# FINAL
# Environmental Impact Report for the Wild Goose Storage, Inc. Expansion Project

**State Clearinghouse No. 2001122093**

JUNE 2002

Prepared for the:
California Public Utilities Commission
Energy Division

By: MHA Environmental Consulting, Inc.

Application #01-06-029

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# Table of Contents

# 1: INTRODUCTION

## 1.1 FEIR Context

This Final Environmental Impact Report (FEIR) addresses the potential environmental effect of the proposed expansion of the Wild Goose Storage Facility, construction of the 25.6-mile Line 400/401 Connection Pipeline, and other approvals necessary to expand the permitted storage and operational capacity of the existing Wild Goose Gas Storage Field located in Butte County, California. The project applicant is Wild Goose Storage, Inc.

The project would provide:

- Gas storage of up to 29 bcf
- Daily injection/withdrawal rates of 450 Mmcfd and 700 Mmcfd respectively
- Expansion of the existing Well Pad Site
- Construction of a second Storage Loop Pipeline, termed a "Loop"
- Expansion of the Remote Facility Site
- Construction of the 25.6 mile Line 400/401 Connection Pipeline and Delevan Interconnect Facility

For a complete description of the project, see the Draft EIR (DEIR, Section 2) that was published in March 2002.

This document has been prepared pursuant to the requirements of the California Environmental Quality Act (CEQA). CEQA Guidelines, Section 15132 states:

> "The Final EIR shall consist of:
>
> a. The draft EIR or a revision of the draft. [herein Section 3]
> b. Comments and recommendations received on the draft EIR either verbatim or in a summary. [Section 3]
> c. A list of persons, organizations, and public agencies commenting on the draft EIR. [Section 1 and 3]
> d. The responses of the Lead Agency to significant environmental points raised in the review and consultation process. [Section 3]

e. Any other information added by the Lead Agency." [Section 1 , 4, Appendices]

These sections are necessary to explain the difference between the DEIR and the FEIR. The combined DEIR and FEIR provide the decision-makers at the CPUC with information prior to decisions regarding a potential approval for the proposed project. The FEIR presents a review of comments and responses to those comments not available in the DEIR. The findings and a statement of overriding considerations (if required) are included in the public record but not in the FEIR.

## 1.2 Comments on the Draft EIR

The Draft EIR was available for review and comment by agencies and the public for 45 days between March 8, 2002 and April 22, 2002. The Draft EIR was submitted to the State Clearinghouse for distribution to State agencies. A public meeting was conducted on April 11, 2002, to receive oral and written comments on the Draft EIR. Letters of comment were received from the agencies, organizations, and the public (see below).

**FEDERAL AGENCIES**

**A1**. U.S. Fish and Wildlife Service

**STATE AGENCIES**

**A2.** California Division of Oil, Gas, and Geothermal Resources

**A3.** Department of Water Resources, State Reclamation Board

**REGIONAL AND LOCAL AGENCIES**

**A4.** Butte County Air Quality Management District

**PUBLIC INDIVIDUALS**

**P1.** California Senator K. Maurice Johannessen

**P2.** Butte Supervisor Curt Josiassen

**P3.** Ann Trowbridge, representing Lodi Gas Storage

**P4.** Jeanne M. Bennett, representing Wild Goose Storage, Inc.

## 1.3 Organization and Contents of the Final EIR

This document contains 3 sections, as described below. The Final EIR consists of two volumes. Volume I of the Final EIR is the Draft EIR, which was previously distributed and is available upon request; Volume II of the Final EIR is this document, which includes changes to the Draft EIR, and responses to comments on the Draft EIR. Volumes I and II constitute the Final EIR that will be the subject of hearings to certify the EIR.

**SECTION 1, INTRODUCTION**

Section 1 presents a brief introduction to the Final EIR, including a brief summary of the project and a list of comment letters received during the public review period.

**SECTION 2, PROJECT OVERVIEW AND SUMMARY OF ENVIRONMENTAL IMPACTS**

Section 2 presents a brief synopsis of the project, project alternatives, environmental impacts, and Conditions of Approval.

**SECTION 3, COMMENTS AND RESPONSES**

Section 3 presents a topic-by-topic summary of the key environmental issues raised during the public review and references the key or "master" responses developed to address these issues. The intent of this section is to aid the reader in quickly finding a response to a topic of interest. Changes made to the DEIR text, tables, and figures as a result of comments and responses are included in this section. The entire DEIR is not reproduced in this volume of the Final EIR.

The last portion of Section 3 contains responses to all the public comments received during the public review period for this period. Each letter received was numbered sequentially according to the list described earlier. Written comments and transcripts of oral comments received at the DEIR meeting conducted in April 2002 are found at the end of Section 3.

**SECTION 4, REVISED MITIGATION AND MONITORING REPORTING PROGRAM**

Section 4 presents the revised MMRP from the Section 6 DEIR. All changes to mitigation measures have been notated in strikeout and underline format in this table.

# 2: PROJECT OVERVIEW AND ENVIRONMENTAL IMPACTS

## 2.1 Project Overview

Wild Goose Storage Inc. (WGSI) proposes to expand and operate the permitted storage and operational capacity of the existing Wild Goose Storage Field located in Butte County, California. The application for an amended Certificate of Public Convenience and Necessity (CPCN) also seeks approval to construct a 25.6-mile pipeline from the WGSI Remote Facility Site (RFS) to the Pacific Gas and Electric Company (PG&E) Line 400/401 transmission pipeline in Colusa County.

Initial development and construction of the WGSI project was completed in April 1999. The CPUC's initial approval of the WGSI project authorized the use of one of the Wild Goose Gas Field's twelve gas storage zones (L4). Zone L4 is authorized for the maximum storage of 14 billion cubic feet (bcf) of natural gas. The Commission's approval also limited the daily injection and withdrawal of gas into and from the Field to 80 million cubic feet per day (Mmcfd) and 200 Mmcfd, respectively.

The proposed project would expand WGSI's permitted storage capacity from 14 to 29 bcf, with daily injection/withdrawal rates of 450 Mmcfd and 700 Mmcfd respectively. Four project components have been proposed to expand storage capacity and increase injection/withdrawal rates:

- Expansion of the existing Well Pad Site
- Construction of a second Storage Loop Pipeline
- Expansion of the Remote Facility Site
- Construction of the Line 400/401 Connection Pipeline and Delevan Interconnect Facility

WGSI proposed expansion of the existing well pad site to provide for the added storage and injection/withdrawal capacity. Expansion of the Well Pad was designed to accommodate the drilling of up to 16 new wells. The new wells would be used for injection/withdrawal and observation, and would be drilled into the Wild Goose reservoir Zones L1, U1, and U2.

WGSI has proposed construction of a second 18-inch diameter bi-directional Loop Pipeline to convey the additional gas volumes between the reservoir and the Remote Facility Site. A fiber optic cable would be installed with this pipeline. The Pipeline and cable would be installed in the same right-of-way as the existing Loop Pipeline.

The added capacity of the Wild Goose reservoir would require expansion of the Remote Facility Site. The site now serves as the operational base for the WGSI facilities and includes the equipment required to receive gas from the PG&E transmission system, to inject and withdraw gas from the reservoir, and to prepare it for reintroduction into the PG&E system. The project would add three additional natural gas-fueled engines with three additional compressors. These new engines would produce a total of up to 14,400 horsepower.

Gas would be conveyed to and from the WGSI facilities from PG&E's Line 400/401 gas transmission pipeline, which runs in a north-south direction along the west side of the upper Sacramento Valley. The proposed Pipeline, which would be up to 36-inches in diameter, would connect the Remote Facility Site to the PG&E Line 400/401 Pipeline at the Delevan Compressor Station. Two fiber optic communication cables, one primary and one back-up, would be installed in the Pipeline trench to allow remote operation of valves and data acquisition by the project applicant.

## 2.2 Summary of Alternatives

The State CEQA Guideline (Section 15126) require that an EIR describe and evaluate alternatives to the project, or to the location of the project. The alternatives should eliminate significant adverse impacts of the project or reduce them to a level of insignificance. Alternatives were developed, evaluated, and selected based on their satisfaction of the following goals:

- Impacts fewer acres of wetlands than the south crossing alternative (at least 1,500 acres less than the south crossing alternative)
- Shortest total pipeline alignment length among alternatives (25.6 miles)
- Shorter river crossing length than South Crossing
- Orchard affected by this alternative would be a prune orchard that is very old and beyond its most productive years
- Impacts fewest number of residences
- Overall minimum adverse environmental effects

The following alternatives are evaluated in Alternatives, Section 5 of the Draft EIR:

**Northern Crossing.** Would be aligned in roadways, within road rights-of-ways (ROW), or just outside the ROW, thereby avoiding sensitive garter snake habitat and minimizing impacts to agricultural land uses by avoiding agricultural fields. This route is coincident

with the proposed route (Central Crossing) and Southern Crossing at several locations until it connects with the Delevan Interconnect Site.

**Southern Crossing.** Is coincident with the proposed alignment from the Remote Facility Site to the point in Colusa County where Gridley Road turns. Here the alignment diverges from the proposed alignment, turning south and continuing along Gridley Road and rice field edges, then west to River Road. The Sacramento River crossing location for the Southern Crossing Alternative begins in a clearing between two orchards along the extension of Gould Road outside the river levee. The river crossing for this alternative is 3,700 feet versus 2,400 feet for the proposed alignment.

## 2.3 Summary of Environmental Impacts

All impacts identified during the course of this environmental analysis are summarized in this section. This summary should be used in conjunction with a thorough reading of the Draft and Final EIR. The summary is intended as an overview. The technical analyses presented in the Draft and Final EIR provides the justification for the conclusions made in the summary. Table 2-1 summarizes the impacts addressed in this EIR, the level of significance for each impact, and the changes made for this FEIR. For the full Mitigation Monitoring and Reporting Program (MMRP) with amendments, see Section 4 of this document.

State law also requires that a public agency adopt a monitoring program to ensure that mitigation measures that have been required or incorporated into a project to avoid or reduce significant impacts have been implemented. The MMRP will be adopted by the CPUC concurrent with approval of the FEIR.

Numbering of mitigation measures in the air quality section was corrected due to duplication in the DEIR. Numbering of mitigation measure in the hazards section was amended due to deletion of a measure in the FEIR.

