservoir to the Wild Goose Facility. The WPS is located within the property of the Wild Goose Club (a private hunting and outdoor recreation club), approximately 4.5 miles to the west of the main Wild Goose Facility site. The WPS is surrounded by wilderness and managed wetlands, which provide ample habitat for wildlife, especially migratory waterfowl. Noise generated from standard injection and withdrawal operations at the WPS is the consequence of gas flowing across valves and other well restrictions. Noise from current gas injection and withdrawal operations in the immediate area of the WPS generally ranges from about 35 to 70 dBA (E & E 2010).

Increased natural gas injection and withdrawal that would take place as part of the proposed Phase 3 Expansion of the Wild Goose Facility (Phase 3 Expansion) could increase the level of noise at the WPS, and potentially affect the behavior of nearby wildlife. As part of the California Environmental Quality Act (CEQA) review of the Phase 3 Expansion, the California Public Utilities Commission (CPUC) undertook a study on August 2 and 3, 2010 to evaluate potential impacts from increased noise at the WPS. Results of the noise study were presented in *Noise Study, Wild Goose Well Pad Site, Phase 3 Expansion* (E & E 2010), and are summarized below.

1.1 Phase 3 Expansion Noise Study Report Summary

Fifteen gas injection and withdrawal wells are currently in operation at the WPS; an additional nine wells will come on line as part of the last phase of the Phase 2 Expansion of the Wild Goose Facility, increasing the total wells at the site to 24. For the noise study, the CPUC evaluated a typical operational noise scenario, in which 20 of the 24 wells at the WPS would be in operation.

For a scenario under which 20 of 24 wells would be in operation, the noise study modeled the increased gas injection and flow rates that would take place after the Phase 3 Expansion, to identify the likely increase in operational noise at the WPS. Results of this modeling indicated a moderate increase in noise at the immediate WPS location. Modeling results indicated a projected increase of up to 25 A-weighted

decibels (dBA1), resulting in a maximum estimated noise level of 75 dBA. At a location 100 yards from the berm surrounding the WPS site, a minor increase in noise of 1 dBA over the upper range of background noise levels would be expected, resulting in a maximum estimated noise level of 51 dBA.

2.0 Assessment of Noise Impacts to Wildlife at the WPS

To determine potential noise impacts on wildlife resulting from the proposed Phase 3 Expansion, and as part of ongoing coordination with the California Department of Fish and Game (CDFG), E & E conducted a literature review of noise impacts to wildlife. This review included published and peer-reviewed literature, as well "gray" literature (non-peer-reviewed reports and other documents published by agencies and other organizations) was also performed. Staff from the CDFG and the Gray Lodge Waterfowl Management Area were also contacted in the course of reviewing available information on this subject.

2.1 Wildlife Species Occurring at the WPS

The potential for special status species to occur in the area of the Phase 3 Expansion (which included the WPS), was discussed in the *Biological Assessment for the Wild Goose Phase 3 Expansion Project* (TRC 2009), and the *Wild Goose Phase 3 Gas Storage Expansion Draft Supplemental Environmental Impact Report* (Draft SEIR; Ecology and Environment, Inc. 2010).

Special status species such as conservancy fairy shrimp, giant garter snake, and western spadefoot toad may occur at the WPS. Some evidence suggests that western spadefoot toad may be affected by anthropogenic noise, especially vehicle noise up to 95 dBA (FHWA 2004), a noise level much higher than that likely to be generated at the WPS after full buildout of the Phase 3 Expansion. Currently, no evidence exists showing that the type of noise impacts that are projected to occur at the WPS as a result of Phase 3 Expansion activities could have a significant adverse impact on invertebrate or reptile species (FHWA 2004).

Several special status fish, including sensitive salmonid species as identified in the Draft SEIR, have the potential to occur in the canal to the east of the WPS and other surface water features in the vicinity. In general, the type of noise that would be generated at the WPS after full buildout of the Phase 3 Expansion is not anticipated to have adverse impacts on fish species (FWHA 2004).

No special status mammals were identified as occurring in the area of the WPS in the Draft SEIR.

Biological resources in the area of the WPS that could be affected by noise primarily include birds, particularly migratory waterfowl (ducks and geese).

[1] "A" indicates that the sound has been filtered to reduce the strength of very low and very high frequency sounds, much as the human ear does.