**Table 2-1:** Summary of Impacts

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Aesthetics** | **Impact 3.1-1:** Potential for a substantial adverse effect on scenic vista. | None required | |
| | **Impact 3.1-2:** Potential to substantially degrade the existing visual character or quality of the site and its surroundings. | None required | |
| | **Impact 3.1-3:** Potential to substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic | None required | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| | highway. | | |
| | **Impact 3.1-4:** Potential to create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area. | None required | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Agriculture** | **Impact 3.2-1:** Direct Conversion of Farmland to Non-Agricultural Use | None | Significant and unavoidable |
| | | **Mitigation Measure 3.2-1.** WGSI shall provide for drainage and irrigation water flow to continue by installing necessary pipes, valves, check dams, berms and dikes in strategic places in cooperation with landowners, farmers and ranchers. | Less than significant |
| | | **Mitigation Measure 3.2-2.** To mitigate restriction of access to Farmlands, WGSI shall, with proper construction practices, provide notice to affected farmers and/or ranchers, and access for the framers to communicate with the applicant's construction team on a 24-hour basis. Phone numbers shall be provided on a "hot-line" basis to remedy any such problems before they create losses. | Less than significant |
| | | **Mitigation Measure 3.2-3.** All restricted pesticide permit requirements as issued by the Butte County and Colusa County Agricultural Commissioner's offices shall be followed. WGSI shall coordinate with the landowner and both counties to assure that all permit requirements are met without unduly affecting or restricting the agricultural operations. These operations depend on timing of crop treatment to successfully bring crops to harvest. Construction workers may be required to work in other locations during pesticide application periods | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| | if the farmer is unable to apply pesticides outside of normal construction hours. The construction manager shall coordinate construction scheduling with the pesticide applicator to ensure compatibility. | |
| | **Mitigation Measure 3.2-4.** Temporary fencing shall be provided in the grazing areas near the Well Pad Site to prevent livestock from straying into the construction areas and to maintain temporary pasture boundaries. | Less than significant |
| | **Mitigation Measure 3.2-5.** Topsoil and subsoil removed during construction activities shall be separated and stockpiled in appropriate locations along the edge of ROW. All soil shall be replaced during backfilling and recontouring at the end of construction with topsoil being replaced last. On-site monitoring shall be conducted to ensure that stockpiling does occur, that topsoil and subsoil are stockpiled separately, that stockpiling is done so that there are no resulting adverse impacts to other farming activities (particularly in orchard areas), and that both subsoil and then topsoil is properly replaced. All construction trench and bore pit spoils shall be placed outside the driplines of all orchard trees and other trees shall be removed within 72 hours of placement. | Less than significant |
| | ~~**Mitigation Measure 3.2-6.** Impacts from the Remote Facility expansion shall be reduced by positioning block valves at the perimeter of cropland areas so that interference with planting, tillage, and harvesting is minimized.~~ | ~~Less than significant~~ |
| **Impact 3.2-2:** Potential conflict with Existing Designated Land Uses | **Mitigation Measure 3.2-~~7~~6.** WGSI shall submit payment of fair market value for crops removed from production by construction or operation of the project. | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| **Impact 3.2-3:** Indirect Conversion of Farmland to Non-Agricultural Use | **Mitigation Measure 3.2-~~8~~7.** Silt fencing and/or straw bale barriers shall be placed as necessary along the edge of ROW where it abuts or bisects agricultural fields to prevent silt-laden runoff and wet soil sloughing from occurring outside the ROW area. The WGSI construction managers(s) shall coordinate closely with farmers and property owners to ensure that construction crews have sufficient advance notice of scheduled pesticide spraying days to allow workers to be relocated to an unaffected part of the project on those days. | Less than significant |
| | **Mitigation Measure 3.2-~~9~~8.** On-site monitoring during these activities and sufficient use of water trucks for spraying dust-generating areas (ROW, access roads, pads, staging areas, etc.) shall be performed to mitigate this potential impact to less than significant levels. Pre-planning for water truck scheduling shall be required during construction activities, and training and monitoring of construction and water truck crews shall also be required. | Less than significant |
| | **Mitigation Measure 3.2-~~10~~9.** If any organic crops are grown along access roads or ROW areas, monitoring shall be performed to assess conditions prior to construction, and WGSI shall control any increase of noxious weed growth for the growing season after construction is completed. | Less than significant |
| | **Mitigation Measure 3.2-~~12~~10.** To mitigate significant adverse effects on cattle grazing, WGSI ~~shall provide two cattle water troughs, one north and another south of the ROW from west of the Glenn-Colusa Canal to the Delevan Compressor Station~~ locate or relocate cattle water troughs where needed in cooperation with the ranchers needs for livestock water if existing water supplies or livestock access is curtailed by construction activities. | Less than significant |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Air Quality** | **Impact 3.3-1:** Potential to Conflict with or Obstruct Implementation of the Applicable Air Quality Plan. | None required | |
| | **Impact 3.3-2:** Potential to Violate Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation | **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. | Less than significant |
| | | **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. | Less than significant |
| | | **Mitigation Measure 3.3-3.** Open haul trucks will be covered with tarps both on and off the work site. | Less than significant |
| | | **Mitigation Measure 3.3-4.** WGSI shall ~~construct an area to wash all heavy equipment vehicle tires before entering paved roadways~~ stabilize the construction access points with 6 inches of gravel to remove mud from construction equipment prior to entering paved roads. | Less than significant |
| | | **Mitigation Measure 3.3-5.** WGSI shall utilize chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days). | Less than significant |
| | | **Mitigation Measure 3.3-~~5~~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. | Less than significant |
| | | **Mitigation Measure 3.3-~~6~~7.** Land clearing, grading, earth moving or excavation activities shall be suspended when winds exceed 20 miles per hour within the project area. | Less than significant |
| | | **Mitigation Measure 3.3-~~7~~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, | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| | mulching, or conversion to biomass fuel). | |
| | **Mitigation Measure 3.3-~~8~~9.** WGSI shall cover all inactive storage piles during construction and operation of the proposed project. | Less than significant |
| | **Mitigation Measure 3.3-~~9~~10.** WGSI shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints at all major construction ~~and operation~~ 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). | Less than significant |
| | **Mitigation Measure 3.3-~~10~~11.** Prior to final occupancy, the applicant shall demonstrate that all ground surfaces have been covered or treated sufficiently to minimize fugitive dust emissions. | Less than significant |
| | **Mitigation Measure 3.3-~~11~~12.** WGSI shall use fleet vehicles that use clean-burning fuels as may be practical. | Less than significant |
| | **Mitigation Measure 3.3-~~12~~13:** WGSI shall use non-toxic ~~binders~~ chemical soil stabilizers on exposed areas after cut and fill operation and hydroseed areas. | Less than significant |
| **Impact 3.3-3:** Potential to 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) | ~~None required.~~<br>**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 | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| | following measures will be met:<br>1. At 20% of the heavy-duty off-road equipment included in the inventory should be powered by EPA/CARB certified off-road engines, as follows:<br>a. 175 hp-750hp 1996 and newer engines<br>b. 100 hp-174hp 1997 and newer engines<br>c. 50hp-99hp 1998 and newer engines<br>Alternatively, equivalent emission reductions may be achieved by engine retrofit technology, exhaust filtration and low-sulfur diesel fuel, emulsified diesel fuels, or other CARB verified or certified technology. The District should be contacted to discuss alternative strategies.<br>2. Construction equipment exhaust emissions shall not exceed BCAQMD Rule 202 Visible Emission limitations.<br>3. The primary contractor shall be responsible to ensure all construction equipment is properly tuned and maintained.<br>4. Utilize existing power sources (e.g. power poles) or clean fuel generator rather than temporary power generators.<br>5. Minimize idling time to 10 minutes.<br>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 | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| | | distance between emission sources; reducing or changing the hours of construction; and scheduling activity during off-peak hours. | |
| | **Impact 3.3-4:** Potential to Expose Sensitive Receptors to Substantial Pollutant Concentrations | None required. | |
| | **Impact 3.3-5:** Potential to Create Objectionable Odors Affecting a Substantial Number of People | None required. | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Biology** | **Impact 3.4-1:** Potential for disturbance or elimination of native vegetation during vegetation management activities | **Mitigation 3.4-1.** WGSI shall develop and implement an Integrated Vegetation Management Plan | Less than significant |
| | **Impact 3.4-2:** Potential for vegetation clearing and soil grading to disturb or eliminate local populations of two special-status plants species - California hibiscus and little mousetail. | **Mitigation 3.4-2 (a).** Preconstruction surveys for California hibiscus and little mousetail will be initiated by WGSI. | Less than significant |
| | | **Mitigation 3.4-2(b).** Populations of California hibiscus and little mousetail shall be avoided and protected by WGSI | Less than significant |
| | | **Mitigation 3.4-2(c).** If avoidance of populations of California hibiscus or little mousetail is not feasible, WSGI shall implement compensatory habitat restoration | Less than significant |
| | **Impact 3.4-3:** Potential for temporary disturbance of riparian habitat. | **Mitigation 3.4-3(a).** Trees within the pipeline ROW shall be avoided during construction. | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| | **Mitigation 3.4-3(b).** Soil compaction and excavation within the ~~root zone (root zone = 15 feet beyond the drip line of the canopy or tree crown)~~ Critical Root Zone (CRZ) shall be minimized and protected by appropriate buffers. | Less than significant |
| | **Mitigation 3.4-3(c).** If tree roots must be severed or exposed; protective treatments to prevent root drying will be implemented. | Less than significant |
| | **Mitigation 3.4-3(d).** Riparian scrub vegetation disturbed at water crossings shall be restored | Less than significant |
| **Impact 3.4-4:** Potential for loss and conversion of wetlands. | **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 | Less than significant |
| **Impact 3.4-5:** Potential to convert freshwater marsh and wet meadow wetlands to other wetland types. | **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 | Less than significant |
| **Impact 3.4-6:** Potential for effects on the habitat of special-status fish species. | **Mitigation 3.4-6(a).** Drilling of channel crossing bores would be scheduled, as directed by the responsible federal and state resources agencies, to avoid, to the extent possible, the spawning periods of special-status fish. | Less than significant |
| | **Mitigation 3.4-6(b).** Best Management Practices would be employed to Avoid or Minimize the Discharge of Drilling Mud or Hazardous Materials | Less than significant |
| **Impact 3.4-7:** Potential for water withdrawals from perennial streams to adversely affect downstream fisheries and aquatic life. | **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 | Less than significant |
| **Impact 3.4-8:** Potential for effects to special-status wildlife species from project construction. | **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. | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| | **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(f).** Preconstruction surveys for Western yellow-billed cuckoo 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. | |
| | **Mitigation 3.4-8(h).** Preconstruction surveys for American bittern shall be conducted and if present, nest sites shall be protected by appropriate buffers during construction. | |
| | **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. | |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| | **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 3.4-8(m).** Protective measures will be implemented to prevent Bank swallow nesting in potentially high impact construction zones | |
| | **Mitigation 3.4-8(n).** Preconstruction surveys for elderberry shrubs shall be initiated by WSGI and, as appropriate, avoidance through project redesign shall be implemented. | |
| **Impact 3.4-9:** Exposed pipeline trenches or bores could pose a barrier to wildlife movement and result in increased wildlife mortality. | None required. | |
| **Impact 3.4-10:** Potential exposure of nesting birds to sudden noise emissions greater than ambient noise levels | **Mitigation 3.4-10(a).** WGSI will schedule blowdowns at the Sacramento River to avoid impacts to sensitive bird species (see WSGI Measure 3.10-4). | Less than significant |
| | **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). | |
| **Impact 3.4-11:** Potential introduction and spread of noxious weeds | **Mitigation 3.4-11(a).** WGSI will implement an equipment-washing program to control the introduction and potential spread of noxious | Less than significant |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| | | weeds.<br><br>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).** WSGI shall implement a weed eradication program if weeds are introduced to construction areas.<br><br>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. | Less than significant |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Cultural Resources** | **Impact 3.5-1:** Potential for Loss of Integrity and/or Alteration of Identified Resources Potentially Eligible for the NRHP and CRHR. | **Mitigation Measure 3.5-1.** The contractor shall observe ~~reclamation district~~ the local district and State Reclamation Board requirement that a minimum distance of ~~15 feet be maintained between the toe of any canal/levee and the construction right-of-way to or 10-foot distance indicated in Section 7.1, Resource Protection of the HPMP (whichever is applicable)~~ 10-foot setback from the landward side of the levee toe or canal for any excavation activity to | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| | insure protection of the resources. | |
| | **Mitigation Measure 3.5-2:** The project proponent shall retain a qualified archaeologist to conduct the appropriate studies as required by the HPMP. Qualifications for the archaeologist would be consistent with those found in the HPMP. | Less than significant |
| **Impact 3.5-2:** Potential for Disturbance to Previously Unidentified Cultural Resources during Project Construction, Operations, and Maintenance. | **Mitigation Measure 3.5-3.** Prior to the initiation of construction or ground disturbing activities, all construction personnel shall be alerted to the possibility of buried cultural remains, including prehistoric and/or historic resources. Personnel shall be instructed that upon discovery of buried cultural materials, work in the immediate area of the find shall be immediately halted and the WGSI project manager shall be notified. Once the find has been identified by a qualified archaeologist, then archaeologist, in conjunction with the WGSI project manager, shall make the necessary plans for treatment of the find(s) and for the evaluation and mitigation of impacts consistent with Section 7.3, Discoveries During Construction of HPMP. If the resource is found to be eligible for the NRHP or CRHP, then WGSI ~~Mitigation~~ Measures 3.5-1 through 3.5-5 would apply. | Less than significant |
| | **Mitigation Measure 3.5-4.** If buried human remains are encountered during construction, work shall be immediately halted, and the appropriate state or county agency and county coroner shall be immediately notified. If the remains are determined to be Native American, then the Native American Heritage Commission (NAHC) would be notified within 24 hours as required by Public Resources Code 5097. The NAHC shall designate a Most Likely Descendants that would provide recommendations for the treatment of the remains within 24 hours. Protection procedures would follow those found in Section 7.4, Discovery of Native American | Less than significant |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| | | Skeletal Remains and Appendix 1, Native American Burial Plan of the HPMP. | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| **Geology** | **Impact 3.6-1.1:** Potential for Effects from Faulting or Uplift. | **Mitigation Measure 3.6-1:** The Applicant shall assess the pipeline response to surface faulting or uplift using a detailed nonlinear pipe-soil interaction analysis model for a case-specific evaluation of the Willows fault crossing. ~~The model shall consider different possible fault offsets (or local uplifts) and slip vectors, different fault crossing geometries, different wall thickness and different steel grades for the selected pipeline diameter. The analysis shall consider both the fault offset required to reach the failure (loss of pressure integrity) limit state and to reach the damage limit states (i.e., incipient wrinkling) as a measure of the fault crossing design performance. A detailed plan for the analysis shall be prepared for review by the CPUC (or its designated consultants) and the analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section within a reasonable distance (to be reviewed and approved by the CPUC or its designated consultants) of the projected location of the Willows fault and the mapped anticlinal feature adjacent to the Sacramento River.~~ The pipeline shall be designed within the area of influence of the Willows Fault to withstand a discrete displacement of 1.1m along dip (reverse, East Side up) with 50 % strike slip component, or 0.55m, at a depth of 1600 feet below the ground surface. The analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan in Appendix S. | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | The pipeline shall be designed to mitigate stresses due to faulting or uplift such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan (Appendix T) the appropriate actions will be initiated. | |
| **Impact 3.6-1.2:** Potential for Effects from Strong Seismic Ground Shaking. | **Mitigation Measure 3.6-2:** The Applicant shall ~~provide the CPUC with a plan to analyze pipeline response to ground shaking and traveling wave effects based on the unique geologic conditions along the pipeline routes (Line 400/401 and the Loop Pipeline) and the conservative levels of groundshaking determined by Kleinfelder. The CPUC shall review and approve a final analysis plan prior to final design.~~ analyze the pipeline response to seismic strong ground shaking and resulting traveling wave effects. Analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan and will be based on the unique geologic conditions along the pipeline route (Line 400/401 Connection and Storage Loop Pipeline) and the conservative levels of ground shaking previously determined by Kleinfelder (Kleinfelder 2001e, pp. 20-23). The pipeline shall be designed to mitigate stresses due to strong ground motion and resulting traveling wave effects such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated. | Less than significant |
| **Impact 3.6-1.3:** Potential to Expose People or Structures to Effects from Liquefaction and Dynamic | **Mitigation Measure 3.6-3.** At the Sacramento River crossing, ~~T~~the Applicant shall ~~drill new borings at~~ | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| Liquefaction and Dynamic Compaction | Applicant shall ~~drill new borings at the final Sacramento River crossing site, using the drilling and sampling techniques recommended by Martin and Lew (1999). These borings shall be performed at the locations with possibly the thickest liquefiable soil deposits, to confirm the SPT blow counts measured (with or without sample rings and considering gravel) and the estimates of liquefaction-induced settlements and lateral deformations. It is possible that the additional field investigation scope may be reduced if a parametric/sensitivity analysis can be performed to investigate the effects of possible lower blow counts and thicker liquefiable soil layers on the liquefaction-induced hazards discussed in Appendix A (Kleinfelder, 2001e). A detailed plan for the drilling, sampling, and analysis shall be prepared for review by the CPUC (or its designated consultants) and the analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section within a reasonable distance (to be reviewed and approved by the CPUC or its designated consultants) of the Sacramento River crossing.~~ perform a sensitivity analysis to investigate the effects of possible lower blow counts and thicker liquefiable soil layers on permanent ground deformation and resulting pipe stresses. Analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan and will incorporate conservative estimates of liquefiable layer depth and blow count factors. The pipeline shall be designed to mitigate stresses due to permanent ground deformation associated with liquefaction and dynamic compaction such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch | |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated. | |
| | **Mitigation Measure 3.6-4**. For the entire pipeline, the ~~The~~ Applicant shall ~~compile~~ obtain data in ~~City, State, or County files, and to obtain new data on shallow water levels and the density of shallow geologic materials so that a broad-area assessment of areas with potential for liquefaction along the pipeline alignment can be made. Results of the analysis shall be used in the design of the pipeline section crossing identified potentially liquefaction-prone areas (to be reviewed and approved by the CPUC or its designated consultants).~~ terms of shallow geologic materials from published California Geological Survey, CGS (formerly California Division of Mines and Geology, CDMG), geologic maps along the pipeline alignment. In addition, the Applicant shall obtain data for the approximate shallow groundwater levels from the State and County files along the pipeline alignment, or assume near surface soils are saturated. The combination of shallow groundwater, shallow Holocene geologic materials, and the conservative levels of ground shaking previously determined by Kleinfelder (Kleinfelder 2001e, pp. 20-23) shall be combined to indicate areas of liquefaction susceptibility. The Applicant shall employ the same techniques as used by CGS in assessing the areas of low, moderate and high liquefaction susceptibility. The pipeline shall be designed to mitigate stresses due to permanent ground deformation associated with liquefaction and dynamic compaction such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|
| | pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated. | |
| **Impact 3.6-1.4:** Potential to Expose People or Structures to Adverse Effects from Liquefaction and Cause Lateral Spread Landslides | **Mitigation Measure 3.6-5:** After performing the liquefaction analysis in Mitigation Measure 3.6-3, ~~The~~ the Applicant shall ~~complete Mitigation Measure 3.6-3 above, including drilling new borings in areas adjacent to the final Sacramento River crossing site, where lateral spreading landslides are most likely to occur based on topography.~~ evaluate lateral spreading due to liquefaction at the Sacramento River crossing. Initially the potentially for lateral spreading and landslides shall be evaluated using semi-empirical calculation methods by Youd and Garris (1995). If lateral spreading is predicted to occur and the pipeline is within the zone of lateral spreading, then the pipeline will be evaluated using a detailed nonlinear pipe-soil interaction analysis model in accordance with the Seismic Hazard Analysis Workplan in Appendix __. The pipeline shall be designed to mitigate stresses due to permanent ground deformation associated with liquefaction and dynamic compaction such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated. | |
| **Impact 3.6-2:** Potential for Soil Erosion or the Loss of Topsoil | None required. | |
| **Impact 3.6-3:** Potential for Impacts due to Unstable Soils or Subsidence | None required. | |
| **Impact 3.6-4:** Potential for Effects Related to Expansive Soils | None required. | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | **Impact 3.6-5:** Potential for Effects to Extraction of Mineral Resources | ~~**Mitigation Measures 3.6-6:** The Applicant shall undertake and complete a modeling study to define possible in-steam mining and floodplain mining scenarios and the potential impacts of the scenarios on the pipeline at the preferred depths. Based on the modeling study the final depth of burial below the river bottom shall be determined. A plan for the modeling study shall be prepared for review by the CPUC. The analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section crossing the Sacramento River (to be reviewed and approved by the CPUC).~~ | ~~Less than significant~~ |
| | **Impact 3.6-6:** Potential to Overcover or Preclude Extraction of Natural Gas or Sand and Gravel Mineral Resources | None required. | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| **Hazards** | **Impact 3.7-1:** Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials | None required. | |
| | **Impact 3.7-2:** Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment | **Mitigation Measure 3.7-1.** WGSI will ~~submit core sample analysis protocols to the CPUC technical team for review and approval prior to conducting tests on new core samples.~~ implement the following protocols for the coring process, preservation, handling and testing:<br><br>~~Test data on new core samples will be submitted to the CPUC technical team for review. If new data indicates that cap rock strength is different (substantially lower) than indicated by previous tests, operating~~ | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | ~~and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR safety guidelines.~~<br><br>**Core Preservation and Transport**<br><br>Cores should be cut into five foot lengths or shorter in PVC core tubes upon extrusion from the core barrel at the wellsite. Avoid bending long, unsupported core lengths during handling.<br><br>The individual core lengths should be capped with plastic end caps and sealed with ample duct tape or equivalent.<br><br>Freezing: Not recommended for argillaceous rocks; optional for poorly cemented, unconsolidated sandstones (injection gel is also an option for weak sandstones).<br><br>Transport the core lengths in their PVC tubes, packed and bound securely into core boxes or special racks such that they cannot move or rotate. Minimize time elapsed from rig floor to testing laboratory.<br><br>**Core Handling and Logging at the Testing Laboratory**<br><br>• Commence core logging, sampling and preservation as soon as possible upon arrival at the testing laboratory.<br><br>• X-ray the cores to assess quality and identify defects.<br><br>• Run a core gamma log.<br><br>• Unwrap ends, split core tube by making two cuts at 180°.<br><br>• Conduct geological analyses (e.g. lithology, fractures, other potentially weak discontinuities) and core photography as quickly as possible; minimize the number of tubes cut open at any given time; select samples to be used for future testing promptly so they can be preserved.<br><br>• If possible, do not slab core samples | |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | to be used for mechanical properties testing and caprock analysis.<br>• Wrap the samples selected for preservation in plastic wrap and several layers of aluminum foil; seal the samples by immersing in hot wax.<br>• Select smaller grab samples from each tube and store in plastic zip-lock bags for possible future testing such as X-ray diffraction.<br>**Core Sampling**<br>• Drill plugs from preserved cores as required for the testing program; optional - use frozen nitrogen for weak sandstone samples.<br>• Apply the minimum axial force possible and use slow rotation speeds when drilling plugs from weak core samples.<br>• Take several core plugs for paleomagnetic analysis to orient selected segments of the core. Core orientation is required to obtain strike data for features such as natural fractures, bedding or other discontinuities identified in the core.<br>**Core Testing**<br>• For tests to be conducted at stressed conditions, calculate a confining stress representative of in-situ conditions. For example, at a depth of 2900 ft (approximate L1 unit caprock depth), the mean effective in-situ stress is estimated to be 1220 psi. This estimate is based on an overburden stress gradient of 0.89 psi/ft, maximum and minimum horizontal stress gradients of 0.89 and 0.80 psi/ft, respectively, and a formation pressure gradient of 0.44 psi/ft.<br>• X-ray Diffraction – to determine clay mineralogy | |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | – Use small grab samples<br>• Triaxial Compression – to determine static elastic and rock strength properties<br>– Conduct a minimum of four compression tests at different confining stresses (from very low values up to the mean effective in-situ stress)<br>– Use full-diameter samples if possible (2:1 length to diameter ratio)<br>– Additional properties can also be measured if required (e.g., stressed sonic velocities, dynamic elastic moduli, residual strength properties).<br>• Caprock Analysis – to determine nitrogen gas threshold pressures<br>– At a confining stress representative of in-situ conditions<br>– Use full-diameter samples if possible<br>– Mercury Injection Capillary Pressure – for displacement pressures and pore size data<br>• Pulse Decay Permeability – to determine gas permeability at in-situ conditions for very low permeability rocks<br>– At a confining stress representative of in-situ conditions<br>– Use preserved core plugs<br>– Test at native saturation state<br>– Routine Core Analyses– to determine porosity, saturations and particle size distributions.<br>WGSI will submit all test results on new core samples for the L1, U1 and U2 intervals to the DOGGR immediately following the tests. If new data indicates that the cap rock quality is different (substantially lower) than indicated by previous tests, operating and injection | |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR safety guidelines. | |
| | ~~**Mitigation Measure 3.7-2.** WGSI will conduct in-situ stress tests of the project relevant cap rock intervals in at least one well when drilled. If in-situ stress tests results are not consistent with core sample test results, re-evaluation of operating pressures may be necessary. If in-situ stress tests indicate that cap rock strength is substantially less than currently believed, operating and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR guidelines.~~ | ~~Less than significant~~ |
| | **Mitigation Measure 3.7-~~3~~2.** The Brady #1-20 shall be inspected and tested ~~immediately~~ during summer 2002 to ascertain its condition. This well shall be located and soil surrounding it excavated to expose the well casing. An attempt should be made to tap (drill a small hole) the plate welded onto the casing, and ~~test for gas~~ if gas is present, a sample will be collected for further analysis. ~~If gas were present, a sample would be extracted and collected for further analysis.~~ Depending on gas origin, if present, appropriate remedial actions (re-abandonment) would be implemented. ~~Routine inspection, monitoring and testing of this well would continue for the duration of the gas storage operation. WGSI shall prepare a report of investigation and remedial actions taken. This report shall be submitted to the CPUC and DOGGR prior to initiating gas storage activities in additional storage zones. Annual inspection of this abandoned well would be included as part of the WGSI inspection program. Annual reports would be submitted to CPUC and DOGGR upon inspection completion. With these immediate (inspection, testing and remediation)~~ | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | ~~and on-going (annual inspection) mitigation measures, potential impacts associated with leaks from the Brady #1-20 would be less than significant.~~ Re-abandonment will be consistent with DOGGR procedures outlined in California Code of Regulations § 1723 et. seq. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measure specified under Impact 3.4-4 on page 3.4-27. Routine surface gas monitoring of this well will continue for the duration of the gas storage operation with immediate notification of the DOGGR in the unlikely event of a leak. WGSI shall prepare a report of investigation and remedial actions taken. This report shall be submitted to the DOGGR prior to initiating gas storage activities in additional storage zones. With the immediate (inspection, testing and remediation) and on-going (routine gas detection) mitigation measures, potential impacts associated with leaks from the Brady #1-20 are less than significant. | |
| | ~~**Mitigation Measure 3.7-4.** Prior to initiating new gas storage operations, WGSI shall conduct a soil-gas survey in the vicinity around each abandoned well within the storage zone boundaries to define current shallow subsurface gas conditions and document that storage gas is not currently leaking. If soil-gas is detected, samples should be collected for laboratory analysis. Samples would be analyzed to determine if any natural gas collected is of biogenic, thermogenic or storage zone origin. All testing and sampling plans would be submitted to CPUC for review and approval by a qualified member of the technical team (Registered Geologist with appropriate background evaluating soil-gas). If wells are found to be leaking, the leaking well would be~~ | ~~Less than significant~~ |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | ~~remediated in consultation with CPUC and DOGGR.~~ | |
| | **Mitigation Measure 3.7-~~5~~3.** At the end of each injection cycle, WGSI shall conduct ~~well~~ surface gas monitoring and vegetation inspections~~, testing and leak surveys for each abandoned well in the field.~~ at each abandoned well within the original productive area. If gas is detected, samples ~~should~~ will be collected, if possible, and analyzed to determine its source or origin. ~~Necessary remedial actions would be implemented to address the leak. All testing and sampling plans would be submitted to CPUC and DOGGR for review and approval by a qualified member of the technical team (Registered Geologist with appropriate background evaluating soil-gas).~~ If a leak is indicated by the data, the necessary remedial actions will be implemented consistent with DOGGR procedures outlined in in California Code of Regulations § 1723 et. seq. All monitoring and sampling results will be submitted to the DOGGR. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measures specified under Impact 3.4-4 on page 3.4-27. | Less than significant |
| | **Mitigation Measure 3.7-~~6~~4.** ~~In addition to regularly scheduled well tests,~~ If routine surface gas monitoring indicates that a well may be leaking (gas bubbles, distressed vegetation), WGSI shall ~~test any well if other indicators or leaks are present (gas bubbles, distressed vegetation) in the immediate well vicinity. WGSI would submit all well test and repair records to DOGGR, CPUC and Butte County. Any well leaks detected would be reported immediately to these agencies. With DOGGR oversight, WGSI would implement appropriate remedial actions to repair detected leaks.~~ report it immediately | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | to the DOGGR and Butte County and implement the appropriate remedial actions consistent with DOGGR procedures outlined in California Code of Regulations §1723 et. seq. in consultation with the DOGGR. WGSI shall submit all well remediation and repair records to DOGGR and Butte County. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measures specified under Impact 3.4-4 on page 3.4-27. | |
| | **Mitigation Measure 3.7-~~7~~5.** WGSI shall locate each abandoned well within the field and immediate vicinity, and place permanent markers over each one, subject to landowner approvals. WGSI will accurately survey and record these locations and submit plans and maps to the DOGGR~~, CPUC, and Butte County~~. All markers will be maintained so ~~they are clearly visible at all times~~ that they can be located during the duration of storage field activities and upon final field decommissioning. Alternatively, WGSI may conduct a Global Positioning Satellite (GPS) survey to obtain GPS coordinates for each well. WGSI would submit any GPS location survey information to DOGGR. | Less than significant |
| **Impact 3.7-3:** Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. | None required. | |
| **Impact 3.7-4:** Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment. | None required. | |
| **Impact 3.7-5:** Potential for the project to result in a safety hazard for people residing or working in the project | None required. | |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| area based on a proposed location near an airport. | | |
| **Impact 3.7-6:** Potential to expose people or structures to a significant risk of fire or explosion. | ~~**Mitigation Measure 3.7-8.** During periodic well testing and leak surveys, evaluate the area overlying the documented faults along the southern field boundary. This will require installation of at least three permanent soil gas probes. Each probe would be monitored during routine leak surveys. If gas were detected in these probes, samples would be collected and analyzed to determine gas origin. All testing and sampling plans, along with probe design and installation procedures, will be submitted to a qualified member of the CPUC.~~<br><br>~~If storage gas is found leaking through the fault or fracture zone along the southern side of Wild Goose Field, storage activities would be reduced to restrict the volume of gas stored in the field until further investigations are conducted. New data from exploratory wells could be required in order to redefine storage reservoir boundaries near the fault or fracture zone area. Based on this new data and revised reservoir boundary conditions, allowable storage volumes would be reduced to prevent storage gas from reaching the fault zone and maintain an appropriate level of safety. All studies and remedial actions would be conducted under the supervision of DOGGR and CPUC technical staff (California Registered Geologist) with the appropriate background to evaluate gas migration through fault or fracture zones.~~ | ~~Less than significant~~ |
| | ~~**Mitigation measure 3.7-9:** The standard "monitored and maintained" seismic design approach would accept significant levels of plastic pipe strain for low probability design events and utilize post-earthquake review and inspection to identify locations where permanent ground displacement-induced (PGD-induced) damage may have occurred.~~ | ~~Less than significant~~ |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | ~~Considering this approach, the Applicant shall prepare (prior to final project approval) a post-earthquake monitoring plan in which an accurate "as-built" base line of the pipeline geometry at/near know seismic hazards will be clearly identified. This plan shall become part of the existing Emergency Plan and will allow rapid response to the most probable damage areas in the event of a severe earthquake.~~ | |
| | ~~**Mitigation Measure 3.7-10:** All of the measures of pipe demand and capacity considered in Appendix A of the Kleinfelder report (2001e) are based on the failure condition (i.e., the loss of pressure integrity limit state). The loss of pressure integrity condition occurs in the post wrinkling condition, i.e., well beyond the peak in the moment curvature diagram. As the wrinkle forms, the moment capacity decreases with increasing curvature. Pipe curvature tends to concentrate in the wrinkle (sometimes referred to as "hinging") while the pipe on either side of the wrinkle tends to straighten and unload elastically. It is not necessary to account for hinging action in demand-capacity assessments that are limited to consideration of the incipient wrinkling limit state. This is because the concentration of curvature is still relatively limited. For all pipe deformation demand-capacity assessments, which make use of post-wrinkling demand-capacity measures, the Applicant shall account for the concentration of curvature at the wrinkle, because demand analyses, which do not include this hinging behavior, can significantly underestimate the pipe strain demand. The CPUC shall review and approve the analysis methodology in advance of its application to the final design.~~ | ~~Less than significant~~ |
| | ~~**Mitigation Measure 3.7-11:** In addition to the seismic demand required to reach the loss of pressure~~ | ~~Less than significant~~ |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | ~~integrity limit state, for all of the PGD analyses the Applicant shall incorporate into their final design different "damage" limit states (e.g., incipient wrinkling) that can occur well before the failure limit state is reached. The CPUC shall review and approve the analysis methodology in advance of its application to the final design.~~ | |
| | ~~**Mitigation Measure 3.7-12:** The PGD demand analyses for PGD parallel to and perpendicular to the pipe alignment discussed in Appendix A of the Kleinfelder report (2001e) are based on simplified hand or spreadsheet calculations methods. The Applicant shall utilize a rigorous analysis and design approach, nonlinear pipe-soil interaction analysis, for evaluating PGD effects for all but the simplest cases~~. | ~~Less than significant~~ |
| | ~~**Mitigation Measure 3.7-13:** Further analysis by the Applicant of generic perpendicular PGD scenarios shall consider a range of soil block lengths (i.e., span lengths) rather than a single span length. The critical span length shall be considered the soil block length that generates the largest strain for given amplitude of a selected PGD profile.~~ | ~~Less than significant~~ |
| | ~~**Mitigation Measure 3.7-14:** The Applicant shall provide a more formal limit states seismic design for the final pipeline design to the CPUC prior to final design. The framework of such a procedure shall include: identification of ultimate and serviceability limit states, application of appropriate load (demand) factors and load combinations, application of appropriate resistance (capacity) factors, structural analysis to calculate pipe deformation demand, and a demand-capacity comparison for each limit state of interest.~~ | ~~Less than significant~~ |
| **Impact 3.7-7:** Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency | **Mitigation Measure 3.7-15:** The Applicant shall update the existing Emergency Response Plan to reflect the new project components and | Less than significant |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
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| | evacuation plan. | operations. The updated plan shall also include specific dates and frequencies with regard to the re-training of existing employees, and the contact with Emergency Services Providers and property owners about the Plan. The update shall indicate the nature and extent of the proper training and indoctrination to ensure effective interaction of all responsible parties in the Plan if an accident were to occur. | |
| **Hydrology** | **Impact 3.8-1.** Potential to Substantially Degrade Surface and Groundwater Water Quality | **Mitigation Measure 3.8-1.** In addition to visual observation of waterways, provide continuous monitoring of drilling fluid pressures while advancing each pipeline bore. If fluid pressure changes indicate possible problems, cease boring operations immediately until conditions are stabilized. | Less than significant |
| | | **Mitigation Measure 3.8-2.** No hazardous or potentially hazardous materials shall be permanently stored on-site at the Well Pad Site as noted in the Water Pollution Prevention Plan and Hazardous Materials Release Response Plan for construction and operations. | Less than significant |
| | | **Mitigation Measure 3.8-3.** Prior to project implementation, water samples would be collected from water well number 17N01E-17F01M, located at the Tule Goose Gun Club. Dissolved gases would be analyzed to ascertain if methane is present. If detected, methane would be further analyzed to determine its origin (biogenic, thermogenic or storage gas) to establish baseline conditions. If storage gas were detected, appropriate investigations would be conducted to find the gas leak source and initiate remedial actions as necessary. Water samples would be collected and analyzed for methane annually, as part of the WGSI field monitoring program. Results would be reported to DOGGR, CPUC, RWQCB and DWR. Remedial actions | Less than significant |

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| | would be implemented as deemed necessary by these State agencies. | |
| | **Mitigation Measure 3.8-4.** With regard to buoyant uplift effects, both beam and cable effects shall be included in buoyant uplift calculations. Also, buoyant span lengths other than 100 feet shall be considered. The critical span length is the length that generates the largest strain for a given amplitude of a selected buoyant uplift profile. | Less than significant |
| | **Mitigation Measure 3.8-5.** WGSI would obtain appropriate permits from the Board prior to implementing the proposed well pad site expansion project. In addition, WGSI would comply with all requirements defined in CCR, Title 23, Waters, Article 8, Section 135. WGSI would also comply with any permit restrictions or requirements by the Board, for both the proposed project and the existing well pad site. | Less than significant |
| **Impact 3.8-2:** Potential to Substantially Deplete Groundwater Supply | **Mitigation Measure 3.8-~~5~~ 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 de-watering methods, if necessary, to protect local groundwater supplies. The hydrogeological investigation shall be conducted by a California Certified Hydrogeolgist 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. | Less than significant |
| **Impact 3.8-3:** Potential for Flooding or to Place Structures within a 100-year Flood Hazard Area | **Mitigation Measure 3.8-~~6~~7.** ~~The berm around the Well Pad Site shall be designed to withstand exposure to flood water anticipated during~~ Since | Less than significant |

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| | | all equipment at the Well Pad Site is designed to withstand periodic inundation, it is not necessary for the berm to tolerate a 100 year and 500 year event. ~~Berm height shall be sufficiently high to exceed water surge. Berm design shall include measures to protect exposed surfaces from erosion and to minimize water seepage through the berm (internal erosion called piping).~~ As the berm is soley for visual screening and habitat it would be designed and constructed in accordance with guidelines and requirements set by the Reclamation Board, and discussed above in Responses A3-2 and A3-3. | |
| | **Impact** | **Mitigation Measure** | **Level of Significance w/ Mitigation** |
| **Land Use** | **Impact 3.9-1:** Physically Divide an Established Community. | None required. | |
| | **Impact 3.9-2:** Conformance with Land Use Plans, Policies, and Regulations | None required. | |
| | **Impact 3.9-3:** Conflict with Habitat Conservation or Natural Community Conservation Plans | None required. | |
| | **Impact** | **Mitigation Measure** | **Level of Significance w/ Mitigation** |
| **Noise** | **Impact 3.10-1:** Potential for exposure to noise levels in excess of standards | None required | Less than significant |
| | **Impact 3.10-2:** Potential for exposure of people to excessive ground borne vibration | None required. | |
| | **Impact 3.10-3:** Potential for permanent increase in ambient noise levels | **Refer to mitigation for Impact 3.10-1.** | Less than significant |
| | **Impact 3.10-4:** Potential for temporary or periodic increase in ambient noise levels | None required. | Less than significant |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| | **Impact 3.10-5:** Exposure of people to excessive noise in areas designated for airport use | None required. | |
| | **Impact 3.10-6:** Potential exposure of people to excessive noise in the vicinity of a private airstrip | None required | Less than significant |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Population and Housing** | **Impact 3.11-1:** Potential for Substantial Population Growth in the Area, Either Directly or Indirectly | None required. | |
| | **Impact 3.11-2:** Potential to Displace Substantial Numbers of Existing Housing, Necessitating the Construction of Replacement Housing Elsewhere | None required. | |
| | **Impact 3.11-3:** Potential to Displace Substantial Numbers of People, Necessitating the Construction of Replacement Housing Elsewhere | None required. | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Public Services and Socioeconomics** | **Impact 3.12-1:** Potential to Increase the Demand for Public Services in Excess of their Existing and/or Projected Capabilities | None required. | |
| | **Impact 3.12-2:** Potential To Cause A Substantial Increase In Acceptable Service Ratios, Response Times, Or Other Performance Objectives For All Emergency Response Providers | **Refer to Mitigation Measure 3.15-1** | Less than significant |
| | **Impact 3.12-3:** Potential To Cause A Quantifiable Reduction in the Value Of Properties Crossed By The Pipeline Or Substantially Impact The Economies Of Those Communities Affected by the | None required. | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| | Proposed Project | | |
| | **Impact 3.12-4:** Potential To Result In A Disruption In The Balance Between Employment Opportunities And Available Housing In An Area | None required. | |

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Transportation** | **Impact 3.14-1:** Potential for Temporary Disruption in Circulation from Project Construction | None required | Less than significant |
| | **Impact 3.14-2:** Temporary Increase in Traffic in the Project Area During Construction | None required. | |
| | **Impact 3.14-3:** Potential for Interference with Emergency Response Routes and Accesses | None required | Less than significant |
| | **Impact 3.14-4:** Potential for Increase in Traffic During Project Operation | **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. | Less than significant |

| Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|

| | Impact | Mitigation Measure | Level of Significance w/ Mitigation |
|---|---|---|---|
| **Utilities** | **Impact 3.15-1:** Potential to Exceed Wastewater Treatment Requirements | None required | |
| | **Impact 3.15-2.** Potential for Construction/Expansion of Water or Wastewater Treatment Facilities | None required. | |
| | **Impact 3.15-3.** Potential for Construction/Expansion of Storm Drainage | None required. | |
| | **Impact 3.15-4.** Sufficient Water Supply | None required. | |
| | **Impact 3.15-5.** Adequate wastewater treatment, septic system, and pumper and hauler service capacity | **Mitigation Measure 3.15-1.** WGSI shall coordinate with local (within Butte and Colusa County) wastewater treatment facilities to ensure adequate treatment capacity would be provided for the project if necessary. This would occur if the water produced from hydrostatic testing does not meet RWQCB General Permit standards for Dewatering and Other Low Threat Discharge to Surface Water. | Less than significant |
| | **Impact 3.15-6.** Adequate Capacity for Solid Waste Disposal | None required. | |
| | **Impact 3.15-7.** Compliance with Solid Waste Regulations and Statutes | None required. | |

# 3: RESPONSE TO COMMENTS

## 3.1 Introduction

A total of eight letters with 90 comments were received from various agencies and members of the public concerning the Draft Environmental Impact Report (Draft EIR) for the proposed Wild Goose Storage, Inc. Expansion Project.

## 3.2 List of Comment Letters Received

The comment letters received on the Draft EIR have been grouped by agency (federal, state, regional, and local), organizations, and members of the public. The letters are given a letter designation (A for agency, O for or organizations, and P for public individuals), as are the comments in each letter. The commenter and the letter numbers are listed below.

**FEDERAL AGENCIES**

**A1.** U.S. Fish and Wildlife Service

**STATE AGENCIES**

**A2**. California Division of Oil, Gas, and Geothermal Resources

**A3.** Department of Water Resources, State Reclamation Board

**REGIONAL AND LOCAL AGENCIES**

**A4.** Butte County Air Quality Management District

**PUBLIC INDIVIDUALS**

- **P1.** California Senator K. Maurice Johannessen
- **P2.** Butte Supervisor Curt Josiassen
- **P3.** Ann Trowbridge, representing Lodi Gas Storage
- **P4.** Jeanne M. Bennett, representing Wild Goose Storage, Inc.

## 3.3 Responses to Comments

This section presents responses to all of the comments received on the Draft EIR during the review period. Each comment letter received is numbered according to the numbering system identified above (Ax and Px). Each comment in each letter received has a number (Px-1). Responses are provided to each written comment. Where a response to a comment has been provided in another response, the reader is referred to the previous response.

The CEQA Guidelines indicate that the Final EIR should receive and consider comments on the Draft EIR. This section provides responses to environmental issues raised regarding the environmental effects of the proposed project. Comments that state opinions about the overall merit of the project or comment on the project description are generally not responded to unless a specific environmental issue is raised within the context of the specific comment made. Comments on the project are referred to the decision-maker (CPUC).

All changes to the Draft EIR are described in the response and referenced by the page number on which the original text appears in the Draft EIR. Added text is <u>underlined</u>; deleted text is ~~stricken.~~

## 3.4 Agencies' Comments

**A1** **JAN A. KNIGHT, CHIEF, ENDANGERED SPECIES DIVISION U.S. FISH AND WILDLIFE SERVICE, SACRAMENTO FISH AND WILDLIFE OFFICE**

**A1-1**

Response Comment noted. The proposed project's Line 400/401 Connection Pipeline alignment (proposed route) would result in the fewest overall environmental impacts when compared against the North and South Crossing alternatives. The North Crossing may result in fewer impacts to potential giant garter snake habitat than the proposed route. This is because the North Crossing would utilize existing roadway rights-of ways. Those rights-of-ways are already disturbed/developed and do not provide the level of biological resource as the agricultural fields utilized for the proposed route. The width of these roads, however, may not be sufficient to accommodate the construction ROW required for pipeline installation. As such, there may be undetermined impacts on adjacent rice fields, and potential garter snake habitat.

**A2** **ROBERT S. HABEL, DISTRICT 6 DISTRICT DEPUTY CALIFORNIA DEPARTMENT OF CONSERVATION, DIVISION OF OIL, GAS, AND GEOTHERMAL RESOURCES**

**A2-1**

Response Although DOGGR has jurisdiction over natural gas storage field operations and activities; they are not the lead agency under CEQA. Under CEQA, the lead agency has authority to impose mitigation measures, beyond meeting existing regulatory requirements; to reduce identified potentially significant impacts.

**A2-2**

Response DOGGR records indicate that a gas leak was observed in one well, the Brady 1-20. In addition, gas bubbles were observed around the WGGUI #1-17. In both cases, no additional testing was conducted to determine the source of this gas. It was assumed that gas was from other sources and not the storage reservoir. Without determining the source of gas observed, the significance level of the potential impact, as defined under CEQA, cannot be determined. Therefore, it must be assumed that a potential hazard or impact may exist until further investigations are concluded. A discussion of these conditions is provided in the DEIR (Appendix K).

**A2-3**

Response Comment noted. The CPUC does not have oversight responsibilities for specific operations related to the gas storage field. As the lead agency under CEQA, the CPUC has responsibility to receive and review documents and studies submitted to DOGGR.

**A2-4**

Response Comment noted and text on page 2-40, under the heading "Well Workover" in the Project Description, Operation and Maintenance Procedures section is corrected as indicated below.

Normal gas well maintenance includes periodic cleaning and reconditioning —termed "workover"—to maintain optimum efficiency. Well-~~drilling~~ maintenance equipment (similar to but much smaller than well-drilling equipment) would occupy the site, and activities would be similar to, but substantially less extensive than, those associated with drilling the injection/withdrawal wells described above. The frequency of workover would depend on the injection and withdrawal flows and integrity of the storage reservoir formation sands, but would likely occur about every two years or more often as needed.

**A2-5**

Response The following text has been added under the State Regulations, DOGGR section of 2.12 Regulatory Requirements of the Project Description:

- Written approval (a permit) from the Division is required prior to commencing drilling, reworking (workover), injection, or any plugging operations.
- Upon completion of any drilling, redrilling, deepening or reworking operations, the operator must submit a written history of the operations to the Division, along with copies of all geophysical tests and surveys performed on the well.

**A2-6**

Response The following text has been added to Table 2.13-1 Permit Requirements in the Project Description:

**Table 2.13-1:** Permit Requirements

| Permits | Agency | Jurisdiction/Purpose |
|---|---|---|
| **Federal** | | |
| Section 404 Individual Permit | U.S. Army Corps of Engineers | Dredge and fill waters of the U.S. and NEPA lead agency |
| Section 401 | U.S. Army Corps of Engineers/Regional Water Quality Control Board | Water quality certification |
| Section 7 Consultation (through Corps permit process) | U.S. Fish and Wildlife Service & National Marine Fisheries Service | Threatened and Endangered Species Biological Opinion and Take Authorization |
| Section 106 Review (through Corps review process) | Advisory Council on Historic Preservation | Protection of Cultural Properties/Historic Properties Management Plan |
| **State** | | |
| Certificate of Public Convenience and Necessity | California Public Utilities Commission | Overall project approval and CEQA lead agency |
| Land Lease | State Lands Commission | Pipeline crossing of the Sacramento River |
| Encroachment Permit | Caltrans | Pipeline crossing State Route 45 and Interstate 5 |
| Gas and Disposal Well Installation, Updated Gas Storage Project Permit, Drilling Permit for Each Well, Abandonment Permit As Needed | Division of Oil, Gas & Geothermal Resources | Natural gas storage wells |
| NPDES General Permits and Section 401 Certification | Regional Water Quality Control Board | Construction storm water, hydrotest water discharge, and water quality certification |
| Stream Crossing Agreements | Department of Fish & Game | Waterways and wildlife habitat areas |

| Permits | Agency | Jurisdiction/Purpose |
|---|---|---|
| Section 2081(b)/2080.1 Permit | Department of Fish & Game | Endangered Species Take Authorization |
| Cultural Resource Consultation (through CPUC CEQA review) | State Historic Preservation Office | Cultural resources protection and management |
| Encroachment Permits | Department of Water Resources, State Reclamation Board | Pipeline crossing under levees along the Sacramento River and Cherokee Canal |
| **Local** | | |
| Land Use Permit | Colusa County Planning | Main line block valve lot(s) and Delevan Interconnect Site |
| Road Encroachment Permits | Butte and Colusa County Public Works | Pipeline crossing of county maintained roads |
| Building Permits | Butte and Colusa County Development Services | Building permits for structures and buildings |
| Authority to Construct/Operate | Butte County Air Quality Management District | Combustion emission reduction and monitoring for compressor engines |
| Encroachment Approval | Reclamation Districts 816, 833, 1004, and 2047 | Pipeline crossing of District canals and ditches |

SOURCE: WGSI 2001

**A2-7**

Response The following text is added after the first paragraph under Storage Field Reservoir and Caprock Conditions on page 3.7-13 in the Hazards and Hazardous Materials section of the DEIR:

Proposed injection and operating pressures are ~~substantially~~ higher than the original field pressure. They are based on technical information collected by the DOGGR for the Sacramento Valley region, and on specific technical data collected by WGSI for the proposed storage field project. A detailed discussion of procedures for determining fracture gradient is presented in "Evaluation and Surveillance of Water Injection Projects" (Guerand, no date). This publication also includes plots of fracture gradient data collected from several gas fields in the Sacramento Valley (Appendix F). Since correlation of fracture pressure gradient data based on depth is evident from these plots, this data is used to establish injection pressure restrictions for gas storage fields in the Sacramento Valley.

Original field pressure for the zones under evaluation ranged from 1,210 to 1,328 pounds per square inch (psi) measured relative to atmospheric pressure, denoted as psia. Initial injection pressures would range from 1,700 (U-1 and U-2 reservoirs) to 1,800 psia (L-1 reservoir) to displace water from the reservoir zones. Planned normal injection pressures would range from 1,350 (U-1 and U-2 reservoirs) to 1,500 psia (L-1 reservoir).

The theoretical fracture pressure gradient for a sedimentary rock is approximately 1.0 psi per foot of depth. DOGGR maintains at least a 20 percent

safety margin (0.8 psi per foot) for most injection projects. Since DOGGR is restricting injection pressures at Wild Goose Field to 0.7 psi per foot, a 30 percent margin of safety is maintained. Technical data on field pressures are provided in Appendix K. Pressure information provided in Table AK-1 has been revised.

**Table AK-1:** Reservoir Pressure Summary —REVISED

| Field Pressure Variable | Units | U1 | U2 | L1 |
|---|---|---|---|---|
| Initial Reservoir Pressure | Psia | 1210 | 1214 | 1328 |
| Volume of Gas Produced | Bcf | 31.62 | 13.23 | 8.64 |
| ~~Normal~~ Initial Injection Pressure - Surface | Psia | 1600 | 1600 | 1700 |
| Normal Injection Pressure – Bottom-hole | Psia | ~~1700~~ | ~~1700~~ | ~~1800~~ |
| | | 1350 | 1350 | 1500 |
| Maximum DOGGR Injection Pressure – Surface (based on 0.7 psi/ft gradient) | Psia | ~~1700~~ | ~~1700~~ | ~~1850~~ |
| | | 1696 | 1696 | 1882 |
| Maximum DOGGR Injection Pressure – Bottom-hole (based on 0.7 psi/ft gradient) | Psia | 1820 | 1820 | 2030 |

SOURCE: WGSI 2001h

**A2-8**

Response Maximum initial injection pressures will be up to 40 percent higher than original reservoir pressures. Even though this is 50 psi below the maximum pressure permitted by DOGGR, this is still substantially higher than original reservoir pressures. The injection pressure limit established by DOGGR is theoretical based on data from other fields. Therefore, as DOGGR indicates, it would be appropriate to evaluate these injection pressures for a new project. Since this project is an expansion of an existing operation, and no known containment problems have occurred, it is considered unlikely that the caprock would leak during anticipated field operating conditions.

**A2-9**

Response Although Mitigation Measure 3.7-1 is beyond the typical project requirements under DOGGR and not required for this project, WGSI proposed to implement this measure. Some procedures and protocols used for the core analysis supporting the original project application were flawed. Data collected during laboratory analyses may not be completely valid. To ensure that valid data is obtained from the new core, WGSI would monitor procedures outlined in the mitigation measure.

**A2-10**

Response Additional text and analysis supporting elimination of this mitigation measure is inserted on page 3.7-13, under the heading "Storage Field Reservoir and Caprock Conditions" as indicated above under Response A2-7.

Based on DOGGR recommendations, Mitigation Measure 3.7-2 has been eliminated. The text has been amended as follows:

> ~~**Mitigation Measure 3.7-2.** WGSI will conduct in-situ stress tests of the project relevant cap rock intervals in at least one well when drilled. If in-situ stress tests results are not consistent with core sample test results, re-evaluation of operating pressures may be necessary. If in-situ stress tests indicate that cap rock strength is substantially less than currently believed, operating and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR guidelines.~~

**A2-11**

Response Comment noted.

**A2-12**

Response While Mitigation Measure 3.7-3 is not required by DOGGR, WGSI plans on exposing the well casing and testing it for leaks. The Brady 1-20 is within projected boundaries of storage gas zones U-1 and L-4. By carrying out this inspection, WGSI would ensure that this abandoned gas well does not represent a potential hazard. DOGGR staff would witness these tests.

During drilling of wells in the Wild Goose Storage Field, non-commercial amounts of natural gas were encountered in moderate depth "shallow" zones (compared to storage zone depth). The presence of natural gas in these shallow zones is not uncommon, and these geologic units may represent commercial resources in other areas. In addition to storage gas and biogenic gas, gas from these shallow zones represents a potential source of gas that could migrate along natural and man-made pathways and be detected at the surface.

A potential gas leak was noted when the Brady 1-20 was inspected in 1977. The source of this gas detection was not investigated. DOGGR believes that the gas was contained in "mud" and used to service this well. The mud had been in-place within the well casing when some production tests were run prior to well abandonment. DOGGR surmises that these prior production tests led to mud being "gas cut" (gas contamination).

DOGGR records indicate that the bottom plug was set at a depth of 2,503 feet in 1966. A surface plug was visible when the steel plate over the casing was removed in 1977 for inspection. If the gas noted on DOGGR records during this inspection was from "gas cut mud", then it could be seeping past the surface plug. No tests were conducted to confirm the source of gas detected.

Although the Brady 1-20 was plugged and abandoned in accordance with current DOGGR standards, this does not automatically preclude a well from developing leaks at a future data. WGSI actions would ensure that any possible future leaks are detected.

DOGGR requirements under Section 3208.1 of the Public Resources Code would provide further safeguards for future property owners constructing structures adjacent to or over abandoned wells.

**A2-13**

Response Additional text and analysis supporting elimination of this mitigation measure is inserted on page 3.7-16, under the heading "Abandoned Wells and Dry Holes." New text begins following the fourth paragraph ending ". . . The Quigley #1-17 (dry hole drilled and abandoned 1952) is within the projected U-1 and U-2 boundaries."

> If storage gas leaked through an abandoned well, it could follow one or more of several different paths. These scenarios include: (1) accumulate in another zone within the field, (2) accumulate in a moderate depth shallow gas–bearing zone, (3) accumulate in a moderately deep aquifer, or (4) reach the surface. Any combination of these scenarios is possible. Based on geologic factors present at Wild Goose Field, if storage gas migrated through a leaking abandoned well, the most likely scenario is storage gas accumulating in another zone.
>
> Since WGSI will conduct annual gas detection surveys, any potential leaking abandoned well would be identified at that time. Therefore, additional surface testing is not required.

The text of the DEIR has been amended with the elimination of Mitigation Measure 3.7-4 as follows:

> ~~**Mitigation Measure 3.7-4.** Prior to initiating new gas storage operations, WGSI shall conduct a soil-gas survey in the vicinity around each abandoned well within the storage zone boundaries to define current shallow subsurface gas conditions and document that storage gas is not currently leaking. If soil-gas is detected, samples should be collected for laboratory analysis. Samples would be analyzed to determine if any natural gas collected is of biogenic, thermogenic or storage zone origin. All testing and sampling plans would be submitted to CPUC for review and approval by a qualified member of the technical team (Registered Geologist with appropriate background evaluating soil-gas). If wells are found to be leaking, the leaking well would be remediated in consultation with CPUC and DOGGR.~~

**A2-14**

Response While Mitigation Measures 3.7-5 and 3.7-6 are not required by DOGGR, WGSI plans on conducting annual leak surveys and inspections. By carrying out these surveys and inspections, WGSI would ensure that abandoned gas wells in the field area do not represent potential hazards.

Wells have leaked through plugs and seals, even when modern practices are applied. Even when modern drilling and completion techniques are used, annular seals can be compromised. Marlow (1989) discusses problems with

annular seals caused by shallow high-pressure gas zones. In urban areas, such as the Los Angeles Basin, leaking abandoned wells are documented in well records. Some wells plugged and abandoned in the 1990s required subsequent re-abandonment after leaks were detected.

Even though DOGGR is correct in stating "…wells are used regularly in steam-injection or gas-storage projects without any evidence of casing or annulus-seal failure", such failures do occur and are noted in well records. Even if the probability of occurrence is considered very low and abandoned wells in the area "should not pose a threat," disclosure and analysis of the potential impact is required in the DEIR.

**A2-15**

Response During abandonment, well casings are generally cut off about 5 feet below the surface and buried. Since no surface equipment or markers are left in-place, it is difficult to find these locations when conducting routine surface screening and leak detection inspections. WGSI would typically use a surveyor and detailed survey coordinates from DOGGR during routine surface inspection and monitoring.

Although not required by DOGGR, WGSI would undertake a program to define locations of abandoned wells, thereby enhancing WGSI's ability to locate wells quickly during routine field inspections. WGSI may either install permanent surface markers, where they would not interfere with established land use, or establish GPS coordinates for each well routinely monitored. Mitigation Measure 3.7-7, as revised, is described below in Response P4-55.

**A2-16**

Response Mitigation Measure 3.7-8 has been deleted since DOGGR has evaluated all technical data pertaining to this geologic feature, and will monitor WGSI operation activities to ensure that gas does not escape from storage reservoirs along this possible fault or fracture zone. The DEIR text has been amended as follows:

Additional text and analysis supporting elimination of this mitigation measure is inserted on page 3.7-20, under the heading "Natural Gas Storage Fields" as indicated below.

> If storage gas reached the fault zone along the southern field boundary and migrated upward, a potentially significant adverse impact ~~w~~could exist if the leaking gas were in proximity to buildings or residences. Depending on the exact subsurface fault location and orientation, sensitive receptors may be located in the vicinity of this fault zone's projected trend. WGSI plans on operating the field so that storage gas does not reach the area where this fault or potentially fractured area may possibly intersect reservoir rocks. By preventing storage gas from reaching this fault location, a factor of safety is maintained and potential adverse impact would be prevented.
>
> The reservoir model used to predict gas migration ~~are~~ is based on limited data and may not accurately represent actual condition. In addition, the exact fault

location has not been determined. As such, it is impossible to guarantee that storage gas could not reach the fault zone. If storage gas reached this fault or fracture zone and migrated upward, sensitive receptors located along the projected fault trend could be exposed to leaking storage gas.

The projected fault location is not encompassed by anticipated boundaries (projected lateral extent) of any proposed gas storage zones. DOGGR is responsible for evaluating data on storage field containment, including potential natural migration pathways (fault or fracture zones). DOGGR has evaluated all technical data pertaining to this geologic feature, and will monitor WGSI operational activities to ensure that gas does not escape from storage reservoirs along this possible fault or fracture zone.

Faults were discussed in Section 3.6, Geology Soils and Mineral Resources and Appendix I of the Draft EIR. If storage gas reaches the faulted (possibly fractured) area on the southern side of the Wild Goose gas storage field, the potential for vertical gas migration increases. Vertical migration of storage gas ~~in the vicinity of sensitive receptors would represent a potentially significant impact if leaking gas reached the surface and accumulated inside area buildings~~ along this fault or fracture system is not anticipated.

~~**Level of Significance Without Mitigation.** Without further testing and defined remediation implemented as mitigation, a potentially significant adverse impact could occur.~~

> ~~**Mitigation Measure 3.7-8.** During periodic well testing and leak surveys, evaluate the area overlying the documented faults along the southern field boundary. This will require installation of at least three permanent soil gas probes. Each probe would be monitored during routine leak surveys. If gas were detected in these probes, samples would be collected and analyzed to determine gas origin. All testing and sampling plans, along with probe design and installation procedures, will be submitted to a qualified member of the CPUC.~~

## A3 JO TURNER, SENIOR ENVIRONMENTAL SCIENTIST DEPARTMENT OF WATER RESOURCES, RECLAMATION BOARD

### A3-1

Response

Jo Turner recommended identifying that portions of the project are located within the Butte Basin Floodplain (Area E). These areas are also subject to Reclamation Board regulations and may require additional Reclamation Board permits. Table 2.13-1 Permit Requirements in the Project Description has been modified to include this information as follows under the heading of Jurisdiction/Purpose:

**Table 2.13-1:** Permit Requirements

| Permits | Agency | Jurisdiction/Purpose |
|---|---|---|
| **Federal** | | |
| Section 404 Individual Permit | U.S. Army Corps of Engineers | Dredge and fill waters of the U.S. and NEPA lead agency |

| Permits | Agency | Jurisdiction/Purpose |
|---|---|---|
| Section 401 | U.S. Army Corps of Engineers/Regional Water Quality Control Board | Water quality certification |
| Section 7 Consultation (through Corps permit process) | U.S. Fish and Wildlife Service & National Marine Fisheries Service | Threatened and Endangered Species Biological Opinion and Take Authorization |
| Section 106 Review (through Corps review process) | Advisory Council on Historic Preservation | Protection of Cultural Properties/Historic Properties Management Plan |
| **State** | | |
| Certificate of Public Convenience and Necessity | California Public Utilities Commission | Overall project approval and CEQA lead agency |
| Land Lease | State Lands Commission | Pipeline crossing of the Sacramento River |
| Encroachment Permit | Caltrans | Pipeline crossing State Route 45 and Interstate 5 |
| Gas and Disposal Well Installation | Division of Oil, Gas & Geothermal Resources | Natural gas storage wells |
| NPDES General Permits and Section 401 Certification | Regional Water Quality Control Board | Construction storm water, hydrotest water discharge, and water quality certification |
| Stream Crossing Agreements | Department of Fish & Game | Waterways and wildlife habitat areas |
| Section 2081(b)/2080.1 Permit | Department of Fish & Game | Endangered Species Take Authorization |
| Cultural Resource Consultation (through CPUC CEQA review) | State Historic Preservation Office | Cultural resources protection and management |
| Encroachment Permits | Department of Water Resources, State Reclamation Board | Pipeline crossing under levees along the Sacramento River and Cherokee Canal, and within the Butte Basin Floodplain (Area E) |
| **Local** | | |
| Land Use Permit | Colusa County Planning | Main line block valve lot(s) and Delevan Interconnect Site |
| Road Encroachment Permits | Butte and Colusa County Public Works | Pipeline crossing of county maintained roads |
| Building Permits | Butte and Colusa County Development Services | Building permits for structures and buildings |

| Permits | Agency | Jurisdiction/Purpose |
|---|---|---|
| Authority to Construct/Operate | Butte County Air Quality Management District | Combustion emission reduction and monitoring for compressor engines |
| Encroachment Approval | Reclamation Districts 816, 833, 1004, and 2047 | Pipeline crossing of District canals and ditches |

SOURCE: WGSI 2001

**A3-2**

Response

Jo Turner noted that the California Code of Regulations, Supplemental Standards for the Butte Basin contains specific standards for vegetation and vegetation maintenance for areas within an adopted plan of flood control. The following text has been amended to include this information in the Regulatory Setting section for Section 3.1, Aesthetics under State/Regional Setting:

> **Department of Water Resources, Reclamation Board**
>
> In 1911, the Reclamation Board (Board) was established, as an independent administrative agency, to provide planning for flood control in the Central Valley of California. From 1929 to 1956, the Board was a division within the Department of Finance. In 1956, the Board was placed under the Department of Water Resources to facilitate cooperation in matters of mutual concern.
>
> Specific restrictions and requirements for vegetation are presented in California Code of Regulations (CCR), Title 23, Water, Article 8, Section 131. These regulations define the types of vegetation allowed within an adopted plan of flood control and their maintenance requirements, as well as planting orientation and spacing.

Additional text is included in the Aesthetics under Impact 3.1-1 under the discussion for Well Pad Site as follows:

> During operations, the expanded Well Pad Site would be screened by surrounding vegetation and would not be visible to many viewers. CCR Article 8, Section 131, contains specific standards for vegetation and vegetation maintenance for areas within an adopted plan of flood control. WGSI will comply with all Board regulations pertaining to landscaping around the Well Pad Site and will obtain applicable approvals prior to implementing the proposed project.

Additional text is also included in Section 3.1, Aesthetics under Impact 3.1-1 under the discussion for the Remote Facility Site as follows:

> **WGSI Measure 3.1-1.** Visual screening would accompany the proposed expansion of the Remote Facility Site. Annual surveys of the landscaping would be performed for five years in the fall of each year. During these surveys, an evaluation of the survivorship of each species and the effectiveness of the visual screening would be completed. Success of the screening would be based on how much of the physical site could be seen from West Liberty Road.
>
> CCR Article 8, Section 131, contains specific standards for vegetation and vegetation maintenance for areas within an adopted plan of flood control. WGSI will comply with all Board regulations pertaining to landscaping around the

Remote Facility Site and obtain applicable approvals prior to implementing the proposed project.