2.2 Noise Impacts to Wildlife Literature Review

The potential for noise to harm or affect animals has been studied extensively, and existing literature shows that high levels of anthropogenic (human-generated) noise can have an adverse effect on animals. Existing data and research do not conclusively support a minimum threshold for noise above which impacts to all wildlife would be considered substantially adverse. Three general conclusions may be made, however:

1. A broad range of anthropogenic noise levels can have adverse effects on wildlife;
2. Impacts to birds and waterfowl may include habitat avoidance and abandonment, decreased food intake, and decreased species richness and composition; and
3. Wildlife, especially waterfowl, have been shown to have the ability to acclimate to industrial noise of a continuous nature, such as the noise generated at the WPS.

Because special status bird species and migratory waterfowl species are the primary populations of concern for the area of the Butte Sink (Burkholder 2010), the discussion below focuses on noise impacts to birds.

No specific studies examining the impact of Phase 3 Expansion noise levels on local waterfowl populations have been undertaken. Most literature reviewed addressed noise impacts from traffic or aircraft to wildlife, and did not address the specific type of noise generated at the WPS. Several studies addressing the effects on birds from noise at existing natural gas facilities were reviewed, however, and were found to be more directly applicable.

The materials supporting the discussion below include the findings of the following two literature reviews addressing potential impacts to birds from anthropogenic noise:

- The Effects of Highway Noise on Birds, prepared for the California Department of Transportation Division of Environmental Analysis by Robert J. Dooling and Arthur N. Popper (Caltrans 2007)
- Synthesis of Noise Effects on Wildlife Populations, prepared by the U.S. Department of Transportation, Federal Highway Administration (FHWA 2004)

An independent review of other published and peer-reviewed literature and "gray" literature (non-peer-reviewed reports and other documents published by agencies and other organizations) was also performed. Staff from the California Department of Fish and Game (CDFG) and the Gray Lodge Waterfowl Management Area were also contacted in the course of reviewing available information on this subject.

2.2.1 Impacts Related to Ground-borne Vibration

Some evidence suggests that ground-borne vibration may have adverse impacts on some wildlife, especially aquatic species (Marr 2010, FHWA 2004). Generally, adverse impacts to wildlife from ground-borne vibration are most often associated with high impact activities such as pile driving. As discussed in the noise study report, measurements recorded during the study at the WPS showed some relatively minor ground-borne vibration currently taking place at the immediate site location due to existing equipment use, which dropped off to background levels at 100 yards from the WPS berm. Consistent ground-borne vibrations that may be associated with the Phase 3 Expansion are not anticipated to have a significantly adverse impact on wildlife species in the area.

2.2.1 Impacts Related to Anthropogenic Noise

Anthropogenic noise has been shown to affect bird species in a number of different ways (Caltrans 2007, FHWA 2004, Ikuta and Blumstein 2002, Belanger and Bedard 1990, Henson and Grant 1991, Newbrey et al. 2005). The range of audible sounds perceived by birds tends to be much narrower than that of humans, and birds are generally unable to distinguish a unique sound among background noise unless the sound is 12 dBA louder than ambient noise (Caltrans 2007). This more limited hearing of birds may result in birds having difficulty communicating in a noise-filled environment.

Potential impacts to birds resulting from anthropogenic noise can include the following (Gill 2007, Francis et al. 2009, Henson and Grant 1991, Belanger and Bedard 1990, Caltrans 2007):

- Disruption of communication (which affects species and individual recognition, mate selection, territorial defense, juveniles communicating with parents, and social activities);
- Avoidance of otherwise suitable habitat;
- Reproductive loss (resulting from nest abandonment, egg mortality due to exposure, or increased predation of eggs and hatchlings due to noise interference with detection of approaching predators);
- Depressed feeding rates on wintering and staging grounds; or
- Reduced community species richness and composition.

Very high noise levels may also cause damage to bird hearing and physical injury, although birds have been shown to tolerate continuous exposure to noises up to 110 dBA without experiencing damage, and birds have the ability to regenerate the hair cells of the ear following such damage (Caltrans 2007).

Despite these potential impacts, some bird species, including waterfowl, have been shown to habituate to a variety of noises of a more continuous nature (i.e., neither sharp nor abrupt) in their environment. Several studies indicate that waterfowl also have the ability to habituate to frequent and regular disturbance events, albeit at different noise levels (Belanger and Bedard 1989, Conomy 1993, Fleming et al. 1996). However, some waterfowl species may not habituate to noise disturbances (Black et al. 1984, McKechnie and Gladwin 1993).

2.2.2 Noise Impacts to Songbirds at Natural Gas Compressor Facilities

Two studies assessing the impacts of noise from natural gas compressor facilities provide useful information regarding potential impacts to birds in environments with continuous levels of anthropogenic noise.