**A3-3**

Response Jo Turner recommended addition of the Reclamation Board to the Regulatory Setting of Section 3.8, Hydrology. The following text has been added under the State/Regional Setting as follows:

**California Safe Drinking Water and Toxics Enforcement Act (Prop. 65)**

Through the RWQCB administration, actions are prohibited that contaminate drinking water with chemicals known to cause cancer or possessing reproduction toxicity.

**Department of Water Resources, Reclamation Board**

The Reclamation Board grants permits for various projects within its jurisdiction. Portions of the project are within the Butte County Basin Floodplain. Specific regulations are presented in California Code of Regulations, Title 23, Waters, Article 8, Section 135, Supplemental Standards for Butte County. Under these regulations, approval from the Board is required for any encroachment that could reduce or impede flood flows, or would reclaim any of the floodplain within Butte Basin. Various project components are located in Area E, and therefore, are under the jurisdiction of the Reclamation Board and required Board permits.

**A3-4**

Response Jo Turner stated that the existing well pad site is unpermitted and the proposed well pad site expansion as shown in figure 2.4-2 does not conform to CCR, Title 23, Waters, Article 8, Section 135. The unpermitted well pad is not part of this project, so will be addressed separately. Impact 3.8-1 is amended under the Well Pad Site section after the last paragraph with the following text:

The well pad site is located within the Butte Basin floodplain defined as Area E. Therefore, a Reclamation Board permit is required prior to construction or expansion of the well pad or any facility located within the floodplain.

**Mitigation Measure 3.8-5.** WGSI would obtain appropriate permits from the Reclamation Board prior to implementing the proposed well pad site expansion project. In addition, WGSI would comply with all requirements defined in CCR, Title 23, Waters, Article 8, Section 135. WGSI would also comply with any permit restrictions or requirements by the Board, for the proposed project and the existing well pad site.

The current mitigation measures 3.8-5 and 3.8-6 are amended to be re-numbered as mitigation measures 3.8-6 and 3.8-7.

## A4 GAIL WILLIAMS, AIR QUALITY PLANNER BUTTE COUNTY AIR QUALITY MANAGEMENT DISTRICT

### A4-1

Response The District commented that the proposed project would generate emissions above the significance thresholds established by the District. As a means of reducing the proposed project's construction impacts the District recommended the addition of a mitigation measure (added as Mitigation Measure 3.3-14) to further reduce construction related emissions. This measure relates to Impact 3.3-3 and is accompanied by amended text as follows:

> Cumulative impacts could result during operation of some new facilities simultaneously with construction of the second phase of proposed improvements. ~~The margin of safety between maximum annual operational emissions and the adopted significance threshold is more than adequate to simultaneously accommodate both operational and construction emissions without exceeding the relevant thresholds. Compliance with AQMD rules on operational emissions and substantial source-receptor distances to pollution-sensitive uses is further presumed to maintain a less than significant air quality impact.~~ As the project is in a non-attainment area, Butte County Air Quality Management District maintains that any increase in pollutants is a significant impact (Williams 2002). Staff at BCQAMD suggested the measure below to mitigate this impact to a less than significant level.
>
> **Level of Significance Without Mitigation.** The cumulative net increase of any criteria pollutants would be ~~less than~~ significant.
>
> **Mitigation Measures.** ~~No mitigation is required.~~ The following measure would be followed to mitigate cumulative air impacts to be less than significant.
>
> **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 least 20 % of the heavy-duty off-road equipment included in the inventory should be powered by EPA/CARB certified off-road engines, as follows:
>
>    a. 175 hp – 750 hp 1996 and newer engines
>    b. 100 hp – 174 hp 1997 and newer engines
>    c. 50 hp – 99 hp 1998 and newer engines
>
>    Alternatively, equivalent emission reductions may be achieved by engine retrofit technology, exhaust filtration and low-sulfur 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.
6. 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.

**P1 SENATOR K. MAURICE JOHANNESSEN, 4TH DISTRICT ASSISTANT REPUBLICAN LEADER**

**P1-1**

Response Senator Johannessen's letter addressed only the merits of the project. No response is necessary.

**P2 SUPERVISOR CURT JOSIASSEN, 4TH DISTRICT BOARD OF SUPERVISORS, BUTTE COUNTY**

**P2-1**

Response Supervisor Josiassen recommended modifying Mitigation Measure 3.2-3 to ensure that WGSI works directly with the farmers and duck clubs to address potential impacts associated with pesticide use by farmers without impairing agricultural activities. The proposed modification is reasonable and would allow for direct communications between potentially affected parties. Mitigation Measure 3.2-3 is amended to read as follows:

> **Mitigation Measure 3.2-3.** All restricted pesticide permit requirements as issued by the Butte County and Colusa County Agricultural Commissioner's offices shall be followed. WGSI shall coordinate with the landowner and both counties to assure that all permit requirements are met without unduly affecting or restricting the agricultural operations. These operations depend on timing of crop treatment to successfully bring crops to harvest. Construction workers may be required to work in other locations during pesticide application periods if the farmer is unable to apply pesticides outside of normal construction hours. The WGSI construction manager(s) shall coordinate closely with farmers and property owners to ensure that construction crews have sufficient advance notice of scheduled pesticide spraying days to allow workers to be relocated to an unaffected part of the project on those days.

**P2-2**

Response Supervisor Josiassen commented that as drafted Mitigation Measure 3.2-8 could be interpreted as requiring WGSI to install hay bales or silt fencing along the entire length of the proposed Line 400/401 Connection Pipeline to mitigate the effects of silt-laden runoff into agricultural fields. The Supervisor recommended modifying or clarifying the measure to ensure that it applies only where needed along the proposed alignment. The proposed recommendation is reasonable and reflects the original intent of the measure. Mitigation Measure 3.2-8 is amended to read as follows:

**Mitigation Measure 3.2-8.** Silt fencing and/or straw bale barriers shall be placed along the edge of ROW where it abuts or bisects agricultural fields to prevent silt-laden runoff and wet soil sloughing from occurring outside the ROW area.

## P3 ANN TROWBRIDGE, DOWNEY, BRAND, SEYMOUR & ROHWER, LLP REPRESENTING LODI GAS STORAGE

**P3-1**

Response WGSI has indicated that it is their intent not to pursue additional expansions of the existing operating WGSI Gas Field facilities beyond the current proposed project. In its PEA and DOGGR application, WGSI has identified that up to 38 Bcf could be developed as working gas volume in the Wild Goose reservoir complex. Since that time, WGSI has conducted, and presented to the Commission, additional geologic research that indicates considerable uncertainty with the economically developable working gas capacity of the U-2 zone. The main factor limiting the economically developable volume in the U-2 zone to 3 Bcf is the lateral extent of the U-2 caprock. Because the caprock does not appear to completely cover the U-2 zone, successful storage of additional gas there would present significant engineering challenges and would likely prove to be uneconomic. While the possibility of additional storage capacity and the potential for additional expansion exists, the extent of such an expansion possibility and the potential environmental effects that might yield from additional expansion is well beyond the realm of reasonable analysis at this time. Any analysis of additional expansion projects or phases would be highly speculative without additional design and engineering analysis by WGSI. The Draft EIR will not be revised to address speculative expansion of the existing WGSI Gas Field facilities or of the proposed project.

P3-2

Response Comment noted. The text of WGSI Measure 3.2-5 is amended to be consistent with the DEIR text as follows:

**WGSI Measure 3.2-5.** The installation of Line 400/401 Connection Pipeline with ~~up to~~ a minimum of five feet of cover in agricultural areas will allow virtually all plowing and ripping practices currently utilized by farmers in the area.

**P3-3**

Response Although Lodi Gas Storage was approved with a combined road and right-of-way alignment, the WGSI project is located in a different geographical area with different environmental concerns. See response A1-1.

## P4 JEANNE BENNETT, REPRESENTING WILD GOOSE STORAGE, INC.

**P4-1**

Response Comment noted. Text has been modified under the heading of Storage Loop Pipeline as follows:

WGSI has proposed construction of a second up-to 24-inch diameter bi-directional Storage Loop Pipeline, along with a fiber optic cable to convey the additional gas volumes between the reservoir and the Remote Facility.

**P4-2**

Response The Project Description has been revised to incorporate previous edits from February 15, 2002. See attached revised section. The revisions do not materially affect the proposed project nor warrant revised or new analyses or mitigation measures.

**P4-3**

Response Comment noted. The conclusion in Impact 3.1-1 addresses the impact to the overall scenic vista, whereas Impact 3.1-2 addresses the potential to degrade the existing visual character or quality of the site and its surroundings. Mitigation measure 3.1-1 addresses the latter impact, so does not conflict with the intent of WGSI Measure 3.1-1.

**P4-4**

Response Comment noted. WGSI Mitigation Measure 3.1-10 through 3.1-12 only discusses valves lots, not landscaping as in 3.1-2.

**P4-5**

Response Comment noted. The findings and conclusions stated on page 3.1-15 relate to Impact 3.1-1, whereas Mitigation Measure 3.14-3 addresses Impact 3.1-2, so the measure does not conflict with the former conclusion.

**P4-6**

Response The text under Impact 3.2-1 has been corrected as follows:

The temporary removal of about ~~221~~ 251 acres from agricultural production would occur during construction of the proposed project (see Table 3.2-1).

Text in Table 3.2-1 has been modified to delete Relocation of Line 167 from the Table's list of project components, as there will not be an eastward expansion.

**Table 3.2-1:** Project Land Requirements (acres[1])

| Land Use | Rice | | Row Crop | | Pasture/ Fallow | | Wetland/ River | | Other |
|---|---|---|---|---|---|---|---|---|---|
| Project Component | Temp | Perm | Temp | Perm | Temp | Perm | Temp | Perm | Temp |
| Well Pad Site | | | | | | | 1.4 | 1.3 | |

| Land Use | Rice | | Row Crop | | Pasture/ Fallow | | Wetland/ River | | Other[2] |
|---|---|---|---|---|---|---|---|---|---|
| **Project Component** | **Temp** | **Perm** | **Temp** | **Perm** | **Temp** | **Perm** | **Temp** | **Perm** | **Temp** |
| Storage Loop Pipeline[4] | 17.2 | | 0.7 | | 2.9 | | 8.4 | | |
| Remote Facility Site | | 5.8 | | | | | | | 5.5 |
| ~~L167 Relocation~~[3] | ~~0.8~~ | ~~0.5~~ | | | | | | | |
| Line 400/401 Connection Pipeline | 155.6 | 66.7 | 37.6 | 16.1 | 5.6 | 2.4 | 10.1 | 4.3 | 5.0 |
| Delevan Interconnect Facility | | | | | 0.5 | 0.5 | | | |
| Total | ~~173.6~~172.8 | ~~73.0~~72.5 | 38.3 | 16.1 | 9.0 | 2.9 | 19.~~8~~9 | 5.~~7~~6 | 10.5 |
| **Total Temporary Use** | ~~251.1~~ 250.5acres | | | | | | | | |
| **Total Permanent Use** | ~~113.6~~ 97.1acres | | | | | | | | |

Notes:
1. All acreage values are estimated and are approximate
2. "Other" is previously disturbed areas as described in 2.0 Project Description
~~3. Assumes construction staging for L167 will be provided in the Remote Facility staging area(s)~~
4. Assumes construction staging for the Storage Pipeline Loop will use the same area as the Line 400/401 Connection Pipeline

SOURCE: WGSI 2001

**P4-7**

Response The reference to the Relocation of Line 167 as a project component under the Remote Facility Site Impact Discussion has been deleted, as it is no longer part of the project. The text has been amended to read as follows:

> *Construction.* A primary staging area would be created on the agricultural landing area just west of the Remote Facility Site. This 5.5-acre area would be used for worker parking and equipment and material storage. ~~To accommodate the relocation of PG&E's L167 around the site perimeter, approximately 0.5 acres of new 30-foot wide easement would be required and just under 1 acre would be required for the temporary construction working strip.~~

**P4-8**

Response In the 1997 California Department of Conservation Agricultural Land Evaluation and Site Assessment Model Instruction Manual, it is quoted that "The only specific mention of agricultural issues is contained in Appendix G of the State CEQA Guidelines, which states that a project will normally have a significant effect on the environment if it will convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land". Clearly, the project will convert prime agricultural land to non-agricultural use, therefore the impact is considered significant and unavoidable. No specific mention is made of the context of a conversion in regard to overall project acreage. In any event, cumulative impacts are significant regarding prime agricultural land conversion.

**P4-9**

Response Comment noted. DEIR included the Well Pad Site as Williamson Act Land.

**P4-10**

Response Comment noted. Restricted pesticide requirements shall be followed by all applicators. Mitigation measure 3.2-3 is amended to read as follows:

> **Mitigation Measure 3.2-3.** All restricted pesticide permit requirements as issued by the Butte County and Colusa County Agricultural Commissioner's offices shall be followed. WGSI shall coordinate with the landowner and both counties to assure that all permit requirements are met without unduly affecting or restricting the agricultural operations. These operations depend on timing of crop treatment to successfully bring crops to harvest. Construction workers may be required to work in other locations during pesticide application periods if the farmer is unable to apply pesticides outside of normal construction hours. The construction manager shall coordinate construction scheduling with the pesticide applicator to ensure compatibility.

**P4-11**

Response Comment noted. Mitigation measure 3.2-5 is amended to read as follows as it clarifies the duration requirements of the measure:

> **Mitigation Measure 3.2-5.** Topsoil and subsoil removed during construction activities shall be separated and stockpiled in appropriate locations along the edge of ROW. All soil shall be replaced during backfilling and recontouring at the end of construction with topsoil being replaced last. On-site monitoring shall be conducted to ensure that stockpiling does occur, that topsoil and subsoil are stockpiled separately, that stockpiling is done so that there are no resulting adverse impacts to other farming activities (particularly in orchard areas), and that both subsoil and then topsoil is properly replaced. All construction trench and bore spoils temporarily placed within the driplines of all orchard trees and other trees shall be removed within 72 hours of placement.

**P4-12**

Response Comment noted. Mitigation measure 3.2-6 has been deleted.

~~**Mitigation Measure 3.2-6.** Impacts from the Remote Facility expansion shall be reduced by positioning block valves at the perimeter of cropland areas so tat interference with planting, tillage, and harvesting is minimized.~~

Mitigation measure 3.7 is re-numbered as 3.6 and mitigation measure 3.2-9, 3.2-10, and 3.2-11 are re-numbered as 3.2-8, 3.2-9, and 3.2-10.

**P4-13**

Response Comment noted. Mitigation measure 3.2-8 is amended and re-numbered to clarify the measure to read as follows:

**Mitigation Measure 3.2-~~8~~7.** Silt fencing and/or straw bale barriers shall be placed as necessary along the edge of ROW to prevent silt-laden runoff and wet soil sloughing from occurring outside the ROW area.

**P4-14**

Response Comment noted. Mitigation measure 3.2-12 is amended to read as follows as cattle may not be grazing in the area during construction:

**Mitigation Measure 3.2-12.** To mitigate significant adverse effects on cattle grazing west of the Glenn-Colusa Canal, WGSI shall locate or relocate cattle water troughs where needed in cooperation with the ranchers needs for livestock water if existing water supplies or livestock access is curtailed by construction activities.

**P4-15**

Response Further discussion with the project reviewer at the Butte County Air Quality Management District confirmed that the Indirect Source Review Guidelines were the appropriate governing regulations. Staff at BCAQMD stated that any project adds cumulative emissions to an already non-attainment area (Williams 2002). The use of these guidelines and the mitigation measures for compliance is relevant for fugitive dust emissions from construction vehicles and operational equipment.

An addition to Section 8, References is added on p. 8-11 as follows:

Williams, Gail. 2002. Butte County Air Quality Management District. Personal communication with Janet Meth. May 3, 2002.

**P4-16**

Response Comment noted. BCAQMD staff confirmed that applying water as needed to control dust was an appropriate mitigation to reduce $PM_{10}$ emissions. However, any increase in emissions over existing $PM_{10}$ background is a significant impact within a non-attainment area.

**P4-17**

Response The text has been amended under Operational Impacts to read as follows:

*Combustion Equipment Emissions.* Combustion equipment associated with the proposed expansion would include three or four compressor units.

**P4-18**

Response The text on page 3.3-15, Air Quality has been amended to read as follows: The maximum possible NOx increase would be ~~5~~ 10 tons above existing annual levels, and well below the 25-ton/year threshold of significance.

**P4-19**

Response Comment noted. Mitigation measure 3.1-1 is amended to read as follows:

> **WGSI Measure 3.3-1.** Workers, excluding welders and construction supervisors, will be bussed from staging areas to the daily pipeline work sites to minimize emissions from workers' vehicles.

**P4-20**

Response Comment noted. Mitigation measure 3.3-4 is amended from the BCAQMD Guideline as it is not practical for a stationary site to be constructed for a linear pipeline project. The measure as stated should be effective for mud removal from construction equipment.

> **Mitigation Measure 3.3-4.** WGSI shall ~~construct an area to wash all heavy equipment vehicle tires before entering paved roadways~~ stabilize the construction access points with 6 inches of gravel to remove mud from construction equipment prior to entering paved roads.

**P4-21**

Response As Mitigation Measure 3.3-6 was drawn directly from the BCAQMD list of standard mitigation measures, it remains appropriate from discussion with District staff. The project area would be defined as that area where construction was occurring on a certain day, with winds consistently at 20 mph, measured by appropriate instrumentation at that site.

**P4-22**

Response As Mitigation Measure 3.3-8 was drawn directly from the BCAQMD list of standard mitigation measures in their Guidelines, it remains an appropriate measure. Based upon further personal communication with District staff, the Guidelines are applicable to this project. Mitigation Measure 3.3-5 addresses the general construction area, whereas Mitigation Measure 3.3-8 refers specifically to inactive spoil piles.

**P4-23**

Response Comment noted. Mitigation Measure 3.3-9 has been amended to read as follows as it clarifies the intent of the measure:

> **Mitigation Measure 3.3-9.** WGSI shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints at all major construction ~~and operation~~ 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).

**P4-24**

Response As Mitigation Measure 3.3-10 was drawn directly from the BCAQMD list of standard mitigation measures, it remains appropriate from discussion with District staff.

**P4-25**

Response Comment noted. Mitigation Measures 3.3-5 and 3.3-12 have been amended to read as follows for consistency:

> **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 3.3-12.** WGSI shall use non-toxic ~~binders~~ chemical soil stabilizers exposed areas after cut and fill operation and by hydroseed areas.

**P4-26**

Response Comment noted. The key emphasis of this mitigation measure is the assurance that a knowledgeable individual with the experience to increase the probability of successful plant establishment would accomplish the plant propagation. The last sentence of the explanatory text of Mitigation 3.4-2(c) shall be amended to read:

> A nursery or qualified individuals familiar with propagation of native plants shall do the plant propagation.

**P4-27**

Response Comment noted. The first sentence of this paragraph under the Impact 3.4-6, 4th paragraph in the DEIR has been revised to be consistent with the description under Bores in the project description to read as:

> All other water crossings – irrigation ditches, canals, creeks, sloughs, or other natural water bodies – would ~~also~~ be bored unless an irrigation flow culvert has been installed during ROW isolation or if the crossing can be dried out at least 14 days prior to construction ~~by either directional or traditional drills~~.

**P4-28**

Response Comment noted. The 3rd and 4th sentences after Mitigation Measure 3.4-8(a) are revised to include the suggested text and to correct the reference to the dormancy period of the giant garter snake. The revised sentence reads as:

> All waterways would be bored or placed in culverts, with the exception of flooded rice fields containing flowing or standing water, or that have ~~not~~ been dried out at least 14 days prior to construction. Construction in wetlands between ~~May and September~~ October and April ~~in wetlands~~ shall be restricted to prevent inadvertent mortality of giant garter snakes before they emerge from dormancy.

**P4-29**

Response Consultations with CDFG, NMFS, and USFWS would be required to identify a water intake source and to establish a rate of withdrawal such that unacceptable impacts to downstream fisheries does not occur. To this end, WGSI would need to adhere to the water withdrawal rate, volume, and timing established through the agency consultation process. Compliance monitoring would be required to assure that adequate stream flow is maintained to avoid damage to aquatic life. It is most likely that the regulatory agencies would require some type of documented evidence that the stipulated conditions of water withdrawal have been met.

The second bullet point under Mitigation Measure 3.4-7 is revised to read as:

- ~~As determine by and in coordination with these agencies, WSGI shall establish a downstream monitoring program to verify verify that withdrawal volume does not adversely impact fisheries or the aquatic life components that support the special-status fish species.~~ WGSI will maintain stream flow adequate to sustain fisheries or the aquatic life components that support special-status fish species. Fishery management agencies would be provided the opportunity to monitor compliance. If, during the course of the hydrostatic testing, an incidental take of a special-status species is observed in the form of an impingement, mortality, or physical removal, such incidental take will be reviewed by CDFG, USFWS, and NMFS. All hydrostatic water withdrawals shall cease and will not restart until an explanation of the causes of the taking is reviewed by the USFWS, and the agency determines that reasonable and prudent measures can be employed to prevent the incidental taking of special-status fish.

**P4-30**

Response Comment noted. The text under Mitigation 3.4-8(f) is revised to read as:

> If active nest sites are identified, a minimum 500-foot construction setback would be established around any nest sites.

**P4-31**

Response The recent literature indicates that the notion that root systems extend only to the drip line of a tree's canopy is erroneous. Some data indicate that root systems may occupy an area four to seven times the surface area occupied by the crown of a tree. The actual root system would vary in width and depth (and structural characteristics) with the species of the tree as well as soils and moisture levels.

Several methods are recommended by arborists to define the size of what is termed the Protected Root Zone (PRZ) including the tree's drip line, height, or diameter as a guide. Sometimes for broad-crowned trees, the drip line method is used, a protected area equal to the extent of the trees' drip line. For narrow-crowned trees, an area equal to approximately 1.5 times the drip line has often been designated as a PRZ. When tree height is used as a guide, the protected area around the tree is a circular area with radius equal to the tree's height.

While both the drip line and tree height guides can produce adequate protection zones when applied with judgment by a knowledgeable arborist, the use of tree diameter as a guide routinely produces the most dependable results. Absent the evaluation of each tree by an arborist during construction, it would be prudent to use the tree diameter method to calculate a "critical root radius" (1 to 1.5 feet for each inch of tree diameter) to define the PRZ.

The text of Mitigation Measure 3.4-3(b) is revised to read as:

**Mitigation Measure 3.4-3(b).** Soil compaction and excavation within the ~~root zone (root zone = 15 feet beyond the drip line of the canopy or tree crown)~~ Critical Root Zone (CRZ) shall be minimized and protected by appropriate buffers.

The explanatory text following this mitigation is revised to read as:

Trees to be protected would be flagged and fenced off at the ~~15-foot "protected perimeter", which includes the root zone~~ outside edge of the Protected Root Zone (PRZ) defined by the Critical Root Radius (1 to 1.5 feet for each inch of tree diameter). A pre-project meeting would be scheduled between the contractor and a biologist or arborist to identify and flag trees.

The following measures shall be implemented:

- The biologist or arborist shall determine the location for protective fencing around trees**.** The protective fencing shall remain in place for the duration of construction**.** The recommended location of fencing is ~~15 feet outside the drip line~~ the PRZ as determined by the Critical Root Radius.
- Changes in grade and compaction of the soil shall be minimized within the protected zone**.** Storage of equipment and materials would not be permitted within the protected zone.
- Storage of oil, gasoline, or other substances potentially hazardous to trees or tree roots shall not be stored or dumped within the protected zone or in any location where such substances may enter the roots.

If earth excavation or compaction cannot be avoided within the ~~15-foot protective perimeter~~ PRZ, the biologist or arborist~~/biologist~~ in consultation with the construction contractor shall determine the least impacting construction techniques to be used. Trenching, excavation, or grading would occur only under supervision of the biologist or arborist. At a minimum, the removal of more than 15 inches of soil from the existing grade within the ~~drip line~~ PRZ of trees to be preserved shall be avoided.

**P4-32**

Response Comment noted. The potential ground disturbance required to prune back to the nearest lateral is acknowledged.

The use of the term "significant" to describe a particular tree is subject to wide interpretation. For example, various county and city tree ordinances have defined "significant trees" using a range of species and size standards. Such size standards range from 6 inches dbh (diameter-at-breast-height) to over 24 inches dbh.

It is recognized that all trees are usually not of concern when developing a tree protection ordinance. In California, oak trees and other native trees are considered important enough to warrant consideration by many local agencies in their tree protection ordinances.

In the WSGI expansion project area oak and sycamore, or other riparian trees are extremely important as wildlife resources. Since all age-classes of oaks are important in the long-term sustainability of oak woodland and riparian vegetation, all of these trees should be protected, regardless of size. Landscaped trees near residences could be exceptions.

The text of the two bulleted paragraphs under Mitigation 3.4-3(c), is revised to read as:

- Two-inch diameter roots and larger shall be pruned with a clean cut free of rips and tears whenever possible.
- Excavation exposing roots of oak, sycamore, trees in riparian corridors, or landscaped trees exceeding 24-inch dbh near residences, which would not be backfilled within 72 hours, shall be covered with burlap or dense jute netting. This material shall be kept moist until backfill operations are complete.

**P4-33**

Response Comment noted. The mitigation measure is coupled directly to avoiding or minimizing the potential effect of accidental discharge of drilling mud or hazardous materials on special-status fish during their critical life stage; as such the mitigation measure is revised to read as:

> **Mitigation Measure 3.4-6(a).** Drilling of channel crossing bores would be scheduled, as directed by the responsible federal and state resource agencies, to avoid, to the extent possible, the spawning periods of special-status fish.

To accommodate an agency approval of construction scheduled within the spawning period of special status fish species, as the comment suggests, the explanatory paragraphs following Mitigation Measure 3.4-6(a) is revised to read as:

~~To the extent possible, drilling activities would be scheduled to occur at the Sacramento River between April 15 and June 15, and between June 15 and October 1 at Butte Creek, outside of the spawning period of special-status fish.~~ The spawning periods for special status fish in the Sacramento River is between June 15 and April 15, and between October 1 and June 15 at Butte Creek. WGSI will consult with responsible federal and state resource agencies to establish a construction period that would avoid adverse affects to critical life history stages of special status fish.

**P4-35**

Response Comment noted. The Cultural Resources section should be amended to include the following text will be inserted into the Local Setting section under Butte County and Colusa County:

> The Sacramento Valley, including the project study area, has undergone several cycles of deposition and erosion since the beginning of the Pleistocene epoch,

about three million years ago. During each of the depositional phases, river channel, levee, and overbank deposits accumulated within the more central portions of the valley, and alluvial fan deposits built up along the margins, near the bases of the previously-uplifted Coast and Sierra Nevada mountain ranges. All deposits of these types hold the potential to yield fossil remains of vertebrate animals.

Two recognized depositional units of Pleistocene age, the Modesto Formation and the older Riverbank Formation, underlie the portion of the project study area within Butte County. Both have a potential to yield significant vertebrate fossils, but are only locally exposed at the surface within this area and are buried elsewhere by younger Holocene sediments. Figure 3.5-1 illustrates the paleontologic sensitivity areas within the project study area.

The Colusa County portion of the project study area encompasses larger surface-exposed areas in both the Modesto and Riverbank Formations. Localized exposures of the still older Red Bluff Formation cap some of the lower foothills near the western end of the project study area. All these units area of Pleistocene age, between about ten thousand and three million years. The sediments of the first two units may be expected to include more alluvial fan deposits than in Butte County, but are also potentially productive of significant fossils. The third unit consists of weathered gravels, probably deposited as a thin veneer or "pediment surface" during a period of impeded drainage of the Sacramento River. Two of the units have produced significant Pleistocene vertebrate fossils near the project study area.

This area also includes exposures of Late Cretaceous marine sedimentary rocks. Invertebrate fossils are known to be locally abundant in some of these older units, but because they have been extensively studied and described from nearby areas, new invertebrate fossil finds would probably not be significant. In contrast, vertebrate fossils are extremely rare in equivalent Cretaceous rocks of northern California, and the probability of discovery of identifiable vertebrate fossils in areas of the Cretaceous exposures within the project study area is very low. Any such discoveries, however, could be of considerable scientific importance. Figure 3.5-1 shows the paleontologically sensitive areas within the project study area.

The following text is inserted to amend the impact discussion:

The following are areas of potential environmental concern that may be associated with implementation of the proposed project:

- The potential to encounter or disturb the context of any deposit or materials of archaeological value;
- The potential to encounter any human remains, burials, or cemetery;
- The potential to directly of indirectly destroy a unique paleontological resource or site or unique geologic feature.

**Impact 3.5-3: Potential for disturbance to a unique paleontological resource or site or unique geologic feature.**

Project-related excavation using the required heavy equipment within paleontologically sensitive geologic formations may damage or destroy significant fossils, including those of vertebrate animals. This impact maybe considered potentially significant.

**Mitigation Measures.** The WGSI-proposed mitigation measures for impacts to paleontological resources are listed below.

**WGSI Measure 3.5-5.** Geologic units, which based on their general lithologic features (e.g. grain size, primary features, color, secondary minerals), hold potential to yield vertebrate fossils but have not produced known fossils in the general vicinity of the project area would be spot monitored during the course of any major excavation, including trenches, bore pits, or site preparation for other project-related facilities. Scheduling for this monitoring shall be arranged by the paleontologist in charge of this phase of the project in light of expected construction scheduling details, including the number and distribution of excavating crews and equipment, proposed rate of trenching, lag time between excavation and pipe laying/backfilling, and other factors which may impose limits on access to potentially fossil-bearing sediments or sedimentary rocks. The paleontologic monitor would be present at the beginning of excavation into each named geologic unit and *at least* one day per week per active excavation site thereafter unless factors favoring closer scheduling appear during the course of the project. Such factors may include:

- Discovery of any vertebrate fossils (bones, teeth, or fragments not clearly associated with modern human activity such as agriculture or hunting) by the monitor or any other personnel,
- The presence of secondary carbonate deposits, usually indicated by white or light gray nodules or fracture-surface deposits within the sedimentary unit, or irregular subhorizontal hard layers (caliche),
- Any abrupt vertical or horizontal changes in sediment texture, color, or other visible features, or
- Any increase in the number of crews involved in project-related excavation.

In the event paleontologic resources are discovered during excavation activities, the excavation at that site would immediately cease, and the monitor would be called to investigate and evaluate the discovery.

Monitoring would include the following activites:

**Visual scanning.** Spoils piles, trench walls, or other areas where sensitive sedimentary deposits are exposed by project-related excavation, during or immediately after excavation would be inspected. If continuing excavation at the site of a new discovery threatens significant specimens, excavation equipment may be temporarily redirected, at the discretion of the monitor and the WGSI project manager, to either avoid the site or to aid in recovery of the specimen(s).

**Collect visible specimens.** Small or isolated specimens would be appropriately wrapped and stored. Larger specimens (typically found in trench walls) would be excavated and stabilized for storage and transport. Explicit labeling and geographic and stratigraphic documentation would be recorded for all speciments.

**WGSI Measure 3.5-6.** The assigned monitor would periodically examine in close detail at least one 100-square-foot sample area of the spoils pile surface, and note the presence or absence of very small fossils, within each half-mile along trench lines and at each larger excavation through sensitive paleontologic formations.

If bones, teeth, or other significant fossils appear in these sample areas, an attempt would be made to locate their stratigraphic source level and to collect at least 1,000 pounds of sediment from that level. Bulk samples also require the same detailed documentation as isolated fossil specimens described above.

Processing the bulk sediment to recover additional small fossils may begin on- or off-site, and may involve dry or wet screening, heavy liquid separation, and hand-picking of concentrate. Wet screening and heavy liquid separation would be done in a manner that precludes sediment-laden runoff from leaving the ROW.

**WGSI Measure 3.5-7.** Pre-arranged agreements would be made to ensure that any significant fossils discovered during the project would be incorporated into established paleontological collections in a public research or educational institution supporting such collections.

**P4-36**

Response The text under Results of Field Reconnaisance in the Local Setting section has been modified to read:

The proposed pipeline is noted in both reports as ~~within~~ adjacent to the Gray Lodge Wildlife Management Area.

**P4-37**

Response Mitigation Measure 3.5-1 has been modified per the local district and Reclamation Board requirements to read:

**Mitigation Measure 3.5-1.** The contractor shall observe ~~reclamation district~~ the local district and the State Reclamation Board requirement that a minimum ~~distance of 15 feet be maintained between the toe of any canal/levee and the construction right-of-way to or 10-foot distance indicated in Section 7.1 Resource Protection of the HPMP (whichever is applicable)~~ 10-foot setback from the landward side of the levee toe or canal for any excavation activity shall be observed to insure protection of the resources.

**P4-38**

Response Comment noted. The last sentence of Mitigation Measure 3.5-3 is amended to read:

**Mitigation Measure 3.5-3.** If the resource is found to be eligible for the NRHP or CRHP, the WGSI Mitigation Measures 3.5-1 through 3.5-3 would apply.

**P4-39**

Response Mitigation measure 3.6-1 is revised to read as follows:

**Mitigation Measure 3.6-1.** The Applicant shall assess the pipeline response to surface faulting or uplift using a detailed nonlinear pipe-soil interaction analysis model for a case-specific evaluation of the Willows fault crossing. ~~The model shall consider different possible fault offsets (or local uplifts) and slip vectors, different fault crossing geometries, different wall thickness and different steel grades for the selected pipeline diameter. The analysis shall consider both the fault offset required to reach the failure (loss of pressure integrity) limit state and to reach the damage limit states (i.e., incipient wrinkling) as a measure of the fault crossing design performance. A detailed plan for the analysis shall be prepared for review by the CPUC (or its designated consultants) and the analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section within a reasonable distance (to be reviewed and approved by the CPUC or its designated consultants) of the projected location of the Willows fault and the mapped anticlinal feature adjacent to the Sacramento River.~~ The pipeline shall be designed within the area of influence of the Willows Fault to withstand a discrete displacement of

1.1m along dip (reverse, East Side up) with 50 % strike slip component, or 0.55m, at a depth of 1600 feet below the ground surface. The analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan in Appendix S. The pipeline shall be designed to mitigate stresses due to faulting or uplift such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan (Appendix T) the appropriate actions will be initiated.

**P4-40**

Response Mitigation Measure 3.6-2 is revised to read as follows:

**Mitigation Measure 3.6-2.** The Applicant ~~shall provide the CPUC with a plan to analyze pipeline response to ground shaking and traveling wave effects based on the unique geologic conditions along the pipeline routes (Line 400/401 Connection and the Storage Loop Pipeline) and the conservative levels of groundshaking determined by Kleinfelder. The CPUC shall review and approve a final analysis plan prior to final design~~ analyze the pipeline response to seismic strong ground shaking and resulting traveling wave effects. Analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan and will be based on the unique geologic conditions along the pipeline route (Line 400/401 Connection and Storage Loop Pipeline) and the conservative levels of ground shaking previously determined by Kleinfelder (Kleinfelder 2001e, pp. 20-23). The pipeline shall be designed to mitigate stresses due to strong ground motion and resulting traveling wave effects such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated.

**P4-41**

Response Mitigation Measure 3.6-3 is revised to read as follows:

**Mitigation Measure 3.6-3.** At the Sacramento River crossing, ~~T~~the Applicant shall ~~drill new borings at the final Sacramento River crossing site, using the drilling and sampling techniques recommended by Martin and Lew (1999). These borings shall be performed at the locations with possibly the thickest liquefiable soil deposits, to confirm the SPT blow counts measured (with or without sample rings and considering gravel) and the estimates of liquefaction-induced settlements and lateral deformations. It is possible that the additional field investigation scope may be reduced if a parametric/sensitivity analysis can be performed to investigate the effects of possible lower blow counts and thicker liquefiable soil layers on the liquefaction-induced hazards discussed in Appendix A (Kleinfelder, 2001e). A detailed plan for the drilling, sampling, and analysis shall be prepared for review by the CPUC (or its designated consultants) and the analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section within a reasonable distance (to be reviewed and approved by the CPUC or its designated consultants) of the Sacramento River crossing.~~ perform a sensitivity analysis to investigate the effects of possible lower blow counts and thicker liquefiable soil layers on permanent ground deformation and resulting pipe stresses. Analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan and will incorporate conservative estimates of liquefiable layer depth and blow count factors. The pipeline shall be designed to mitigate stresses due to permanent ground deformation associated with liquefaction and dynamic compaction such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline

of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated.

**P4-42**

Response Mitigation Measure 3.6-4 has been revised to read as follows:

**Mitigation Measure 3.6-4.** For the entire pipeline, the ~~The~~ Applicant shall ~~compile~~ obtain data in ~~City, State, or County files, and to obtain new data on shallow water levels and the density of shallow geologic materials so that a broad-area assessment of areas with potential for liquefaction along the pipeline alignment can be made. Results of the analysis shall be used in the design of the pipeline section crossing identified potentially liquefaction-prone areas (to be reviewed and approved by the CPUC).~~ terms of shallow geologic materials from published California Geological Survey, CGS (formerly California Division of Mines and Geology, CDMG), geologic maps along the pipeline alignment. In addition, the Applicant shall obtain data for the approximate shallow groundwater levels from the State and County files along the pipeline alignment, or assume near surface soils are saturated. The combination of shallow groundwater, shallow Holocene geologic materials, and the conservative levels of ground shaking previously determined by Kleinfelder (Kleinfelder 2001e, pp. 20-23) shall be combined to indicate areas of liquefaction susceptibility. The Applicant shall employ the same techniques as used by CGS in assessing the areas of low, moderate and high liquefaction susceptibility. The pipeline shall be designed to mitigate stresses due to permanent ground deformation associated with liquefaction and dynamic compaction such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated.

**P4-43**

Response Mitigation Measure 3.6-5 has been revised to read as follows:

**Mitigation Measure 3.6-5.** After performing the liquefaction analysis in Mitigation Measure 3.6-3, t~~T~~he Applicant shall ~~complete Mitigation Measure 3.6-3 above, including drilling new borings in areas adjacent to the final Sacramento River crossing site, where lateral spreading landslides are most likely to occur based on topography.~~ evaluate lateral spreading due to liquefaction at the Sacramento River crossing. Initially, the potential for lateral spreading and landslides shall be evaluated using semi-empirical calculation methods by Youd and Garris (1995). If lateral spreading is predicted to occur and the pipeline is within the zone of lateral spreading, then the pipeline will be evaluated using a detailed nonlinear pipe-soil interaction analysis model in accordance with the Seismic Hazard Analysis Workplan in Appendix __. The pipeline shall be designed to mitigate stresses due to lateral spreading such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated.

**P4-44**

Response Mitigation Measure 3.6-6 has been deleted.

~~**Mitigation Measure 3.6-6.** The Applicant shall undertake and complete a modeling study to define possible in-steam mining and floodplain mining scenarios and the potential impacts of the scenarios on the pipeline at the preferred depths. Based on the modeling study the final depth of burial below the river bottom shall be determined. A~~

~~plan for the modeling study shall be prepared for review by the CPUC. The analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section crossing the Sacramento River (to be reviewed and approved by the CPUC).~~

**P4-45**

Response Comment noted regarding communication with Ms. Lorna Burks at State Lands Commission (SLC).

**P4-46**

Response Comment noted. Text has been amended in the Hazards section under Natural Gas Field Conditions in the Environmental Setting section as follows:

> Original field pressure for the zones under evaluation for use as storage reservoirs ranged from 1,210 to 1,328 pounds per square inch (psi) measured relative to atmospheric pressure, denoted as psia. Planned normal injection pressures would range from ~~1,600 to 1,700~~ 1,350 to 1,500 psia, about ~~30~~ 15 percent higher than original field pressures. Extreme conditions of consistent maximum injection rates would raise the pressures from 1,600 to 1,700 psia, about 30 percent higher than original field pressures. Initial injection pressures would range from 1,700 to 1,800 psia, approximately 35 to 40 percent higher than original field pressures. These high pressures are required to displace water from the reservoir zones. More detailed information, related to proposed operating pressures, is presented in Appendix K.

Table AK-1: Reservoir Pressure Summary, found in the DEIR Appendix K has been revised per response A2-7.

**P4-47**

Response Comment noted. The text for paragraph one under Storage Field Reservoir and Caprock Conditions in the Hazards section is amended as follows:

> Proposed injection and operating pressures are ~~substantially~~ higher than the original field pressure. They are based on technical information collected by the DOGGR for the Sacramento Valley region, and on specific technical data collected by WGSI for the proposed storage field project. A detailed discussion of procedures for determining fracture gradient is presented in "Evaluation and Surveillance of Water Injection Projects" (Guerand, no date). This publication also includes plots of fracture gradient data collected from several gas fields in the Sacramento Valley (Appendix F). Since correlation of fracture pressure gradient data based on depth is evident from these plots, this data is used to establish injection pressure restrictions for gas storage fields in the Sacramento Valley.
>
> Original field pressure for the zones under evaluation ranged from 1,210 to 1,328 pounds per square inch (psi) measured relative to atmospheric pressure, denoted as psia. Initial injection pressures would range from 1,700 (U-1 and U-2 reservoirs) to 1,800 psia (L-1 reservoir) to displace water from the reservoir zones. Planned normal injection pressures would range from 1,350 (U-1 and U-2 reservoirs) to 1,500 psia (L-1 reservoir).

The theoretical fracture pressure gradient for a sedimentary rock is approximately 1.0 psi per foot of depth. DOGGR maintains at least a 20 percent safety margin (0.8 psi per foot) for most injection projects. Since DOGGR is restricting injection pressures at Wild Goose Field to 0.7 psi per foot, a 30 percent margin of safety is maintained. Technical data on field pressures are provided in Appendix K. Pressure information provided in Table AK-1 has been revised.

**P4-48**

Response Comment noted. The text in the Hazards section under Impact 3.7-6, Line 400/401 Connection Pipeline, Sensitive Receptors has been amended as follows:

~~The process for making the determination of "where fields have not yet been leveled or have been re-leveled" and the construction process are not clear. It appears that there is a potential for areas not to be identified before an inadvertent deep ripping event damages the pipeline. Therefore, without special design consideration for these deep ripping events before original construction, and possibly additional design measures, there is a potentially significant impact to existing and future populations adjacent to the pipeline due to the possible deep ripping over the pipelines.~~ Deep ripping, or 'slip plowing', to a depth of approximately six feet is typically only associated with preparing the land for orchards. The only area along the pipeline routes suitable for orchards is near the Sacramento River where the soils are sufficiently deep. WGSI has already, as part of its ongoing negotiations with owners near the Sacramento River, made pipeline depth or alignment adjustments on properties where there are specific plans for deep ripping for orchard planting. In addition to these accommodations, a supplemental payment may be offered to the property owner to compensate them for not deep ripping and/or planting in the 30-foot easement strip. This impact is less than significant.

**P4-49**

Response Mitigation Measure 3.7-1 has been amended to read as follows:

**Mitigation Measure 3.7-1.** WGSI will ~~submit core sample analysis protocols to the CPUC technical team for review and approval prior to conducting tests on new core samples.~~ implement the following protocols for the coring process, preservation, handling and testing:

~~Test data on new core samples will be submitted to the CPUC technical team for review. If new data indicates that cap rock strength is different (substantially lower) than indicated by previous tests, operating and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR safety guidelines.~~

**Core Preservation and Transport**

- Cores should be cut into five foot lengths or shorter in PVC core tubes upon extrusion from the core barrel at the wellsite. Avoid bending long, unsupported core lengths during handling.
- The individual core lengths should be capped with plastic end caps and sealed with ample duct tape or equivalent.
- Freezing: Not recommended for argillaceous rocks; optional for poorly cemented, unconsolidated sandstones (injection gel is also an option for weak sandstones).

- Transport the core lengths in their PVC tubes, packed and bound securely into core boxes or special racks such that they cannot move or rotate. Minimize time elapsed from rig floor to testing laboratory.

**Core Handling and Logging at the Testing Laboratory**

- Commence core logging, sampling and preservation as soon as possible upon arrival at the testing laboratory.
- X-ray the cores to assess quality and identify defects.
- Run a core gamma log.
- Unwrap ends, split core tube by making two cuts at 180°.
- Conduct geological analyses (e.g. lithology, fractures, other potentially weak discontinuities) and core photography as quickly as possible; minimize the number of tubes cut open at any given time; select samples to be used for future testing promptly so they can be preserved.
- If possible, do not slab core samples to be used for mechanical properties testing and caprock analysis.
- Wrap the samples selected for preservation in plastic wrap and several layers of aluminum foil; seal the samples by immersing in hot wax.
- Select smaller grab samples from each tube and store in plastic zip-lock bags for possible future testing such as X-ray diffraction.

**Core Sampling**

- Drill plugs from preserved cores as required for the testing program; optional - use frozen nitrogen for weak sandstone samples.
- Apply the minimum axial force possible and use slow rotation speeds when drilling plugs from weak core samples.
- Take several core plugs for paleomagnetic analysis to orient selected segments of the core. Core orientation is required to obtain strike data for features such as natural fractures, bedding or other discontinuities identified in the core.

**Core Testing**

- For tests to be conducted at stressed conditions, calculate a confining stress representative of in-situ conditions. For example, at a depth of 2900 ft (approximate L1 unit caprock depth), the mean effective in-situ stress is estimated to be 1220 psi. This estimate is based on an overburden stress gradient of 0.89 psi/ft, maximum and minimum horizontal stress gradients of 0.89 and 0.80 psi/ft, respectively, and a formation pressure gradient of 0.44 psi/ft.
- X-ray Diffraction – to determine clay mineralogy
- Use small grab samples
- Triaxial Compression – to determine static elastic and rock strength properties
- Conduct a minimum of four compression tests at different confining stresses (from very low values up to the mean effective in-situ stress)
- Use full-diameter samples if possible (2:1 length to diameter ratio)
- Additional properties can also be measured if required (e.g., stressed sonic velocities, dynamic elastic moduli, residual strength properties).
- Caprock Analysis – to determine nitrogen gas threshold pressures
- At a confining stress representative of in-situ conditions

- Use full-diameter samples if possible
- Mercury Injection Capillary Pressure – for displacement pressures and pore size data
- Pulse Decay Permeability – to determine gas permeability at in-situ conditions for very low permeability rocks
- At a confining stress representative of in-situ conditions
- Use preserved core plugs
- Test at native saturation state
- Routine Core Analyses– to determine porosity, saturations and particle size distributions.

WGSI will submit all test results on new core samples for the L1, U1 and U2 intervals to the DOGGR immediately following the tests. If new data indicates that the cap rock quality is different (substantially lower) than indicated by previous tests, operating and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR safety guidelines.

**P4-50**

Response Mitigation Measure 3.7-2 has been deleted.

~~**Mitigation Measure 3.7-2.** WGSI will conduct in-situ stress tests of the project relevant cap rock intervals in at least one well when drilled. If in-situ stress tests results are not consistent with core sample test results, re-evaluation of operating pressures may be necessary. If in-situ stress tests indicate that cap rock strength is substantially less than currently believed, operating and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR guidelines.~~

**P4-51**

Response Mitigation Measure 3.7-3 has been amended to read as follows:

**Mitigation Measure 3.7-3.** The Brady #1-20 shall be inspected and tested ~~immediately~~ during summer 2002 to ascertain its condition. This well shall be located and soil surrounding it excavated to expose the well casing. An attempt should be made to tap (drill a small hole) the plate welded onto the casing, and ~~test for gas~~ if gas is present, a sample will be collected for further analysis. ~~If gas were present, a sample would be extracted and collected for further analysis.~~ Depending on gas origin, if present, appropriate remedial actions (re-abandonment) would be implemented. ~~Routine inspection, monitoring and testing of this well would continue for the duration of the gas storage operation. WGSI shall prepare a report of investigation and remedial actions taken. This report shall be submitted to the CPUC and DOGGR prior to initiating gas storage activities in additional storage zones. Annual inspection of this abandoned well would be included as part of the WGSI inspection program. Annual reports would be submitted to CPUC and DOGGR upon inspection completion. With these immediate (inspection, testing and remediation) and on-going (annual inspection) mitigation measures, potential impacts associated with leaks from the Brady #1-20 would be less than significant.~~ Re-abandonment will be consistent with DOGGR procedures outlined in California Code of Regulations § 1723 et. seq. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measure specified under Impact 3.4-4 on page 3.4-27. Routine surface gas monitoring of this well will continue for the duration of the gas storage operation with immediate notification of the DOGGR in the unlikely event of a leak. WGSI shall prepare a report of investigation and remedial actions taken. This report shall be submitted to the DOGGR prior to initiating gas storage activities in additional storage zones. With the immediate (inspection, testing and remediation) and

on-going (routine gas detection) mitigation measures, potential impacts associated with leaks from the Brady #1-20 are less than significant.

**P4-52**

Response Mitigation Measure 3.7-4 has been deleted and the accompanying text has been amended as follows:

The area overlying the Wild Goose Field is heavily vegetated with wetland species. If gas leaking from wells was present in the soil overlying the Field, vegetation in the vicinity of the leak would evidence distress. The on-site habitat managers at the clubs which overly the Field regularly conduct vegetation management and would notice any distressed vegetation. While distressed vegetation is just one means of determining whether gas may be leaking from wells, it is a fairly reliable indicator. Therefore, the lack of distressed vegetation during the three years of project operation is sufficient to conclude that the wells are not leaking. ~~It is not known if near-surface gas conditions, related to leaking wells, are present in the soil overlying Wild Goose Field. If gas from leaking wells is present, a potentially significant impact may exist depending upon gas source, concentrations present, and location relative to sensitive receptors. If storage gas migrates through abandoned wells and accumulates inside buildings or structures, the risk of fire or explosion exists. This represents a potentially significant adverse impact if subsurface gas migration is occurring. If subsurface gases were not present, then no associated impact would be present. The following measure would reduce this impact to less than significant:~~

> ~~**Mitigation Measure 3.7-4.** Prior to initiating new gas storage operations, WGSI shall conduct a soil-gas survey in the vicinity around each abandoned well within the storage zone boundaries to define current shallow subsurface gas conditions and document that storage gas is not currently leaking. If soil-gas is detected, samples should be collected for laboratory analysis. Samples would be analyzed to determine if any natural gas collected is of biogenic, thermogenic or storage zone origin. All testing and sampling plans would be submitted to CPUC for review and approval by a qualified member of the technical team (Registered Geologist with appropriate background evaluating soil-gas). If wells are found to be leaking, the leaking well would be remediated in consultation with CPUC and DOGGR.~~

**P4-53**

Response Mitigation Measure 3.7-5 has been amended to read as follows:

**Mitigation Measure 3.7-5.** At the end of each injection cycle, WGSI shall conduct ~~well~~ surface gas monitoring and vegetation inspections~~, testing and leak surveys for each abandoned well in the field.~~ at each abandoned well within the original productive area. If gas is detected, samples ~~should~~ will be collected, if possible, and analyzed to determine its source or origin. ~~Necessary remedial actions would be implemented to address the leak. All testing and sampling plans would be submitted to CPUC and DOGGR for review and approval by a qualified member of the technical team (Registered Geologist with appropriate background evaluating soil-gas).~~ If a leak is indicated by the data, the necessary remedial actions will be implemented consistent with DOGGR procedures outlined in in California Code of Regulations § 1723 et. seq. All monitoring and sampling results will be submitted to the DOGGR. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measures specified under Impact 3.4-4 on page 3.4-27.