A study in Alberta, Canada compared pairing success and age distribution of male ovenbirds (*Seiurus aurocapilla*) in areas around noise-generating natural gas compressor stations compared to areas around habitat-disturbed well pad sites (Habib et al. 2007). In this study, the well pad sites were considered to be the quiet/noiseless control sites. A significant reduction in ovenbird pairing success at the louder compressor sites was found, and was attributed to noise interfering with the songs of ovenbird males. Noise levels in the area of the compressor sites studied for this research ranged from 75-90 dBA. The area of the sites studied ranged from about 10 to up to 40 acres.

A study in northwestern New Mexico monitored bird nests for three breeding seasons at study sites among natural gas well sites with and without compressor equipment (control sites were those without compressor equipment), (Francis et al. 2009). Sites were approximately 6 acres in size. Noise levels measured at treatment sites ranged from about 60 to 90 dBC (decibels on the C-weighted scale). This study showed reduced nesting species richness and avian community changes in the areas of the treatment sites, which were subject to louder volumes of noise. However, the study also found that noise can indirectly facilitate reproductive success of some individuals nesting in noisy areas, as a result of predator-prey interactions (the noise interfered with predator activities, reducing the level of predation on the bird species studied).

2.2.3 Noise Impacts to Waterfowl

Many studies have been performed on the effects of aircraft overflights on waterfowl. These studies show impacts to birds at certain noise levels associated with anthropogenic industrial-type noise. Waterfowl responses included alert behavior, mass behavior (grouping) and flight/flushes.

One study of Pacific black brant (*Branta bernicla nigricans*) flocks at Izembek Lagoon in Alaska showed a response to disturbance from aircraft overflights at noise levels of 65 dBA and above (Ward et al. 1988). At noise levels over 80 dBA, a flight response of more than 50 percent of the flocks studied was recorded. One evaluation of migratory waterfowl (ducks, geese, and swans) responses to military aircraft in Northeastern North Carolina flights also showed responses to noises within a range of 70-110 dBA (Plumpton et al. 2006). Another evaluation, of the effects of aircraft noise on the behavior of wintering dabbling ducks in North Carolina showed that the waterfowl were able to behaviorally tolerate aircraft noise across the range of sound levels recorded (80 to 109 decibels) (Conomy 1993). Other studies showed waterfowl responses to sound levels in a range of 63-110 dBA, with flight or escape behaviors occurring at around 85 dBA (FHWA 2004).

3.0 Conclusions

Without undertaking a site-specific study, it is difficult to predict individual bird responses to one type of noise at a specific location. Even with evidence from a site-specific study, it is still difficult to determine an effect level for a particular noise impacting birds because of the presence of confounding influences, such as human presence and visual interference.

In general, the data and evidence discussed above indicate that noise impacts to birds may take place in the 63 to 110 dBA range. Because responses differ from species to species, and because it is not advisable to apply conclusions based on observations at one site and one noise level to a different site with a different noise level, it is difficult to identify a threshold for significant adverse impacts at the WPS site, although in general such a level may occur above a range of 75 to 85 dBA. It should be noted that this range is likely to represent a conservative threshold of impacts.

Review of existing literature indicates that the lowest noise level resulting in a bird response was 63 dBA. As discussed in the Phase 3 Expansion Noise Study Report, the projected noise level at the WPS after full buildout of the Phase 3 Expansion is 51 dBA at a distance of 100 yards from the site. Therefore, the increased noise after Phase 3 buildout is not expected to result in a significant adverse impact to wildlife species outside of the WPS and the near vicinity (within the area around the WPS extending 100 yards from the site berm).

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Appendix D
Wild Goose Draft SEIR Notice of Completion

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Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # 2010062025

references SCH # 2001122093

Project Title: Wild Goose Phase 3 Gas Storage Expansion
Lead Agency: California Public Utilities Commission — Contact Person: Eric Chiang
Mailing Address: 505 Van Ness Avenue, 4th Floor — Phone: (415) 703-1956
City: San Francisco — Zip: 94102-3298 — County: San Francisco

Project Location: County: Butte/Colusa — City/Nearest Community: City of Gridley (Butte)/City of Maxwell (Colusa)
Cross Streets: West Liberty and Pennington Roads (Butte)/Noel Evan Road and Delevan Road (Colusa) — Zip Code: 95948/95955
Longitude/Latitude (degrees, minutes and seconds): 39°20' 53.10" N/ 121° 49' 11.63" W (Remote Facility Site) — Total Acres: RFS:~5; PGE:~15; Delevan:~1
Assessor's Parcel No.: Remote Facility Site: 021-010-047-000 — Section: 2 — Twp.: 17N — Range: 1E — Base:
Within 2 Miles: State Hwy #: SR 99, I-5 — Waterways: Feather River, Sacramento River, Lake Oroville
Airports: None — Railways: None — Schools: Sycamore Middle, McKinley Elementary