**P4-54**

Response Mitigation Measure 3.7-6 is amended to read as follows:

> **Mitigation Measure 3.7-6.** ~~In addition to regularly scheduled well tests,~~ If routine surface gas monitoring indicates that a well may be leaking (gas bubbles, distressed vegetation), WGSI shall ~~test any well if other indicators or leaks are present (gas bubbles, distressed vegetation) in the immediate well vicinity. WGSI would submit all well test and repair records to DOGGR, CPUC and Butte County. Any well leaks detected would be reported immediately to these agencies. With DOGGR oversight, WGSI would implement appropriate remedial actions to repair detected leaks.~~ report it immediately to the DOGGR and Butte County and implement the appropriate remedial actions consistent with DOGGR procedures outlined in California Code of Regulations §1723 et. seq. in consultation with the DOGGR. WGSI shall submit all well remediation and repair records to DOGGR and Butte County. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measures specified under Impact 3.4-4 on page 3.4-27.

**P4-55**

Response Comment noted. The text of Mitigation Measure 3.7-7 is amended for clarification to read as follows:

> **Mitigation Measure 3.7-7.** WGSI shall locate each abandoned well within the field and immediate vicinity, and place permanent markers over each one, subject to landowner approvals. WGSI will accurately survey and record these locations and submit plans and maps to the DOGGR~~, CPUC, and Butte County~~. All markers will be maintained so ~~they are clearly visible at all times~~ that they can be located during the duration of storage field activities and upon final field decommissioning. Alternatively, WGSI may conduct a Global Positioning Satellite (GPS) survey to obtain GPS coordinates for each well. WGSI would submit any GPS location survey information to DOGGR.

**P4-56**

Response Mitigation Measure 3.7-8 has been deleted and the accompanying text has been amended as follows:

> Analyses of specific cap rock intervals overlying proposed storage zones were conducted. The probability of these rocks allowing vertical gas migration is considered very low (Advanced Geotechnology 2001; Apex 2002). Even if some vertical gas migration from the storage zone occurred, additional moderately to very thick shale (confining layers) units that would trap vertically migrating gas are present in shallower horizons. Therefore, no adverse gas migration impacts are anticipated. ~~Existing, limited data may not reflect actual conditions across the field. If the data are not representative, then a potential hazardous condition might exist.~~
>
> ~~If storage gas reached the fault zone along the southern field boundary and migrated upward, a potentially significant adverse impact would exist if the leaking gas was in proximity to buildings or residences. Depending on the exact subsurface fault location and orientation, sensitive receptors may be located in the vicinity of this fault zone's projected trend. WGSI plans on operating the field so that storage gas does not reach the area where this fault or potentially fractured area may possibly intersect reservoir rocks. By preventing storage gas from reaching this fault location, a factor of safety is maintained and potential adverse impact would be prevented.~~

~~The reservoir model used to predict gas migration are based on limited data and may not accurately represent actual condition. In addition, the exact fault location has not been determined. As such, it is impossible to guarantee that storage gas could not reach the fault zone. If storage gas reached this fault or fracture zone and migrated upward, sensitive receptors located along the projected fault trend could be exposed to leaking storage gas.~~

Faults were discussed in the Section 3.6, Geology and Appendix I of this document~~. If storage gas reaches the faulted (possibly fractured) area on the southern side of the Wild Goose gas storage field, the potential for vertical gas migration increases. Vertical migration of storage gas in the vicinity of sensitive receptors would represent a potentially significant impact if leaking gas reached the surface and accumulated inside area buildings.~~ and a northeast-southwest trending un-named fault traverses about 4000 feet south of the Well Pad Site. While it is unknown whether this fault intersects the gas storage formation, faults normally act as conduits or barriers to subsurface gas and liquid movement. Because the storage formation originally trapped and accumulated natural gas for millions of years, it can be assumed that either the storage formation is not in contact with the fault or that the fault acts as a barrier to the vertical movement of natural gas.

~~**Level of Significance Without Mitigation.** Without further testing and defined remediation implemented as mitigation, a potentially significant adverse impact could occur.~~

> ~~**Mitigation Measure 3.7-8.** During periodic well testing and leak surveys, evaluate the area overlying the documented faults along the southern field boundary. This will require installation of at least three permanent soil gas probes. Each probe would be monitored during routine leak surveys. If gas were detected in these probes, samples would be collected and analyzed to determine gas origin. All testing and sampling plans, along with probe design and installation procedures, will be submitted to a qualified member of the CPUC.~~

~~If storage gas is found leaking through the fault or fracture zone along the southern side of Wild Goose Field, storage activities would be reduced to restrict the volume of gas stored in the field until further investigations are conducted. New data from exploratory wells could be required in order to redefine storage reservoir boundaries near the fault or fracture zone area. Based on this new data and revised reservoir boundary conditions, allowable storage volumes would be reduced to prevent storage gas from reaching the fault zone and maintain an appropriate level of safety. All studies and remedial actions would be conducted under the supervision of DOGGR and CPUC technical staff (California Registered Geologist) with the appropriate background to evaluate gas migration through fault or fracture zones.~~

**P4-57**

Response The following mitigation measures and text were deleted as follows:

~~To account for the geologic permanent ground displacement potential, certain specific analyses are being requested below. Based on these determinations, the design shall include the following mitigation:~~

> ~~**Mitigation Measure 3.7-9.** The standard "monitored and maintained" seismic design approach would accept significant levels of plastic pipe strain for low probability design events and utilize post-earthquake review and inspection to~~

~~identify locations where permanent ground displacement induced (PGD-induced) damage may have occurred. Considering this approach, the Applicant shall prepare (prior to final project approval) a post-earthquake monitoring plan in which an accurate "as-built" base line of the pipeline geometry at/near know seismic hazards will be clearly identified. This plan shall become part of the existing Emergency Plan and will allow rapid response to the most probable damage areas in the event of a severe earthquake.~~

~~**Mitigation Measure 3.7-10.** All of the measures of pipe demand and capacity considered in Appendix A of the Kleinfelder report (2001e) are based on the failure condition (i.e., the loss of pressure integrity limit state). The loss of pressure integrity condition occurs in the post wrinkling condition, i.e., well beyond the peak in the moment curvature diagram. As the wrinkle forms, the moment capacity decreases with increasing curvature. Pipe curvature tends to concentrate in the wrinkle (sometimes referred to as "hinging") while the pipe on either side of the wrinkle tends to straighten and unload elastically. It is not necessary to account for hinging action in demand-capacity assessments that are limited to consideration of the incipient wrinkling limit state. This is because the concentration of curvature is still relatively limited. For all pipe deformation demand-capacity assessments, which make use of post-wrinkling demand-capacity measures, the Applicant shall account for the concentration of curvature at the wrinkle, because demand analyses, which do not include this hinging behavior, can significantly underestimate the pipe strain demand. The CPUC shall review and approve the analysis methodology in advance of its application to the final design.~~

~~**Mitigation Measure 3.7-11.** In addition to the seismic demand required to reach the loss of pressure integrity limit state, for all of the PGD analyses the Applicant shall incorporate into their final design different "damage" limit states (e.g., incipient wrinkling) that can occur well before the failure limit state is reached. The CPUC shall review and approve the analysis methodology in advance of its application to the final design.~~

~~**Mitigation Measure 3.7-12.** The PGD demand analyses for PGD parallel to and perpendicular to the pipe alignment discussed in Appendix A of the Kleinfelder report (2001e) are based on simplified hand or spreadsheet calculations methods. The Applicant shall utilize a rigorous analysis and design approach, nonlinear pipe-soil interaction analysis, for evaluating PGD effects for all but the simplest cases. The CPUC shall review and approve the analysis methodology in advance of its application to the final design.~~

~~**Mitigation Measure 3.7-13.** Further analysis by the Applicant of generic perpendicular PGD scenarios shall consider a range of soil block lengths (i.e., span lengths) rather than a single span length. The critical span length shall be considered the soil block length that generates the largest strain for given amplitude of a selected PGD profile.~~

~~**Mitigation Measure 3.7-14.** The Applicant shall provide a more formal limit states seismic design for the final pipeline design to the CPUC prior to final design. The framework of such a procedure shall include: identification of ultimate and serviceability limit states, application of appropriate load (demand) factors and load combinations, application of appropriate resistance (capacity) factors, structural analysis to calculate pipe deformation demand, and a demand-capacity comparison for each limit state of interest.~~

**P4-58**

Response Comment noted. The text in the last sentence under Flood Zones in Section 3.8, Hydrology has been amended as follows:

The most severe hazards within the project study area are located along the Colusa Trough and the ~~west~~ east side of the Butte Sink in the area of the Well Pad Site.

**P4-59**

Response Comment noted. The text in Mitigation Measure 3.8-2 has been amended for clarification of intent as follows:

**Mitigation Measure 3.8-2.** No hazardous or potentially hazardous materials shall be permanently stored on-site at the Well Pad Site as noted in the Water Pollution Prevention Plan and Hazardous Materials Release Response Plan for construction and operations.

**P4-60**

Response WGSI must investigate the potential for dewatering activities to affect groundwater supply at nearby wells. Without conducting an evaluation, WGSI cannot state, "Because of the limited scope of dewatering activities, there will be little, if any, potential to affect local wells." There is no data upon which to reach this conclusion. A hydro-geologic investigation, similar to a geotechnical investigation, should be conducted prior to implementing pipeline construction. Due to the restricted nature of proposed dewatering activities, the hydro-geologic investigation would be limited in scope.

**P4-61**

Response Comment noted. The text of Mitigation Measure 3.8-6 (re-numbered as 3.8-7) has been amended as follows to clarify the intent of the measure:

**Mitigation Measure 3.8-6.** ~~The berm around the Well Pad Site shall be designed to withstand exposure to flood water anticipated during~~ Since all equipment at the Well Pad Site is designed to withstand periodic inundation, it is not necessary for the berm to tolerate a 100 year and 500 year event. ~~Berm height shall be sufficiently high to exceed water surge. Berm design shall include measures to protect exposed surfaces from erosion and to minimize water seepage through the berm (internal erosion called piping).~~ As the berm is soley for visual screening and habitat it would be designed and constructed in accordance with guidelines and requirements set by the Reclamation Board, and discussed above in Responses A3-2 and A3-3.

**P4-62**

Response Comment noted. The MMRP is amended to include the WGSI Measure 3.10-2 as follows:

**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.

**P4-63**

Response WGSI Measure 3.10-5 has been amended as follows:

**WGSI Measure 3.10-5.** Limiting construction activities (excluding horizontal directional drilling) 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.

**P4-64**

Response Comment noted. The following text has been deleted from Section 3.12, Public Services Threshold of Significance section of the Public Services:

- **Cause a quantifiable reduction in the value of properties crossed by the pipeline or substantially impact the economies of those communities affected by the proposed project.** ~~If it can be shown that the proposed project would significantly diminish the property values of the lands crossed by the proposed project, this would be considered a significant impact. In addition, i~~If the proposed project adversely affects the local economies of communities within the project area this would be considered to be a significant impact.

**P4-65**

Response WGSI states that routine traffic associated with operations and maintenance activities would consist of light truck (pickup) access to the pipeline routes between 6 and 12 times per year for inspections and maintenance, with access limited by the hunting season and poor road conditions in the winter. The proposed mitigation measure does not assume that this routine operations maintenance would significantly affect roads. The measure was intended to cover those unusual instances in which maintenance needs to occur that requires heavy equipment that may damage roads. The parameters of when roads are checked or scheduled for repair due to maintenance damage, and other criteria for repair, would be delineated in the Operations Road Maintenance Plan.

**P4-66**

Response Comment noted. The MMRP is amended to include the Mitigation Measure 3.15-1 to be consistent with the DEIR analysis text as follows:

**Mitigation Measure 3.15-1.** WGSI shall coordinate with local (within Butte and Colusa County) wastewater treatment facilities to ensure adequate treatment capacity would be provided for the project if necessary. This would occur if the water produced from hydrostatic testing does not meet RWQCB General Permit standards for Dewatering and Other Low Threat Discharge to Surface Water.

**P4-67**

Response Comment noted. The text under Backbone Expansion in the Cumulative and Growth-Inducing Impacts section is amended for clarification as follows:

The Phase 1 hearings on the project have not established that an expansion of the PG&E backbone system would be necessary. Such an expansion may be necessary depending on PG&E's willingness to consider options to maximize the operational capabilities and capacity of the existing system. Expansion of the PG&E Backbone would likely require construction of a compressor station south of the Delevan interconnect site. The details associated with this possible expansion have not yet been defined. Potential impacts associated with an

additional compressor could include land use, noise, air quality, and aesthetics impacts, depending on the specific location of the compressor. These impacts would not be significant.

**P4-68**

Response The bulleted list under 6.2 Roles and Responsibilities in the MMRP is amended to include the following:

- Butte County of Environmental Health
- Colusa Office of Emergency Services

**P4-69**

Response The text under Level of Significance w/Mitigation in the MMRP for WGSI Measure 3.2-1 has been amended to read as follows:

~~Significant and unavoidable~~ Less than significant

**P4-70**

Response The text under Mitigation Measure in the MMRP for Impact 3.12-2 is amended as follows:

~~Refer to Mitigation Measure 3.15-1~~ None required

**P4-71**

Response The text under Mitigation Measure in the MMRP for Impact 3.15-5 is amended as follows:

~~None required~~ Refer to Mitigation Measure 3.15-1

# 4: MITIGATION, MONITORING AND REPORTING PROGRAM

## 4.1 Introduction

The purpose of this Mitigation, Monitoring, and Reporting Program (MMRP) is to summarize the mitigation, monitoring, and reporting process for the proposed WGSI Expansion Project and the role and responsibilities of the CPUC in ensuring the effective implementation of mitigation for potential adverse effects and cumulatively considerable effects.

This MMRP is a draft program, and will be finalized if the CPUC approves the project. At that time final mitigation measures will be incorporated into the program and the roles and responsibilities for their implementation refined.

## 4.2 Roles and Responsibilities

As the lead agency under CEQA, the CPUC is required to monitor the project to ensure that mitigation is undertaken and that it accomplishes the required levels of mitigation or compensation.

WGSI will have the responsibility for initiating implementation of all of the mitigation measures. Oversight of their implementation will be divided among a variety of agencies including:

- CPUC
- Butte County Agricultural Commissioner
- Colusa County Agricultural Commissioner

- California Department of Fish and Game
- Army Corps of Engineer
- Regional Water Quality Control Board
- US Fish and Wildlife Service
- Division of Oil, Gas, and Geothermal Resources
- Butte County Planning Department
- Department of Water Resources
- Department of Toxic Substance Control
- Butte County Public Works Department
- Colusa County Public Works Department
- Sutter County Public Works Department
- Local Fire Departments
- Local Sheriff's Departments
- California Highway Patrol

For overall coordination and responsibility, the CPUC and its representatives would coordinate with WGSI to ensure implementation and adequate monitoring of all mitigation measures through construction and operation.

## 4.3 Environmental Sectors and Mitigation

Construction, operation, and maintenance of the proposed WGSI Expansion Project could result in potentially significant environmental impacts. Mitigation measures identified in this EIR have been developed to reduce those potential impacts to a less than significant level. The one exception to this is the permanent loss of agricultural land, which has been determined to be significant and unavoidable.

The numbers of the mitigation measures summarized in Table 4.3-1 correspond with the mitigation measure numbers outlined in Section 3. Numbering of mitigation measures in the air quality section was corrected due to duplication in the DEIR. Numbering of mitigation measure in the hazards section was amended due to deletion of a measure in the FEIR. WGSI Measure 3.15-2 was included in this FEIR as the measure was inadvertently omitted in the DEIR.

**Table 4.3-1:** Draft Mitigation, Monitoring, and Reporting Program

| Aesthetics | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.1-1:** Potential for a substantial adverse effect on scenic vista. | **WGSI Measure 3.1-1.** Visual screening would accompany the proposed expansion of the Remote Facility Site. Annual surveys of the landscaping would be performed for five years in | Less than significant | CPUC, WGSI |

| Aesthetics | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | the fall of each year. During these surveys, an evaluation of the survivorship of each species and the effectiveness of the visual screening would be completed. Success of the screening would be based on how much of the physical site could be seen from West Liberty Road. | | |
| | | **WGSI Measure 3.1-2.** In wetlands and riparian areas, relatively rapid re-growth of riparian vegetation would ensure that visual evidence of pipeline construction would occur during only one or two growing seasons. The rapid re-vegetation in these areas may be attributed to replacement of topsoil (containing the seed base) following construction, the ample water in the wetlands, and the vigorous growth typical of wetland and riparian vegetation. On farmed lands, row crops may be planted following land clearing as soon as ROW is restored. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-3.** The markers would be installed at angle points in the alignment, near road crossings, and at inter-visible locations, to provide notice of the approximate location of the line. Although these markers must be visible to be effective as safety devices, they would be sufficiently spaced along the line so as not to result in a significant visual impact to the scenic vista. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-4.** All above ground features would be painted to blend in with the natural surroundings. Visual impacts due to clearing of vegetation and grading are | Less than significant | CPUC, WGSI |

| Aesthetics | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | considered to be less than significant with implementation of replanting measures included as part of the project. | | |
| | **Impact 3.1-2:** Potential to substantially degrade the existing visual character or quality of the site and its surroundings. | **WGSI Measure 3.1-5.** The lease with the Wild Goose Club stipulates that screening be provided around the Well Pad. In compliance with this stipulation, the existing landscape berm would be extended around the entire expanded Well Pad Site and landscaped similar to the existing vegetation. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-6.** All buildings and aboveground features would be painted the same neutral color as the existing buildings. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-7.** Site lighting would be hooded and directed toward the interior of the facility. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-8.** Building design of the expanded Remote Facility Site would emulate the existing facility. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-9.** If a main line block valve lot must be located on the Line 400/401 Connection Pipeline adjacent to or within the foreground of views of either of the two county-designated scenic highways, the circulation policies of the *Colusa County General Plan* require that it be set back as far as possible from the designated roadway and in a low-visibility area, if possible. WGSI would create a feasible set back in accordance with this policy. | Less than significant | CPUC, WGSI |
| | **Impact 3.1-3:** Potential to substantially damage | **WGSI Measure 3.1-10.** Valve lots would be placed as far | Less than significant | CPUC, WGSI |

| Aesthetics | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway. | back from the scenic highway as possible. | significant | |
| | | **WGSI Measure 3.1-11.** Wooden slats would be installed in the valve lot chain link fence for screening on the sides facing the road. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-12.** Site lighting would be low-profile and shrouded to direct light down and inside the valve lot. | Less than significant | CPUC, WGSI |
| | **Impact 3.1-4:** Potential to create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area. | **WGSI Measure 3.1-13.** Light glare from night construction at the Remote Facility Site would be mitigated by using smaller grinding wheels which produces smaller spark showers. | Less than significant | CPUC. WGSI |
| | | **WGSI Measure 3.1-14.** Directing all lighting down toward the work area, | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-15.** Installing shielding on the sides of the light fixtures to direct the light to the work area and limit off-site illumination. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-16.** Using light blocking material on the ends of the welding tents, and keeping lighting as near to the ground as practicable. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-17.** Installation of shielding on all light fixtures to direct light downward | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.1-18.** Use of low profile, shrouded light at the valve stations | Less than significant | CPUC, WGSI |

| Aesthetics | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | light at the valve stations | | |

| Agriculture | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.2-1:** Direct Conversion of Farmland to Non-Agricultural Use | **WGSI Measure 3.2-1.** Farmers shall be compensated for the loss of crops during construction of the proposed facilities. | Significant and unavoidable | CPUC. WGSI |
| | | **WGSI Measure 3.2-2**. Following construction, agricultural fields shall be surveyed and regraded to their original elevation where needed and all rice field dikes and check boxes will be repaired and/or replaced. Although the trench backfill in agricultural areas will be compacted to the original density to minimize settling (see Section 3.6 Geology), follow-up elevation surveys and finish grading will be provided, if necessary, to ensure that the field grading and irrigation flows are not adversely affected. Fences and irrigation facilities will be replaced or repaired to their original condition following construction. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.2-3.** Where required, farmers will be provided breaks in spoil piles, trenches, or pipe strings to accommodate their need for field access during construction. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.2-4.** Cattle grazing in the annual grasslands west of the Glenn-Colusa Canal will be excluded from the construction work area. This will be accomplished by a temporary solar-powered electric fence or other temporary fence along the | Less than significant | CPUC, WGSI |

| Agriculture | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | ROW and minimizing open pipeline trench, or the rancher may elect to move the cattle to another grazing area during construction. | | |
| | | **WGSI Measure 3.2-5.** The installation of Line 400 Connection Pipeline with ~~up to~~ a minimum of five feet of cover in agricultural areas will allow virtually all plowing and ripping practices currently utilized by farmers in the area. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.2-1.** WGSI shall provide for drainage and irrigation water flow to continue by installing necessary pipes, valves, check dams, berms and dikes in strategic places in cooperation with landowners, farmers and ranchers. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.2-2.** To mitigate restriction of access to Farmlands, WGSI shall, with proper construction practices, provide notice to affected farmers and/or ranchers, and access for the framers to communicate with the applicant's construction team on a 24-hour basis. Phone numbers shall be provided on a "hot-line" basis to remedy any such problems before they create losses. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.2-3.** All restricted pesticide permit requirements as issued by the Butte County and Colusa County Agricultural Commissioner's offices shall be followed. WGSI shall coordinate with the landowner and both counties to assure that all permit requirements are met without unduly affecting or | Less than significant | CPUC. WGSI, Butte County and Colusa County Agricultural Commissioner |

| Agriculture | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | restricting the agricultural operations. These operations depend on timing of crop treatment to successfully bring crops to harvest. Construction workers may be required to work in other locations during pesticide application periods if the farmer is unable to apply pesticides outside of normal construction hours. The construction manager shall coordinate construction scheduling with the pesticide applicator to ensure compatibility. | | |
| | | **Mitigation Measure 3.2-4.** Temporary fencing shall be provided in the grazing areas near the Well Pad Site to prevent livestock from straying into the construction areas and to maintain temporary pasture boundaries. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.2-5.** Topsoil and subsoil removed during construction activities shall be separated and stockpiled in appropriate locations along the edge of ROW. All soil shall be replaced during backfilling and recontouring at the end of construction with topsoil being replaced last. On-site monitoring shall be conducted to ensure that stockpiling does occur, that topsoil and subsoil are stockpiled separately, that stockpiling is done so that there are no resulting adverse impacts to other farming activities (particularly in orchard areas), and that both subsoil and then topsoil is properly replaced. All construction trench and bore pit spoils shall be placed outside the driplines of all orchard trees | Less than significant | CPUC, WGSI |

| Agriculture | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | and other trees shall be removed within 72 hours of placement. | | |
| | | ~~**Mitigation Measure 3.2-6.** Impacts from the Remote Facility expansion shall be reduced by positioning block valves at the perimeter of cropland areas so that interference with planting, tillage, and harvesting is minimized.~~ | ~~Less than significant~~ | ~~CPUC, WGSI~~ |
| | **Impact 3.2-2:** Potential conflict with Existing Designated Land Uses | **Mitigation Measure 3.2-~~7~~6.** WGSI shall submit payment of fair market value for crops removed from production by construction or operation of the project. | Less than significant | CPUC. WGSI |
| | **Impact 3.2-3:** Indirect Conversion of Farmland to Non-Agricultural Use | **Mitigation Measure 3.2-~~8~~7.** Silt fencing and/or straw bale barriers shall be placed as necessary along the edge of ROW where it abuts or bisects agricultural fields to prevent silt-laden runoff and wet soil sloughing from occurring outside the ROW area. The WGSI construction manager(s) shall coordinate closely with farmers and property owners to ensure that construction crews have sufficient advance notice of scheduled pesticide spraying days to allow workers to be relocated to an unaffected part of the project on those days. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.2-~~9~~8.** On-site monitoring during these activities and sufficient use of water trucks for spraying dust-generating areas (ROW, access roads, pads, staging areas, etc.) shall be performed to mitigate this potential impact to less than significant levels. Pre-planning for water truck | Less than significant | CPUC, WGSI |

| Agriculture | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | scheduling shall be required during construction activities, and training and monitoring of construction and water truck crews shall also be required. | | |
| | | **Mitigation Measure 3.2-~~10~~9.** If any organic crops are grown along access roads or ROW areas, monitoring shall be performed to assess conditions prior to construction, and WGSI shall control any increase of noxious weed growth for the growing season after construction is completed. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.2-~~12~~10.** To mitigate significant adverse effects on cattle grazing, WGSI ~~shall provide two cattle water troughs, one north and another south of the ROW from west of the Glenn-Colusa Canal to the Delevan Compressor Station.~~ locate or relocate cattle water troughs where needed in cooperation with the ranchers needs for livestock water if existing water supplies or livestock access is curtailed by construction activities. | Less than significant | CPUC, WGSI |

| Air Quality | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.3-1:** Potential to Conflict with or Obstruct Implementation of the Applicable Air Quality Plan. | None required | | |
| | **Impact 3.3-2:** Potential to Violate Any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation | **WGSI Measure 3.3-1.** Workers, excluding welders and construction supervisors, will be bussed from staging areas to the daily pipeline work site to minimize emissions from | Less than significant | CPUC, WGSI |