Document Type:
CEQA: ☐ NOP ☒ Draft EIR — NEPA: ☐ NOI — Other: ☐ Joint Document
☐ Early Cons ☒ Supplement/Subsequent EIR ☐ EA ☐ Final Document
☐ Neg Dec (Prior SCH No.) ☐ Draft EIS ☐ Other: _____
☐ Mit Neg Dec Other: Draft Supplemental EIR ☐ FONSI

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Local Action Type:
☐ General Plan Update ☐ Specific Plan ☐ Rezone ☐ Annexation
☐ General Plan Amendment ☐ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☐ Planned Unit Development ☐ Use Permit ☐ Coastal Permit
☐ Community Plan ☐ Site Plan ☐ Land Division (Subdivision, etc.) ☒ Other: Lot Line Adjustment

Development Type:
☐ Residential: Units: ____ Acres ____
☐ Office: Sq. ft. ____ Acres ____ Employees ____
☐ Commercial: Sq. ft. ____ Acres ____ Employees ____
☐ Industrial: Sq. ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities Type: ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☒ Power: Type Natural Gas Storage MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:
☒ Aesthetic/Visual ☐ Fiscal ☒ Recreation/Parks ☒ Vegetation
☒ Agricultural Land ☒ Flood Plain/Flooding ☒ Schools/Universities ☒ Water Quality
☒ Air Quality ☒ Forest Land/Fire Hazard ☒ Septic Systems ☒ Water Supply/Groundwater
☒ Archeological/Historical ☒ Geologic/Seismic ☒ Sewer Capacity ☒ Wetland/Riparian
☒ Biological Resources ☒ Minerals ☒ Soil Erosion/Compaction/Grading ☒ Growth Inducement
☐ Coastal Zone ☒ Noise ☒ Solid Waste ☒ Land Use
☒ Drainage/Absorption ☒ Population/Housing Balance ☒ Toxic/Hazardous ☒ Cumulative Effects
☒ Economic/Jobs ☒ Public Services/Facilities ☒ Traffic/Circulation ☐ Other _____

Present Land Use/Zoning/General Plan Designation:
Remote Facility Site: Butte County General Plan: Orchard and Field Crops (OFC); Zoning: Agriculture with a 40-acre minimum parcel size (A-40). *PG&E Electric Distribution Reconductoring*: BCGP: OFC; Zoning: A-40, A-5; City of Gridley General Plan/Zoning: Residential Suburban (R-S, 3 units/acre maximum). *Delevan Site*: Colusa County General Plan: Agriculture (A-G), Zoning: Exclusive Agriculture (E-A)

Project Description: *(please use a separate page if necessary)*
The expansion would include improvements to the Wild Goose Remote Facility Site; improvements to the Wild Goose/PG&E Delevan Interconnect Site; up to four, new hot-tapped natural gas pipeline connections at PG&E's Line 400/401; and PG&E's reconductoring of up to 6 miles of electrical distribution line within an existing right-of-way. See attachment for more detail.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead agencies may recommend State Clearinghouse distribution by marking agencies below with an "X".
If you have already sent your document to the agency please denote that with an "S".

S	Air Resources Board	X	Office of Emergency Services
	Boating & Waterways, Department of	S	Office of Historic Preservation
S	California Highway Patrol		Office of Public School Construction
S	Caltrans District #		Parks & Recreation, Department of
	Caltrans Division of Aeronautics		Pesticide Regulation, Department of
X	Caltrans Planning	S	Public Utilities Commission
	Central Valley Flood Protection Board	S	Regional WQCB (Central Valley Region)
	Coachella Valley Mtns. Conservancy	S	Resources Agency
	Coastal Commission		S.F. Bay Conservation & Development Comm.
	Colorado River Board		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
X	Conservation, Department of		San Joaquin River Conservancy
	Corrections, Department of		Santa Monica Mtns. Conservancy
	Delta Protection Commission	S	State Lands Commission
	Education, Department of		SWRCB: Clean Water Grants
S	Energy Commission	X	SWRCB: Water Quality
S	Fish and Game Region #2 (North Central)		SWRCB: Water Rights
S	Food & Agriculture, Department of		Tahoe Regional Planning Agency
X	Forestry and Fire Protection, Department of	S	Toxic Substances Control, Department of
	General Services, Department of	S	Water Resources, Department of
X	Health Services, Department of		
	Housing & Community Development		Other:
	Integrated Waste Management Board		Other:
S	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date **June 7, 2010** Ending Date **July 21, 2010**

Lead Agency (Complete if applicable):

Consulting Firm:	Ecology & Environment, Inc.	Applicant:	Wild Goose Storage, LLC
Address:	130 Battery Street #400	Address:	400 – 607 8th Ave SW
City/State/Zip:	San Francisco, CA 94111	City/State/Zip:	Calgary, Alberta Canada T2P 0A7
Contact:	Christy Herron	Phone:	Simon.Dupere@niskags.com
Phone:	(415) 981-2811		

Signature of Lead Agency Representative: _____ **Date:** 5/28/10

Authority cited: Section 21803, Public Resources Code. Reference: Section 21161, Public Resources Code.

Notice of Completion & Environmental Document Transmittal
Wild Goose Phase 3 Gas Storage Expansion Supplemental EIR

ATTACHMENT

Description of Phase 3 Expansion
The Phase 3 Expansion would include four main components:

1. **Modifications to the RFS.** The RFS is currently the operation hub of the Wild Goose Facility. Modifications would include installation of four new natural gas compressors in a new building; installation of four 15-foot-high associated gas coolers; and installation of two new 30-foot-high gas contactors (dehydration units). A new 6,000-gallon glycol storage tank may also be installed on the site. Work at the site would require the expansion of the existing site area from 12.2 acres to approximately 16.7 acres, and the resulting fill of approximately 4.5 acres of rice field agricultural wetlands. Work might also include modifications to existing site utilities. The existing RFS is described in more detail in Section 2.3, Existing Facility.
2. **Modifications to the Delevan Site.** The Delevan Site is approximately 25 miles west of the RFS, in Colusa County. This facility is also described in more detail in Section 2.3, Existing Facility. Modifications would include expansions of both Wild Goose and PG&E operations at the Delevan Interconnect Site, including the installation of new meters, piping, valves, and associated equipment, to accommodate the increase in withdrawal and injection volume. This work would not result in an expansion of the existing site area.
3. **Hot Tapped Pipeline Connections.** Up to four new subsurface pipeline connections, totaling approximately 200 feet in length, would be installed using a hot tap process. The pipelines would run from the Wild Goose Connection Pipeline to PG&E Line 401. (The Wild Goose Connection Pipeline currently only connects to PG&E Line 400.) The new hot tapped pipeline connections at PG&E's Line 401 would be installed largely within an existing 100-foot-wide easement held by PG&E. The total area temporarily disturbed during construction would be approximately 0.25 acres, approximately 0.1 acres of which would be outside of the PG&E easement. Further description of the hot tap process are provided below.
4. **PG&E Distribution Line Reconductoring.** To accommodate the increase in use at the Wild Goose Facility as well as to increase reliability, PG&E would upgrade distribution lines in the vicinity of the RFS by reconductoring up to 32,400 feet of electrical line. An additional ground- or pole-mounted 1,500-kilovolt-ampere (kVA) transformer would also be required.

Appendix E
Wild Goose Draft SEIR Public Meeting Summary

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Wild Goose Phase 3 Gas Storage Expansion Draft Supplemental Environmental Impact Report (Draft SEIR) Public Meeting Summary

The California Environmental Quality Act (CEQA) public comment meeting for the Wild Goose Phase 3 Gas Storage Expansion (Phase 3 Expansion) Draft Supplemental Environmental Impact Report (Draft SEIR) commenced at 7:00 PM, Tuesday, June 29, 2010.

Introduction: Conor Doyle, Ecology and Environment, Inc.

Mr. Doyle provided an overview of the purpose of the night's meeting and the methods for providing comments on the Draft SEIR during the 45-day public comment period.

Presentations

Eric Chiang, California Public Utilities Commission (CPUC) Project Manager

Mr. Chiang outlined the function of the CPUC and the role the CPUC is playing in the proposed Phase 3 Expansion.

Christy Herron, Ecology and Environment, Inc. CEQA Project Manager

Ms. Herron provided an overview of the proposed Phase 3 Expansion, and summarized some of the findings for several environmental resource areas as presented in the draft CEQA document.

Oral Comments

Two persons provided oral comments on the Draft SEIR: Gary Kerhoulas, the Manager of the Wild Goose Club, and Roger Swanson, a Wild Goose Club member.

Gary Kerhoulas, Wild Goose Club Manager

Mr. Kerhoulas stated that the Draft SEIR had significantly misjudged the noise impact that would take place at the well pad site as a result of the increased injection and withdrawal capacity from the Phase 3 Expansion. Mr. Kerhoulas stated that a noise assessment for the Phase 3 Expansion was not performed, that a noise assessment must be performed, and that there should be mitigation for any increase in noise at the well pad site.