| Air Quality | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | workers' vehicles. | | |
| | | **WGSI Measure 3.3-2.** Car-pooling will be encouraged among construction workers through contractor bid specifications and project orientation training for workers. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.3-3.** Vehicles used in construction activities will be tuned per the manufacturer's recommended maintenance schedule, or at least annually thereafter. | Less than significant | CPUC, WGSI |
| | | **WGSI 3.3-4.** Beginning with the initial clearing and continuing until the disturbed area is restored, water will be applied to disturbed areas as necessary to reduce dust when vehicle traffic is present. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.3-5.** If construction of the Line 400 /401 Connection Pipeline along the orchards near the Sacramento River must occur during the growing season (anytime between bud break and the conclusion of harvest), additional water will be applied as necessary to minimize dust or vehicle speeds will be limited to 15 mph. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.3-6.** Construction vehicles will use paved roads to access the ROW wherever possible. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.3-7.** Any soil or mud deposited by construction equipment on paved roads near the egress from unpaved areas will be removed on a daily basis. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.3-8.** Following the completion of construction, disturbed areas | Less than significant | CPUC, WGSI |

| Air Quality | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | will be stabilized as prescribed in the Restoration and Monitoring Plan. | | |
| | | **WGSI Measure 3.3-9.** Valves and flanges will be subject to a leak test following installation and following any maintenance on the valve. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.3-10.** Welded connections will be used to the extent feasible to minimize the number of flanges. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.3-11.** Unless necessitated by specific design requirements or valve location limitations, pipeline pressure valve actuators will not be used by WGSI. Pneumatic valve actuators are presently powered by compressed air. PG&E may use natural gas valve actuators on its portions of the Interconnect Sites, and WGSI may use similar actuators for its main line block valve(s) if they must be remotely operated. However, the remote location of these facilities should preclude any odor impacts. | Less than significant | CPUC, WGSI |
| | | **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. | Less than significant | CPUC, WGSI |
| | | **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. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.3-3.** Open haul trucks will be covered with tarps both on | Less than significant | CPUC, WGSI |

| Air Quality | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | and off the work site. | | |
| | | **Mitigation Measure 3.3-4.** WGSI shall ~~construct an area to wash all heavy equipment vehicle tires before entering paved roadways~~ stabilize the construction access points with 6 inches of gravel to remove mud from construction equipment prior to entering paved roads. | Less than significant | CPUC, WGSI |
| | | **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). | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.3-~~5~~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. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.3-~~6~~7.** Land clearing, grading, earth moving or excavation activities shall be suspended when winds exceed 20 miles per hour within the project area. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.3-~~7~~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). | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.3-~~8~~9.** WGSI shall cover all inactive storage piles during construction and operation of the proposed project. | Less than significant | CPUC, WGSI |

| Air Quality | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | **Mitigation Measure 3.3-~~9~~10.** WGSI shall post a publicly visible sign with the telephone number and person to contact regarding dust complaints at all major construction ~~and operation~~ 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). | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.3-~~10~~11.** Prior to final occupancy, the applicant shall demonstrate that all ground surfaces have been covered or treated sufficiently to minimize fugitive dust emissions. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.3-~~11~~12.** WGSI shall use fleet vehicles that use clean-burning fuels as may be practical. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.3-~~12~~13:** WGSI shall use non-toxic ~~binders~~ chemical soil stabilizers exposed areas after cut and fill operation and by hydroseed areas. | Less than significant | CPUC, WGSI |
| | **Impact 3.3-3:** Potential to 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) | ~~None required.~~ | | |
| | | **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 | Less than significant | CPUC, WGSI |

| Air Quality | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | 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:<br>1. At 20% of the heavy-duty off-road equipment included in the inventory should be powered by EPA/CARB certified off-road engines, as follows:<br>a. 175 hp-750hp 1996 and newer engines<br>b. 100 hp-174hp 1997 and newer engines<br>c. 50hp-99hp 1998 and newer engines<br>Alternatively, equivalent emission reductions may be achieved by engine retrofit technology, exhaust filtration and low-sulfur diesel fuel, emulsified diesel fuels, or other CARB verified or certified technology. The District should be contacted to discuss alternative strategies.<br>2. Construction equipment exhaust emissions shall not exceed BCAQMD Rule 202 Visible Emission limitations.<br>3. The primary | | |

| Air Quality | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | contractor shall be responsible to ensure all construction equipment is properly tuned and maintained.<br>4. Utilize existing power sources (e.g. power poles) or clean fuel generator rather than temporary power generators.<br>5. Minimize idling time to 10 minutes.<br>6. 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. | | |
| | **Impact 3.3-4:** Potential to Expose Sensitive Receptors to Substantial Pollutant Concentrations | None required. | | |
| | **Impact 3.3-5:** Potential to Create Objectionable Odors Affecting a Substantial Number of People | None required. | | |

| Biology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | **Impact 3.4-1:** Potential for disturbance or elimination of native vegetation during vegetation management activities | **Mitigation 3.4-1.** WGSI shall develop and implement an Integrated Vegetation Management Plan | Less than significant | CPUC, WGSI, CDFG |
| | **Impact 3.4-2:** Potential for vegetation clearing and soil grading to disturb or eliminate local populations of two special-status plants species - California hibiscus and little mousetail. | **Mitigation 3.4-2 (a).** Preconstruction surveys for California hibiscus and little mousetail will be initiated by WGSI. | Less than significant | CPUC, WGSI, CDFG |
| | | **Mitigation 3.4-2(b).** Populations of California hibiscus and little mousetail shall be avoided and protected by WGSI | Less than significant | CPUC, WGSI, CDFG |
| | | **Mitigation 3.4-2(c).** If avoidance of populations of California hibiscus or little mousetail is not feasible, WSGI shall implement compensatory habitat restoration | Less than significant | CPUC, WGSI, CDFG |
| | **Impact 3.4-3:** Potential for temporary disturbance of riparian habitat. | **Mitigation 3.4-3(a).** Trees within the pipeline ROW shall be avoided during construction. | Less than significant | CPUC, WGSI, CDFG |
| | | **Mitigation 3.4-3(b).** Soil compaction and excavation within the ~~root zone (root zone = 15 feet beyond the drip line of the canopy or tree crown)~~ Critical Root Zone (CRZ) shall be minimized and protected by appropriate buffers. | Less than significant | CPUC, WGSI, CDFG |
| | | **Mitigation 3.4-3(c).** If tree roots must be severed or exposed; protective treatments to prevent root drying will be implemented. | Less than significant | CPUC, WGSI, CDFG |

| Biology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | **Mitigation 3.4-3(d).** Riparian scrub vegetation disturbed at water crossings shall be restored | Less than significant | CPUC, WGSI, CDFG |
| | **Impact 3.4-4:** Potential for loss and conversion of wetlands. | **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 | Less than significant | CPUC, WGSI, Army Corps, RWQCB |
| | **Impact 3.4-5:** Potential to convert freshwater marsh and wet meadow wetlands to other wetland types. | **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 | Less than significant | CPUC, WGSI, Army Corps, RWQCB |
| | **Impact 3.4-6:** Potential for effects on the habitat of special-status fish species. | **Mitigation 3.4-6(a).** Drilling of channel crossing bores would be scheduled, as directed by the responsible state and federal resource agencies, to avoid, to the extent possible, the spawning periods of special-status fish. | Less than significant | CPUC, WGSI, Army Corps, USFWS, DWR |
| | | **Mitigation 3.4-6(b).** Best Management Practices would be employed to Avoid or Minimize the Discharge of Drilling Mud or Hazardous Materials | Less than significant | CPUC, WGSI, Army Corps, USFWS, RWQCB |
| | **Impact 3.4-7:** Potential for water withdrawals from perennial streams to adversely affect downstream fisheries and aquatic life. | **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 | Less than significant | CPUC, WGSI, USFWS |
| | **Impact 3.4-8:** Potential for effects to special-status wildlife species from project construction. | **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. | Less than significant | CPUC, WGSI, USFWS |
| | | **Mitigation 3.4-8(b).** Preconstruction surveys | Less than significant | CPUC, WGSI, USFWS |

| Biology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | 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. | significant | USFWS |
| | | **Mitigation 3.4-8(c).** Preconstruction surveys for northwestern pond turtle shall be conducted and impact avoidance and species protection procedures shall be implemented | Less than significant | CPUC, WGSI, USFWS |
| | | **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. | Less than significant | CPUC, WGSI, USFWS |
| | | **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. | Less than significant | CPUC, WGSI, USFWS |
| | | **Mitigation 3.4-8(f).** Preconstruction surveys for Western yellow-billed cuckoo shall be conducted and construction activities shall be scheduled to avoid impacts to nest sites | Less than significant | CPUC, WGSI, USFWS |
| | | **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. | Less than significant | CPUC, WGSI, USFWS |
| | | **Mitigation 3.4-8(h).** Preconstruction surveys for American bittern shall be conducted and if present, nest sites shall be protected by appropriate buffers | Less than significant | CPUC, WGSI, USFWS |

| Biology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | during construction. | | |
| | | **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. | Less than significant | CPUC, WGSI, USFWS |
| | | **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. | Less than significant | CPUC, WGSI, USFWS |
| | | **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. | Less than significant | CPUC, WGSI, USFWS |
| | | **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. | Less than significant | CPUC, WGSI, USFWS |
| | | **Mitigation 3.4-8(m).** Protective measures will be implemented to prevent Bank swallow nesting in potentially high impact construction zones | Less than significant | CPUC, WGSI, USFWS |
| | | **Mitigation 3.4-8(n).** Preconstruction surveys for elderberry shrubs shall be initiated by WSGI and, as appropriate, avoidance through project redesign shall be implemented. | Less than significant | CPUC, WGSI, USFWS |
| | **Impact 3.4-9:** Exposed pipeline trenches or bores could pose a barrier to wildlife movement and result in increased wildlife mortality. | None required. | | |

| Biology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | **Impact 3.4-10:** Potential exposure of nesting birds to sudden noise emissions greater than ambient noise levels | **Mitigation 3.4-10(a).** WGSI will schedule blowdowns at the Sacramento River to avoid impacts to sensitive bird species (see WSGI Measure 3.10-4). | Less than significant | CPUC, WGSI, USFWS |
| | | **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). | | |
| | **Impact 3.4-11:** Potential introduction and spread of noxious weeds | **Mitigation 3.4-11(a).** WGSI will implement an equipment-washing program to control the introduction and potential spread of noxious weeds.<br>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. | Less than significant | CPUC, WGSI |
| | | **Mitigation 3.4-11(b).** WSGI shall implement a weed eradication program if weeds are introduced to construction areas.<br>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 | Less than significant | CPUC, WGSI |

| Biology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | 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. | | |
| **Cultural Resources** | **Impact** | **Mitigation Measure** | **Level of Significance w/ Mitigation** | **Responsible Party** |
| | **Impact 3.5-1:** Potential for Loss of Integrity and/or Alteration of Identified Resources Potentially Eligible for the NRHP and CRHR. | **WGSI Measure 3.5-1.** WGSI shall seek to avoid cultural resources as the preferred mitigation measure. Avoidance of cultural resources would result in less-than-significant levels of impacts to identified cultural resources. The pipelines would be buried and construction techniques would avoid any of the known cultural resources by boring under the resources (e.g. canal/levee). If the resources cannot be avoided then documentation and data recovery efforts consistent with Section 5, Archaeological Data Recovery Plan in HPMP would be implemented to reduce impacts to less than significant levels. Historic resource mitigation measures may include further study to evaluate the sites, detailed recording, and/or excavation. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.5-2:** Protection measures for NRHP or CRHR eligible sites would be implemented prior to any subsurface | Less than significant | CPUC, WGSI |

| Cultural Resources | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | disturbance. This may include a passive protection program (e.g. barrier fencing, signage, etc), construction personnel education, and/or archaeological monitoring. To ensure that no inadvertent damage occurs to avoided cultural resources, the cultural resource boundaries shall be marked as exclusion zones both on the ground and on construction maps. Construction supervisory personnel shall be notified of the existence of these resources and required to keep personnel and equipment away from these areas. A WGSI-assigned qualified archeologist shall be notified prior to initiation of construction activities. Periodic monitoring of cultural resources to be avoided shall be completed by a qualified archeologist to ensure that no inadvertent damage to the resources occurs as a result of construction or construction-related activities. The timing and frequency of this monitoring shall be at the discretion of the archaeologist. | | |
| | | **WGSI Measure 3.5-3.** Language would be included in the General Specifications section of any subsurface construction contracts regarding trespass on known or potential cultural resources. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.5-1.** The contractor shall observe ~~reclamation district~~ the local district and the State Reclamation Board requirement that a minimum distance of ~~15 feet be~~ | Less than significant | CPUC, WGSI |

| Cultural Resources | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | ~~maintained between the toe of any canal/levee and the construction right-of-way to or 10-foot distance indicated in Section 7.1 Resource Protection of the HPMP (whichever is applicable)~~ 10-foot setback from the landward side of the levee toe or canal for any excavation activity to insure protection of the resources. | | |
| | | **Mitigation Measure 3.5-2:** The project proponent shall retain a qualified archaeologist to conduct the appropriate studies as required by the HPMP. Qualifications for the archaeologist would be consistent with those found in the HPMP. | Less than significant | CPUC, WGSI |
| | **Impact 3.5-2:** Potential for Disturbance to Previously Unidentified Cultural Resources during Project Construction, Operations, and Maintenance. | **WGSI Measure 3.5-4.** WGSI shall complete the remaining inventory of unsurveyed areas 60 days prior to the start of construction. This would include the reported location of the prehistoric site which, as of January 2002, is inundated. Any design changes that cause a change in the alignment would be inventoried at least 60 days prior to construction. A final report would be completed. Field survey methods and reporting would be consistent with the terms and conditions found in Section 6, Project Changes of the HPMP. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.5-3.** Prior to the initiation of construction or ground disturbing activities, all construction personnel shall be alerted to the possibility of buried cultural remains, including prehistoric and/or historic resources. Personnel shall be instructed that upon discovery of buried cultural | Less than significant | CPUC, WGSI |

| Cultural Resources | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | materials, work in the immediate area of the find shall be immediately halted and the WGSI project manager shall be notified. Once the find has been identified by a qualified archaeologist, then archaeologist, in conjunction with the WGSI project manager, shall make the necessary plans for treatment of the find(s) and for the evaluation and mitigation of impacts consistent with Section 7.3, Discoveries During Construction of HPMP. If the resource is found to be eligible for the NRHP or CRHP, the WGSI Mitigation Measures 3.5-1 through 3.5-3 would apply. | | |
| | | **Mitigation Measure 3.5-4.** If buried human remains are encountered during construction, work shall be immediately halted, and the appropriate state or county agency and county coroner shall be immediately notified. If the remains are determined to be Native American, then the Native American Heritage Commission (NAHC) would be notified within 24 hours as required by Public Resources Code 5097. The NAHC shall designate a Most Likely Descendants that would provide recommendations for the treatment of the remains within 24 hours. Protection procedures would follow those found in Section 7.4, Discovery of Native American Skeletal Remains and Appendix 1, Native American Burial Plan of the HPMP. | Less than significant | CPUC, WGSI |
| | **Impact 3.5-3: Potential for a disturbance to a** | **WGSI Measure 3.5-5:** Geologic units , which based | Less than significant | CPUC, WGSI |

| Cultural Resources | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | **for a disturbance to a unique paleontological resource or site or unique geologic feature.** | Geologic units , which based on their general lithologic features (e.g. grain size, primary features, color, secondary minerals), hold potential to yield vertebrate fossils but have not produced known fossils in the general vicinity of the project area would be spot monitored during the course of any major excavation, including trenches, bore pits, or site preparation for other project-related facilities. Scheduling for this monitoring shall be arranged by the paleontologist in charge of this phase of the project in light of expected construction scheduling details, including the number and distribution of excavating crews and equipment, proposed rate of trenching, lag time between excavation and pipe laying/backfilling, and other factors which may impose limits on access to potentially fossil-bearing sediments or sedimentary rocks. The paleontologic monitor would be present at the beginning of excavation into each named geologic unit and *at least* one day per week per active excavation site thereafter unless factors favoring closer scheduling appear during the course of the project. | significant | |
| | | **WGSI Measure 3.5-6:** The assigned monitor would periodically examine in close detail at least one 100-square-foot sample area of the spoils pile surface, and note the presence or absence of very small fossils, within each half-mile along trench lines and at each larger excavation through sensitive | Less than significant | CPUC, WGSI |

| Cultural Resources | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | paleontologic formations.<br><br>If bones, teeth, or other significant fossils appear in these sample areas, an attempt would be made to locate their stratigraphic source level and to collect at least 1,000 pounds of sediment from that level. Bulk samples also require the same detailed documentation as isolated fossil specimens described above.<br><br>Processing the bulk sediment to recover additional small fossils may begin on- or off-site, and may involve dry or wet screening, heavy liquid separation, and hand-picking of concentrate. Wet screening and heavy liquid separation would be done in a manner that precludes sediment-laden runoff from leaving the ROW. | | |
| | | **WGSI Measure 3.5-7.** Pre-arranged agreements would be made to ensure that any significant fossils discovered during the project would be incorporated into established paleontological collections in a public research or educational institution supporting such collections. | Less than significant | CPUC, WGSI |

| Geology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | **Impact 3.6-1.1:** Potential for Effects from Faulting or Uplift. | **Mitigation Measure 3.6-1:** The Applicant shall assess the pipeline response to surface faulting or uplift using a detailed nonlinear pipe-soil interaction analysis model for a case-specific evaluation of the Willows fault crossing. ~~The model shall consider different possible fault offsets (or local~~ | Less than significant | CPUC, WGSI |

| Geology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | ~~uplifts) and slip vectors, different fault crossing geometries, different wall thickness and different steel grades for the selected pipeline diameter. The analysis shall consider both the fault offset required to reach the failure (loss of pressure integrity) limit state and to reach the damage limit states (i.e., incipient wrinkling) as a measure of the fault crossing design performance. A detailed plan for the analysis shall be prepared for review by the CPUC (or its designated consultants) and the analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section within a reasonable distance (to be reviewed and approved by the CPUC or its designated consultants) of the projected location of the Willows fault and the mapped anticlinal feature adjacent to the Sacramento River.~~ The pipeline shall be designed within the area of influence of the Willows Fault to withstand a discrete displacement of 1.1m along dip (reverse, East Side up) with 50 % strike slip component, or 0.55m, at a depth of 1600 feet below the ground surface. The analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan in Appendix S. The pipeline shall be designed to mitigate stresses due to faulting or uplift such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain | | |

| Geology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan (Appendix T) the appropriate actions will be initiated. | | |
| | **Impact 3.6-1.2:** Potential for Effects from Strong Seismic Ground Shaking. | **Mitigation Measure 3.6-2:** The Applicant ~~shall provide the CPUC with a plan to analyze pipeline response to ground shaking and traveling wave effects based on the unique geologic conditions along the pipeline routes (Line 400/401 and the Loop Pipeline) and the conservative levels of groundshaking determined by Kleinfelder. The CPUC shall review and approve a final analysis plan prior to final design.~~ analyze the pipeline response to seismic strong ground shaking and resulting traveling wave effects. Analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan and will be based on the unique geologic conditions along the pipeline route (Line 400/401 Connection and Storage Loop Pipeline) and the conservative levels of ground shaking previously determined by Kleinfelder (Kleinfelder 2001e, pp. 20-23). The pipeline shall be designed to mitigate stresses due to strong ground motion and resulting traveling wave effects such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic | Less than significant | CPUC, WGSI |

| Geology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated. | | |
| | **Impact 3.6-1.3:** Potential to Expose People or Structures to Effects from Liquefaction and Dynamic Compaction | **Mitigation Measure 3.6-3.** At the Sacramento River crossing, ~~T~~the Applicant shall ~~drill new borings at the final Sacramento River crossing site, using the drilling and sampling techniques recommended by Martin and Lew (1999). These borings shall be performed at the locations with possibly the thickest liquefiable soil deposits, to confirm the SPT blow counts measured (with or without sample rings and considering gravel) and the estimates of liquefaction-induced settlements and lateral deformations. It is possible that the additional field investigation scope may be reduced if a parametric/sensitivity analysis can be performed to investigate the effects of possible lower blow counts and thicker liquefiable soil layers on the liquefaction-induced hazards discussed in Appendix A (Kleinfelder, 2001c). A detailed plan for the drilling, sampling, and analysis shall be prepared for review by the CPUC (or its designated consultants) and the analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section within a reasonable distance (to be reviewed and approved by the CPUC or its designated consultants) of the Sacramento River crossing.~~ perform a | Less than significant | CPUC, WGSI |

| Geology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | sensitivity analysis to investigate the effects of possible lower blow counts and thicker liquefiable soil layers on permanent ground deformation and resulting pipe stresses. Analysis shall be performed in accordance with the Seismic Hazard Analysis Workplan and will incorporate conservative estimates of liquefiable layer depth and blow count factors. The pipeline shall be designed to mitigate stresses due to permanent ground deformation associated with liquefaction and dynamic compaction such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated.<br><br>**Mitigation Measure 3.6-4**. For the entire pipeline, the ~~The~~ Applicant shall ~~compile~~ obtain data in ~~City, State, or County files, and to obtain new data on shallow water levels and the density of shallow geologic materials so that a broad-area assessment of areas with potential for liquefaction along the pipeline alignment can be made. Results of the analysis shall be used in the design of the pipeline section crossing identified potentially liquefaction-prone areas (to be reviewed and approved by the CPUC or its designated consultants).~~ terms of shallow geologic materials | | CPUC, WGSI |

| Geology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | from published California Geological Survey, CGS (formerly California Division of Mines and Geology, CDMG), geologic maps along the pipeline alignment. In addition, the Applicant shall obtain data for the approximate shallow groundwater levels from the State and County files along the pipeline alignment, or assume near surface soils are saturated. The combination of shallow groundwater, shallow Holocene geologic materials, and the conservative levels of ground shaking previously determined by Kleinfelder (Kleinfelder 2001e, pp. 20-23) shall be combined to indicate areas of liquefaction susceptibility. The Applicant shall employ the same techniques as used by CGS in assessing the areas of low, moderate and high liquefaction susceptibility. The pipeline shall be designed to mitigate stresses due to permanent ground deformation associated with liquefaction and dynamic compaction such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated. | | |
| | **Impact 3.6-1.4:** Potential to Expose People or Structures to Adverse Effects from Liquefaction and Cause Lateral Spread Landslides | **Mitigation Measure 3.6-5:** After performing the liquefaction analysis in Mitigation Measure 3.6-3, ~~The~~ the Applicant shall ~~complete Mitigation~~ | | CPUC, WGSI |

| Geology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | Landslides | ~~Measure 3.6-3 above, including drilling new borings in areas adjacent to the final Sacramento River crossing site, where lateral spreading landslides are most likely to occur based on topography.~~ evaluate lateral spreading due to liquefaction at the Sacramento River crossing. Initially the potentially for lateral spreading and landslides shall be evaluated using semi-empirical calculation methods by Youd and Garris (1995). If lateral spreading is predicted to occur and the pipeline is within the zone of lateral spreading, then the pipeline will be evaluated using a detailed nonlinear pipe-soil interaction analysis model in accordance with the Seismic Hazard Analysis Workplan in Appendix F. The pipeline shall be designed to mitigate stresses due to permanent ground deformation associated with liquefaction and dynamic compaction such that these stresses remain at or below the following acceptance criteria: longitudinal pipeline strain in tension of 4%, longitudinal pipeline strain in compression for 30-inch pipeline of 2.6%, ovality of 15%. In addition, if a seismic event exceeds the criteria established in the Post Seismic Pipeline Inspection Plan the appropriate actions will be initiated. | | |
| | **Impact 3.6-2:** Potential for Soil Erosion or the Loss of Topsoil | None required. | | |
| | **Impact 3.6-3:** Potential for Impacts due to Unstable Soils or | None required. | | |