Roger Swanson, Wild Goose Club Member

Mr. Swanson expressed concern that a noise assessment had not been performed at the well pad site for the Phase 3 Expansion. Mr. Swanson also stated that there was only one mention of the well pad site in the Draft SEIR. Mr. Swanson also stated that increased noise from the well pad site associated with the Phase 3 Expansion had been completely ignored and needed to be studied in the Draft SEIR.

Meeting Conclusion

After Mr. Swanson finished commenting, Mr. Doyle of Ecology and Environment, Inc. invited all other persons in the audience to provide comment. No others requested to speak.

The meeting concluded at 7:45 pm.

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Appendix F
Wild Goose Draft SEIR Distribution List

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LAST NAME	FIRST NAME	ORGANIZATION	ADDRESS				PHONE	CD OR PAPER
Chiang	Eric	CPUC	505 Van Ness Avenue	San Francisco	CA	94102	415-703-1956	5 paper copies
Morgan	Scott	Governor's Ofc Planning and Research/State Clearinghouse	1400 Tenth Street, Rm 121	Sacramento	CA	95814	916-445-0613	15 paper ESs, CDs
Theberge	Gary	Wild Goose Gas Storage	400-607 8th Ave SW	Calgary	AB	T2P 0A7	403-513-8631	1 paper copy
Dupere	Simon	Wild Goose Gas Storage	400-607 8th Ave SW	Calgary	AB	T2P 0A7	403-513-8709	CD
Thistlethwaite	Chuck	Butte Co. Dept. Development Services, Planning Div.	7 County Center Drive	Oroville	CA	95965	530-538-6572	1 paper copy
Marr	Jenny	CA Dept of Fish and Game, North Central Region	1100 Fortress Street, Suite 2	Chico	CA	95973	530-895-4267	1 paper copy
Johanns	Kent	Colusa County Department of Planning and Building	220 12th Street	Colusa	CA	95932-2112	530-458-0480	1 paper copy
Hanni	Jason	U.S. Fish & Wildlife Service	2800 Cottage Way, Rm W2605	Sacramento	CA	95825-1846	916-414-6645	1 paper copy
Circulation	Reference /	Gridley Library	299 Spruce Street	Gridley	CA	95948	530-846-3323	1 paper copy + extra CD
Circulation	Reference /	Maxwell Branch Library	34 Oak Street	Maxwell	CA	95955	530-438-2250	1 paper copy + extra CD
Peters	Karen	Biggs-West Gridley Water District	1713 West Biggs-Gridley Road	Gridley	CA	95948	530-846-3317	CD
Dan	Breedon	Butte Co. Dept. Development Services, Planning Div.	7 County Center Drive	Oroville	CA	95965	530-538-7629	CD
Hill	Rob	Butte County Agriculture Commission	316 Nelson Avenue	Oroville	CA	95965-3318	530-538-7381	CD
Williams	Gail	Butte County Air Quality Management District	2525 Dominic Drive #J	Chico	CA	95928	530-891-2882 x105	CD
Lusk	David	Butte County Air Quality Management District	2525 Dominic Drive #J	Chico	CA	95928	530-891-2882 x113	CD
Clark	Jon	Butte County Association of Governments	2580 Sierra Sunrise Terrace #100	Chico	CA	95928	530-879-2468	CD
Hightower	Scott	Butte County Department of Public Works	7 County Center Drive	Oroville	CA	95965	530-538-7681	CD
Crump	Mike	Butte County Department of Public Works	7 County Center Drive	Oroville	CA	95965	530-538-7681	CD
Gosselin	Paul	Butte County Dept. Water & Resource Conservation	308 Nelson Ave	Oroville	CA	95965	530-538-4343	CD
Cecil	Colleen	Butte County Farm Bureau	2580 Feather River Blvd.	Oroville	CA	95965	530-533-1473	CD
Review	CEQA/Environmental	Butte County Fire Department	176 Nelson Ave.	Oroville	CA	95965	530-538-7111	CD
Review	CEQA/Environmental	Butte County Office of Emergency Services	25 County Center Drive, #200	Oroville	CA	95965	530-538-7373	CD
Morey	Sandy	CA Dept of Fish and Game, Reg. 2	1701 Nimbus Road, Ste A	Rancho Cordova	CA	95670	916-358-2899	CD
Owens	Dana	Cal EMA Inland Region	3650 Schriever Ave.	Rancho Cordova	CA	95670	510-286-0895	CD
CEQA Review		California Department of Fish and Game	1416 Ninth Street	Sacramento	CA	95814	916-653-7664	CD
Pencovic	Terri	California Department of Transportation	1120 N Street, MS-32	Sacramento	CA	95814	916-653-1067	CD
Isam	Tabshouri	California Department of Transportation Dist 3 Advance Planning	703 B Street	Marysville	CA	95901		CD
Review	CEQA/Environmental	California Energy Commission	1516 Ninth Street, MS-29	Sacramento	CA	95814		CD
Review	CEQA/Environmental	California Highway Patrol (240)	2072 Third St.	Oroville	CA	95965	530-538-2700	CD
Snow	Lester	California Natural Resources Agency	1416 Ninth Street, Suite 1311	Sacramento	CA	95814	916-653-5656	CD
Newton	Gail	California State Lands Commission	100 Howe Ave. #100 South	Sacramento	CA	95825-8202	916-574-1900	CD
Jones	Jody	Caltrans District 3	703 B Street	Marysville	CA	95901	530-741-4232	CD
Vaughn	Greg	Central Valley Regional Water Quality Control Board	11020 Sun Center Drive, Ste 200	Rancho Cordova	CA	95670-6114	916-464-4742	CD
Zaitz	Scott	Central Valley Regional Water Quality Control Board	415 Knollcrest Drive, Suite 100	Redding	CA	96002	530-224-4845	CD
Evans	Gary	Colusa Basin Drainage District	P.O. Box 390	Willows	CA	95988	530-517-0260	CD
Krug	Harry	Colusa County Agriculture Commission	100 Sunrise Blvd., Suite F	Colusa	CA	95932-3246	530-458-0580	CD
Kitamura	Don	Colusa County Air Pollution Control District	100 Sunrise Blvd. #A-3	Colusa	CA	95932-3246	530-458-0590	CD
Gomez	TJ	Colusa County Air Pollution Control District	100 Sunrise Blvd. #A3	Colusa	CA	95932-3246	530-458-0595	CD
Hackney	Steve	Colusa County Department of Planning and Building	220 12th Street	Colusa	CA	95932-2112	530-458-0480	CD
Wrysinski	Jon	Colusa County Department of Public Works	1215 Market Street	Colusa	CA	95932	530-458-0466	CD
Tibbits	George	Colusa County Farm Bureau	520 Market Street #2	Colusa	CA	95932-2464	530-458-5130	CD
Review	CEQA/Environmental	Colusa County Office of Emergency Services	929 Bridge Street	Colusa	CA	95932	530-458-0230	CD
Meraz	Mary	Department of Conservation	801 K Street, MS 18-01	Sacramento	CA	95814	916-445-9411	CD
Review	CEQA/Environmental	Department of Toxic Substances Control	8800 Cal Center Drive	Sacramento	CA	95826-3200	916-255-3545	CD
Farris	Paul	Department of Water Resources	1416 9th Street	Sacramento	CA	95814	916-653-5791	CD
Webb	Sadie	Dept. Conservation / Ofc of Gov & Env Relations	801 K Street, MS 24-02	Sacramento	CA	95814	916-445-8734	CD
Ceccarelli	Pam	Division of Oil, Gas and Geothermal Resources	801 K. Street, MS 20-20	Sacramento	CA	95814-3530	916-322-1097 x103	CD
Bopp	Hal	Division of Oil, Gas and Geothermal Resources	801 K. Street, MS 20-20	Sacramento	CA	95814-3530	916-322-1110	CD
Mosebar	Doug	Farm Bureau Federation	2300 River Plaza Drive	Sacramento	CA	95833	916-561-5500	CD
Popper	Andy	Glenn County Resource Planning and Development	777 N. Colusa Street	Willows	CA	95988	530-934-6540	CD
Pennock	Ben	Glenn-Colusa Irrigation District	P.O. Box 150	Willows	CA	95988-3114	530-934-8881	CD
Treadway	Debbie	Native American Heritage Commission	915 Capitol Mall, Room 364	Sacramento	CA	95814	916-653-4082	CD
Stratton	Susan	Office of Historic Preservation	1416 9th Street, Room 1442-7	Sacramento	CA	95814	916-653-6624	CD
Public Affairs:	Natural Gas	Pacific Gas & Electric Company	1 Market, Spear Tower	San Francisco	CA	94105	415-973-7000	CD
Wilson	Michael R.	Pillsbury Winthrop Shaw Pittman LLP	50 Fremont Street	San Francisco	CA	94105-2228	415-983-6180	CD
Nuchols	Charles	Reclamation District 833	PO Box 247	Gridley	CA	95948	530-846-3303	CD
CEQA Review	Water Quality	State Water Resources Control Board	1001 I Street	Sacramento	CA	95814	916 341-5455	CD