| Geology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | Subsidence | | | |
| | **Impact 3.6-4:** Potential for Effects Related to Expansive Soils | None required. | | |
| | ~~**Impact 3.6-5:** Potential for Effects to Extraction of Mineral Resources~~ | ~~**Mitigation Measures 3.6-6:** The Applicant shall undertake and complete a modeling study to define possible in-steam mining and floodplain mining scenarios and the potential impacts of the scenarios on the pipeline at the preferred depths. Based on the modeling study the final depth of burial below the river bottom shall be determined. A plan for the modeling study shall be prepared for review by the CPUC. The analysis methodology shall be approved by the CPUC prior to the Applicant preparing the analysis. Results of the analysis shall be used in the design of the pipeline section crossing the Sacramento River (to be reviewed and approved by the CPUC).~~ | ~~Less than significant~~ | ~~CPUC, WGSI~~ |
| | **Impact 3.6-6:** Potential to Overcover or Preclude Extraction of Natural Gas or Sand and Gravel Mineral Resources | None required. | | |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | **Impact 3.7-1:** Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials | None required. | | |
| | **Impact 3.7-2:** Create a significant hazard to the public or the | **WGSI Measure 3.7-1.** WGSI would initiate a program to locate each previously | Less than significant | CPUC, WGSI |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment | locate each previously abandoned and documented well in the field and place permanent markers at these locations. | | |
| | | **Mitigation Measure 3.7-1.** WGSI will ~~submit core sample analysis protocols to the CPUC technical team for review and approval prior to conducting tests on new core samples.~~ implement the following protocols for the coring process, preservation, handling and testing:<br><br>~~Test data on new core samples will be submitted to the CPUC technical team for review. If new data indicates that cap rock strength is different (substantially lower) than indicated by previous tests, operating and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR safety guidelines.~~<br><br>**Core Preservation and Transport**<br><br>• Cores should be cut into five foot lengths or shorter in PVC core tubes upon extrusion from the core barrel at the wellsite. Avoid bending long, unsupported core lengths during handling.<br>• The individual core lengths should be capped with plastic end caps and sealed with ample duct tape or equivalent.<br>• Freezing: Not recommended for argillaceous rocks; optional for poorly | Less than significant | CPUC, WGSI, DOGGR |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | cemented, unconsolidated sandstones (injection gel is also an option for weak sandstones).<br>• Transport the core lengths in their PVC tubes, packed and bound securely into core boxes or special racks such that they cannot move or rotate. Minimize time elapsed from rig floor to testing laboratory.<br>**Core Handling and Logging at the Testing Laboratory**<br>• Commence core logging, sampling and preservation as soon as possible upon arrival at the testing laboratory.<br>• X-ray the cores to assess quality and identify defects.<br>• Run a core gamma log.<br>• Unwrap ends, split core tube by making two cuts at 180°.<br>• Conduct geological analyses (e.g. lithology, fractures, other potentially weak discontinuities) and core photography as quickly as possible; minimize the number of tubes cut open at any given time; select samples to be used for future testing promptly so they can be preserved.<br>• If possible, do not slab core samples to be used for mechanical properties testing and caprock analysis.<br>• Wrap the samples selected for preservation in plastic wrap and several layers of aluminum foil; seal the samples by immersing in hot wax. | | |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | • Select smaller grab samples from each tube and store in plastic zip-lock bags for possible future testing such as X-ray diffraction.<br>**Core Sampling**<br>• Drill plugs from preserved cores as required for the testing program; optional - use frozen nitrogen for weak sandstone samples.<br>• Apply the minimum axial force possible and use slow rotation speeds when drilling plugs from weak core samples.<br>• Take several core plugs for paleomagnetic analysis to orient selected segments of the core. Core orientation is required to obtain strike data for features such as natural fractures, bedding or other discontinuities identified in the core.<br>**Core Testing**<br>• For tests to be conducted at stressed conditions, calculate a confining stress representative of in-situ conditions. For example, at a depth of 2900 ft (approximate L1 unit caprock depth), the mean effective in-situ stress is estimated to be 1220 psi. This estimate is based on an overburden stress gradient of 0.89 psi/ft, maximum and minimum horizontal stress gradients of 0.89 and 0.80 psi/ft, respectively, and a formation pressure gradient of 0.44 psi/ft.<br>• X-ray Diffraction – to determine clay mineralogy<br>– Use small grab samples | | |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | • Triaxial Compression – to determine static elastic and rock strength properties<br>– Conduct a minimum of four compression tests at different confining stresses (from very low values up to the mean effective in-situ stress)<br>– Use full-diameter samples if possible (2:1 length to diameter ratio)<br>– Additional properties can also be measured if required (e.g., stressed sonic velocities, dynamic elastic moduli, residual strength properties).<br>• Caprock Analysis – to determine nitrogen gas threshold pressures<br>– At a confining stress representative of in-situ conditions<br>– Use full-diameter samples if possible<br>– Mercury Injection Capillary Pressure – for displacement pressures and pore size data<br>• Pulse Decay Permeability – to determine gas permeability at in-situ conditions for very low permeability rocks<br>– At a confining stress representative of in-situ conditions<br>– Use preserved core plugs<br>– Test at native saturation state<br>– Routine Core Analyses– to determine porosity, saturations and particle size distributions.<br>WGSI will submit all test results on new core samples for the L1, U1 and U2 intervals to the DOGGR | | |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | immediately following the tests. If new data indicates that the cap rock quality is different (substantially lower) than indicated by previous tests, operating and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR safety guidelines. | | |
| | | ~~**Mitigation Measure 3.7-2.** WGSI will conduct in-situ stress tests of the project relevant cap rock intervals in at least one well when drilled. If in-situ stress tests results are not consistent with core sample test results, re-evaluation of operating pressures may be necessary. If in-situ stress tests indicate that cap rock strength is substantially less than currently believed, operating and injection pressures would be reduced to maintain an appropriate level of safety consistent with DOGGR guidelines.~~ | ~~Less than significant~~ | ~~CPUC, WGSI, DOGGR~~ |
| | | **Mitigation Measure 3.7-~~3~~2.** The Brady #1-20 shall be inspected and tested ~~immediately~~ during summer 2002 to ascertain its condition. This well shall be located and soil surrounding it excavated to expose the well casing. An attempt should be made to tap (drill a small hole) the plate welded onto the casing, and ~~test for gas~~ if gas is present, a sample will be collected for further analysis. ~~If gas were present, a sample would be extracted and collected for further analysis.~~ Depending on gas origin, if present, appropriate remedial actions (re-abandonment) would be implemented. ~~Routine~~ | Less than significant | CPUC, WGSI, DOGGR |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | ~~inspection, monitoring and testing of this well would continue for the duration of the gas storage operation. WGSI shall prepare a report of investigation and remedial actions taken. This report shall be submitted to the CPUC and DOGGR prior to initiating gas storage activities in additional storage zones. Annual inspection of this abandoned well would be included as part of the WGSI inspection program. Annual reports would be submitted to CPUC and DOGGR upon inspection completion. With these immediate (inspection, testing and remediation) and on-going (annual inspection) mitigation measures, potential impacts associated with leaks from the Brady #1-20 would be less than significant.~~ Re-abandonment will be consistent with DOGGR procedures outlined in California Code of Regulations § 1723 et. seq. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measure specified under Impact 3.4-4 on page 3.4-27. Routine surface gas monitoring of this well will continue for the duration of the gas storage operation with immediate notification of the DOGGR in the unlikely event of a leak. WGSI shall prepare a report of investigation and remedial actions taken. This report shall be submitted to the DOGGR prior to initiating gas storage activities in additional storage zones. With the immediate (inspection, | | |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | testing and remediation) and on-going (routine gas detection) mitigation measures, potential impacts associated with leaks from the Brady #1-20 are less than significant. | | |
| | | ~~**Mitigation Measure 3.7-4.** Prior to initiating new gas storage operations, WGSI shall conduct a soil-gas survey in the vicinity around each abandoned well within the storage zone boundaries to define current shallow subsurface gas conditions and document that storage gas is not currently leaking. If soil-gas is detected, samples should be collected for laboratory analysis. Samples would be analyzed to determine if any natural gas collected is of biogenic, thermogenic or storage zone origin. All testing and sampling plans would be submitted to CPUC for review and approval by a qualified member of the technical team (Registered Geologist with appropriate background evaluating soil-gas). If wells are found to be leaking, the leaking well would be remediated in consultation with CPUC and DOGGR.~~ | ~~Less than significant~~ | ~~CPUC, WGSI, DOGGR~~ |
| | | **Mitigation Measure 3.7-~~5~~3.** At the end of each injection cycle, WGSI shall conduct ~~well~~ surface gas monitoring and vegetation inspections~~, testing and leak surveys for each abandoned well in the field.~~ at each abandoned well within the original productive area. If gas is detected, samples ~~should~~ will be collected, if possible, and analyzed to determine its source or origin. ~~Necessary remedial actions~~ | Less than significant | CPUC, WGSI, DOGGR |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | ~~would be implemented to address the leak. All testing and sampling plans would be submitted to CPUC and DOGGR for review and approval by a qualified member of the technical team (Registered Geologist with appropriate background evaluating soil-gas).~~ If a leak is indicated by the data, the necessary remedial actions will be implemented consistent with DOGGR procedures outlined in in California Code of Regulations § 1723 et. seq. All monitoring and sampling results will be submitted to the DOGGR. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measures specified under Impact 3.4-4 on page 3.4-27. | | |
| | | **Mitigation Measure 3.7-~~6~~4.** ~~In addition to regularly scheduled well tests,~~ If routine surface gas monitoring indicates that a well may be leaking (gas bubbles, distressed vegetation), WGSI shall ~~test any well if other indicators or leaks are present (gas bubbles, distressed vegetation) in the immediate well vicinity. WGSI would submit all well test and repair records to DOGGR, CPUC and Butte County. Any well leaks detected would be reported immediately to these agencies. With DOGGR oversight, WGSI would implement appropriate remedial actions to repair detected leaks.~~ report it immediately to the DOGGR and Butte County and | Less than significant | CPUC, WGSI, DOGGR, Butte County Planning Department |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | implement the appropriate remedial actions consistent with DOGGR procedures outlined in California Code of Regulations §1723 et. seq. in consultation with the DOGGR. WGSI shall submit all well remediation and repair records to DOGGR and Butte County. Any surface disturbance associated with implementing remedial actions shall be conducted consistent with the wetland impact minimization and mitigation measures specified under Impact 3.4-4 on page 3.4-27. | | |
| | | **Mitigation Measure 3.7-~~7~~5.** WGSI shall locate each abandoned well within the field and immediate vicinity, and place permanent markers over each one, subject to landowner approvals. WGSI will accurately survey and record these locations and submit plans and maps to the DOGGR~~, CPUC, and Butte County~~. All markers will be maintained so ~~they are clearly visible at all times~~ that they can be located during the duration of storage field activities and upon final field decommissioning. Alternatively, WGSI may conduct a Global Positioning Satellite (GPS) survey to obtain GPS coordinates for each well. WGSI would submit any GPS location survey information to DOGGR. | Less than significant | CPUC, WGSI, DOGGR |
| | **Impact 3.7-3:** Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter | None required. | | |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | mile of an existing or proposed school. | | | |
| | **Impact 3.7-4:** Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment. | None required. | | |
| | **Impact 3.7-5:** Potential for the project to result in a safety hazard for people residing or working in the project area based on a proposed location near an airport. | None required. | | |
| | **Impact 3.7-6:** Potential to expose people or structures to a significant risk of fire or explosion. | ~~**Mitigation Measure 3.7-8.** During periodic well testing and leak surveys, evaluate the area overlying the documented faults along the southern field boundary. This will require installation of at least three permanent soil gas probes. Each probe would be monitored during routine leak surveys. If gas were detected in these probes, samples would be collected and analyzed to determine gas origin. All testing and sampling plans, along with probe design and installation procedures, will be submitted to a qualified member of the CPUC.~~<br><br>~~If storage gas is found leaking through the fault or fracture zone along the southern side of Wild Goose Field, storage activities would be reduced to restrict the volume of gas stored in the field until further investigations are conducted. New data from exploratory wells could be required in order to redefine storage~~ | ~~Less than significant~~ | ~~CPUC, WGSI, DOGGR~~ |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | reservoir boundaries near the fault or fracture zone area. Based on this new data and revised reservoir boundary conditions, allowable storage volumes would be reduced to prevent storage gas from reaching the fault zone and maintain an appropriate level of safety. All studies and remedial actions would be conducted under the supervision of DOGGR and CPUC technical staff (California Registered Geologist) with the appropriate background to evaluate gas migration through fault or fracture zones. | | |
| | | **Mitigation measure 3.7-9:** The standard "monitored and maintained" seismic design approach would accept significant levels of plastic pipe strain for low probability design events and utilize post earthquake review and inspection to identify locations where permanent ground displacement induced (PGD-induced) damage may have occurred. Considering this approach, the Applicant shall prepare (prior to final project approval) a post-earthquake monitoring plan in which an accurate "as-built" base line of the pipeline geometry at/near know seismic hazards will be clearly identified. This plan shall become part of the existing Emergency Plan and will allow rapid response to the most probable damage areas in the event of a severe earthquake. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.7-10:** All of the measures of pipe demand and capacity | Less than significant | CPUC, WGSI |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | ~~considered in Appendix A of the Kleinfelder report (2001e) are based on the failure condition (i.e., the loss of pressure integrity limit state). The loss of pressure integrity condition occurs in the post wrinkling condition, i.e., well beyond the peak in the moment curvature diagram. As the wrinkle forms, the moment capacity decreases with increasing curvature. Pipe curvature tends to concentrate in the wrinkle (sometimes referred to as "hinging") while the pipe on either side of the wrinkle tends to straighten and unload elastically. It is not necessary to account for hinging action in demand-capacity assessments that are limited to consideration of the incipient wrinkling limit state. This is because the concentration of curvature is still relatively limited. For all pipe deformation demand-capacity assessments, which make use of post-wrinkling demand-capacity measures, the Applicant shall account for the concentration of curvature at the wrinkle, because demand analyses, which do not include this hinging behavior, can significantly underestimate the pipe strain demand. The CPUC shall review and approve the analysis methodology in advance of its application to the final design.~~ | | |
| | | ~~**Mitigation Measure 3.7-11:** In addition to the seismic demand required to reach the loss of pressure integrity limit state, for all of the PGD analyses the Applicant shall incorporate into their final~~ | ~~Less than significant~~ | ~~CPUC, WGSI~~ |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | ~~design different "damage" limit states (e.g., incipient wrinkling) that can occur well before the failure limit state is reached. The CPUC shall review and approve the analysis methodology in advance of its application to the final design.~~ | | |
| | | ~~**Mitigation Measure 3.7-12:** The PGD demand analyses for PGD parallel to and perpendicular to the pipe alignment discussed in Appendix A of the Kleinfelder report (2001e) are based on simplified hand or spreadsheet calculations methods. The Applicant shall utilize a rigorous analysis and design approach, nonlinear pipe-soil interaction analysis, for evaluating PGD effects for all but the simplest cases~~. | ~~Less than significant~~ | ~~CPUC, WGSI~~ |
| | | ~~**Mitigation Measure 3.7-13:** Further analysis by the Applicant of generic perpendicular PGD scenarios shall consider a range of soil block lengths (i.e., span lengths) rather than a single span length. The critical span length shall be considered the soil block length that generates the largest strain for given amplitude of a selected PGD profile.~~ | ~~Less than significant~~ | ~~CPUC, WGSI~~ |
| | | ~~**Mitigation Measure 3.7-14:** The Applicant shall provide a more formal limit states seismic design for the final pipeline design. The framework of such a procedure shall include: identification of ultimate and serviceability limit states, application of appropriate load (demand) factors and load combinations, application of appropriate resistance (capacity) factors,~~ | ~~Less than significant~~ | |

| Hazards | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | ~~structural analysis to calculate pipe deformation demand, and a demand-capacity comparison for each limit state of interest.~~ | | |
| | **Impact 3.7-7:** Potential to impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. | **Mitigation Measure 3.7-~~15~~6:** The Applicant shall update the existing Emergency Response Plan to reflect the new project components and operations. The updated plan shall also include specific dates and frequencies with regard to the re-training of existing employees, and the contact with Emergency Services Providers and property owners about the Plan. The update shall indicate the nature and extent of the proper training and indoctrination to ensure effective interaction of all responsible parties in the Plan if an accident were to occur. | Less than significant | CPUC, WGSI |

| Hydrology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | **Impact 3.8-1.** Potential to Substantially Degrade Surface and Groundwater Water Quality | **WGSI Measure 3.8.1.** Provide continuous visual observation of waterway during boring operations. If visual observations indicate possible problems, cease boring operations immediately until conditions are stabilized. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.8-2.** WGSI will submit a list of proposed drilling mud components and additives to DTSC, RWQCB, and DWR for review and receive approval of specific products prior to commencing subsurface boring operations. | Less than significant | CPUC, WGSI, DTSC, RWQCB, DWR |

| Hydrology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | **Mitigation Measure 3.8-1.** In addition to visual observation of waterways, provide continuous monitoring of drilling fluid pressures while advancing each pipeline bore. If fluid pressure changes indicate possible problems, cease boring operations immediately until conditions are stabilized. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.8-2.** No hazardous or potentially hazardous materials shall be permanently stored on-site at the Well Pad Site as noted in the Water Pollution Prevention Plan and Hazardous Materials Release Response Plan for construction and operations. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.8-3.** Prior to project implementation, water samples would be collected from water well number 17N01E-17F01M, located at the Tule Goose Gun Club. Dissolved gases would be analyzed to ascertain if methane is present. If detected, methane would be further analyzed to determine its origin (biogenic, thermogenic or storage gas) to establish baseline conditions. If storage gas were detected, appropriate investigations would be conducted to find the gas leak source and initiate remedial actions as necessary. Water samples would be collected and analyzed for methane annually, as part of the WGSI field monitoring program. Results would be reported to DOGGR, CPUC, RWQCB and DWR. Remedial actions would be implemented as deemed | Less than significant | CPUC, WGSI, DOGGR, RWQCB, DWR |

| Hydrology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | necessary by these State agencies. | | |
| | | **Mitigation Measure 3.8-4.** With regard to buoyant uplift effects, both beam and cable effects shall be included in buoyant uplift calculations. Also, buoyant span lengths other than 100 feet shall be considered. The critical span length is the length that generates the largest strain for a given amplitude of a selected buoyant uplift profile. | Less than significant | CPUC, WGSI |
| | | **Mitigation Measure 3.8-5.** WGSI would obtain appropriate permits from the Board prior to implementing the proposed well pad site expansion project. In addition, WGSI would comply with all requirements defined in CCR, Title 23, Waters, Article 8, Section 135. WGSI would also comply with any permit restrictions or requirements by the Board, for both the proposed project and the existing well pad site. | Less than significant | CPUC, WGSI, State Reclamation Board |
| | **Impact 3.8-2:** Potential to Substantially Deplete Groundwater Supply | **Mitigation Measure 3.8-~~5~~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 de-watering methods, if necessary, to protect local | Less than significant | CPUC, WGSI |

| Hydrology | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | groundwater supplies. The hydrogeological investigation shall be conducted by a California Certified Hydrogeolgist 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. | | |
| | **Impact 3.8-3:** Potential for Flooding or to Place Structures within a 100-year Flood Hazard Area | **Mitigation Measure 3.8-~~6~~7.** ~~The berm around the Well Pad Site shall be designed to withstand exposure to flood water anticipated during~~ Since all equipment at the Well Pad Site is designed to withstand periodic inundation, it is not necessary for the berm to tolerate a 100 year and 500 year event. ~~Berm height shall be sufficiently high to exceed water surge. Berm design shall include measures to protect exposed surfaces from erosion and to minimize water seepage through the berm (internal erosion called piping).~~ As the berm is soley for visual screening and habitat it would be designed and constructed in accordance with guidelines and requirements set by the Reclamation Board, and discussed above in Responses A3-2 and A3-3. | Less than significant | CPUC, WGSI |

| Land Use | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | **Impact 3.9-1:** Physically Divide an Established | None required. | | |

| Land Use | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | Community. | | | |
| | **Impact 3.9-2:** Conformance with Land Use Plans, Policies, and Regulations | None required. | | |
| | **Impact 3.9-3:** Conflict with Habitat Conservation or Natural Community Conservation Plans | None required. | | |

| Noise | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | **Impact 3.10-1:** Potential for exposure to noise levels in excess of standards | **WGSI Measure 3.10-1.** Pipeline operators will notify nearby residents when a blowdown is planned at the Well Pad Site, so they will not be alarmed by the noise or can make plans to be elsewhere while it is occurring. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.10-2.** During the design of the additional compressors 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. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.10-3.** WGSI will reduce the gas pressure/volume in the | Less than significant | CPUC, WGSI |

| Noise | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | 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. | Less than significant | CPUC, WGSI, USFWS |
| | **Impact 3.10-2:** Potential for exposure of people to excessive ground borne vibration | None required. | | |
| | **Impact 3.10-3:** Potential for permanent increase in ambient noise levels | **Refer to mitigation for Impact 3.10-1.** | Less than significant | CPUC, WGSI |
| | **Impact 3.10-4:** Potential for temporary or periodic increase in ambient noise levels | **WGSI Measure 3.10-5.** Limiting construction activities (excluding horizontal directional drilling) 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. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.10-6.** Coordinating construction with residents within 200 feet of the route and accommodating any unique or unusual noise-related situations if possible. | Less than significant | CPUC, WGSI |

| Noise | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | **WGSI Measure 3.10-7.** Ensuring all construction equipment have mufflers no less effective than original equipment and maintained to minimize noise generation. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.10-8.** Changing the location of stationary construction equipment to minimize noise impacts to sensitive receptors where feasible. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.10-9.** Rescheduling construction activities to accommodate specific situations where feasible. | Less than significant | CPUC, WGSI |
| | | **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. | Less than significant | CPUC, WGSI |
| | **Impact 3.10-5:** Exposure of people to excessive noise in areas designated for airport use | None required. | | |
| | **Impact 3.10-6:** Potential exposure of people to excessive noise in the vicinity of a private airstrip | WGSI Measures 3.10-3, 3.10-4, and 3.10-6 through 3.10-9 would mitigate this impact to a less than significant level. | Less than significant | CPUC, WGSI |

| Population and Housing | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.11-1:** Potential for Substantial Population Growth in the Area, Either Directly or Indirectly | None required. | | |
| | **Impact 3.11-2:** Potential to Displace Substantial Numbers of Existing Housing, Necessitating the Construction of Replacement Housing Elsewhere | None required. | | |
| | **Impact 3.11-3:** Potential to Displace Substantial Numbers of People, Necessitating the Construction of Replacement Housing Elsewhere | None required. | | |

| Public Services and Socio-economics | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.12-1:** Potential to Increase the Demand for Public Services in Excess of their Existing and/or Projected Capabilities | None required. | | |
| | **Impact 3.12-2:** Potential To Cause A Substantial Increase In Acceptable Service Ratios, Response Times, Or Other Performance Objectives For All Emergency Response Providers | **Refer to Mitigation Measure 3.15-1** | Less than significant | CPUC, WGSI |
| | **Impact 3.12-3:** Potential To Cause A Quantifiable Reduction in the Value Of Properties Crossed By The Pipeline Or Substantially Impact The Economies Of Those Communities Affected by the Proposed Project | None required. | | |

| Public Services and Socio-economics | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.12-4:** Potential To Result In A Disruption In The Balance Between Employment Opportunities And Available Housing In An Area | None required. | | |

| Transportation | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.14-1:** Potential for Temporary Disruption in Circulation from Project Construction | **WGSI Measure 3.14-1.** Develop and Implement a Transportation Management Plan. WGSI will prepare and implement a comprehensive Transportation Management Plan. The Plan objectives are to minimize transportation-related effects and inconveniences to local residents and farm operations, and to establish a procedure to restore and/or maintain existing access roads to at least preconstruction conditions. The Plan will identify applicable agency requirements, prescribe responsibilities and coordination by and between the agencies, WGSI and the construction contractor, and outline performance requirements for the use of public and private construction access roads and for traffic management. Key implementation measures of the plan include:<br>• Coordinate the timing and route selection for movement of heavy equipment and truck traffic on county roads with the Butte, Sutter, and Colusa County | Less than significant | CPUC, WGSI, Butte, Colusa, Sutter County Public Works Departments, Caltrans |

| Transportation | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
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| | | Road Departments (Public Works) to minimize traffic and physical road impacts.<br>• Conduct a preconstruction assessment of access roads and repair any damage to county roads and bridges or private roads caused by project construction activities and traffic.<br>• Coordinate construction activities with county officials, landowners, and lessees to minimize disruption to local traffic, farming activities and movement of agricultural equipment.<br>• Obtain Encroachment Permits from Butte and Colusa Counties for the pipeline construction activities in or crossing county-maintained roads and restore the sub-base, base, and surface at trenched crossings to pre-project conditions or better.<br>• Provide traffic control at trenched county road crossings as required by Encroachment Permits.<br>• Provide breaks in spoil piles, trench, or pipe strings to accommodate agricultural field access during construction.<br>• Obtain and encroachment permit from Caltrans for crossings of the State Route 45 and Interstate 5 which will address specific boring | | |

| Transportation | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | techniques and pipeline design requirements. | | |
| | **Impact 3.14-2:** Temporary Increase in Traffic in the Project Area During Construction | None required. | | |
| | **Impact 3.14-3:** Potential for Interference with Emergency Response Routes and Accesses | **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. | Less than significant | CPUC, WGSI, Butte, Colusa, Sutter County Public Works, Local Fire Departments and Paramedics, Local Sheriff Departments, California Highway Patrol, Caltrans |
| | **Impact 3.14-4:** Potential for Increase in Traffic During Project Operation | **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, | Less than significant | CPUC, WGSI |

| Transportation | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | | identify a road maintenance schedule, and determine types of repairs necessary on an ongoing basis. | | |

| Utilities | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.15-1:** Potential to Exceed Wastewater Treatment Requirements | None required | | CPUC, WGSI, RWQCB |
| | **Impact 3.15-2.** Potential for Construction/Expansion of Water or Wastewater Treatment Facilities | None required. | | |
| | **Impact 3.15-3.** Potential for Construction/Expansion of Storm Drainage | **WGSI Measure 3.15-1.** Following pipeline construction, all disturbed surfaces would be returned to their pre-construction elevation and slope. Above-ground facilities would be covered with gravel to allow storm water infiltration and directed flow of runoff to existing drainage ways. | Less than significant | CPUC, WGSI, RWQCB |
| | | **WGSI Measure 3.15-2.** The temporary construction access ramps installed on the levee face would be removed following construction and the levee face would be returned to its preconstruction configuration and appearance. | Less than significant | CPUC, WGSI |
| | | **WGSI Measure 3.15-3.** Following construction, agricultural fields would be surveyed and regraded to their original elevation where needed and all rice fields dikes and check boxes would be repaired and/or replaced. | Less than significant | CPUC, WGSI |
| | **Impact 3.15-4.** Sufficient Water Supply | None required. | | |

| Utilities | Impact | Mitigation Measure | Level of Significance w/ Mitigation | Responsible Party |
|---|---|---|---|---|
| | **Impact 3.15-5.** Adequate wastewater treatment, septic system, and pumper and hauler service capacity | **Mitigation Measure 3.15-1.** WGSI shall coordinate with local (within Butte and Colusa County) wastewater treatment facilities to ensure adequate treatment capacity would be provided for the project if necessary. This would occur if the water produced from hydrostatic testing does not meet RWQCB General Permit standards for Dewatering and Other Low Threat Discharge to Surface Water. | Less than significant | CPUC, WGSI, RWQCB |
| | **Impact 3.15-6.** Adequate Capacity for Solid Waste Disposal | None required. | | |
| | **Impact 3.15-7.** Compliance with Solid Waste Regulations and Statutes | None required. | | |