LAST NAME	FIRST NAME	ORGANIZATION	ADDRESS				PHONE	CD OR PAPER
Yount	Kevin	Sutter Co. Community Services Dept., Planning Div.	1130 Civic Center Blvd.	Yuba City	CA	95993	530-822-7400	CD
Vierria	Brian	U.S. Army Corps of Engineers, Regulatory	1325 J Street, Room 1480	Sacramento	CA	95814-2922	916-557-7728	CD
Blumenfeld	Jared	U.S. EPA, Region 9	75 Hawthorne Street	San Francisco	CA	94105	415-947-8702	CD
Donohue	Susan S.	UCCE Butte County	2279-B Del Oro Avenue	Oroville	CA	95965	530-538-7201	CD
Review	Environmental	UCCE Central Valley Region	9240 So. Riverbend Ave.	Parlier	CA	93648	559-646-6543	CD
Murray	Mike	UCCE Colusa County	100 Sunrise Blvd., Suite E	Colusa	CA	95932	530-458-0570	CD
Hossein	Monfared	US DOT Office of Pipeline Safety	3401 Centrelake Drive, Suite 550B	Ontario,	CA	91761	909-937-3279	CD
Review	Environmental	US DOT Office of Pipeline Safety	12300 W. Dakota Ave., Suite 110	Lakewood	CO	80228	720-963-3160	CD
Yoshii	Laura	US EPA Region 9	75 Hawthorne St., Mail Code ORA-1	San Francisco	CA	94105	415-947-8702	CD
Azimi-Gaylon	Shakoora	Water Resources Control Board	PO Box 100	Sacramento,	CA	95812-0100	916-341-5508	CD
Waterbury	Eric		PO Box 193	Gridley,	CA	95948	530-846-5411	CD
Vanderford	Birdie C.		PO Box 1048	Gridley	CA	95948	530-846-5730	CD
Thelma	Jensen Mills		PO Box 1048	Gridley	CA	95948	530-846-5730	CD
Azevedo	Allen E. & Mary A.		PO Box 629	Maxwell	CA	95955	530-438-2454	CD
Holthouse	Leo M & Diane M.		25039 Hwy 395 South	Canyon City	OR	97820	541-575-0126	CD
Herger	Wally	U.S. House of Representatives	242 Cannon HOB	Washington	DC	20515	202-225-3076	CD
Herger	Wally	U.S. House of Representatives	2635 Forest Ave, Ste. 100	Chico	CA	95928	530-893-8363	CD
Boxer	Senator	U.S. Senate	112 Hart SOB	Washington	DC	20510	202-224-3553	CD
Boxer	Senator	U.S. Senate	501 I Street, Suite 7-600	Sacramento	CA	95814	202-228-3865	CD
Feinstein	Senator	U.S. Senate	331 Hart SOB	Washington	DC	20510	202-224-3841	CD
Feinstein	Senator	U.S. Senate	One Post Street, Suite 2450	San Francisco	CA	94104	415-393-0707	CD
Nielsen	Assemblyman		1527 Starr Drive, Suite U	Yuba City	CA	95993	530-223-6300	CD
Nielsen	Assemblyman		State Capitol Room #6031	Sacramento	CA	95814	916-319-2002	CD
Logue	Assemblyman		1550 Humboldt Rd. Ste. 4	Chico	CA	95928	530-895-4217	CD
Logue	Assemblyman		State Capitol	Sacramento	CA	95814	916-319-2003	CD
Aanestad	Senator		State Capitol Room # 3063	Sacramento	CA	95814	916-651-4004	CD
Aanestad	Senator		411 Mainstreet, 3rd Floor	Chico	CA	95928	530-895-6088	CD
Lambert	Steve	Butte County Board of Supervisors, District 4	3159 Nelson Avenue	Oroville	CA	95965	530-538-2516	CD
Butte County Clerk-Recorder's Office		Butte County	25 County Center Drive, Suite 105	Oroville	CA	95965-3375	530-538-7691	CD
Dolbow Vann	Kimberly	Colusa County Board of Supervisors, District 1 (Chair)	546 Jay Street Suite 200	Colusa	CA	95932	530-458-0500	CD
Evans	Gary	Colusa County Board of Supervisors, District 4 (Chairman)	546 Jay Street Suite 200	Colusa	CA	95932	530-458-0500	CD
Moran	Kathleen	County Clerk	546 Jay Street Suite 200	Colusa	CA	95932	530-458-0500	CD
Fichter	Jerry Ann	Mayor, City of Gridley	685 Kentucky St	Gridley	CA	95948	530-846-5695	CD
Frith	Roger	Mayor, City of Biggs	465 C Street	Biggs	CA	95917	530-868-5493	CD